INSTRUCTION, RESEARCH, AND STUDENT AFFAIRS
FEBRUARY 18, 2016

TAB	DESCRIPTION	ACTION
1	**HIGHER EDUCATION RESEARCH COUNCIL AND STATEWIDE PLAN FOR HIGHER EDUCATION AND RESEARCH ANNUAL UPDATE**	Information Item
2	**BOARD POLICY III.P. STUDENTS – FIRST READING**	Motion to Approve
3	**BOISE STATE UNIVERSITY – PH.D IN ECOLOGY, EVOLUTION AND BEHAVIOR**	Motion to Approve
4	**UNIVERSITY OF IDAHO – MASTER OF PUBLIC ADMINISTRATION, ONLINE FEE REQUEST**	Motion to Approve
5	**UNIVERSITY OF IDAHO – MASTER OF LAWS PROPOSAL**	Motion to Approve
6	**UNIVERSITY OF IDAHO – BACHELOR OF SCIENCE, SOCIOLOGY, CRIMINOLOGY EMPHASIS ONLINE**	Motion to Approve

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SUBJECT

Higher Education Research Council and Statewide Strategic Plan for Higher Education Research Annual Update

REFERENCE

April 2010	The Board was provided with a summary of the Statewide Strategic Plan for Higher Education Research
October 2010	The Board was provided with an update of the progress made toward the development of the Statewide Strategic Plan for Higher Education Research
December 2011	Board approved the Statewide Strategic Plan for Higher Education Research
December 2012	The Board was updated on the progress made in the Higher Education Research Strategic Plan
December 2013	The Board was updated on the progress made in the Higher Education Research Strategic Plan and received the annual report of the Higher Education Research Council
October 2014	The Board was provided the Performance Measure Report for the Higher Education Research Strategic Plan.
February 2015	The Board approved changes to the Higher Education Research Strategic Plan
October 2015	The Board was provided the Performance Measure Report for the Higher Education Research Strategic Plan

APPLICABLE STATUTE, RULE, OR POLICY

Idaho State Board of Education Governing Policies and Procedures, Section III.W., Higher Education Research

BACKGROUND/DISCUSSION

Board Policy III.W, Higher Education Research, recognizes the significant role research plays in innovation, economic development and enhanced quality of educational programs. By developing and leveraging the State's unique research expertise and strengths, Idaho's universities and college serve as catalyst to spur the creation of new knowledge, technologies, products and industries. This in turn leads to new advances and opportunities for economic growth.

The Board's Higher Education Research Council (HERC) provides recommendations to the Board regarding statewide collaborative efforts and initiatives to accomplish these goals and objectives. In addition, HERC provides direction for and oversees the use of the limited resources provided by the Legislature for research by promoting research activities that will have the greatest beneficial effect on the quality of education and the economy of the State.

The Statewide Strategic Plan for research assists in the identification of research areas that will enhance the economy of Idaho through the collaboration of academia, industry, and government and are in alignment with identified areas of

strength at our public universities. The Research Strategic Plan was first approved by the Board in December 2011. The Board has received annual performance measure reports each year. Based on the performance measure reporting of the original strategic plan HERC recommended and the Board approved changes to the plan in February 2015.

The plan represents the role Idaho's research universities play in driving innovation, economic development, and enhancing the quality of educational programs in strategic areas. The plan identifies areas of strength among Idaho's research universities; research challenges and barriers facing the universities; research opportunities Idaho should capitalize upon to further build its research base, goals to build the research pipeline through engaging undergraduate students, and steps for achieving the research vision for Idaho's universities. Additional responsibilities of HERC include the management of the Incubation Fund and HERC IGEM Fund programs, disbursement of Infrastructure Funds and the matching funds for our Idaho EPSCoR Track 1 project (Managing Idaho's Landscapes for Ecosystem Services). Additional responsibilities include receiving annual reporting on the institutions activities in relation to the Center for Advanced Energy Studies (CAES).

Incubation Fund projects are single-year projects that are at the proof-of-concept stage. Through a competitive process, the Council awards funds to those projects where the Principal Investigator can rapidly move their project into the development stage. IGEM Fund projects are those that are designed to develop spin-off companies. While these awards may be for up to three years, the funding is contingent upon successful progress as determined by the Council at an annual review of the project.

CAES is a research and education consortium between the Idaho National Laboratory, the University of Wyoming, and the three Idaho public research institutions: Boise State University, Idaho State University, and the University of Idaho.

Dr. Mark Rudin, the current chair of HERC, will provide the Board with the Council's annual update, including an update on CAES activities.

IMPACT

Taking a strategic approach to invest in the state's unique research expertise and strengths will lead to new advances and opportunities for economic growth and enhance Idaho's reputation as a national and international leader in excellence and innovation. This update will provide the Board with the opportunity to provide HERC, through the Council's Chair, input on areas of focus or strategic direction.

ATTACHMENTS

Attachment 1 – Statewide Strategic Plan for Higher Education Research Page 5
Attachment 2 – FY15 Performance Measure Report Page 13

Attachment 3 – FY15 Research Activity Report Page 17
Attachment 4 – FY15 Infrastructure Summary Report Page 21
Attachment 5 – HERC FY16 Budget Allocation Page 23
Attachment 6 – FY16 Incubation Fund Summaries Page 25
Attachment 7 – FY16 IGEM Fund Summaries Page 41
Attachment 8 – CAES 2015 Annual Report Page 53

STAFF COMMENTS AND RECOMMENDATIONS

In addition to the responsibility for the creation of the state's Higher Education Research Strategic plan the Council is responsible for approximately $3.9M in funds used for the mission of HERC and to incentivize industry and institution research partnerships. Attachment 2 is the October 2015 performance measure report, Attachment 3, is the research institutions annual research activity reports, Attachment 4 summarizes the funding categories that HERC is authorized by the Board to allocate funds for, Attachment 5 outlines HERC's FY16 budget allocation, and Attachments 6 and 7 are summaries of the projects funded by HERC in FY16. Attachment 8 is the CAES 2015 annual report.

The strategic plan is monitored annually and updated as needed based on the work of HERC and direction from the Board. HERC uses a competitive process for distributing funds from the Incubation Fund category and the HERC IGEM Fund category. All proposals that are considered must be in alignment with the Board's Higher Education Research Strategic Plan.

BOARD ACTION

This item is for informational purposes only. Any action will be at the Board's discretion.

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STRATEGIC RESEARCH PLAN FOR IDAHO HIGHER EDUCATION

(2016-2020)

Submitted by: Idaho State Board of Education
& Higher Education Research Council

Approved February 2015

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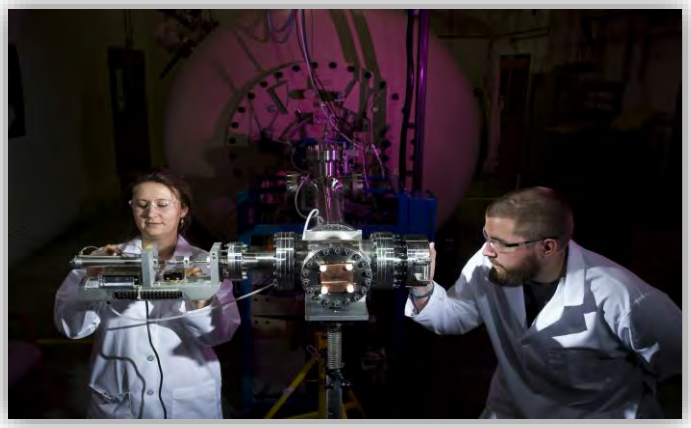
EXECUTIVE SUMMARY

Research is being increasingly acknowledged by industry, government and education as a key factor in the future economic vitality of Idaho. The universities and colleges of Idaho's system of higher education understand the need for greater collaboration in order to be competitive in today's global environment. Recognizing the need to focus on and emphasize existing strengths and opportunities in Idaho's research community, the vice presidents of research and economic development developed the following statewide strategic plan for research to ensure the greatest potential for achieving a vital and sustainable research base for Idaho. The strategic plan identifies the key research areas that will become the focal points for research and economic development through partnering among academia, industry and government in science, technology, and creative activity.

Research is fundamental to the mission of a university due to its role in knowledge discovery and in providing new ideas for technology commercialization via patents, copyright, licenses and startup companies. University faculty who engage in research and creative activity are at the leading edge of their respective fields. Research also enhances the national reputation of the faculty and the universities. These faculty and their vibrant research programs attract the best graduate and undergraduate students by providing unique cutting-edge learning experiences in their research laboratories, studios, field sites and classrooms. On the most basic level, research strengthens a university's primary product — innovative, well-educated students ready to enter a competitive workforce.



Research is the foundation of a university's economic development role. The influx of research dollars from external grants and contracts creates new jobs at the university,

along with the attendant purchases of supplies, services, materials and equipment. The results of the research are new knowledge, new ideas, and new processes, which lead to patents, startup companies, more efficient businesses as well as a highly trained workforce prepared to tackle 21st century challenges.

Idaho's research universities have strengths and opportunities for economic development in 1) Energy, 2) Natural Resource Utilization and Conservation, 3) Biosciences, 4) Novel Materials and 5) Software Engineering.

By focusing collaborative efforts in these areas, the research universities will expand research success by:

- Helping Idaho institutions focus on their research strengths;
- Creating research and development opportunities that build relationships between universities and the private sector;
- Contributing to the economic development of the State of Idaho;
- Enhancing learning and professional development through research and scholarly activity; and
- Building and improving the research infrastructure of Idaho universities to meet current and future research needs.

This statewide Strategic Research Plan for Idaho Higher Education is a tool for identifying and attaining quantifiable goals for research and economic growth and success in Idaho. The plan will be reviewed and updated annually as needed amid the fast-changing pace of research discovery.

VISION

Idaho's public universities will be a catalyst and engine to spur creation of new knowledge, technologies, products and industries that lead to advances and opportunities for economic growth and enhance the quality of life in Idaho and the nation.

MISSION

The research mission for Idaho's universities is to develop a sustainable resource base by:

- Identifying, recruiting and retaining top faculty with expertise in key research areas;
- Building research infrastructure including facilities, instrumentation, connectivity and database systems to support an expanding statewide and national research platform;
- Attracting top-tier students to Idaho universities at the undergraduate and graduate levels and providing outstanding education and research opportunities that will prepare them to excel in future careers;
- Raising awareness among state, national and international constituencies about the research excellence and capabilities of Idaho's universities by developing and implementing targeted outreach, programs and policies; and
- Collaborating with external public, private, state and national entities to further the shared research agenda for the state, thereby promoting economic and workforce development and addressing the needs and challenges of the state, region and nation.

GOALS AND OBJECTIVES

Goal 1: Increase research at, and collaboration among, Idaho universities and colleges to advance areas of research strength and opportunity.

Objective 1.A: Ensure growth and sustainability of public university research efforts.

Performance Measure 1.A.1: Statewide amount of total annual research and development expenditures as reported in the National Science Foundation (NSF) Higher Education Research and Development Survey. Benchmark: 10% increase per year.

Objective 1.B: Ensure the growth and sustainability of the existing collaborative research at the Center for Advanced Energy Studies (CAES).

Performance Measure 1.B.1: Statewide amount of U.S. Department of Energy (DOE) research and development expenditures as reported in the National Science Foundation (NSF) Higher Education Research and Development Survey. Benchmark: 10% increase per year.

Objective 1.C: Expand joint research ventures among the state universities.

Performance Measure 1.C.1: Number of new fully sponsored project proposals submitted by an Idaho University that involve a subaward with another Idaho institution of higher education (in either direction). Benchmark: 50% increase per year.

Performance Measure 1.C.2: Number of new fully sponsored project awards to an Idaho University that involve a subaward with another Idaho institution of higher education (in either direction). Benchmark: 30% increase per year.

Goal 2: Create research and development opportunities that strengthen the relationship between state universities and the private sector.

Objective 2.A: Increase the number of sponsored projects involving the private sector.

Performance Measure 2.A.1: Number of new sponsored projects involving the private sector. Benchmark: 50% increase per year.

Goal 3: Contribute to the economic development of the State of Idaho.

Objective 3.A: Increase the amount of university-generated intellectual property introduced into the marketplace.

Performance Measure 3.A.1: Number of technology transfer agreements (as defined by AUTM [Association of University Technology Managers]). Benchmark: 15% increase per year.

Performance Measure 3.A.2: Number of invention disclosures (including plant varieties). Benchmark: 1 for every $2M of research expenditures.

Performance Measure: 3.A.3: Amount of licensing revenues. Benchmark: 10% increase per year.

Objective 3.B: Increase the number of university startup companies (include startups outside of Idaho).

Performance Measure 3.B.1: Number of startup companies. Benchmark: 10% increase per year.

Goal 4: Enhance learning and professional development through research and scholarly activity.

Objective 4.A: Increase the number of university and college students and staff involved in sponsored project activities.

Performance Measure 4.A.1: Number of undergraduate and graduate students paid from sponsored projects. Benchmark: 20% increase per year.

Performance Measure 4.A.2: Percentage of baccalaureate students who graduated in STEM disciplines and had a research experience. Benchmark: 20% increase per year.

Performance Measure 4.A.3: Number of faculty and staff paid from sponsored projects. Benchmark: 20% increase per year.

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Performance Measure	FY 2012	FY 2013	FY 2014	FY 2015
Statewide amount of total annual research and development expenditures as reported in the National Science Foundation (NSF) Higher Education Research and Development Survey	$125,146,923.76	$121,580,993.00	$142,771,851.00	Not reported unitl January 2016
Statewide amount of U.S. Department of Energy (DOE) research and development expenditures as reported in the National Science Foundation (NSF) Higher Education Research and Development Survey.	$10,760,704.00	$10,262,639.00	$13,545,198.00	Not reported unitl January 2016
Number of new fully sponsored project proposals submitted by an Idaho University that involve a subaward with another Idaho institution of higher education (in either direction).	75	106	77	69
Number of new fully sponsored project awards to an Idaho University that involve a subaward with another Idaho institution of higher education (in either direction).	53	48	53	42
Number of new sponsored projects involving the private sector.	92	108	183	133
Number of technology transfer agreements (as defined by AUTM [Association of University Technology Managers]).	20	28	34	50
Number of invention disclosures (including plant varieties)	55	43	47	29
Amount of licensing revenues.	$478,891	$404,153	$1,192,007	$441,071
Number of startup companies.	0	3	0	0
Number of undergraduate students paid from sponsored projects.	1,746	1,698	1,383	1,699
Number of graduate students paid from sponsored projects.	710	699	860	648
Percentage of baccalaureate students who graduated in STEM disciplines and had a research experience.				
Number of faculty and staff paid from sponsored projects.	2,113	2,310	2,050	2,375
K-20 Statewide Stratgic Plan Performance Measures				
Percentage of students participating in undergraduate research.				
Total amount of research expenditures	81,614,760	75,244,872	73,726,315	101,830,918
Institution expenditures from competitive Federally funded grants	$91,023,902	$89,099,167	$81,951,549	$106,047,448
Institution expenditures from competitive industry funded grants	$9,337,536	$9,253,841	$7,748,543	$7,389,079
Measure of production of intellectual property:				
Number of startups	0	3	0	0
Number of patents	5	32	13	10
Number of student internships	2,345	2,479	2,109	2,090

Performance Measure	FY 2012	FY2013	FY 2014	FY2015
Statewide amount of total annual research and development expenditures as reported in the National Science Foundation (NSF) Higher Education Research and Development Survey (See Note B below)	$97,226,924	$95,890,993	$95,593,851	Not available, report due January 2016
Statewide amount of U.S. Department of Energy (DOE) research and development expenditures as reported in the National Science Foundation (NSF) Higher Education Research and Development Survey.	$6,448,704	$6,106,639	$4,613,198	Not available, report due January 2016
Number of new fully sponsored project proposals submitted by an Idaho University that involve a subaward with another Idaho institution of higher education (in either direction).	24	47	24	25
Number of new fully sponsored project awards to an Idaho University that involve a subaward with another Idaho institution of higher education (in either direction).	19	20	10	14
Number of new sponsored projects involving the private sector (see Note A below).	53	69	68	57
Number of technology transfer agreements (as defined by AUTM [Association of University Technology Managers]).	5	6	7	11
Number of invention disclosures (including plant varieties)	28	16	18	14
Amount of licensing revenues.	$442,875	$366,571	$1,156,407	$419,596
Number of startup companies.	0	2	0	0
Number of undergraduate students paid from sponsored projects.	661	572	489	575
Number of graduate students supported by sponsored projects	503	453	488	574
Percentage of baccalaureate students who graduated in STEM disciplines and had a research experience.	73.30%	76.68%	65.87%	63.29%
Number of faculty and staff paid from sponsored projects.	1,202	1,208	1,153	1,175
K-20 Statewide Strategic Plan Performance Measures				
Percentage of students participating in undergraduate research.	74.42 %	73.95%	66.8%	65.9%
Total amount of research expenditures	$59,783,877	$57,426,119	$56,385,826	$54,955,421
Institution expenditures from competitive Federally funded grants	$70,413,770	$67,910,558	$64,567,276	$63,565,943
Institution expenditures from competitive industry funded grants (see Note A below).	$6,805,705	$7,322,692	$5,674,316	$5,422,896
private sector	1,372,564	1,898,229	1,452,711	1,527,156
private sector federal flow through	5,433,141	5,424,463	4,221,605	3,895,740
Measure of production of intellectual property:				
Number of startups	0	2	0	0
Number of patents	2	23	7	7
Number of student internships	1,740	1,784	1,326	764

Performance Measure Explanatory Notes:

Note A - Number of proposed sponsored projects with private sector - (a) is funding from private sector, and (b) is funding from private sector, federal flow through.

Note B - The FY15 NSF Survey has not been submitted yet, it will be completed in January 2016.

	2012	2013	2014	2015
Institution expenditures from competitive industry funded grants (see Note A).	$1,372,564 (a); $5,433,141 (b)	$1,898,229 (a); $5,424,463 (b)	$1,452,711 (a); $4,221,605 (b)	$1,527,156 (a); $3,895,740 (b)

	2012	2013	2014	2015
Number of new sponsored projects involving the private sector (see Note A).	53	53 (a); 16 (b)	53 (a); 15 (b)	45 (a); 12 (b)

Performance Measure	FY 2012	FY2013	FY 2014	FY 2015
Statewide amount of total annual research and development expenditures as reported in the National Science Foundation (NSF) Higher Education Research and Development Survey	$27,920,000	$25,690,000	$26,568,000	
Statewide amount of U.S. Department of Energy (DOE) research and development expenditures as reported in the National Science Foundation (NSF) Higher Education Research and Development Survey.	4,312,000	4,156,000	4,307,000	
Number of new fully sponsored project proposals submitted by an Idaho University that involve a subaward with another Idaho institution of higher education (in either direction). [1]	26	30	33	26
Number of new fully sponsored project awards to an Idaho University that involve a subaward with another Idaho institution of higher education (in either direction).[2]	16	12	21	15
Number of new sponsored projects involving the private sector. [3]	17	19	22	22
Number of technology transfer agreements (as defined by AUTM [Association of University Technology Managers]).	15	22	27	38
Number of invention disclosures (including plant varieties)	25	24	16	15
Amount of licensing revenues.*	$36,016	$37,582	$35,600	$21,475
Number of startup companies.	0	1	0	0
Number of undergraduate students paid from sponsored projects.	900	916	607	807
Number of graduate students supported by sponsored projects. **				
Percentage of baccalaureate students who graduated in STEM disciplines and had a research experience.**				
Number of faculty and staff paid from sponsored projects.	661	597	651	676
K-20 Statewide Stratgic Plan Performance Measures				
Percentage of students participating in undergraduate research.	28.50%	31.10%	29%	29.40%
Total amount of research expenditures	$21,830,883	$17,818,753	$17,340,489	$20,613,353
Institution expenditures from competitive Federally funded grants	$20,610,132	$21,188,609	$17,384,273	$21,042,684
Institution expenditures from competitive industry funded grants	$2,531,831	$1,931,149	$2,074,227	$1,966,183
private sector	$395,419	$215,244	$134,010	$266,467
private sector federal flow through	$2,136,412	$1,715,905	$1,940,217	$1,699,716
Measure of production of intellectual property:				
Number of startups	0	1	0	0
Number of patents	2	7	6	3
Number of Student internships [4]	398	449	411	438

[1] Represents the number of full proposal submissions that involved a financial relationship with another Id
[2] Represents the number of new awards that involved a financial relationship with another Idaho institutio
[3] Represents the number of new awards that involved a financial relationship with the private sector.
[4] Internship information is based on estimates by academic year (e.g., FY09=Academic year Summer 2008 t

* 2012, 2013, 2014 - Licensing revenue includes $30k/year for Micron Licensing Restriction Agreement and is not considered net for OTT.
**Undergraduate and Graduate student totals have been combined into one line as BSU does not have the ability to break this information out.

	2012	2013	2014	2015
Institution expenditures from competitive industry funded grants	a. $395,419.37 b. 2,136,411.87	a. $215,243.91 b. $1,715,905.10	a. $134,009.76 b. $1,940,216.83	a. $266,467.06 b. $1,699,715.80

	2012	2013	2014	2015
Number of new sponsored projects involving the private sector. [3]	17	19	a) 10; b) 12	a) 10; b) 12

Performance Measure	FY 2012	FY 2013	FY 2014	FY 2015
Statewide amount of total annual research and development expenditures as reported in the National Science Foundation (NSF) Higher Education Research and Development Survey			$20,610,000	
Statewide amount of U.S. Department of Energy (DOE) research and development expenditures as reported in the National Science Foundation (NSF) Higher Education Research and Development Survey.			$4,625,000	
Number of new fully sponsored project proposals submitted by an Idaho University that involve a subaward with another Idaho institution of higher education (in either direction).	25	29	20	18
Number of new fully sponsored project awards to an Idaho University that involve a subaward with another Idaho institution of higher education (in either direction).	18	16	22	13
Number of new sponsored projects involving the private sector.	22	20	93	54
Number of technology transfer agreements (as defined by AUTM [Association of University Technology Managers]).				1
Number of invention disclosures (including plant varieties)	2	3	13	0
Amount of licensing revenues.	0	0	0	0
Number of startup companies.	0	0	0	0
Number of undergraduate students paid from sponsored projects.	185	210	287	317
Number of graduate students supported by sponsored projects	207	246	372	74
Percentage of baccalaureate students who graduated in STEM disciplines and had a research experience.				71%
Number of faculty and staff paid from sponsored projects.	250	505	246	524
K-20 Statewide Stratgic Plan Performance Measures				
Percentage of students participating in undergraduate research.				41%
Total amount of research expenditures				$26,262,144
Institution expenditures from competitive Federally funded grants				$21,438,821
Institution expenditures from competitive industry funded grants				
Measure of production of intellectual property:				
Number of startups	0	0	0	0
Number of patents	1	2	0	0
Number of Student internships	207	246	372	888

Performance Measure Explanatory Notes:

# of student internships - data are from the Career Placement Internship Program (CPI) that was started in FY2011. Internships arranged by the student are not tracked by the university. Also includes numbers from the Job Location and Development Report.

	2012	2013	2014	2015
Biology - PhD	8	7	0	0
Microbiology - PhD	5	1	0	0
Engineering & Applied Science - PhD	3	6	0	0
Nuclear Science & Eng'g - PhD	2	0	0	0
Applied Physics - PhD	3	5	0	0
Mathematics	4	2	0	0
Chemistry	6	4	0	0
Geology	9	5	0	0
Physics	6	0	0	0
Environmental Engineering	2	1	0	0
Environmental Science & Mgmt	2	1	0	0
Measurement & Control Engineering	4	6	0	0
Nuclear Science & Engineering	8	8	0	0
Civil Engineering	6	3	0	0
Mechanical Engineering	1	4	0	0
Geographic Information Science	9	7	0	0
Microbiology	0	6	0	0
Biology	2	14	0	0
Physics/Health Physics	3	20	0	0
Applied Nuclear Certificate	2	2	0	0
Post-Bacc. Cert. in Geotechnology	5	2	0	0
	90	104	0	2015

Sponsored Project Activity Report
FY2015

Awards for the Period July 1, 2014 through June 30, 2015

Activity Type	Federal	State	Industry	Other	Total	% of Grand Total
Instruction:						
Sponsored Programs	$ 2,211,390	$ 3,421,715	$ -	$ 9,750	$ 5,642,855	
Subtotal Instruction	$ 2,211,390	$ 3,421,715	$ -	$ 9,750	$ 5,642,855	14.05%
Research:						
Sponsored Programs	$ 20,567,228	$ 704,165	$ 269,118	$ 883,402	$ 22,423,913	
Construction	$ -	$ -	$ -	$ -	$ -	
State Research Appropriations	$ -	$ 365,700	$ -	$ -	$ 365,700	
Subtotal Research	$ 20,567,228	$ 1,069,865	$ 269,118	$ 883,402	$ 22,789,613	56.74%
Other Sponsored Activities:						
Sponsored Programs	$ 8,258,181	$ 1,971,984	$ 3,484	$ 1,500,938	$ 11,734,587	
Construction	$ -	$ -	$ -	$ -	$ -	
Subtotal Other Sponsored Activities	$ 8,258,181	$ 1,971,984	$ 3,484	$ 1,500,938	$ 11,734,587	29.21%
Grand Totals	**$ 31,036,799**	**$ 6,463,564**	**$ 272,602**	**$ 2,394,090**	**$ 40,167,055**	
Percent of Grand Total	***77.27%***	***16.09%***	***0.68%***	***5.96%***	***100%***	***100%***

Expenditures for the Period July 1, 2014 through June 30, 2015

Activity Type	Federal	State	Industry	Other	Totals	% of Grand Total
Instruction:						
Sponsored Programs	$ 3,020,641.99	$ 1,321,178.83	$ -	$ 927,858.38	$ 5,269,679.20	14.42%
Research:						
Sponsored Programs	$ 18,440,619.06	$ 1,006,076.73	$ 258,892.41	$ 907,764.55	$ 20,613,352.75	
Construction	$ -	$ -	$ -	$ -	$ -	
State Research Appropriations	$ -	$ 294,837.01	$ -	$ -	$ 294,837.01	
Subtotal Research	$ 18,440,619.06	$ 1,300,913.74	$ 258,892.41	$ 907,764.55	$ 20,908,189.76	57.23%
Other Sponsored Activities:						
Sponsored Programs	$ 6,889,844.47	$ 826,848.67	$ 7,574.65	$ 2,234,123.71	$ 9,958,391.50	
Construction	$ 345,967.99	$ -	$ -	$ -	$ 345,967.99	
State Other Sponsored Activities Appropriations	$ -	$ 50,672.27	$ -	$ -	$ 50,672.27	
Subtotal Other Sponsored Activities	$ 7,235,812.46	$ 877,520.94	$ 7,574.65	$ 2,234,123.71	$ 10,355,031.76	28.34%
Grand Totals	**$ 28,697,073.51**	**$ 3,499,613.51**	**$ 266,467.06**	**$ 4,069,746.64**	**$ 36,532,900.72**	
Percent of Grand Total	***78.55%***	***9.58%***	***0.73%***	***11.14%***	***100%***	***100%***

University of Idaho - FY2015 Research Activity Report

Awards for the Period July 1, 2014 through June 30, 2015

	Federal	State	Industry	Other	Total	% of Grand Total	% of Sponsor Total
Instruction:							
Sponsored Programs	$ 2,172,163.00	$ 463,026.00	$ 57,789.15	$ 1,281,676.75	$ 3,974,654.90		**5.52%**
	$ 2,172,163.00	$ 463,026.00	$ 57,789.15	$ 1,281,676.75	$ 3,974,654.90	**3.73%**	
Research:							
Sponsored Programs	$ 41,930,169.11	$ 1,729,165.00	$ 1,656,584.78	$ 4,255,850.70	$ 49,571,769.59		**68.90%**
Federal Land Grant Appropriations (FFY15)	2,742,323.00				2,742,323.00		
State Research/Endowment Appropriations		19,202,167.63			19,202,167.63		
Subtotal Research:	$ 44,672,492.11	$ 20,931,332.63	$ 1,656,584.78	$ 4,255,850.70	$ 71,516,260.22	**67.19%**	
Public Service:							
Sponsored Programs	$ 15,420,014.54	$ 1,830,217.53	$ 170,500.00	$ 980,376.44	$ 18,401,108.51		**25.58%**
Federal Land Grant Appropriations (FFY15)	2,938,282.00				2,938,282.00		
State Extension Appropriations		9,601,785.64			9,601,785.64		
Subtotal Public Service:	$ 18,358,296.54	$ 11,432,003.17	$ 170,500.00	$ 980,376.44	$ 30,941,176.15	**29.07%**	
Construction:							
Sponsored Programs	-	-	-	-	-	**0.00%**	**0.00%**
Total Sponsored Programs Funding	**$ 59,522,346.65**	**$ 4,022,408.53**	**$ 1,884,873.93**	**$ 6,517,903.89**	**$ 71,947,533.00**		
Percent of Total Sponsored Programs	***82.73%***	***5.59%***	***2.62%***	***9.06%***	***100%***		***100%***
Grand Total of All Funding Per Category	**$ 65,202,951.65**	**$ 32,826,361.80**	**$ 1,884,873.93**	**$ 6,517,903.89**	**$ 106,432,091.27**		
Percent of All Funding	***61.26%***	***30.84%***	***1.77%***	***6.13%***	***100%***	***100%***	

Expenditures for the Period July 1, 2014 through June 30, 2015

	Federal	State	Industry	Other	Institutional	Total	% of Grand Total	% of Sponsor Total
Instruction:								
Sponsored Programs	$ 2,372,264.90	$ 88,120.55	$ 46,206.79	$ 108,475.44	$ 502,761.46	$ 3,117,829.14		**3.63%**
Other Sources		-			8,956.68	8,956.68		
	$ 2,372,264.90	$ 88,120.55	$ 46,206.79	$ 108,475.44	$ 511,718.14	$ 3,126,785.82	**2.36%**	
Research:								
Sponsored Programs	$ 47,485,464.86	$ 1,479,285.37	$ 1,580,934.86	$ 4,236,144.05	$ 8,345,418.55	$ 63,127,247.69		**73.48%**
Sponsored ARRA Stimulus Funding	(10.57)					(10.57)		**0.00%**
Federal Land Grant Appropriations	3,073,659.74					3,073,659.74		
State Research Appropriations		18,657,901.74				18,657,901.74		
State Endowment/Other Appropriations		3,899,837.27				3,899,837.27		
Other Sources			164,444.03	1,837,945.10	6,731,799.55	8,734,188.68		
Subtotal Research:	$ 50,559,114.03	$ 24,037,024.38	$ 1,745,378.89	$ 6,074,089.15	$ 15,077,218.10	$ 97,492,824.55	**73.59%**	
Public Service:								
Sponsored Programs	$ 14,412,476.60	$ 1,536,187.58	$ 106,212.78	$ 903,126.86	$ 2,711,182.17	$ 19,669,185.99		**22.89%**
Federal Land Grant Appropriations	2,433,042.18					2,433,042.18		
State Extension Appropriations		9,634,934.69				9,634,934.69		
Other Sources					129,422.72	129,422.72		
Subtotal Public Service:	$ 16,845,518.78	$ 11,171,122.27	$ 106,212.78	$ 903,126.86	$ 2,840,604.89	$ 31,866,585.58	**24.05%**	
Construction:								
Sponsored Programs	$ -	$ -	$ -	$ -	$ -	$ -	**0.00%**	**0.00%**
Total Sponsored Programs Funding & ARRA Funding Only	$ 64,270,195.79	$ 3,103,593.50	$ 1,733,354.43	$ 5,247,746.35	$ 11,559,362.18	$ 85,914,252.25		
Percent of Total Sponsored Programs	***75%***	***4%***	***2%***	***6%***	***13%***	***100%***		**100%**
Grand Total of All Funding Per Category	$ 69,776,897.71	$ 35,296,267.20	$ 1,897,798.46	$ 7,085,691.45	$ 18,429,541.13	$ 132,486,195.95	**100%**	
Percent of All Funding	***53%***	***27%***	***1%***	***5%***	***14%***	***100%***		

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Idaho State University
Office for Research Economic Development
Award Breakdown by Funding Agency Type and Project Type
July 1, 2013 through June 30, 2014

	Federal	State	Industry	Other/Foundation	Totals	Percent of Total
Research	5,286,427	2,725,181	2,414,069	558,146	10,983,823	44%
Training and Instruction	2,226,133	3,421,915	1,459,114	684,240	7,791,402	31%
Other/Public Service	874,194	4,384,868	321,910	666,137	6,247,109	25%
Totals	8,386,754	10,531,964	4,195,093	1,908,523	25,022,334	100%
Percent of Total	34%	42%	17%	8%	100%	

File Name: ISU ORED Annual Awards FY14_final

IDAHO STATE UNIVERSITY

8/22/2014

SPONSORED PROJECT EXPENDITURE REPORT
FY2014

Expenditures for the Period July 1, 2013 through June 30, 2014

	Federal	State	Industry	Other	Totals	
Training and Instruction	$5,494,480	$1,032,060	$223,607	$261,629	$7,011,776	28%
Research	$11,098,032	$510,185	$583,015	$449,807	$12,641,039	51%
Other/Public Service	$4,723,582	$151,137	$345,807	$80,409	$5,300,935	21%
Totals	$21,316,093	$1,693,383	$1,152,429	$791,845	$24,953,750	
Percent of Total	85%	7%	5%	3%	100%	100%

Boise State University's Infrastructure funds went towards the following areas:

Structures for Research Seed Funding	$16,194.49
Salary/Fringe for Tech Transfer Director/Patent Officer:	$108,953
TOTAL:	**$125,147.49**

Idaho State University's Infrastructure funds went towards the following areas:

Graduate Research Assistantships/Research Associates	$25,000
Flow Cytometer Upgraded Analytical - Fragment Analysis	$55,006
Other/Research Infrastructure Support	$70,000
TOTAL:	**$150,006**

Lewis-Clark State College Infrastructure funds went towards the following areas:

Technician Support	$11,037
Other	$3,000
TOTAL:	**$14,037**

Lewis-Clark reported 3 publications in refereed journals in reference to Workforce Training. There was a total of 7 presentations at professional meetings and conferences reported, with 1 grant received as a result of these presentations. There are a total of 2 grants pending as a result of these infrastructure funding. There was a total of 63 students, and 72 faculty involved as participants in these infrastructure funds. To conclude, a total of 2 manuscripts have been submitted.

University of Idaho Infrastructure funds went towards the following areas:

Library Support	$94,005
Post Doctoral Fellows	$16,063
Technician Support	$77,714
Star-Up Funds for New Hires	$21,442
Other	$1,239
TOTAL:	$210,463

As a result of the infrastructure funding UI reported a total of 48 publications in refereed journals; 24 presentations at professional meetings and conferences; 6 grants for $2,168,576 and 9 grants pending for $5,668,549; 38 students and 21 faculty; and 19 manuscripts pending.

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FY 2016 Allocation of HERC Funds

		Total $3,958,000	Proposed Allocation
HERC IGEM			1,900,000
Inrastructure Funds			825,000
Incubation Fund			333,000
Matching Grants (EPSCoR Match)			800,000
Strategic Initiative			100,000
Total		**$3,958,000**	
Balance		$0	
IGEM Funds			$2,000,000
BSU	IGEM16-01/IGEM16-02		$1,200,000
ISU	IGEM16-03		$700,000
UI			
Transfer	Strategic Initiative		$100,000
Total IGEM		$0.00	**$2,000,000**
Research Infrastructure Funds			$825,000
BSU			$250,000
ISU			$250,000
UI			$250,000
LCSC			$75,000
Total Infrastructure		$0	**$825,000**
Matching Award Grants			
NSF-EPSCoR (Managing Idaho's Landscapes for Ecosystem Services - $20M) (2013 - 2018)			$800,000
Total Matching Grants			**$800,000**
Targeted Research			$333,000
Idaho Incubation Fund (6th round)			
BSU			$75,000
ISU			$61,700
UI			$196,300
Total Targeted Research		$0	**$333,000**
Research Centers			
Total Research Center			**$0**
Strategic Initiative			
LCSC			$25,000
BSU			$20,000
UI			$20,000
ISU			$20,000
Undergraduate Research			$15,000
			$100,000
Total Budget / Allocation			**$3,958,000**

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IF16-003 – BSU: Solid State Positioning Device

Principle Investigator: Peter Mullner ($75,000)

The goal of this project is to build a prototype for a miniature large-stroke positioning device for medical applications such as real-time imaging of the chamber of the human heart. This project will demonstrate proof of concept for a fast, high-precision positioning device for applications such as valves, microsurgery, and semiconductor processing, and for the economic growth in Idaho. Magnetic shape-memory alloys (MSMAs) exhibit multiple functional properties such as magnetic-field-induced strain and deformation-induced change of magnetization, resistivity, and magnetic susceptibility, making this material "smart." We will utilize the multi-functionality of MSMAs to develop large-stroke actuators consisting of very few parts. Simplicity combined with minimal friction enables miniaturization and light-weight design. The device will be useful for various applications in the medical and semiconductor sectors and potentially in the automotive sector. For this project, our primary industry partner is Acutus Medical, Inc. who does product development at the Medtec Furnace in Boise, Idaho.

Progress:

We have designed, built and tested an electrical actuation device. The device produces locally concentrated, pulsed magnetic fields of up to 300 mT with 0.2 kHz actuation frequency. These parameters are sufficient to drive twin boundaries in Ni-Mn-Ga.

Next project steps include

- Producing single crystal Ni-Mn-Ga MSM elements
- Implementing MSM element with the electrical actuation device
- Demonstrating twin boundary motion with the electrical actuation device
- Designing and building an electrically driven (i.e. solid state) MSM actuator

The expenses for July-December 2015 are summarized in Table 1. The remaining budget as of December 31, 2015 is $ 55,366.93. The December 2015 spending as $6,444. The current burn rate exceeds $8,000.

Expense category	Amount
Salary regular	$ 8,070.75
Student salary	$ 7,229.22
Fringe	$ 2,559.14
Other expense	$ 1,773.96
Total	**$19,633.07**

Table 1

There are patents pending and in preparation, specifically: “Electrically driven magnetic Shape Memory Apparatus” (BSU file 158) is pending, and the patent “Magnetic Shape Memory Apparatus with Long Stroke” (BSU file 169) is in preparation.

On November 19, 2015, Shaw Mountain Technology LLC licensed Boise State’s patent US 9,091,251 *Acuation method and apparatus, micropump, and PCR enhanced method*. Effective January 20, 2015, Dr. Mullner registered Shaw Mountain Technology LLC (SMT, http://www.shawmountaintechnology.com) with the State of Idaho. SMT is a Boise-based company that produces high-quality, advanced technology. SMT’s priority is to keep product development, manufacturing and company operations located within Idaho. SMT specializes in shape memory alloys, particularly the magnetic shape memory alloy Ni-Mn-Ga, and develops various technologies within the fields of sensors, microfluidics, energy harvesters and actuators.

Starting in August 2015, SMT sponsors a senior design project at Boise State’s College of Engineering. The students are tasked to develop a self-resting power breaker based on magnetic shape memory alloys.

SMT licensed Boise State technology (BSU files 90, 96, 122, see paragraph 5) and considers licensing technology developed in this project. SMT is interested in partnering on this project if continued in FY 2017

IF16-006 – UI: Plant Extracts as Natural Pesticides and Potato Sprout Inhibitors

Principle Investigator: Matthew Morra ($72,900)

Mustard plants contain bioactive compounds that at as a natural pesticide. The highest concentrations of the natural pesticides are in seed meal; solid materials remaining after oil for biodiesel is removed from the seed by crushing. The primary obstacle in using mustard seed meals as bio pesticides is the bulky nature of the materials. We have developed methods to extract concentrate, dry and formulate seed meal extracts, thus generating natural pesticide products targeting weeds, nematodes, and sprout inhibition of stored potatoes. The products will cost less to transport, can be applied more easily, and will be more efficacious than seed meals. Procedures for generating the products have been optimized at the laboratory scale. Our objective is to produce formulated natural pesticides from mustard seed meal extracts such that efficacy testing by our commercialization partners, Farm Fuel, Inc. and 1,4GROUP, Inc., is possible. We propose to produce 25 lbs. of formulated natural pesticide products as shelf-stable powders from each of two different mustard species. Funding in the amount of $72,900 is requested to purchase specialized spray drying equipment and to provide salary dollars for producing the proposed products. Our commercial partners will produce efficacy data, assist with EPA registration, and potentially market the developed natural pesticide formulations.

Progress:

Sufficient amounts of our sprout inhibitor biopesticide have been produced such that our business partner the 1,4GROUP in Meridian, ID has been able to test efficacy on 20 pounds of potatoes, followed by a larger scale test on 200 pounds of potatoes. In both tests, our product has proven extremely effective. We have sent the 1,4GROUP three separate batches of our extract and each has proven efficacious. Plans are underway to test our product on a 2,000 pound lot of potatoes. Production of a sufficient quantity of product for such testing is ongoing.

Bioherbicidal formulations of our product are ready for shipment to our business partner in Californian, Farm Fuel Inc. Application procedures equivalent to a pesticide label have been drafted. Greenhouse tests of the product to be shipped have demonstrated that it will be phytotoxic to weeds and thus a viable bioherbicide. We are continuing to scale up production based on positive results and successful testing.

Equipment was purchased to dry the seed meal extracts as proposed. The cost of the equipment was $43,309. Salary dollars in the amount of $18,700 have not been expended, but a full-time employee has been hired and the burn rate for those dollars is approximately $3,000 per month. Six months of salary will fully expend the budget by the project end date. We are on track with our spending and expect to expend the budget within the timeline as proposed.

One patent has been applied for specifically:

Mustard Meal Extracts as Bio-Pesticides, Morra, M.J., I. Popova, and J. Dubie. US 62/190,552.

An option agreement for product evaluation was signed with the 1,4GROUP. An option agreement with Farm Fuel, Inc. is in review.

Both the 1,4GROUP and Farm Fuel, Inc. are fully engaged. A group of four representatives from the 1,4GROUP visited our facility here in Moscow. The General Manager for the Meridian location was present. I reciprocated by visiting the 1,4GROUP's testing laboratory in order to get a better view of how sprout inhibitor testing was conducted. Plans to utilize the University of Idaho Food Technology Center in Caldwell for scale-up activities were discussed. Discussions are ongoing about expanding testing on other stored products such as sweet potatoes.

Farm Fuel, Inc. is developing a contract to have mustard seed crushed in the Pacific Northwest. This will facilitate co-locating an extraction facility to meet larger production needs for the extracted bio pesticides.

Both companies remain fully engaged with our efforts. Positive testing results have improved and expanded our interaction.

The equipment necessary for our project was purchased, installed, and is now being used to produce our powdered product as proposed. Testing has shown that the products from our efforts are indeed effective. Business partners continue to be enthusiastic. The 1,4GROUP has been especially supportive and continues to test larger and larger lots of potatoes for sprout inhibition based on positive results. Farm Fuel is expanding their company's operations to the Pacific Northwest, an expansion that will improve our interaction and business connection. We are progressing well towards commercializing our products.

IF16-013 – ISU: Development of a Commercial Process for I-123

Principle Investigator: Jon Stoner & Frank Harmon ($61,700)

The goal of this project is to develop a unique process for producing iodine-123 (^{123}I) using an accelerator at the Idaho Accelerator Center (IAC). The project involves building and testing a target, developing an extraction process, and verifying yields and purity. An outcome of this project is a commercial process for production to be utilized by their industry partner, International Isotopes Inc. (INIS) to eventually produce and ship ^{123}I through its customer network.

^{123}I is a widely used SPECT diagnostic imaging isotope with a short, 13 hour half-life that is replacing the more commonly used ^{131}I. ^{123}I has many advantages over ^{131}I due to improved image quality and lower patient radiation dose. The disadvantages include a much higher cost and less supply. International isotopes is an FDA approved supplier of ^{131}I and is interested in supplying ^{123}I. The IAC and INIS are jointly investigating a new method of production using a photo-nuclear reaction instead of a high power cyclotron. The potential advantage would be high purity at an equivalent or lower cost of production.

North American radiopharmaceutical demand in 2012 was approximately $1.9 billion with SPECT imaging products the bulk of those sales. ^{123}I is the fourth largest usage SPECT isotope with estimated NA sales of approximately $30 million. If the process development is successful, meets business goals, and achieves FDA approval, this project could lead to an Idaho production facility dedicated to ^{123}I production, operating 5 days/week with several employees. In addition, ^{123}I would be available to intermountain area hospitals and imaging centers, improving growth of their businesses.

The initial plan for this project was to create a gas target system and complete initial evaluations of the nuclear reaction to create I-123 using an electron LINAC. This involved initial simulations and a long design and fabrication process before we obtained initial data. Fortunately, we were able to speed up our research thanks to a working relationship with the INL on another project. INL made available to us several small 0.5 ml glass vials of 10% enriched 124Xe. These vials allowed us to quickly analyze reaction yields without the extensive design process of a complete target. Instead, we were able to use a very simplified target system, irradiate the material, and analyze the production rate. The value of the vials supplied gratis by INL was near $1000.

Progress:

1). Experiment #1 – Reaction yields at 40 MeV. In this experiment, we irradiated a 0.5 ml vial of 10% enriched 124Xe at 1.6 kW and 40 MeV for 3 hours. The following HPGe gamma spectrum shows the results from one time point and clearly shows the Xe-123 and I-123 daughter.

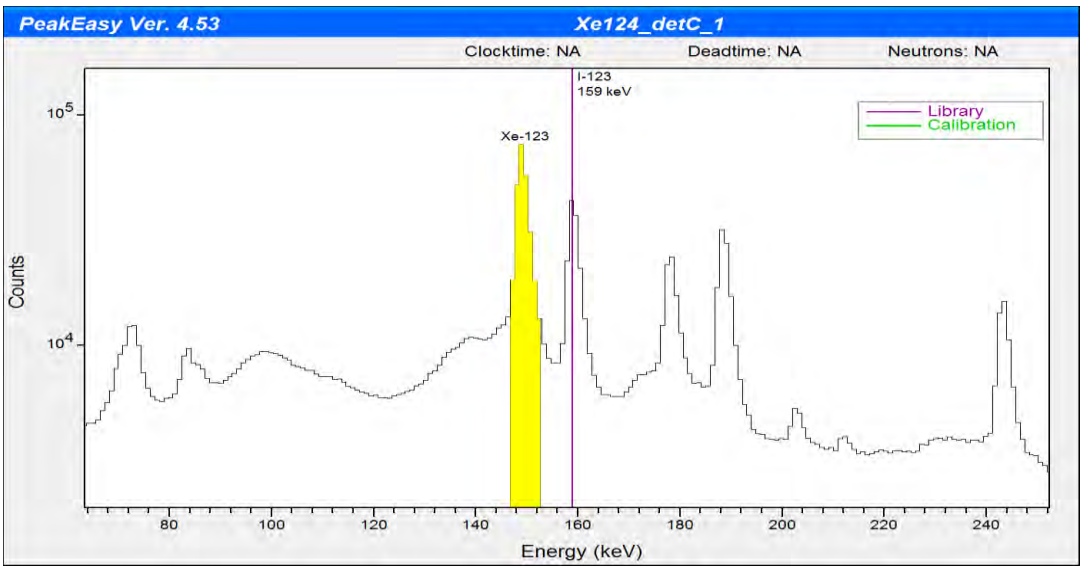


Figure 1 HPGe spectrum of 22 MeV irradiated Xe-124 at ~3 hour post irradiation

Since Xe-123 decays into I-123 with a half-life of about 2 hours, maximum yield is achieved after 4-6 hours. Figure 2 shows the yield of 123I from this experiment, ~ 2.2 uCi at 5 hours.

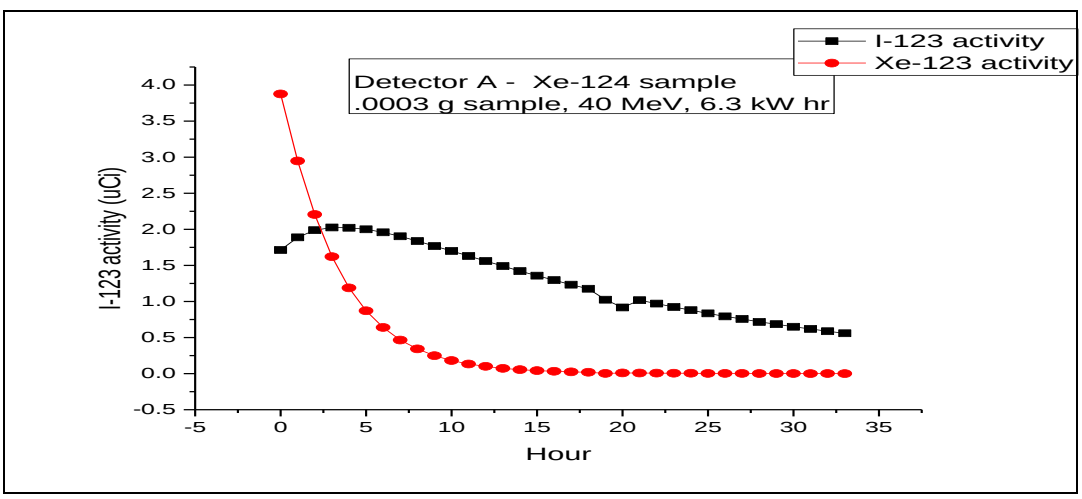


Figure 2 40 MeV yields, 0.5 ml sample 6.3kWhr

2). Experiment #2: In this experiment we irradiated a 0.5 ml vial of 10% enriched 124Xe at 40 MeV and a higher power than the first experiment. As expected, yields were significantly improved. Figures 3 shows the yields achieved with 23 kW hrs.

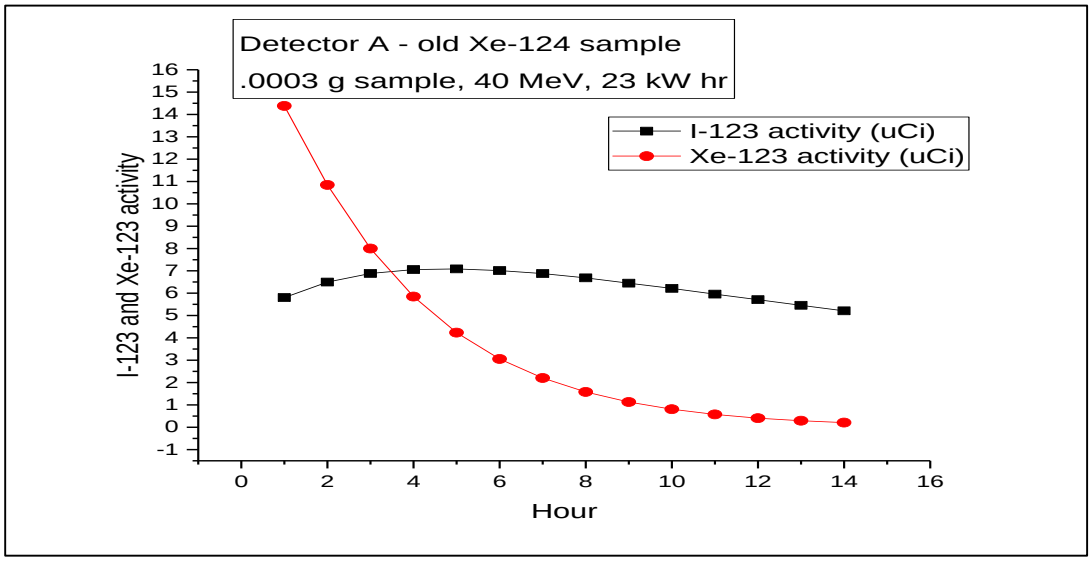


Figure 3 40 MeV activation for 3 hours

Summary of experimental results:

Our experiments show that we can achieve ~ 1.4 mCi/g/kw*hr of 123I from a 124Xe target at 40 MeV. This equates to a potential 525 mCi of activity/one liter enriched target per 10 hour day. This is what we had predicted in our initial proposal and we are pleased with experimental confirmation.

Next steps:

We are proceeding with the design/build of a suitable target to scale up our process to one or more liters of gas at 1-5 atm of pressure. The figure 4 shows the current design.

FINANCIAL Summary FY 2016 to December 16th, 2015

	Budget	Spent	Balance
Total Personnel Costs	**35,260.00**	**11,489.59**	**23,770.41**
Materials and Supplies	2,440.00	424.39	2,015.61
Beam Time	10,000.00	-	10,000.00
Capital	14,000.00	-	14,000.00
Totals	**61,700.00**	**11,913.98**	**49,786.02**

Re-budget Request

Our initial budget as listed above allows for 14,000 for purchase of capital. We had anticipated being able to acquire most of the system needed for the gas target from established vendors. We have determined that no system has been created yet by others that is adequate for our process and therefore we request to move the capital budget into materials and supplies and labor so that we can build the required equipment in house. The re-budget request is to increase Materials and supplies by $4000 and Personnel costs by $10,000.

IF16-014 – UI: Developing All-Natural Low GI Potato

Principle Investigator: Amy Lin ($61,700)

Glycemic response can be modulated by designing a food matrix that is more resistant to digestion. Traditionally, such modification can be achieved through chemical processing and genetic approaches, which raise more health concerns. The proposed all-natural techniques include three major approaches: (1) selecting potato varieties with the proper biochemical characteristics to respond to another two approaches; (2) incorporating some food ingredients to form a new food matrix; (3) applying various hydrothermal treatments to manipulate potato tissues. The modified potatoes, "all-natural low GI potato," will then be further processed to powder form for use as a food ingredient. The commercialized product will target several food markets including processed potato, health food, and gluten-free (or allergen-free) markets.

Progress:

The goal for the first year of funding was to establish a database of Idaho potato cultivars and modify potato tubers using natural approaches to modulate glycemic response (The proposed timeline is attached at the end of this report). In the first 3 months (October-December, 2015), we have examined five major and well developed Idaho cultivars and applied some techniques to modify the microstructure of those potato tubers. In the next progress report, we plan to complete the examination of new lines of potatoes developed in Idaho. For the modification, we plan to optimize the technique for modifying microstructure and introduce a second technique to incorporate guest molecules (natural ingredients) into potato. In addition, we plan on reporting the change in glycemic response resulting from the combined techniques.

The expenses for October-December 2015 are summarized in Table 1. The remaining budget as of December 31, 2015 is $ 42,976.

	Salary & fringe	*Graduate student fees*	*Travel*	*Equipment*	*Consultant*	*Operation and suppliers*	*Total*
Budgeted	21,868	8,200	4,932	1000	19,000	6,700	61,700
Balance	13,012	4,089	2,168	1000	19,000	3,687	42,976

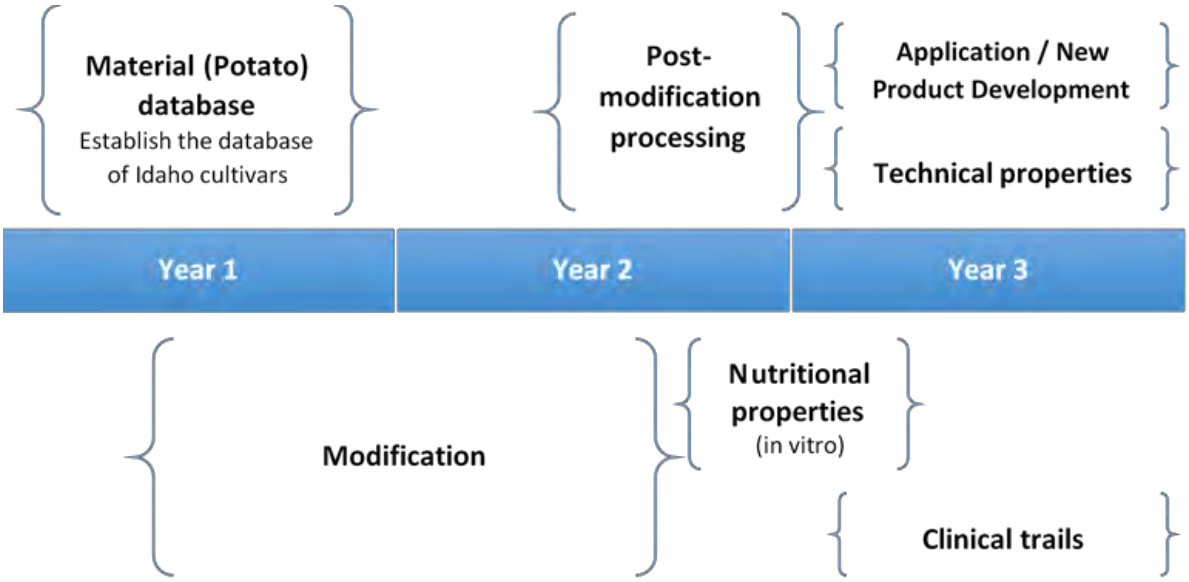
Table 1

The potato industry has shown their excitement about this project. The PI met some current and potential partners in Minneapolis (MN), Caldwell (ID) and Portland (OR) in October 2015 to engage industry partners. Companies such as Simplot and McCain are interested in knowing our progress of this project.

Though this project "all natural low GI potato" was not funded until late September 2015, it has gotten a lot of attention from the potato industry and researchers in this area. Thus, we have received strong support from researchers to provide us necessary research materials. Industry partners also shared a wealth of experience and ideas of this project. Students have screened some major cultivars developed in Idaho, and will select the second batch of potatoes to broaden the screening in Feb, 2016.

Appendix: The proposed timelines:

The project timelines includes screen potato varieties, develop the proposed technology (modification), produce powder form product, assess nutritional and technical quality, and demonstrate the application. During year 1, we expect to complete the variety selection and produce preliminary data of the proposed technology. It will take additional two years, working with the industry collaborators to bring the new products to market.



IF16-015 – UI: N-E-W Terra™: An Enhanced Efficiency Fertilizer (EEF) Manufactured from Biochar

Principle Investigator: Daniel Strawn ($61,700)

The project objective is to successfully filter and harvest N-E-W Terra™ enhanced efficiency fertilizer from our 2013 patent-pending wastewater treatment process N-E-W Tech™ and to use our UI Office Technology Transfer disclosed new technology: "N-E-W Terra™: A System and Process for Manufacture of an Enhanced Efficiency Fertilizer" in horticulture studies and in advanced soil, water, plant research to determine efficacy engineering economics, scale-up potential and market potential.

Progress:

In this period we have successfully recovered enough modified biochar from catalytic reactive filtration (N-E-W Tech™) using dairy water from the UI dairy lagoon as the process influent to start early plant growth trials. We call this biochar fertilizer product N-E-W Terra™. This established the system process required for upcycling nutrients into a product that can be recovered and potentially used as an enhanced efficiency fertilizer. We have submitted the samples for nutrient testing, have developed protocols that are in line with methods used by the fertilizer industry (following the Association of American Plant Food Control Offices (AAPFCO)) to measure enhanced efficiency fertilizer properties, and prepared the experimental design for plant growth trials. Initial lab test indicate the biochar has low salinity, which is a good first hurdle to clear.

Preliminary plant trials will begin in February 2016 to test the effects of N-E-W Terra™ on plant growth, and lab testing of N-E-W Terra™. We are planning another production trial of N-E-W Terra™ at the end of February at a waste water treatment plant, and another trial at a dairy in March. We will be testing the physicochemical properties of the N-E-W Terra™ generated from these trials to determine their potential use as enhanced efficiency fertilizers. Another more extensive growth trial will commence in March and carry through June 2016.

As of Dec 31, 2015, we have spent $10,000 to purchase a Dow Tequatics advanced filtration unit, a critical piece of equipment needed to recover N-E-W Terra™ from N-E-W Tech™. We secured $20,000 from the University of Idaho Agriculture Experiment Station to purchase this unit as a fully assembled skid (plug-and-play), saving 6-8 weeks of time that would otherwise have been required for us to assemble the unit based on the filter alone. Burn rate is $1,667 per month, or 3% per month. Although the Burn rate is currently low, incurred expenses for analytical cost in January are pending, and planned high analytical costs as we move to the testing phase of N-E-W Terra™ (including hiring an undergraduate intern) will use remaining funds.

The project involves five faculty, two graduate students, nine undergraduate students (including a senior thesis), and one senior staff engineer. We are in process of finding an undergraduate researcher to assist in the plant growth trials.

Patents have been filed, specifically:

Möller, G., Strawn, D.G., Baker, M. and Stags, G. Continuation in Part, Functionalized Biochar Water Treatment, Provisional Patent Application. 2016

Möller, G., Strawn, D.G. Biochar Water Treatment, PCT Application No. PCT/US2014/066677. Patent Pending. 2014

A University of Idaho N-E-W Tech™/N-E-W Terra "Biochar Water Treatment" Option and Technology Evaluation Agreement License was signed with BlueXGreen, LLC (BXG). BXG is a new Idaho start-up company formed in 2015 by six seasoned senior partners in the fields of business, science and engineering as an emerging green tech/clean tech accelerator. BXG's mission is to help research products from the University of Idaho and Washington State University navigate the early "valley-of-death" pathway to commercialization for promising research innovations. Professor Strawn and Möller are partners in BXG and have initiated appropriate university research conflict of interest documentation. N-E-W Tech™/N-E-W Terra™ has received interest for commercial licensing in the U.K. and by a Southern California investment group, in addition to corporate interest in rights of first refusal licensing options.

Since September, 2015, we have had regular communications with Dr. Terry Tindall, the Director of Agronomy at J.R. Simplot Company on progress and product development. We provide him updates on our results, successes and challenges. Our planned meeting at our dairy recovery trial in December was thwarted by severe winter storms that halted our dairy operations for most of the month. Current plans are for Dr. Tindall to have a site visit in February or March. With their permission and encouragement, we are adding a Simplot logo to the list of research partners on our N-E-W Tech™ water treatment trailer that is producing the N-E-W Terra™ nutrient upcycled fertilizer. We are also working with secondary partners Blue Water Technologies, Inc. (Hayden, ID), DOW Clean Filtration Technologies, LLC (Redwood City, CA), Kemira, (Oulu, Finland), Regenis Dairy Waste Management (Ferndale, WA), and Evergreen Engineering (Peterborough, UK).

As part of our great progress, we have submitted the $326,000 research proposal "INFEWS N/P/H2O: Molecular Mechanisms of Resource Recovery in a Functionalized Biochar - Catalytic Oxidation - Reactive Filtration Water Treatment Process" to the National Science Foundation Innovations in the Food, Energy Water System RFP in November 2015; we should receive feedback in the 1st quarter of 2016.

An invited case study article N-E-W Tech™/N-E-W Terra™ appeared online and in the January 2016 paper issue of the engineering trade magazine Control Design with a total distribution of $193,000: http://www.controldesign.com/articles/2015/scalable-control-system-is-at-the-heart-of-water-treatment-process-skid-plc/?show=all, IGEM is recognized in this publication.

The University of Idaho/State of Idaho N-E-W Tech™/N-E-W Terra™ project is submitted as a 12-month, almost $600,000 total commitment of Activities and Actions to Build a Sustainable Water Future-2016 White House Water Summit announcement. The White House Water Summit follows the announcement of what has been characterized in December 2015 by USA Today as a "moonshot for water" where innovations in science and technology are a central focus.

N-E-W Tech™/N-E-W Terra™ is central in a novel "whole system architecture" dairy waste management approach submitted to the Nutrient Recycling Challenge, a $20K prize competition searching the globe for new ideas to support animal agriculture operations. The concept paper was submitted by the new Idaho start-up company BlueXGreen, LLC, in cooperation with the University of Idaho.

The University of Idaho College of Agriculture and Life Sciences produced and released a 2-minute YouTube video "Creating a Sustainable Water Supply" about N-E-W Tech™/N-E-W Terra™. The video, which recognizes IGEM funding, is publically available at: https://www.youtube.com/watch?v=DnpvY4cWKEI.The video and accompanying UI-CALS *AgKnowledge* write-up were emailed to all members of the Idaho Legislature.

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FY16 - Incubation Fund Summary

									Involvement		Inventions and Discoveries					Industry Involvement
NUMBER	INST.	P.I.	Project Title	Project Summary	eporting Yea	Awarded	Expended	Balance	Faculty	Student	Patents	PVP Apps	Copyrights	Licenses	Start Ups	# of Companies
IF16-003	BSU	Peter Mullner	Solid State Positioning Device	To build a prototype for a miniture large-stroke positioning device for medical applications such as real-time imaging of the chamber of the heart	2016	$75,000.00	$19,633.07	$55,366.93	2	5	2	0	0	1	0	1
IF16-006	UI	Matthew Morra	Plant Extracts as Natural Pesticides and Potato Sprout Inhibitors	Purchase specialized spray drying equipment and provide salary dollars for producing the proposed products.	2016	$72,900.00	$43,309.00	$29,591.00	1	0	1	0	0	1	0	2
IF16-013	ISU	Jon Stoner-Frank Harmon	Development of a Comercial Process to Produce ^123| Using an Electron LINAC	To create an isotope supply and research hub for Idaho at the IAC to drive commercial and research growth in the intermountain region. This ^123| is a 13 hour medical isotope used as a SPECT diagnositic tool for imaging organs in the body, especially the thyroid, and detecting various cancers.	2016	$61,700.00	$11,913.98	$49,786.02	1	0	0	0	0	0	0	0
IF16-014	UI	Amy Lin	Developing All-Natural Low GI Potato	To produce an "all natural low GI potato" with moderate glycemic impact and gut health promotion through a unique combination of three approaches: Potato variety selection, product formulation, and new processing techniques	2016	$61,700.00	$18,724.00	$42,976.00	1	1	0	0	0	0	0	5
IF16-015	UI	Daniel Strawn	N-E-W Terra™: An Enhanced Efficiency Fertilizer (EEF) Manufactured from Biochar	To use the N-E-W Terra™ along with patent-pending N-E-W Tech™ in horticultural studies and in advnaced soil, water, plant research to determine efficiency, engineering economics, scale-up potential and market potential.	2016	$61,700.00	$10,000.00	$51,700.00	5	11	2	0	0	1	0	7
IF 16					**TOTALS:**	$333,000.00	$103,580.05	$229,419.95	10	17	5	0	0	3	0	

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IGEM16-001

Boise State University – **Computer Science at Boise State University – An Investment in Idaho's Future ($700,000)**

The focus of the Boise State University project is on accelerating the growth in the areas of Cyber Security and Big Data to expand research, industry collaboration and teaching capacity. The Computer Science Department continues to increase its formal and informal connections with industries, and the IGEM hires are integral to growing partnerships with those industries. The strategic faculty hires that were made in the first round of HERC funding will be key in the progress of this project.

The University has made significant additional infrastructure enhancements to help support the faculty recruitment and retention, receiving a $1 million grant from the Idaho Department of Labor along with a $280k match from eight industry partners. This grant and match allowed the University to hire three additional lecturers and support staff. These hires will be focused in the areas of Big Data, Cyber Security, Human Computer Interaction, and Computer Science Education research; along with the capability to create a Big Data track in both the Masters and PhD programs.

As part of the previous IGEM grant (FY13-FY15), the Department restructured the first two undergraduate Computer Science classes into three classes to allow students more time to absorb the material. Along with other strategies, this has led to an improvement in retention in the freshmen computer science course from 65% to 85% over the last two years.

This project plan involves four strategies that align with our objectives. The first strategy involves maintaining IGEM funding for 4 faculty lines to leverage the tactical hires we made with the first round of HERC funding to grow programs in cyber-security and big data. The second strategy involves promoting greater integration and collaboration between the Department and Industry. The third strategy focuses on how the CS department can integrate, support and impact interdisciplinary research across the University and support entrepreneurship. The fourth strategy will focus on continued growth of the student pipeline through techniques to attract, retain and graduate a higher quantity of quality students.

Strategy One Progress: Sustain Current Faculty Lines and Continue Forward Trajectory

The Computer Science Department was successful in hiring and retaining five faculty members using the original IGEM grant (one full professor, two associate professors, one assistant professor and one clinical professor) – Three of the faculty are in the area of software engineering while one is in the area of data science and databases and another visualization. Dr. Jim Conrad has been moved to another line and the others are being supported by the IGEM grant.

Dr. Vijay Dialani left for industry (Linkedin) in August, 2015. The department was able to hire Dr. Edoardo Serra of Calabria, Italy in 2012. Since then he has held research positions at UCLA and University of Maryland. Dr. Serra's expertise is in the field of Data Science with applications in precision agriculture, cybersecurity, data-privacy, and national security. His expertise also includes probabilistic models, optimization, databases, and artificial intelligence. He has taken the

lead role for the IGEM project that Dr. Dialani has started in collaboration with Simplot and built up a research lab with four graduate students and a post-doctoral research.

Another strong impact of the IGEM grant has been in the additional hiring that the department has done in the last six months. Using the eight lines provided by JFAC funding, the department has **successfully hired seven faculty in six months.** In each case, the faculty hired were the top choices in the respective areas of research. Given the extremely competitive nature of hiring in computer science that has been very gratifying. The list of the faulty is shown below (with the PhD granting University in parentheses).

- *Data Science*: Dr. Edoardo Serra (university of Calabria, Italy),
  Dr. Francesca Spezzano (University of Calabria, Italy)
- *Cyber Security*: Dr. Gaby Dagher (Concordia University, Canada),
  Dr. Jidong Xiao (College of William and Mary)
- *Human Computer Interaction*: Dr. Jerry Fails (University of Maryland),
  Dr. Michael Ekstrand (University of Minnesota)

Strategy Two Progress: Industry Partnerships

The CS Department continues to increase its formal and informal connections with industry and the IGEM hires are integral to the following initiatives and connections.

Growing partnerships with industry. Boise State University will support and encourage CS faculty to establish partnerships with industry via joint research projects, service on industrial boards, consulting and faculty and student involvement. We have several ongoing examples of faculty working with our industry partners:

- In the last 6 months, Dr. Time Andersen has worked as a consultant at Micron, and is also currently working as a consultant at Appdetex, a local startup company.
- Dr. Sole Pera is working on the advisory board at ReleVent City, a recent Boise startup.
- Dr. Sole Pera has also volunteered as an advisor/mentor for B-launch.
- Dr. Steve Cutchin is working as a consultant for Digital Mechanics, a 3D capture and reconstruction startup.
- Drs. Andersen, Cutchin, Jain, Serra, and Spezzano are working with the J.R. Simplot Co. on a joint funded research project in Precision Agriculture, helping them to fuse information from multiple sources (such as historical yield data, satellite imagery, sensor data, and etc.) to assist farmers in intelligent decision making. This project also involves multibple graduate students and a post-doc. This collaborative effort is leading to additional collaborative projects and proposals, with proposals involving Simplot planned for both NSF's PFI:BIC and INFEWS tracks.
- During the reporting period Drs. Andersen, Cutchin, Jain, Serra, and Spezzano worked on a $2.5m grant proposal from NSF's CISE:CRI track. This grant involves industry partners Micron, HP, and Data Vortex. It also involves researchers from Rice University, Georgia Tech, and Indiana University.
- 7 Industry partners committed to donate an additional $140,000 to expand the CS Scholarships program, which has allowed us to offer 21 scholarships to students for the 2016-2017 academic year. These scholarships are designed to encourage and help

students to finish their degree faster. The industry partners who donated are AppDetex, Clearwater, Cradelpoint, HP, Impact Sales, MetaGeek, and Whitecloud

Community Events. The CS Department continues to host *Boise Code Camp* and participate in *Develop Idaho* and *Hackfort* to strengthen connections with industry and entrepreneurs. Code camp has grown to over 1000 participants in 2015 and is now the largest code camp in the Northwest. Hackfort has grown and will partner with Develop Idaho this year to host a combined event.

Senior Design Projects. **The senior capstone projects, which are sponsored by local industry partners, has grown 50% in the last year, from 10 in academic year 2014, to 15 this academic year.** We are working with companies from multiple sectors including high-tech, health care, government, finance, transportation, marketing, merchandising and agriculture. The companies who are sponsoring projects include: BoomBoxBody, toGetHERout.com, TransitFox, Willoop, RecallInfoLink, Zamzows, Clearwater Analytics, Kairosys.net, Noteworthy Recruiting, Whitecloud Analytics, WinCo, and zData.

Industrial Advisory Board. Alden Sutherland, VP and Chief information Security Officer at AmericsourceBergen (a Fortune-16 company that recently bought multi-billion dollar local company MWI), currently heads the board. The board meets at least twice yearly with the department and provides feedback and strong support for curriculum, facilities, and hiring. Fasial Shah, a leading entrepreneur in Boise, has also joined the board.

Strategy Four: Enhancing the Student Pipeline

The changes made in the lower division curriculum have resulted in higher retention Specifcally we have gone from 65% to 85% retention in CS 1 course and the effects have percolated up the course sequence. During the first IGEM grant, we were able to double the number of bachelor's degree graduates (from 25 to 47). The upward trend continues as we expect 60+ graduates this year.

Another important data point comes from course-pairing. In this analysis, we examined the pass rate of CS 1 students in the subsequent CS 2 course (sophomore level CS 221). Historically, 78% of the CS1 students passed CS 2. **With improvements in the CS 1 course, 90% of the new batch of students passed CS 2, a significant uptick.** This data was collected over four semesters of the new courses versus ten years of the older style courses. This research was highlighted by the NSF WIDER PERSIST research grant last semester in their annual report and the CS department was asked to present a testimonial to their advisory board. The faculty is now propagating the new styles of teaching and learning to more courses in the curriculum.

With the hiring of new faculty, the department is now also working on developing a PhD program as mentioned earlier. The PhD program has the potential to significantly increase the research profile of the department and to draw top0notch talent to come to Boise State University and potentially end up in local industry.

The IDoCode project (funded by the National Science Foundation) to introduce high quality computer science in high schools is also progressing well in its second year. We now have 40 teachers in two cohorts and are recruiting for the third cohort to start in Summer 2016. These teachers will offer fourteen new sections of AP Computer Science Principles course in Fall 2016.

This new national course is designed to get a diverse group of students excited about computer science, which will lead to a bigger and better-prepared pipeline of students going on to college.

Future Plans

The department is well on its way to further sustained growth in all areas. We expect to hire three more faculty this Spring with the JFAC lines. **We expect the number of graduates to be over 60 this year, which would be a 240% increase from three years ago!** The research activity is staying at an all time high level and the interaction with industry continues to increase.

Faculty and Student Participation

Five faculty and six graduate research assistants were supported directly on this grant. The supported faculty has in turn worked with more students and staff because of grants they received. Three graduate students that were working with the faculty that has left are now working with two other new faculty: Dr. Sole Pera and Dr. Francesca Spezzano. As a result there were a total of **seven faculty, 43 students and one post-doc** that were supported directly or indirectly (excluding the three PIs). Additionally, 7 students have started internships at local companies because of the renewal of the Expand.CS program this fall.

Patents and Copyrights

There are no patents or copyrights to report at this time.

Startups and Technology Licenses

CS faculty were directly involved in two new startups:

- SilVR City Productions, where Dr. Steve Cutchin is the President and founder along with one co-founder. SilVR City is a Virtual Reality Production Company based on the technology developed in Dr. Cutchin's lab.
- relEVENT city, is a five-person Boise tech-start up building a mobile event recommendation application. Dr. Sole Pera is on their advisory board and is a shareholder. Her research is directly applicable to the startup. relEVENT city recently won the Boise Metro Chamber of Commerce launched competition, presented its work at an international recommendation conference (RecSys) in Vienna, Austria last month, presented at the Boise Metro Annual Economic Summit, and was recently featured in the Boise Weekly and Idaho Business Review.

Students were directly involved in the following five new startups, supported by Co-PI Jim Conrad via the Senior Design course. Several of these startups are in conjunction with Boise State Venture College.

- BoomBoxBody.com – Boise Startup. Social workouts.
- toGetHEROut.com – Athletic Activities for women.
- Willoop – An LLC startup working on a Living Will service/apps
- Kairosys.net – Startup in Agriculture Decision Support Solutions.
- Noteworthy Recruiting – Boise startup that matches high school musicians with their preferred college marching bands.

Expenditure Report

Five Faculty and six graduate assistants were directly supported via the IGEM grant during this period.

Budget for July 2015 to December 2015				
Category	**Salary**	**Fringe**	**Tuition**	**Total**
Faculty	$217,792.56	$62,277.12		$280,069.68
Graduate Assistants	$64,808.64	$4,990.67		$69,799.31
Operating Costs			$20,280.00	20280
	$282,601.20	**$67,267.79**	**$20,280.00**	**$370,148.99**

$700,000 of awarded funding for FY16, funding that is remaining for FY16 is $329,851.

IGEM16-002

Boise State University – **Enhancing Capabilities in Nanotechnology and Microfabrication at Boise State ($500,000)**

Economic growth in this industry is enabled by innovative research and development using advanced processing techniques to create new materials, structures, and devices. These new products have broad impacts within industries as diverse as agriculture, medicine, transportation, and energy. This project will enhance the capabilities of the IML and nanotechnology fabrication at BSU, which will in-turn educate the current and future workforce, offering programs that will support local companies, and the ability to conduct leading edge research that attracts external funding. Idaho companies who are partnering with Boise State on this project are interested in a wide variety of capabilities. The results of this project would allow these companies to perform research and development activities which would otherwise be too costly as well as offer the potential to expand their business by improving the performance or increasing yields of existing products in addition to developing completely new products.

The primary objectives of this project are to:

a) Augment existing capabilities of the IML and Nanotechnology Research Corridor at Boise State.
b) Expand expertise in emerging research areas of flexible/printed electronics, thin-filmed and 2D materials, and neuromorphic computing.
c) Forge stronger industrial partnerships and collaboration and deliver more direct access to the advanced facilities and research at Boise State.
d) Provide additional opportunities for both industrial and academic education and training in nanotechnology and microelectronics.

Advanced processing techniques are critical to the successful development and manufacturing of new materials and electronic devices. This project upgrades the infrastructure and improves capabilities in the Idaho Microfabrication Laboratory such that it can continue to support research throughout Idaho as well as catalyze product development and manufacturing in the State.

Progress:

From the start of funding in September 2015, we immediately began the process of purchasing year 1 equipment and supplies as well as starting work on facility infrastructure upgrades. A list of related project objectives and outcomes is:

- Purchase of a Bruker Dektak XT-A stylus profilometer for measuring nanometer to micrometer height variations in semiconductor samples. This equipment arrived and was installed at the end of September and has already found heavy internal and external use, including an hourly contract with American Semiconductor, Inc.
- Purchase of laboratory consumables including a gold sputtering target which is used to support various faculty research projects.
- Upgrade of the Hitachi 4500 scanning electron microscope (SEM) which is currently the highest resolution SEM at Boise State.
- Installation of additional and replacement of some old de-ionized water plumbing to increase the quality of clean room water.

- Examined the feasibility of adding end point detection to the Veeco inductively couple plasma etcher (ion mill). Unfortunately, although this item was included in the year 1 budget, no vacuum port is available for attachment of such an instrument. Purchase of similar equipment for this instrument or the similar Oxford Plasma Lab 100 etcher will be re-evaluated in year 3.
- In place of the end point detector, purchase of the Fuji Dimatix materials inkjet printer originally scheduled for year 3 was moved forward. This decision was made primarily in response to interest in the tool both from Boise State faculty as well as several local companies including American Semiconductor, PakSense, Simplot, PKG, Biomark, and others.
- Full refurbishment of the vacuum pump for the CHA thermal evaporation deposition system.
- Purchase of all supplies including stainless steel tubing for an ultra-pure nitrogen distribution system inside the clean room.
- Full clean room-compatible window tinting to eliminate all UV light from the lithography bay and improve patterning results.
- Initiation of the hiring process for both the technical support engineer (near completion) and the new ECE faculty member (phone interviews completing by February 12, 2016).
- Purchase of three wet chemical processing stations (acid, base, and solvent purchase of only two benches, but the company was able to offer a significant discount as well as an upgrade to a gently used bench, resulting in the same total cost. Together, these three pieces of equipment will significantly increase the usability and safety factor of the facility, and include advanced capabilities such as automated touch screen process control, advanced spin-coating station, ultrasonic heated processing bath, integrated hot plates, and handheld sprayers for de-ionized water and ultra-pure nitrogen.

Expenditure Report

As of January 29th, 2016, approximately $414,000 of the $500,000 year 1 budget has been encumbered or spent. For the five months since receiving funds, that corresponds to a **burn rate of approximately $83,000/month.** However, large purchases make that rate quite varied, these major items include:

- $47,500 for the Fuji Dimatix DMP-2831 Materials Printer
- $52,000 for the Bruker Dektak XT-A stylus profilometer
- $187,707 for the three new wet chemical processing stations from JST Manufacturing, Inc.
- $36,404 in total for supplies for facility and equipment upgrades.
- Approximately $40,000 in salary and associated fringe for IML staff, with $52,000 remaining (counted in the encumbered amount).

Several other items are still expected to be purchased including safe chemical storage cabinets for acids, bases, and solvents to accompany the new wet benches, clean room tables for the profilometer, computers, an upgraded optical microscope with digital camera, as well as several facility and infrastructure upgrades (electrical, nitrogen, chilled water, etc.). The total cost of the listed physical items is expected to be on the order of $25,000.

Faculty and Student Participation

There are no students or faculty supported directly by this project currently. The hiring process has been initiated and there were 64 applicants in all. Of these, 12 are scheduled to be interviewed by phone in the first two weeks of February 2016, and on-campus interviews of 3-4 candidates will take place in March 2016. Once the new faculty member officially begins their appointment in August, funds will be used for their specific research start-up needs, as well as for the stipend and fees of two ECE graduate students for the remainder of the project.

Patents and Copyrights

There are no patents or copyrights to report at this time.

Startups and Technology Licenses

At this time there are no start-up businesses created as a result of the funding. However, memristor (resistive memory) technology developed by Professor Kris Campbell in the ECE department has been licensed by Knowm, Inc. and M. Alexander Nugent Consulting (MANC) of Santa Fe, NM. If their projects proceed as expected, as much as $100,000 could be spent in the IML over the next few years.

Industry Partners

Several new agreements with Idaho businesses have been put in place since the start of the project to use the IML and new equipment and processes contained in it, these include:

- American Semiconductor, Inc. (Boise, ID), which as used the new Bruker stylus profilometer for approximately 6 hours (>$200) during the first three months of ownership of the tool.
- Fiberguide, inc. (Caldwell, ID) has spent approximately $1300 using the current wet bench for process development and anticipates heave use of the new benches when they arrive.
- Collaborative use of the Bruker stylus profilometer (approximately $1500 spent to date) for a joint project with Idaho National Laboratory (INL), with additional use planned for the future.

Closing Statements

On-site interviews of the new technical support engineer have begun and we expect to extend an offer to one of these very qualified candidates within the next week. Phone interviews for faculty will be completed in approximately two weeks, and on-campus interviews are expected to finish by the end of March so a competitive offer can be made early in the faculty recruiting cycle.

IGEM16-003

Idaho State University – **Wide Bandgap and Harsh Environment Semiconductor RD&D Capability ($700,000)**

Wide bandgap and harsh environment semiconductors are currently on the cutting edge of research in materials science, solid state physics, and electrical engineering fields around the globe. The focus of this project is to bring new jobs and economic growth to Idaho while providing the ability to grow as an industry center in this area. The material systems for this project hold several key scientific and engineering advantages over existing semiconductor material systems with the ability to operate with higher efficiencies, higher currents, and higher outputs; these materials hold a strategic focus in energy harvesting and green energy solutions.

This project will unite all stages of advanced wide bandgap semiconductor device fabrication as well as extreme environment semiconductors with a special emphasis on the fundamental building blocks of semiconductor growth. Additional capabilities will be added to meet the growing needs for bulk wide bandgap semiconductor materials as well as epitaxial growth of novel bandgap engineered semiconductor films and establish a demonstration pilot scale production capability.

Progress:

1. Summary of project accomplishments for the period just completed and plans for the coming reporting period:

   All pieces of equipment have been purchased and are being installed.

2. Summary of budget expenditures for the period just completed (include project burn rate):

   $649,617.95 of $700,000 has been expended as of February 1, 2016.

3. Numbers of faculty and student participation resulting from the funding, including internships:

   Currently 3 students, two faculty and two engineers are participating.

4. List patents, copyrights, plant variety protection certificates received or pending:

   N/A

5. List technology licenses signed and start-up businesses created:

   NA

6. Status of private/industry partnerships (include enough information to judge level of engagement):

   EJ Proprietary has committed $150,000, NuMat, Inc has committed $200,000 in funding for the current fiscal year.

Although the project started after the expected date of 07/01/2015 due to the late release of funds, the project is on track as described in the proposal. “The project is predominantly focused around the acquisition, commissioning, and demonstration of four major pieces of research infrastructure. In the first quarter, the capital equipment purchases will be made. Due to the long lead times for the fabrication of several of the components of the systems, the next six months will be devoted to acquisition and installation of the systems. The last three months will be devoted to demonstration of the growth capabilities of the systems.”

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3 Year Awards									Involvement		Inventions and Discoveries					Industry Involvement
NUMBER	INST.	P.I.	Project Title	Project Summary	Reporting Year	Awarded	Expended	Balance	Faculty	Student	Patents	PVP Apps	Copyrights	Licenses	Start Ups	# of Companies
IGEM16-001	BSU	Amit Jain	Computer Science at Boise State University - An Investment in Idaho's Future	Project plan involves four strategies. 1)Sustain faculty in emerging areas of strength 2)Tighter Industry Integration, 3)Interdisciplinary Research and Economic Development Activity 4) Enhancing the Student Pipeline	2016	$700,000	$370,149	$329,851	7	43	0	0	0	0	7	22
					2017	$700,000		$700,000								
					2018	$700,000		$700,000								
IGEM16-002	BSU	Kurtis Cantley	Enhancing Capabilities in Nanotechnology and Microfabrication at Boise State	Project seeks to upgrade the materials characterized and microelectronic processing capability of the Idaho Microfabrication Laboratory (IML), supporting technology development and economic growth in the State of Idaho.	2016	$500,000	$414,000	$86,000	0	0	0	0	0	1	0	3
					2017	$500,000		$500,000								
					2018	$500,000		$500,000								
IGEM16-003	ISU	Eric Burgett	Wide Band Gap and Harsh Environment Semiconductor RD&D Capability	The proposed effort leverages several strategic components at the RISE Complex and aims to develop a focused research, development and demonstration capability in the growth and characteriazation of functionalized wide band gap and harsh environment semiconductors.	2016	$700,000	$649,618	$50,382	2	3	0	0	0	0	0	2
					2017	$700,000		$700,000								
					2018	$700,000		$700,000								
IGEM 16					**TOTALS:**	$5,700,000	$1,433,766.94	$1,729,851.01	7	43	0	0	0	0	7	
						$4,266,233.06										

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ANNUAL REPORT 2015

CAES Center for Advanced Energy Studies

CAES has become a proven model that institutions throughout the world aspire to replicate.

Message from the Director:

CAES is about using the power of collaboration to solve complex technical challenges as a team. CAES is about regional partnerships that create opportunities for our students, industries, and research centers. CAES is about leveraging regional partnerships for global competitiveness. And most importantly, CAES is about enabling a clean energy future for generations to come.

When the concept of Idaho's independent research institutes coming together to share research, staff, and educational resources was first imagined, it seemed like an impossible goal. However, since CAES was formally established in 2009, it has become a proven model that institutions throughout the world aspire to replicate. Last year, we expanded to a regional collaboration when University of Wyoming joined the team.

This year, the CAES collaboration has placed added emphasis on research that increases industry competitiveness while opening more opportunities for our students. We're developing innovations to help industry compete and to help our nation realize a clean energy future. As the world is rapidly changing its approach to energy, CAES is helping discover new approaches for energy production and energy use that will allow us to stay competitive in this dynamic landscape. It is estimated that $67 trillion dollars will be invested in energy technology globally over the next 25 years. CAES researchers will help regional stakeholders compete for a share of these markets, and will help our students compete for jobs. The future will be exciting indeed!

Over the past year, we've had many exciting advances. We expanded our materials and catalysis capabilities by bringing in capabilities like the Temporal Analysis of Products (TAP) reactor and a picoindenter for in-situ tests in the Microscopy and Characterization Suite. We are developing some big, impactful projects, including the Frontier Observatory for Research in Geothermal Energy (FORGE) and the food-energy-water nexus. We brought in new high-caliber research staff to help take our research to the next level. We established an Industry Advisory Board to enhance public-private partnerships and engage industry partners to work with CAES on technology commercialization for maximum impact.

CAES had a great year and we look forward to continue building world-class capabilities, working with the region's best researchers, educating the next generation of energy scientists, and using our expertise to help industry succeed in fast-paced global markets.

Sincerely,

Steven Aumeier
Director, Center for Advanced Energy Studies

FY 2015 | By the Numbers

INVESTMENTS:

$3 MILLION
STATE OF IDAHO INVESTMENT IN CAES

$347,000
UNIVERSITY OF WYOMING INVESTMENT IN CAES

$16.93 MILLION
RESEARCH PROGRAM AND OTHER FUNDING FOR CAES INCLUDING LABORATORY DIRECTED RESEARCH AND DEVELOPMENT FUNDING AND RESEARCH GRANT AWARDS FROM DOE, NSF, NRC, AND PRIVATE INDUSTRY

$6.84 MILLION
IDAHO NATIONAL LABORATORY'S INVESTMENT IN INFRASTRUCTURE, OPERATIONS, AND RESEARCH

OUTREACH:

1558
VISITORS TOURED THE CAES IDAHO FALLS FACILITY IN FY 2015

1891
VISITORS EXPERIENCED THE CAES COMPUTER-ASSISTED VIRTUAL ENVIRONMENT (CAVE) 3-D DATA IMMERSION RESEARCH ENVIRONMENT

237
CAES PRESENTATIONS, PUBLICATIONS, AND PROCEEDINGS IN FY 2015

84
CAES AFFILIATES COLLABORATED WITH 84 COMPANIES

STUDENT IMPACT:

87
STUDENTS FROM THE CAES PARTNER UNIVERSITIES INTERNED AT IDAHO NATIONAL LABORATORY IN AREAS INCLUDING MECHANICAL ENGINEERING, MATERIALS SCIENCE, GEOTECHNOLOGY, NUCLEAR ENGINEERING, AND COMPUTER SCIENCE

249
STUDENTS WORKED ON CAES-RELATED PROJECTS IN AREAS INVOLVING ELECTRICAL GENERATION TECHNOLOGIES (NUCLEAR, COAL, GAS, RENEWABLE), ENERGY POLICY, MATERIALS SCIENCE ENGINEERING, NUCLEAR SCIENCE, AND HUMAN FACTORS AND STATISTICS

"I was particularly struck by the conversations I've had since I arrived here [at CAES]. Frankly, I hadn't realized the extent to which you have moved in tying your efforts together with those of industry, [tying] your efforts with academia...Frankly, you're far ahead of most of the places I go and talk about this. . . It's commendable on your behalf."

-Norm Augustine (above center), retired chairman and CEO of Lockheed Martin and a member of a special committee convened by Energy Secretary Moniz to assess the effectiveness of the Department of Energy national laboratories, visited the Center for Advanced Energy Studies as a guest of the University of Wyoming on April 8, 2015.

COVER: THE TEMPORAL ANALYSIS OF PRODUCTS (TAP) REACTOR LOCATED IN CAES.

Regional Leadership

CAES co-sponsors Intermountain Energy Summit

On Aug. 18-19, the Center for Advanced Energy Studies (CAES) at INL co-sponsored the Second Annual Intermountain Energy Summit in Idaho Falls to provide an opportunity for individuals of the energy community to come together to discuss environmental and energy topics, and present ideas on how to best overcome various obstacles. This year's theme, the Energy-Water Nexus, was of interest due to changing weather patterns leading to drought conditions in much of the Western states. Pressure from growing populations and increased energy extraction is exacerbating the impact of increasingly limited freshwater availability. Speakers and notable attendees included: John Kotek, DOE assistant secretary for Nuclear Energy, Lynn Orr, DOE undersecretary for Science and Energy, U.S. senators Jim Risch and Mike Crapo, Rep. Mike Simpson, Idaho Lt. Gov. Brad Little, NRC Commissioner Kristine Svinicki, Asst. Secretary of the Navy Dennis McGinn and the EPA's Lek Kadeli.

Energy Policy Research Conference 2015

In September 2015, over 100 attendees from 28 universities and colleges, 18 industry or nonprofit organizations and three national laboratories came together for the 5th Energy Policy Research Conference in Denver, Colorado. Each year, the CAES Energy Policy Institute, headquartered at Boise State University, organizes and hosts the conference. Over the course of this year's two-day conference, participants gave 55 presentations across 14 panels on topics ranging from "Coal Regulation and the Clean Power Plan" to "Renewables Integration: Scenarios and Novel Approaches." Jim Rogers, former CEO and Chairman of Duke Energy, delivered the keynote address. Select papers from the conference were published in a symposium issue of The Electricity Journal (October 2015).

KEYNOTE SPEAKER JIM ROGERS, FORMER CEO AND CHAIRMAN OF DUKE ENERGY, THE LARGEST UTILITY IN THE U.S., ADDRESSES THE CROWD AT THE ENERGY POLICY RESEARCH CONFERENCE.

CAES PROGRAM DEVELOPMENT DIRECTOR MICHAEL HAGOOD ADDRESSES THE INTERMOUNTAIN ENERGY SUMMIT (ABOVE).

5th International Advanced Coal Technologies Conference

The 5th International Advanced Coal Technologies Conference (IACTC) took place in Jackson Hole, Wyoming, on Oct. 6-7, 2015. Each year, the conference rotates among United States, Australian, and Chinese locations. The IACTC conferences seek to advance, through collaboration with global partners in policy, education, and research, the environmental and economic use of coal to meet world energy sustainability and security. The theme of the 2015 IACTC conference was to explore new opportunities for coal through carbon engineering and CO2 utilization and storage.

The conference brought together an international array of leading energy experts from government, industry, academic, and research sectors to discuss and share recent advancements in the development and deployment of low-emission coal-based power and carbon-emission mitigation technologies. The conference was hosted by the University of Wyoming School of Energy Resources (SER) in conjunction with Shaanxi Provincial Institute of Energy Resources & Chemical Engineering.

PANELISTS AT THE 5TH INTERNATIONAL ADVANCED COAL TECHNOLOGIES CONFERENCE IN JACKSON HOLE, WYOMING.

Meetings and Workshops

In 2015 CAES hosted or sponsored over 20 meetings that attracted researchers from the region and beyond:

- 69th Northwest Regional Meeting (NORM) of the American Chemical Society
- Advanced Nuclear Manufacturing & Supply Chain Conference (Premiere Technology)
- Big Data Workshop
- Clean Coal Technology Research Fund Symposium
- Energy Education Summit
- Energy Policy Research Conference
- Intermountain Energy Summit
- International Advanced Coal Technologies Conference
- International Conference on Future Technologies for Wind Energy - WindTech 2015
- Landscape Discussion on Energy Law and Policy in the Rockies
- Materials, Modeling, Simulation, and Visualization (MMSV) Workshop
- Midwest Energy Conference- St. Louis- Energy Workforce Development
- Modeling, Experimentation & Validation (MeV) Summer School
- Nuclear Innovation Workshop
- Nuclear Security, Alternative Technologies and Consequence, Management for the Health Physicist Workshop
- Small Modular Reactor Working Group
- Snake River Geothermal Workshop
- Symposium G: Next Generation Electrochemical Energy Storage and Conversion Systems
- University of Idaho Engineering Design Expo
- University of Wyoming Meet and Greet
- Western Initiative for the Dairy Environment Workshop

Research with Impact

Leading the next generation of geothermal energy research

CAES and INL are at the forefront of one of five groups pursuing the development of Enhanced Geothermal Systems for the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy.

The Snake River Geothermal Consortium is proposing to create an engineered geothermal reservoir 8,000 to 12,000 feet below land surface in the southwest corner of the INL site. Water will be circulated through the reservoir to harvest natural geothermal heat for producing electricity.

Phase 1 studies for the Frontier Observatory for Research in Geothermal Energy (FORGE) are underway thanks to $400,000 that DOE awarded to INL in April. CAES' Dr. Robert Podgorney believes the consortium has a good chance of being one of three participants selected for Phase 2, which involves up to $29 million in funding.

Besides INL and CAES, other members of the consortium include DOE's National Renewable Energy Laboratory and Lawrence Livermore National Laboratory. The Center for Advanced Energy Studies includes Idaho State University, Boise State University, the University of Idaho and the University of Wyoming. The University of Oklahoma and the University of Utah have joined the consortium, and an advisory panel representing regulatory agencies, industry and environmental groups is on board. Private-sector partners include Baker Hughes, U.S. Geothermal, Campbell Scientific, Alaska's Chena Power and Mink Geohydro.

"This is a great example of how the national labs will operate in the future, developing highly competitive industry, academic, government and laboratory partnerships that increase U.S. energy security and economic competitiveness; INL and CAES are national leaders in this regard, and FORGE is a great example of what we can do in the future," said Steven Aumeier, INL Associate Laboratory Director and Director of CAES.

DR. ROBERT PODGORNEY HANDLES SAMPLES AT THE USGS CORE SAMPLE LIBRARY.

Drying and detoxifying coal with carbon-free energy

Idaho National Laboratory and University of Wyoming are researching whether heat from a nuclear reactor can be used to dry and detoxify coal from the Powder River Basin. Drying coal with carbon-free energy like what is anticipated from NuScale's small modular reactor could improve the combustion efficiency and reduce CO_2 emissions, thus helping states that depend on coal-fired power meet increasingly stringent EPA requirements.

Increasing the Safety of Nuclear Plant Components

Idaho State University received a $200,000 grant from INL in 2015 to research the performance of nuclear power plant components under flooding conditions. The research, led by Dr. Chad Pope, encompasses small-scale testing of components to develop testing methodologies and gain insight into mathematical models to be used to represent component reliability. The research also includes investigation into the use of Smoothed Particle Hydrodynamic (SPH) modeling, a computational method used for simulating fluid flows.

BOISE STATE UNIVERSITY MECHANICAL ENGINEERING STUDENTS KAHLIL WILLIAMS AND JOEL HOOD LOOK AT A CONTROL PANEL.

Enhancing Industry Energy Efficiency

The CAES Energy Efficiency Research Institute Industrial Assessment Center (CEERI-IAC) based out of Boise State University is a DOE-sponsored program that offers businesses in the Mountain West in-depth energy assessments of their plant sites. An IAC team -- typically junior- and senior-year mechanical engineering students from Boise State, Idaho State or the University of Idaho – studies the production methods and energy usage of a plant. The team meets the company representatives and takes tours, collects data and makes observations on how energy might be saved, and therefore, energy costs reduced. Within 60 days of the site visit, the team compiles a confidential report, including a detailed analysis and recommendations specific to the company site. On average, a visit by an IAC team will save a regional business more than $55,000 a year and pay for itself within 12 to 18 months. To date, the Center has helped approximately 60 companies become more energy-efficient with their assessments.

International Nuclear Safety Research

With a long-term solution for spent nuclear fuel disposal still in the distance, South Korea, which relies on nuclear energy for more than one-third of its electricity, is looking at pyrorocessing as a means of dealing with its growing stockpile.

Idaho State University and the Korea Atomic Energy Research Institute have engaged in fundamental nuclear safety research that will be necessary to any pyroprocessing facility that might be built. Work has been done under three contracts. The first addressed pyroprocessing safety and regulations. The second expanded on the first, delving into hazard evaluation and safety system selection. The third, a $160,000 contract issued in September 2015, focuses on a pre-conceptual facility design, including initial hazard analysis, shielding and criticality safety and probabilistic risk analysis. Research is led by Dr. Chad Pope.

THE PALISADES RESERVOIR IN THE CARIBOU-TARGHEE NATIONAL FOREST.

Addressing the World's Food, Energy, and Water Needs

By 2050, the world's population is expected to reach 9.6 billion. As a consequence, food production must nearly double by that time using roughly the same amount of energy and water. The University of Idaho-led Center for Advanced Energy Studies initiative on Food-Energy-Water is working on solutions to meet this rising demand and challenge to our resources.

Food processing requires lots of water and energy and is central to Idaho and the region's agricultural economy. Regional industries have major challenges in updating food processing infrastructure, reducing energy demand, minimizing impacts on the environment and conserving water. A new generation of workers needs to be educated to operate new technologies and solve problems for industries that are vital to our society and the world. The University of Idaho, in partnership with CAES, is stepping up to the challenge by exploring several research opportunities that will lead to more efficient food production and processing.

"NEET" Research

Drs. Yanliang Zhang and Darryl Butt of Boise State University are leading a team that is researching how to keep tabs on the workings inside nuclear power plants under extreme conditions, like Fukushima in 2011. Zhang and Butt, a CAES associate director, are attempting to see whether heat from a nuclear power plant can be harnessed to drive self-powered sensor networks. Their work is being funded by a three-year $980,804 grant from the Department of Energy called a Nuclear Energy Enabling Technologies (NEET) research and development and infrastructure award. Self-powered sensors eliminate the need for both an external energy supply and power cables. Their work is in collaboration with Dr. Vivek Agarwal of Idaho National Laboratory, and Dr. Zhifeng Ren at University of Houston. The research will significantly expand the existing partnership between BSU and Idaho National Laboratory, and will provide opportunities to train undergraduate and graduate students.

Race for Rare Earth Elements

In 2014, the University of Wyoming joined CAES. With $750,000 from the state of Wyoming, INL and UW began research this year on recovering and processing rare earth elements from domestic coal and coal by-products using methods that are efficient, cost-conscious and environmentally benign. The 17 rare-earth elements in the periodic table that are plentiful in the earth's crust but typically not found in economically exploitable ore deposits. Since 2000, there has been an explosion in demand for items that require rare earth elements: cell phones, tablets, computers, cameras, etc. Rare earth compounds are in batteries that power every electric vehicle and hybrid-electric vehicle. After China began selling rare earth elements at very low prices in the 1980s, production in the United States eventually flat-lined. When China cut exports in 2010, rare earth prices skyrocketed. That motivated new production in the United States and other countries.

Prestigious Nuclear Engineering Grant

The University of Idaho's Nuclear Engineering Program received a $434,048 faculty development grant, part of $16.6 million the NRC awarded to academic institutions in 2015. This will allow the faculty to improve its experimental capabilities and computational resources. The funds will also provide summer support, allowing the faculty to develop ideas into relevant research proposals and new courses for the nuclear engineering program and its core capabilities: thermal hydraulics, passive safety systems, nuclear materials, fuel cycle and safeguarding and increased sustainability. The end result is not only innovative research but a greater number of well-educated graduates entering the nation's technological workforce. With the award of the FY-15 grants, the NRC has awarded more than $138 million since the program began in 2007.

CAES SCIENTISTS ARE RESEARCHING HOW TO RECOVER AND PROCESS RARE EARTH ELEMENTS FROM DOMESTIC COAL AND COAL BY-PRODUCTS.

$1,000,000

CAES RESEARCHERS WON TWO NATIONAL SCIENCE FOUNDATION EARLY CAREER AWARDS OF $500,000 EACH

Operating Safely and Effectively

Operations

During 2015, the CAES consortium performed a comprehensive review of CAES operations, safety protocols, and practices. This was the first comprehensive review since CAES was established and provided an opportunity to examine protocols and practices against real operational history and activities. The review indicated that with some modest adjustment, the protocols and practices are effective when consistently implemented. The review also demonstrated that over time there is a possibility for loss of critical knowledge of systems as staff transition out of CAES, so the team is developing a more structured process to transfer knowledge of specific critical systems and operational practices.

New Premier Capabilities & Equipment

Microscopy and Characterization Suite

Hysitron PI 95 TEM PicoIndenter

This TEM sample holder from Hysitron (right), in CAES' MaCS Lab, is capable of direct-observation nano-mechanical testing inside a transmission electron microscope (TEM). The PI 95 has been carefully designed for compatibility with JEOL, FEI, Hitachi, and Zeiss microscopes. With it, it is not only possible to image the mechanical response of nanoscale materials, but also to observe microscopic deformation mechanisms in real time.

479

NUMBER OF HOURS MACS WAS BOOKED IN JULY 2014

866

NUMBER OF HOURS MACS WAS BOOKED IN JULY 2015

81%

INCREASE IN HOURS BOOKED FROM JULY 2014 TO JULY 2015

CLOSE-UP VIEW OF THE NEW PICOINDENTER IN MACS.

TAP Reactor System for Materials Characterization

Temporal Analysis of Products

Installed in late September at the CAES facility in Idaho Falls, the Temporal Analysis of Products (TAP) reactor system gives researchers a new, very rare capability to support advanced manufacturing. There are fewer than 20 TAP systems in the world and, counting the one at CAES, only three in the United States. Researchers plan to use TAP to design more energy-efficient catalysts for building chemical intermediates from abundant domestic shale gas rather than breaking down petroleum. These chemicals are essential to making products as diverse as disposable diapers and diesel fuel.

X-ray Diffractor

Located in CAES' Advanced Materials Lab, the X-ray diffractor is used to detect structures in crystalline materials, metals and alloys, minerals, organic and inorganic compounds and polymers. Diffraction allows for quick, nondestructive analysis without the need for extensive sample preparation. It gives laboratories around the world the ability to quickly characterize unknown materials in such fields as metallurgy, mineralogy, forensic science, archaeology, condensed matter physics, and the biological and pharmaceutical sciences.

REBECCA FUSHIMI ON THE TAP REACTOR (TOP) AND JATUPORN BURNS ON THE X-RAY DIFFRACTOR IN THE CAES ADVANCED MATERIALS LABORATORY (BOTTOM).

UNIVERSITY OF WYOMING'S 3-D CAVE. PHOTO COURTESY OF UW.

CAES Capabilities at University of Wyoming

Since University of Wyoming joined CAES in October 2014, CAES collaborators have gained access to a host of new capabilities. Highlights include:

Shell 3-D Visualization Center, Advanced Research Computing Center, and the NCAR-Wyoming Supercomputer

The Energy Innovation Center's Shell 3-D Visualization Center houses the only four-walled, 3-D CAVE (Cave Automatic Virtual Environment) in Wyoming and is much like the Computer-Assisted Virtual Environment (CAVE) located in the CAES Idaho Falls facility. One of the laboratory's many capabilities is its ability to model oil, gas, and water movements and interactions in the subsurface environment, which will aid researchers and energy companies in deriving maximum value from their mineral resources.

The laboratory connects via 10-gigabit lines to one of the most powerful supercomputers in the region – the Wyoming National Center for Atmospheric Research Supercomputing Center (NWSC) located west of Cheyenne and UW's Advanced Research Computing Center (ARCC) – both essential for the complex simulations required in today's energy research.

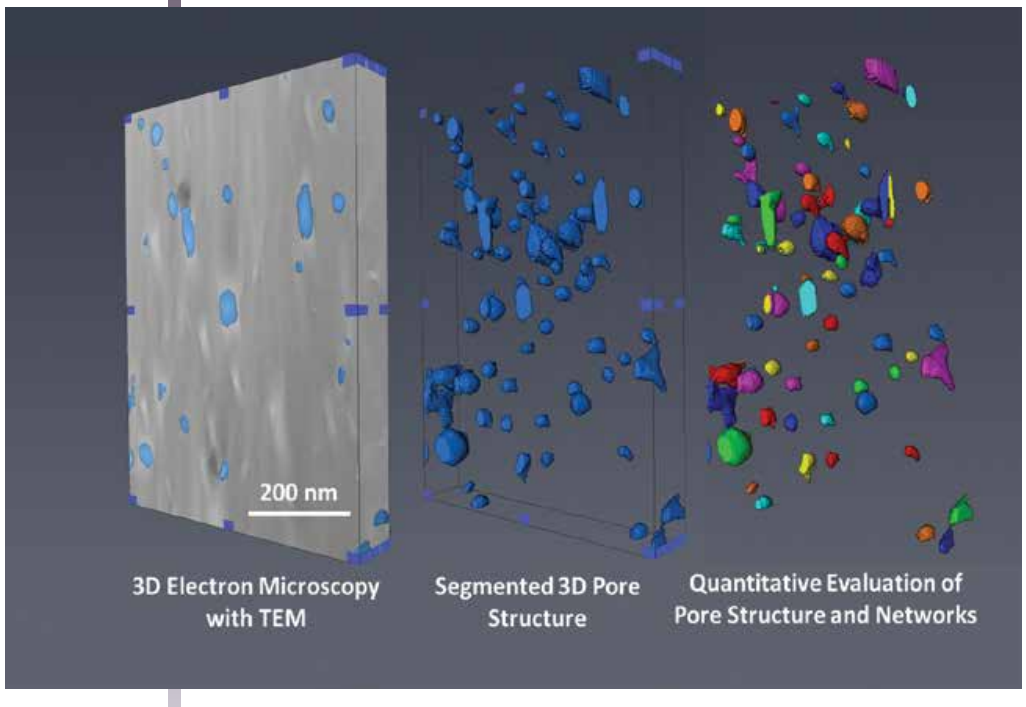
UNIVERSITY OF WYOMING'S PEABODY ADVANCED COAL LAB (ABOVE) AND HESS DIGITAL ROCK PHYSICS LABORATORY (INSET). PHOTOS COURTESY OF UNIVERSITY OF WYOMING

Hess Digital Rock Physics Laboratory

The Hess Digital Rock Physics Laboratory located in the Energy Innovation Center includes the most advanced high-resolution 3-D X-ray microscope available for studying underground oil and natural gas reservoirs. UW is the world's first university to provide access to this state-of-the-art tool.

Peabody Energy Advanced Coal Technology Laboratory

Located on the first floor of the Energy Innovation Center, the Peabody Energy Advanced Coal Technology Laboratory is used primarily to analyze and research coal conversion technologies. Scientists are researching methods to convert low-value fossil resources into higher-value products – or advanced conversion. This lab also supports research in the conversion of natural gas and coal into various manufactured products and liquid fuels.



3-D TOMOGRAPHY OF SHALE MATERIALS TAKEN WITH A TRANSMISSION ELECTRON MICROSCOPE.

3-D Software

Boise State University acquired Avizo, a 3-D analysis program for scientific and industrial data (CAES in Idaho Falls has Amira, a similar software). In materials science, geosciences or engineering applications, Avizo offers state-of-the-art image data processing, exploration and analysis features within an intuitive workflow and easy-to-use graphical user interface. It is being used to model shale formations by a team at CAES that includes BSU's Patrick Price and INL's Earl Mattson and Hai Huang.

Ceramic Fiber Testing

Dr. Darryl Butt, BSU's Materials Science and Engineering Department chairman and an associate director of CAES, procured capabilities for testing the strength of ceramic fibers as thin as 1/10th the diameter of a human hair. CAES is working in collaboration with Advanced Ceramic Fibers, an Idaho Falls startup company producing high-performance, low-cost alpha silicon carbide/carbon fibers for use in specialty applications and metal and ceramic matrix composites. Butt also received $80,000 from Idaho's Higher Education Research Council for two gloveboxes.

$80,000

RECEIVED FROM IDAHO'S HIGHER EDUCATION RESEARCH COUNCIL FOR TWO GLOVEBOXES

ESTEC Upgrades

In response to a growing need for engineering technicians in the energy sector, the College of Technology at Idaho State University has established the Energy Systems Technology and Education Center (ESTEC) on the Idaho State University campus in Pocatello. Partnership with CAES has supported the department's ability to produce graduates with the precise skills required by the energy industry. Upgrades include installation of a Distributive Control System (DCS) with Programmable Logic Controllers (PLC) integration and additional SMART transmitters that communicate through wireless and HART protocols.

AN ESTEC STUDENT DEMONSTRATES A WIRELESS VALVE.

Environmental Chambers

Purchased with an Idaho Global Entrepreneurial Mission (IGEM) grant, the benchtop environmental chambers in the Micron Engineering Center at BSU can produce extended temperature ranges as cold as -70 C. They allow for testing the durability of advanced energy materials, particularly those used in batteries, at extreme conditions without having to use a larger, stand-alone chamber.

Linseis LFA 1000 Laser Flash

The Linseis LFA 1000 Laser Flash is the most modular and precise instrument for measuring the thermal diffusivity, conductivity and specific heat values of solids, powders and liquids. It is capable of six simultaneous samples ranging in temperature from minus 125 to 2800°C. Purchased with money from CAES' Micron donation, it is located on the Boise State University campus.

Linseis LSR -3

If waste heat from hot engines and combustion systems could be captured and converted into electricity with thermoelectric devices, it could save billions of dollars. Linseis has developed the LSR -3 for evaluating Seebeck Coefficient/Electric Resistance measurements from minus 100 up to 1500°C. This capability is located on the Boise State University and is primarily being used for CAES-related thermoelectric research.

PS6100 Spectroscopy

Located in Boise State University's Micron Engineering Center, Positron Annihilation Spectroscopy is a nondestructive materials testing technique that detects defect concentrations and residual stress in materials. Its common use is to investigate the source of large component failures in a nondestructive manner.

People: Appointments, Awards, and Accomplishments

Geoffrey Black, Boise State University associate professor of economics, won the 2015 Energy Policy Institute Associate of the Year award.

GEOFFREY BLACK, WINNER OF THE 2015 ENERGY POLICY INSTITUTE ASSOCIATE OF THE YEAR AWARD.

Darryl Butt, Boise State University, received the Richard E. Tressler Materials Science Award and Lecture from Penn State University.

Indrajit Charit, University of Idaho, won the ASM-IIM Visiting Lectureship Award.

John Gardner, director of the CAES Energy Efficiency Research Institute based out of Boise State University, was elected a fellow of the American Society of Mechanical Engineers (ASME).

Robert Hiromoto, University of Idaho, submitted an Invention Disclosure Record (IDR) # BA-871, titled, "Branch and Bound Algorithm for Optimization of Dynamic Systems using LENDIT Metrics and S2R2 Sets," submitted by Joseph Nielsen, Robert E. Hiromoto and Akira Tokuhiro.

Courtney Hollar, a Boise State University graduate student, received a three-year National Science Foundation Graduate Fellowship.

Adamu Kadiri, an Idaho State University doctoral student, received the Roy G. Post Foundation Scholarship (nuclear waste management).

Nick Kempf, a graduate student at Boise State University, received a three-year DOE NEUP Graduate Fellowship.

Jay Kunze, Idaho State University, won a five-year Specialized Training of Nuclear Regulatory Commission (NRC) Inspectors on Motor Operated Valves award from the NRC Training Center in Chattanooga, Tennessee.

Masego Lepule, Boise State University student, won a William Fulbright Fellowship.

Gabriel Potirniche, University of Idaho, received a University Mid-Career Faculty Award.

Deepesh Poudel, an Idaho State University doctoral student, won the 2015 HPS F. Ward Whicker Scholarship, and award for graduate studies in health physics.

Luke Schoensee, a Boise State University undergraduate student, received a best paper award at the International Conference on Thermoelectrics.

Matthew Swenson, Boise State University student, won Best Student Poster Award in Microstructural Processes in the Irradiated Materials Symposium at The Minerals, Metals & Materials Society (TMS) Annual Meeting in Orlando, Florida.

Janelle Wharry, assistant professor of materials science and engineering at Boise State University, won a Nuclear Regulatory Commission Faculty Development Award.

Janelle Wharry, assistant professor of materials science and engineering at Boise State University, received a Nuclear Regulatory Commission Young Faculty Award.

Claire Xiong, assistant professor of materials science and engineering at Boise State University, won a Faculty Early Career Development (CAREER) award from the National Science Foundation.

New Research Staff

Dr. Rebecca Fushimi
Research Scientist, Idaho National Laboratory

In summer 2015, CAES and INL's Materials Science & Engineering Department welcomed research scientist Dr. Rebecca Fushimi. Prior to coming to CAES, Dr. Fushimi was the executive director of the Langmuir Research Institute in St. Louis, Missouri, and an adjunct professor at St. Louis University. Her previous research focused on catalyst development and using a unique transient kinetic characterization technique (known as Temporal Analysis of Products, or TAP). In her current position, Dr. Fushimi will continue research using TAP and plans to expand use of TAP to interfacial chemistry and materials characterization.

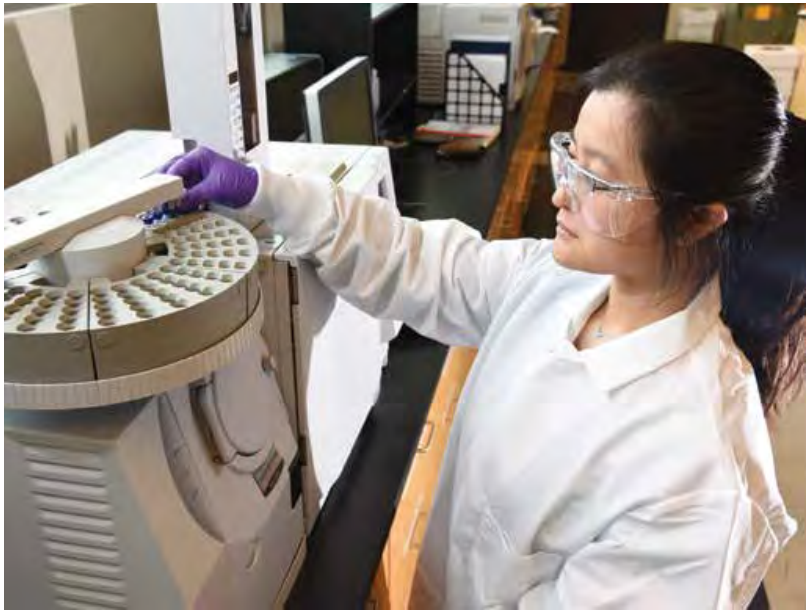
Dr. Bob Borrelli
Assistant Professor, Nuclear Engineering, University of Idaho

In July 2015, CAES and University of Idaho welcomed Dr. Bob Borrelli as an assistant professor of nuclear engineering. Dr. Borrelli received his doctorate in nuclear engineering from the University of California-Berkeley. He then worked as a research associate at the University of Tokyo and postdoctoral researcher at UC-Berkeley. His dissertation and University of Tokyo research focused on radionuclide modeling in a high-level waste repository. Dr. Borrelli's UC-Berkeley postdoctoral and current research involves scientific computing applications to the development of safeguardability methodologies for the advanced fuel cycle.

Education & Outreach

1891 VISITORS EXPERIENCED THE CAES COMPUTER-ASSISTED VIRTUAL ENVIRONMENT (CAVE) 3-D DATA IMMERSION RESEARCH ENVIRONMENT.

1558 VISITORS TOURED CAES ON 90 DIFFERENT TOURS OF THE CAES FACILITY IN 2015.



CAES GRADUATE ASSISTANT MENG SHI FROM UNIVERSITY OF IDAHO WORKS IN THE CAES ANALYTICAL CHEMISTRY LABORATORY.

New CAES Competitive Graduate Assistantship Program

This year, University of Idaho (UI) and University of Wyoming (UW) created new CAES graduate assistantship programs to catalyze interdisciplinary, cooperative energy research and academic programs, promote workforce development, and engage industry partners in transformational energy programs. The program also promotes enhanced faculty–to-faculty inter-institutional collaboration requiring students in the program to work on a project that involves participation from at least two CAES member institutions. The University of Idaho program supports a UI graduate student at the master's or doctoral level for up to two years.

This year's UI CAES graduate assistants were electrical-civil engineering student Taylor Romenesko, working with Dr. Erik R. Coats on a project to integrate algal biomass into a broad-based Dairy Manure Resource Recovery Technology, and doctoral student Meng Shi, working with Dr. Haiyan Zhao on novel heterogeneous catalysts for synthetic fuels.

University of Idaho

This year, University of Wyoming funded four CAES graduate assistantships for collaborative research projects and one additional graduate assistant to develop a Western Energy Corridor Resource Map. The UW graduate assistantship topics include evaluating unconventional rare earth element resources from energy production in Wyoming, the technical, economical, and geological feasibility of rare earth element extraction from the nation's most prolific coal resources, nanocatalysts and separation technologies for advanced energy conversion and produced water treatment, and rare earth element catalyst research.

UNIVERSITY OF WYOMING

121

EVENTS HELD IN CAES IN 2015

963

TOTAL NUMBER OF STEM VISITORS

Boise State University Wins Collegiate Wind Competition 2015

Seven teams of students from across the country gathered at the National Renewable Energy Laboratory's National Wind Technology Center (NWTC) for a fierce blade-to-blade wind turbine rematch. At the Department of Energy Collegiate Wind Competition 2015 Engineering Contest, teams of undergraduates tested original designs of model wind turbines in an on-site wind tunnel and presented their technical designs to wind technology experts. The Boise State University team took first place, winning the competition with an innovative wind turbine design.

BOISE STATE UNIVERSITY

THE FIRST PLACE BOISE STATE UNIVERSITY TEAM AT THE 2015 COLLEGIATE WIND COMPETITION HELD AT NREL'S NATIONAL WIND TECHNOLOGY CENTER JUST SOUTH OF BOULDER, COLORADO. (PHOTO BY DENNIS SCHROEDER / NREL)

"This internship was an amazing opportunity to understand what a job in scientific research would look like. It helped me to understand what I would like to do in my life."

–INL 2015 summer intern

Internships

This year, 87 interns worked on CAES-related projects or came from CAES partner universities and worked on Idaho National Laboratory projects. CAES and INL internships provide opportunities for the best and brightest students to further their education by working with world-class scientists and engineers, plus showcase universities and INL to researchers from around the world. Interns have the opportunity to learn how to solve real-world problems under the guidance of distinguished scientific and technical experts.

INL SUMMER IONTERN LOREN ANDERSON (TOP). AN INL INTERN RESEARCHES A SUPER CRITICAL FLUIDS CATALYST (BOTTOM).

Idaho State University
McKenzie Whitesides, BA, English
Joseph Pehrson, BA, Art and Business
Wyatt Hill, BS, Psychology
Sergio Hernandez, BS, Microbiology
Caryn Wendt, BS, Civil Engineering
Spencer Denton, BS, Computer Science
Larinda Nichols, BS, Nuclear Engineering
Mary Toston, BS, Nuclear Engineering
Rhett Backstrom, BS, Computer Science
Colter Rasmussen, BS, Electrical Engineering
Sam Giegel, BS, Nuclear Engineering
Shane Rielly, BS, Computer Science
Nicholas Wilmot, BS, Accounting
Brady Smith, BS, Accounting
Jordan Castle, BS, ESTEC
Julie Tomchak, BS, ESTEC
Jacob Ivie, BS, ESTEC
Bret Scott, BS, ESTEC
Jonathon Taylor, BS, ESTEC
Jonathon Taylor, BS, Mechanical Engineering
Korbin Traughber, BS, Mechanical/Nuclear Engineering
Sean McClellan, BS, ESTEC
Daniel Beaderstadt, BS, ESTEC
Cameron Nielsen, BS, ESTEC
Marko Sterbentz, BS Computer Science
Namie VanDyke, BS, Biology
Marie Holmer, MS, Geotechnology
Robin Baker, MS, Nuclear Engineering
Dane Sterbentz, MS, Nuclear Engineering
Shiloh Elliott, MS, Geographical Information Systems

University of Idaho
Payton McGriff, BA, Architecture
Mary Ellen Case, BS, Chemistry
Morgan Dieckmann, BS, Civil Engineering
Leilani Beard, BS, Environmental Sciences
Michael West, BS, Electrical Engineering
Hillary Hanson, BS, Applied Mathematics
Hayden Smotherman, BS, Physics
Keith Drew, BS, Computer Science
Callan McGriff, BS, Mining Engineering
Emily Mariner, BS, Computer Science
Jeffery Porter, BS, Chemical Engineering
Matthew Brown, BS, Computer Science
Matthew Dieckmann, BS, Mechanical Engineering
Cristofer Farnetti, BS, Mechanical Engineering
Paden Rumsey, BS, Computer Science
Hannah Pearson, BS, Computer Science
Kateryna Savchenko, MA, Psychology
Brendi Heath, MS, Environmental Science
Zachary Spielman, MS Experimental Psychology
Lei Tu, PhD, Nuclear Engineering
Thomas Ulrich, PhD, Neuroscience
Kamshad Eshghi, PhD, Electrical Engineering

Washington State University
Rachel Wood, MA, Geophysics
Mathew Snow, PhD, Radiochemistry

Boise State University
Arthur Figueiredo, BS, Materials Science
Alex Schmidt, BS, Mechanical Engineering
Riley Parrish, BS, Material Science and Engineering
John Mulvaney, BS, Nuclear Engineering
John-Paul Stroud, BS, Materials Science

Stanford University
Yayu Hew, PhD, Aero/Astro Engineering

University of Southern California
Juha Nieminen, MS, Astronautical Engineering
Brian Franz, PhD, Astronautical Engineering
Adarsh Rajguru, PhD, Astronautical Engineering

Hillcrest High School,
Cole Mortensen, HS, General Studies
Skyline High School,
Ryan Myers, HS, General Studies

Brigham Young University–Idaho
Andrew Johnson, BA, Mechanical Engineering
Brittany McGuinness, BA, Biology

Utah State University
Matthew Ralphs, MS, Mechanical Engineering
Kurt Harris, PhD, Mechanical Engineering

University of Utah
Manas Pathak, PhD, Chemical Engineering
Gorakh Pawar, PhD, Chemical Engineering

DID YOU KNOW?
87
CAES AFFILIATES HOSTED 87 INTERNS FROM 18 ACADEMIC INSTITUTIONS IN 2015.

Virginia Tech
Meng-Jen Wang, PhD, Nuclear Engineering

Missouri S&T
Mikayla Molnar, BS, Nuclear Engineering
Philip Rexing, BS, Nuclear Engineering

University of Wyoming
John Brouwer, BS, Energy Resource Management
Rajiv Khadka, PhD, Computer Science

University of Tennessee
Kelsa Benesky, PhD, Nuclear Engineering

University of North Texas-Denton
Sabhashish Meher, PhD, Material Science and Engineering

Texas A&M University
Akansha Kumar, PhD, Nuclear Engineering

University of Alabama
Kevin Schillo, PhD, Aerospace Systems Engineering

Georgia Institute of Technology
Alexander Moore, PhD, Nuclear Engineering

Advancing Industry Competitiveness

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COMPANIES CAES WORKED WITH ON COLLABORATIVE EFFORTS IN FY 2015

CAES Industry Advisory Board Established

Primarily two drivers are defining the future outlook for global energy demands and infrastructure transitions: 1) a dramatic increase in the human population, and 2) the contribution of greenhouse gases to global climate change. This will place unprecedented pressure on our ability to provide sufficient energy, water and food. Our energy systems will undergo enormous transitions as we add more clean and renewable sources to existing fossil fuel and nuclear sources.

To meet this grand global challenge, CAES must leverage our collective expertise to partner with the private sector to advance regional energy solutions that have global impact. Our CAES Strategic Plan (2016-2022) calls out the necessity for CAES to become a national and global model for federal and state agencies to work effectively with the private sector. This year, we formed a CAES Industry Advisory Board to help develop a path forward for enhanced public-private partnerships. The Industry Advisory Board will provide guidance and assistance for how CAES, and its consortium members, can engage with industry partners and enable technologies to be commercialized.

Industry Advisory Board

Bill Bellamy, CH2M HILL, Fellow & Sr. VP

Paul Kjellander, Idaho Public Utilities Commission, President

Jay Larsen, Idaho Technology Council, President & Founder

Jeff Malmen, IDACORP & Idaho Power, VP for Public Affairs

Jim Nottingham, LJ Enterprise (Hewlett-Packard), VP and General Manager

Janine Rush-Byers, Micron, University Relations Manager

David Spurling, Simplot, Sr. VP, Secretary, and General Counsel

Raino Zoller, Trailhead, Executive Director

CAES Work with Industry in FY 15

Industry highlights from this year include:

BSU's Energy Policy Institute collaborates with NuScale Power

The Center for Advanced Energy Studies' Energy Policy Institute (EPI) is working with NuScale Power, a developer of small modular nuclear reactors, to analyze the potential "economies of small" over the life cycle of a plant. EPI's David Solan and Dave Koehler are collaborating with BSU Economics Associate Professor Geoff Black and the University of Idaho's Fatih Aydogan (nuclear engineering) and Steven Peterson (economics) on the project.

NanoSteel Co. uses MaCS for advanced steel testing

NanoSteel used the CAES Microscopy and Characterization Suite to elucidate basic structural features in the development of next generation Advanced High Strength Steel (AHSS). They used Atom Probe Tomography combined with advanced sample preparation using Focused Ion Beam (FIB) at MaCS to study the chemical hierarchy of nanoscale grains and grain boundaries.

Accelerating Lab Impact – Lab-Corps Pilot Program

In 2014, the Department of Energy launched a $2.3 million pilot program called Lab-Corps to accelerate the transfer of innovative clean energy technologies from the national laboratories into the commercial marketplace. CAES affiliate Idaho National Laboratory is one of seven laboratories participating in the Lab-Corps pilot program. INL selected two entrepreneurial teams, both consisting of three people: a principal investigator, an entrepreneurial lead and an industry mentor. Each team focuses on one new technology.

INL's teams have the advantage of being able to tap into CAES universities. CAES members participating in Lab-Corps include Idaho State University's Small Business Development Center, Boise State University Venture College, and the Technology Deployment team at INL. This unique program allows the students working on the market assessments for the teams to get real-world experience and the INL teams to receive invaluable data.

Autonomous Systems Center of Excellence Fosters Cooperation and Innovation

In 2015, CAES and the Idaho Department of Commerce established the Idaho Autonomous Systems Center of Excellence (ASCE, pronounced "ace").

ASCE was created to foster the swift development, deployment, and commercialization of technologies that advance the competitiveness of the region, especially in the area of agriculture technology. ASCE has already generated regional economic benefits and is driving new business, university, and government partnerships. ASCE is intent on using unmanned aerial systems to take regional agriculture to the next level of high-tech.

ASCE provides a range of products and services for unmanned aerial systems (UAS) developers, researchers and users in need of access to test ranges, facilities, and most importantly, the equipment and personnel to acquire, analyze and visualize large complex data sets.

ASCE PROVIDES A RANGE OF PRODUCTS AND SERVICES FOR UNMANNED AERIAL SYSTEMS (UAS) DEVELOPERS, RESEARCHERS, AND USERS.

Publications, Presentations, & Proceedings

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4. Akbas, S., V. Martinez-Quiroga, F. Aydogan, C. Allison, and A Ougouag, 2015, "Survey Coupling Schemes in Traditional Coupled Neutronics-Thermal-Hydraulics Codes," ASME 2015 International Mechanical Engineering Congress and Exposition, upcoming presentation *IMECE201552990*, Houston, Texas, November 13-19, 2015.
5. Alanko, G. A., B. J. Jaques, A. Bateman, and D. P. Butt, 2014, "Mechanochemical Synthesis and Spark Plasma Sintering of Cerium Silicides," *Journal of Alloy Compounds* 616: 306–311.
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14. Andrews, B. and G. P. Potirniche, 2014, "Explicit and Implicit Lifetime Assessment Methods of 9Cr1Mo Steel Under Combined Creep and Fatigue Loads Using a Strip Yield Model," *International Mechanical Engineering Congress and Exposition (IMECE2014)*, Toronto, Canada, November 14–20, 2014.
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16. Aydogan, F., G. Black, M. Black, and D. Solan, 2015, "Quantative and Qualitative Comparison of Light Water and Advanced Small Modular Reactors," *Journal of Nuclear Engineering and Radiation Science*, Nuclear Safety Special Issue, DOI: 10.1115/1.4031098.
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18. Aydogan, F., 2015, "Coupling between RELAP5 and LabVIEW," Hacettepe University, March 12, 2015
19. Aydogan, F., 2015, "More Conservative Governing Equations," Texas A&M, January 21-22, 2015.
20. Aydogan, F., 2015, "New Developments in Nuclear Safety," *in International Nuclear Power Plants Summit*, March 19, 2015.
21. Aydogan, F., 2015, "Space Reactors," Istanbul Technical University, May 5, 2015.
22. Aydogan, F., J. Pack, and Z. Fu, 2015, "Qualitative and Quantitative Evaluation of Coupling Approaches for Coupling of RELAP and LabVIEW," *Nuclear Science and Engineering Journal*, RELAP5-3D Special Issue, NSE15-4.
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29. Braine, T., B. J. Jaques, J. Watkins, and D. P. Butt, 2015, "Preparations for Hydrothermal Corrosion of Uranium Nitride Composite Fuels," *Idaho Conference on Undergraduate Research*, Boise, Idaho, July 30, 2015.
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36. Butt, D. P. and P. Price, 2015, "Thermochemical Stability of Lanthanum Orthoferrite, Oxygen Ion Conducting Materials," Imperial College, London, April 2015.

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38. Cárdenas, E. S., E. T. E. Reedy, H. A. Seipel, B. H. Failor, and A. W. Hunt, 2015, "Comparison of Fission Signatures from β-delayed γ-ray and Neutron Emissions," *Nuclear Instruments & Methods in Physics Research A* 792: 67.

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40. Charit, I., S. Pasebani, Y. Wu, J. Burns, K. N. Allahar, D. P. Butt, and J. I. Cole, 2015, "Lanthana-Bearing Nanostructured Ferritic Steels via Spark Plasma Sintering: Microstructural Characteristics and Mechanical Behavior," submitted to *Journal of Nuclear Materials*.

41. Chen, W.-Y., Y. Miao, C. A. Tomchik, J. Gan, M. Okuniewski, Y. Q. Wu, S. A. Maloy, and J. F. Stubbins, 2014, "Microstructure and Mechanical Property Studies on Neutron-Irradiated Ferritic Fe-Cr Model Alloys," *The Nuclear Materials Conference (NuMat 2014)*, Hilton Clearwater, Florida, October 27–30, 2014.

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45. Csarnovics, I., M. R. Latif, T. Nichol, W. Kuang, M. Mitkova, M. Veres, S. Kokenyesi, 2015, "Dual Effects of Photo-Darkening and Photo-Bleaching in Ge-Se Films," *Journal of Material Science and Engineering A* 5(1–20): 78–86.

46. Collins, J. A., G. P. Potirniche, and S. R. Daniewicz, 2015, "Failure Modes: Performance and Service Requirements for Metals," *Mechanical Engineers' Handbook: Materials and Mechanical Design*, 4th Edition, Volume 1, Editor: M. Kutz, Wiley.

47. Cutler, R., J. Lu, J. Mok, C. Deng, K. Smith, J. Zhang, and H. Xiong, 2015, "A Redox-Active Porous Organic Framework for Efficient Energy Storage in Na-ion Batteries," (poster) *MRS 2015 Spring Meeting*, San Francisco, California, April 2015.

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50. Demkowicz, P. A., J. D. Hunn, R. N. Morris, C. A. Baldwin, J. M. Harp, P. L. Winston, S. A. Ploger, T. J. Gerczak, I. J. van Rooyen, F. C. Montgomery, and C. M. Silva, 2015, "Irradiation Performance of AGR-1 High Temperature Reactor Fuel," paper HTR2014-31182, to be published in *Proceedings of the 7th International Topical Meeting on High Temperature Reactor Technology (HTR2014)*, Weihai, China, October 27–31, 2014.

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53. Dunzik-Gougar, M. L., 2014, "Radionuclide Production in HTGR Graphite," *7th International Topical Meeting on High Temperature Reactor Technology (HTR2014)*, INET, Tsinghua University, Weihai, China, October 2014.

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55. Dunzik-Gougar, M. L., 2015, "The Basics of Radiation and Radioactivity," *ANS Congressional Seminar Series*, Washington, D.C., March 20, 2015.

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57. Dunzik-Gougar, M. L., I. J. van Rooyen, P. M. van Rooyen, and C. M. Hill, 2015, "Effects of CVD Production Parameters and Annealing on the Grain Characteristics of a Thin Silicon Carbide Layer," *Journal of Nuclear Materials*, submitted September 2015.

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66. Guillen, D. P., 2015, "Radiation Effects on the Thermophysical Properties of a New Neutron Absorbing Material," *2015 TMS Annual Meeting*, Orlando, Florida, March 1519, 2015.

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71. Harris, J. T., 2014, "Nuclear Energy and Security," *Naval Post Graduate School Energy Academic Group Seminar Series*, Monterey, California, November 14, 2014.

72. Harris, J. T., 2014, "International Nuclear Security Education Network (INSEN): Structure, Accomplishments, and Lessons Learned," *United Nations 1540 Committee*, United Nations, New York, New York, November 17, 2014.

73. Harris, J. T., 2015, "IAEA Radiation Source Controls in the Era of Global Terrorist Threats," *2015 NATC ISOE ALARA Symposium*, Ft. Lauderdale, Florida, January 11, 2015.

74. Harris, J. T., 2015, "Materials and Resources for Nuclear Security Education (including online resources)," P*NS and KCL Advanced Nuclear Security Curriculum Design Workshop*, Vienna, Austria, February 23–24, 2015.

75. Harris, J. T., 2015, "Assessing the Effect of INSEN Activities on Nuclear Security Education," 2015 International Nuclear Security Education Network (INSEN) Working Group Meeting, Vienna, Austria, February 25–27, 2015.

76. Harris, J. T., 2015, "Securing Nuclear Materials: Destructive Analysis and Non-Destructive Assay," *U.S. Department of State PNS Webinar series*, Pandit Deendayal Petroleum University, India, April 16, 2015.

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78. Harris, J. T., 2015, "Nuclear Security: Threats and Terrorism," *U.S. Department of State PNS Webinar series*, Gadjah Mada University, Indonesia, May 5, 2015.

79. Harris, J. T., 2015, "Nuclear Security: Teaching Methods, Design Basis Threat, and Curriculum Development," *Department of State PNS and University of Georgia CITS Nuclear Security Curriculum Development Workshop*, Vienna, Austria, May 12–15, 2015.

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SUBJECT

Board Policy III.P. Students – Student Health Insurance – First Reading

REFERENCE

April 2012	State Board of Education (Board) consideration of several options for SHIP policy waiver. Motion failed.
September 2012	Board considered first reading of amendments to SHIP policy. Motion failed.
April 2013	Board consideration of SHIP policy one-year waiver for Lewis-Clark State College with respect to mandatory student health insurance coverage. Returned to committee for further consideration.
December 2013	Board returned SHIP policy to committee for further consideration.
January 2015	Board approved first reading of proposed changes to Board Policy III.P.16 student health insurance.
February 2015	Board approved second reading of III.P.16.
August 2015	Board approved the first reading of proposed changes to Board Policy III.P.16.
October 2015	Board approved second reading of proposed changes to Board Policy III.P.16
December 2016	Board approved waiver to Board Policy III.P.16.b.i (which contained the definition of minimum required elements for "Affordable Care Act (ACA)-compliant" health insurance policies) and III.P.16.b.iv (actions required in the event of "non-compliance" with Board policy).

APPLICABLE STATUTES, RULE OR POLICY

Idaho State Board of Education Governing Policies & Procedures, Section III.P.16.

BACKGROUND / DISCUSSION

In December 2015 the Board waived two sub paragraphs of the Student Health Insurance policy. The waiver:

1. Eliminated the definition of "ACA-compliant" policies (which had listed ten mandatory criteria which, as determined upon later investigation, do not necessarily apply to ACA-compliant, large group policies, and would have categorized a large number of adequately-insured students as out of compliance with Board policy); and

2. Removed the mandatory guidelines previously in effect for full-time students found to be out of compliance with Board policy, giving institution presidents the discretion to deal with students on a case-by-case or group basis. The waiver prevented students who were covered under their parents' large group health policies from being classified as non-compliant after institutional audits of students'

insurance coverage. The waiver also enabled continued enrollment of students who fell into the "coverage gap" (incomes too low to qualify for federal subsidies which would have assisted them in acquiring insurance, but too high to qualify for Medicaid under Idaho's current criteria). These students, many of whom were recognized by federal authorities as exempt from having to acquire health insurance, were automatically identified as non-compliers under Board policy and therefore ineligible to enroll as full-time students, regardless of other arrangements that they and their families had made. The temporary waiver has also provided more flexibility to institutions working with students and families for whom an "ACA-compliant" policy with high annual costs ($2,500 to $3,000 per year) and high deductible levels (often over $1,000 per year) might put access to any the five institutions covered by Board policy out of reach.

The Board specified that the current waiver would remain in effect until September 1, 2016 (in order to prevent disruption to student enrollment through the fall 2016 semester)—or until amendment to policy Board III.P.16, whichever occurs first. Though the current waiver provides relief to the institutions and affected students for the current semester (spring 2016) and those hoping to enroll full-time in the upcoming (fall 2016) semester, the Board office continues to receive many calls of concern from students, families, insurance providers, and legislators regarding the mandatory health insurance provisions in Board policy.

Federal regulations and guidelines on health insurance are still in flux, as are the various plans offered by insurance providers. There is an ongoing "shake out" of firms participating in state health insurance exchanges. The one constant factor appears to be increasing costs, sometimes accompanied by reduced benefits. It is difficult to predict additional changes which may affect individuals, families, and institutions after the upcoming federal elections. It is also difficult for the Board to put in place a, "one size fits all" policy on student health insurance that would allow the flexibility needed on a group or case-by-case basis by students; or the discretion needed by the institutions to deal with their unique student populations, in-house health support/medical resources, and local community characteristics.

The proposed amendment would restore a measure of the flexibility and discretion enjoyed by the four four-year institutions and the technical college prior to the establishment of the Board's original student health insurance policy that became effective July 1, 2003. The original justification for the Board's policy—that uninsured students might pose an unsustainable drain on county and state contingency funds—has not been realized. With the advent of federal laws and guidelines on individual and employer health insurance, Board policy no longer serves as the primary determinant on whether students should be insured and, if so, in what manner. The proposed amendment would "level the playing field" so that students at the five institutions covered under current Board policy would be treated in the same manner as students at Idaho's community colleges; and full-time students could have the same flexibility on health insurance matters that part-

time students currently enjoy—subject to requirements which may be established by the presidents of the institutions.

IMPACT

The proposed amendment will eliminate the Board-level mandate that full-time students must obtain health insurance policies. The amended policy will give the presidents of Boise State University, Idaho State University, Lewis-Clark State College, the University of Idaho, and Eastern Idaho Technical College the authority to establish health-insurance requirements for all or particular groups of students (e.g., international students, intercollegiate athletes, students in designated health-profession or student teachers, etc.). Institutions would continue to be authorized to offer their own optional or mandatory insurance programs or health support programs funded by student activity or point of service fees. The amended policy would note that, when required by an institution, insurance and/or mandatory health support fees are authorized uses of student financial aid.

ATTACHMENTS

Attachment 1 – Section III.P.16. Student Health Insurance Page 5

STAFF COMMENTS AND RECOMMENDATIONS

The proposed amendment should ameliorate problems which are impacting hundreds of students at each of the five institutions covered by current Board policy and reduce the volume of complaints/concerns expressed by students, parents, and legislators. The amended policy is better-suited to the current situation at the national, state, and local levels. The amendment provides appropriate flexibility to the institutions and their students. It is anticipated that the amended policy will have a positive impact on access, enrollment, and affordability at the affected institutions. Staff recommends approval.

BOARD ACTION

I move to approve the amendment to Board policy III.P.16, as presented in attachment 1.

Moved by_____ Seconded by_____ Carried Yes____ No____

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Idaho State Board of Education
GOVERNING POLICIES AND PROCEDURES
SECTION: III. POSTSECONDARY AFFAIRS
SUBSECTION: P. STUDENTS February 2016 ~~October 2015~~

The following policies and procedures are applicable to or for any person designated as a student at an institution under governance of the Board. A "student" means any person duly admitted and regularly enrolled at an institution under governance of the Board as an undergraduate, graduate, or professional student, on a full-time or part-time basis, or who is admitted as a non-matriculated student on or off an institutional campus.

1. Nondiscrimination

It is the policy of the Board that institutions under its governance must provide equal educational opportunities, services, and benefits to students without regard to race, color, religion, sex, national origin, age, handicap, or veterans status, including disabled veterans and veterans of the Vietnam era in accordance with:

a. Title VI of the Civil Rights Act of 1964, as amended, 42 U.S.C. 2000d *et seq*., which prohibits discrimination on the basis of race, color, or national origin in programs and activities receiving federal financial assistance.

b. Section 504 of the Rehabilitation Act of 1973, as amended, 29 U.S.C. 794, which prohibits discrimination on the basis of handicap in programs and activities receiving federal financial assistance.

c. Title IX of the Education Amendments of 1972, as amended, 20 U.S.C. 1681 *et seq*., which prohibits discrimination on the basis of sex in education programs and activities receiving federal financial assistance.

d. The Age Discrimination Act of 1975, as amended, 42 U.S.C. 6101 *et seq*., which prohibits discrimination on the basis of age in programs or activities receiving federal financial assistance.

e. Chapter 59, Title 67, Idaho Code, and other applicable state and federal laws.

2. Sexual Harassment

Each institution must establish and maintain a positive learning environment for students that is fair, humane, and responsible. Sexual discrimination, including sexual harassment, is inimical to any institution.

Sexual harassment violates state and federal laws and the Governing Policies and Procedures of the Board. "Sexual harassment" means an un-welcomed sexual advance, request for sexual favors, or behavior, oral statements, or physical conduct of a sexual nature when:

a. submission to such conduct is made either explicitly or implicitly a term or condition of a student's grade, receipt of a grade, or status as a student;

b. an individual student's submission to or rejection of such conduct is used as a basis for a decision affecting the student; or

c. such conduct has the purpose or effect of substantially interfering with a student's learning or learning performance, or creating an intimidating, hostile, or offensive learning environment.

Each institution must develop and make public procedures providing for the prompt, confidential, and equitable resolution of student complaints alleging an act of sex-based discrimination, including sexual harassment.

3. Academic Freedom and Responsibility

Institutions of postsecondary education are conducted for the common good and not to further the interests of either the individual student or the institution as a whole. Academic freedom is fundamental for the protection of the rights of students in learning and carries with it responsibilities as well as rights.

Membership in an academic community imposes on students an obligation to respect the dignity of others, to acknowledge the right of others to express differing opinions, and to foster and defend intellectual honesty, freedom of inquiry and instruction, and free expression on and off the campus of an institution. Expression of dissent and attempts to produce change may not be carried out in ways which injure individuals, damage institutional facilities, disrupt classes, or interfere with institutional activities. Speakers on the campuses must not only be protected from violence but must also be given an opportunity to be heard. Those who seek to call attention to grievances must do so in ways that do not significantly impede the functioning of the institution.

Students are entitled to an atmosphere conducive to learning and to fair and even treatment in all aspects of student-teacher relationships. Teaching faculty may not refuse to enroll or teach a student because of the student's beliefs or the possible uses to which the student may put the knowledge gained from the course. Students must not be forced by the authority inherent in the instructional role to make personal or political choices.

4. Catalog and Representational Statements

Each institution will publish its official catalogue and admissions, academic, and other policies and procedures which affect students. (*See also* "Roles and Missions," Section III, Subsection I-2.)

Each institutional catalogue must include the following statement:

> Catalogues, bulletins, and course or fee schedules shall not be considered as binding contracts between [institution] and students. The

> [institution] reserves the right at any time, without advance notice, to: (a) withdraw or cancel classes, courses, and programs; (b) change fee schedules; (c) change the academic calendar; (d) change admission and registration requirements; (e) change the regulations and requirements governing instruction in and graduation from the institution and its various divisions; and (f) change any other regulations affecting students. Changes shall go into force whenever the proper authorities so determine and shall apply not only to prospective students but also to those who are matriculated at the time in [institution]. When economic and other conditions permit, the [institution] tries to provide advance notice of such changes. In particular, when an instructional program is to be withdrawn, the [institution] will make every reasonable effort to ensure that students who are within two (2) years of completing graduation requirements, and who are making normal progress toward completion of those requirements, will have the opportunity to complete the program which is to be withdrawn.

No employee, agent, or representative of an institution may make representations to, or enter into any agreement with, or act toward any student or person in a manner which is not in conformity with Board Governing Policies and Procedures or the approved policies and procedures of the institution.

5. Student Records

The collection, retention, use, and dissemination of student records is subject to the requirements of the Family Educational Rights and Privacy Act of 1974, as amended, and implementing regulations. Each institution will establish policies and procedures for maintenance of student records consistent with the act and implementing regulations and will establish and make public an appeals procedure which allows a student to contest or protest the content of any item contained in his or her institutional records.

6. Residency Status - Procedure for Determination

Rules and procedures for the determination of residency status for purposes of paying nonresident tuition are found in the State Board of Education Rule Manual IDAPA 08.01.04.

7. Full-Time Students

   a. Undergraduate Student

      For fee and tuition purposes, a “full-time” undergraduate student means any undergraduate student carrying twelve (12) or more credits (or equivalent in audit and zero-credit registrations).

      i. Student Body Officers and Appointees

For fee and tuition purposes, the president, vice president, and senators of the associated student body government are considered full-time students when carrying at least the following credit loads: (a) president, three (3) credits and (b) vice president and senators, six (6) credits.

ii. Editors

Editors of student published newspapers are recognized as full-time students when carrying a three credit load, and associate editors are recognized as full-time students when carrying a six credit load.

b. Graduate Student

For fee and tuition purposes, a “full-time” graduate student means any graduate student carrying nine (9) or more credits, or any graduate student on a full appointment as an instructional or graduate assistant, regardless of the number of credits for which such instructional or graduate assistant is registered.

8. Student Governance

The students at each institution may establish a student government constitution for their own duly constituted organization, which must be consistent with Board Governing Policies and Procedures. Each student constitution must be reviewed and approved by the Chief Executive Officer. Any amendments to the student constitution must also be reviewed and approved by the Chief Executive Officer.

9. Student Financial Aid

Each institution will establish policies and procedures necessary for the administration of student financial aid.

a. Transfer of Delinquent National Direct Student Loans. (*See* Section V, Subsection P)

b. Student Financial Aid Fraud

Each institution under governance of the Board should, as a matter of policy, initiate charges against individuals who fraudulently obtain or misrepresent themselves with respect to student financial aid.

10. Fees and Tuition

a. Establishment
Policies and procedures for establishment of fees, tuition, and other charges are found in Section V, Subsection R, of the Governing Policies and Procedures.

b. Refund of Fees

Each institution will develop and publish a schedule for refund of fees in the event a student withdraws in accordance with regulations governing withdrawal.

11. Student Employees

a. Restrictions

No student employee may be assigned to duties which are for the benefit of personal and private gain, require partisan or nonpartisan political activities, or involve the construction, operation, or maintenance of any part of any facility which is used for sectarian instruction or religious worship. No supervisor may solicit or permit to be solicited from any student any fees, dues, compensation, commission, or gift or gratuity of any kind as a condition of or prerequisite for the student's employment.

b. Policies and Procedures

Each institution will develop its own policies and procedures regarding student employment, including use of student employment as a part of financial assistance available to the student. Such policies and procedures must ensure that equal employment opportunity is offered without discrimination and that wage administration is conducted in a uniform manner. Such policies also must include a statement of benefits available to student employees, if appropriate.

c. Graduate Assistants

Each institution is delegated the authority to appoint within the limitations of available resources graduate assistants in a number consistent with the mission of the institution. Graduate assistantships are established to supplement a graduate student's course of study, with employment appropriate to the student's academic pursuits.

Each institution will establish its own procedures for appointment of graduate assistants which will include (a) qualifications, (b) clear and detailed responsibilities in writing, and (c) maximum number of hours expected and wages for meeting those requirements.

Matriculation, activity, and facility fees for graduate assistants will be paid either by the student or by the department or academic unit on behalf of the student. Graduate students will be covered by appropriate insurance in accordance with institutional procedures for work-related illness or injury.

d. Hourly or Contractual Employment

Each institution may employ students on an hourly or contractual basis in accordance with the needs of the various departments or units, available funds, and rules of the Division of Human Resources (or the University of Idaho classified employee system) or federal guidelines when work-study funds are used.

12. Student Conduct, Rights, and Responsibilities

Each institution will establish and publish a statement of student rights and a code of student conduct. The code of conduct must include procedures by which a student charged with violating the code receives reasonable notice of the charge and is given an opportunity to be heard and present testimony in his or her defense. Such statements of rights and codes of conduct, and any subsequent amendments, are subject to review and approval of the chief executive officer.

Sections 33-3715 and 33-3716, Idaho Code, establish criminal penalties for conduct declared to be unlawful.

13. Student Services

Each institution will develop and publish a listing of services available to students, eligibility for such services, and costs or conditions, if any, of obtaining such services.

14. Student Organizations

Each student government association is responsible, subject to the approval of the institution's chief executive officer, for establishing or terminating student organizations supported through allocation of revenues available to the association. Expenditures by or on behalf of such student organizations are subject to rules, policies, and procedures of the institution and the Board.

15. Student Publications and Broadcasts

Student publications and broadcasts are independent of the State Board of Education and the institutional administration. The institutional administration and the State Board of Education assume no responsibility for the content of any student publication or broadcast. The publishers or managers of the student publications or broadcasts are solely liable for the content.

16. Student Health Insurance

Students are responsible for making arrangements for coverage of their medical needs while enrolled in a post-secondary institution on a part or full time basis. Accidents, injuries, illnesses, and other medical needs of students (with limited exceptions in the case of student employees of an institution who experience workplace injuries within the course and scope of their employment) typically are not covered by the institution's insurance policies. The types and levels of medical/clinical support services available to students varies among the institutions and among the local communities within which institutions conduct operations.

~~The Board's student health insurance policy is a minimum requirement. Each institution, at its discretion, may adopt policies and procedures more stringent than those provided herein.~~

a. Health Insurance Coverage Offered through the Institution

Each institution, at the discretion of its chief executive officer, may provide the opportunity for students to purchase health insurance through an institution-offered plan. ~~Health insurance offered through the institution shall be Affordable Care Act (ACA) compliant.~~ Institutions are authorized to provide student health insurance plans through consortium arrangements, when this option serves the interests of students and administration. Institutions which elect to enter contractual arrangements to offer student health insurance plans (either singly or through consortium arrangements) shall comply with applicable Board and State Division of Purchasing policies. Institutions which elect to offer health insurance plans to their students are authorized, at the chief executive officer's discretion, to make student participation in such plans either optional or mandatory.

b. Mandatory Student Health Insurance

Each institution, at the discretion of its CEO, may require all or specified groups of students (for example, international students, intercollegiate athletes, health professions students engaged in clinical activities, student teachers, etc.) to carry health insurance that meets coverage types and levels specified by the institution. Administration and enforcement of any such health insurance requirements, and procedures for dealing with any exceptions thereto, lies within the authority of the institution.

~~Every full-fee paying full-time student (for purposes of federal financial aid) attending classes in Idaho shall be covered by an ACA compliant health insurance policy. Students without proof of health insurance coverage shall be ineligible to enroll full-time at an institution. Each institution shall monitor and enforce student compliance with this policy.~~

~~i. "ACA compliant" means a health insurance policy which meets the minimum coverage requirements classified by the ACA as "essential health benefits." Essential health benefits include items and services within at least the following 10 general categories: ambulatory patient services; emergency services; hospitalization; maternity and newborn care; mental health and substance use disorder services, including behavioral health treatment; prescription drugs; rehabilitative and habilitative services and devices; laboratory services; preventive and wellness services and chronic disease management; and pediatric services (including oral and vision care).~~

~~ii. Proof of Insurance. All full-time students shall provide proof of ACA compliant health insurance coverage. Proof of health insurance coverage shall include at least the following information:~~

~~1) Name of health insurance carrier~~

~~2) Policy number~~
~~3) Contact information for employer, insurance company or agent who can verify coverage~~
~~4) Attestation by the student, parent or guardian that health insurance policy is ACA complaint~~

~~Along with proof of insurance, students shall certify they will maintain active and continuous ACA compliant insurance coverage for the duration of their time enrolled as a full-time student.~~

~~iii. Temporary Insurance Coverage. A full-time student may have a non-ACA compliant policy before registration for their first semester of attendance, but such a student shall sign an affidavit that they will enroll in ACA compliant insurance by the end of the first available health insurance exchange open-enrollment period. At no other time may a full-time student be enrolled without ACA compliant insurance.~~

~~iv. Non-compliance. A student found to be out of compliance with this policy while enrolled at an institution, shall be ineligible for full-time enrollment in future terms (fall, or spring) until insurance is obtained and proof thereof is certified; provided however, that if health insurance is offered through an institution and a student is found in non-compliance, the institution may default enroll the student into the institution's student health insurance plan and charge the student's account.~~

c. Other Medical Support Services and Fees

Institutions are authorized to support or supplement students' medical needs through services provided by college/university clinics, health centers, cooperative arrangements with community/regional health care providers, etc. In cases where such services are provided, institutions are authorized to establish optional or mandatory fees to cover the delivery cost of such services.

d. Financial aid considerations.

Any medical insurance or health services-related fees which are mandated by an institution as a condition of participation in any institutional program are considered a bona fide component of the institution's cost of college and are a legitimate expenditure category for student financial aid.

17. Students Called to Active Military Duty

The Board strongly supports the men and women serving in the National Guard and in reserve components of the U.S. Armed Forces. The Board encourages its institutions to work with students who are called away to active military duty during the course of an academic term and provide solutions to best meet the student's current and future

academic needs. The activated student, with the instructor's consent, may elect to have an instructor continue to work with them on an individual basis. Additionally, institutions are required to provide at least the following:

a. The activated student may elect to completely withdraw. The standard withdrawal deadlines and limitations will not be applied. At the discretion of the institution, the student will receive a "W" on his or her transcript, or no indication of enrollment in the course(s).

b. One hundred percent (100%) of the paid tuition and/or fees for the current term will be refunded, as well as a pro-rated refund for paid student housing fees, meal-plans, or any other additional fees. Provided, however, that if a student received financial aid, the institution will process that portion of the refund in accordance with each financial aid program.

18. Student Complaints/Grievances.

The State Board of Education and Board of Regents of the University of Idaho, as the governing body of the state's postsecondary educational institutions, has established the following procedure for review of institution decisions regarding student complaints/grievances:

a. The Board designates its Executive Director as the Board's representative for reviewing student complaints/grievances, and authorizes the Executive Director, after such review, to issue the decision of the Board based on such review. The Executive Director may, in his/her discretion, refer any matter to the Board for final action/decision.

b. A current or former student at a postsecondary educational institution under the governance of the Board may request that the Executive Director review any final institutional decision relating to a complaint or grievance instituted by such student related to such individual's attendance at the institution. The student must have exhausted the complaint/grievance resolution procedures that have been established at the institution level. The Executive Director will not review complaints/grievances that have not been reported to the institution, or processed in accordance with the institution's complaint/grievance resolution procedures.

c. A request for review must be submitted in writing to the Board office to the attention of the Chief Academic Officer, and must contain a clear and concise statement of the reason(s) for Board review. Such request must be received in the Board office no later than thirty (30) calendar days after the student receives the institution's final decision on such matter. The student has the burden of establishing that the final decision made by the institution on the grievance/complaint was made in error. A request for review must include a copy of the original grievance and all proposed resolutions and recommended decisions issued by the institution, as well as all other documentation necessary to demonstrate that the student has strictly

followed the complaint/grievance resolution procedures of the institution. The institution may be asked to provide information to the Board office related to the student complaint/grievance.

d. The Chief Academic Officer will review the materials submitted by all parties and make a determination of recommended action, which will be forwarded to the Executive Director for a full determination. A review of a student complaint/grievance will occur as expeditiously as possible.

e. The Board office may request that the student and/or institution provide additional information in connection with such review. In such event, the student and/or institution must provide such additional information promptly.

f. The Board's Executive Director will issue a written decision as to whether the institution's decision with regard to the student's complaint/grievance was proper or was made in error. The Executive Director may uphold the institution's decision, overturn the institution's decision, or the Executive Director may remand the matter back to the institution with instructions for additional review. Unless referred by the Executive Director to the Board for final action/decision, the decision of the Executive Director is final.

The Board staff members do not act as negotiators, mediators, or advocates concerning student complaints/grievances.

BOISE STATE UNIVERSITY

SUBJECT

Ph.D. in Ecology, Evolution, and Behavior

APPLICABLE STATUTE, RULE, OR POLICY

Idaho State Board of Education Governing Policies & Procedures, Section III.G.

BACKGROUND/DISCUSSION

Boise State University (BSU) proposes to create a new program that will award a Ph.D. degree in Ecology, Evolution, and Behavior (PhD in EEB). The proposed program will be offered face-to-face in BSU's regional service area.

The creation of the program follows directly from the principles of Program Prioritization. Boise State University identified programs in the Department of Biological Sciences as being among the strongest at BSU: the BS in Biology, MS/MA in Biology, and MS in Raptor Biology all placed in the first quintile, and were at the 100th, 88th, and 90th percentiles respectively. Because of these rankings and because there is substantial need for increased instructional capacity at the undergraduate level, the Department of Biological Sciences is an excellent candidate for investment of new resources.

Subsequent to Program Prioritization, the department developed a comprehensive and holistic plan that would substantially increase the quality, relevance, productivity, and efficiency of the department and its programs at both the graduate and undergraduate levels. The plan involves two primary components: (i) create a robust PhD in EEB and (ii) make a number of substantial changes to undergraduate biology instruction and degree programs.

The proposed PhD in EEB will be transdisciplinary, bringing together faculty members from three academic departments (Biological Sciences, Geosciences, and Anthropology), a research center (Human-Environment Systems), and three organizations: the U.S. Geological Survey Snake River Field Station, The Peregrine Fund, and the Intermountain Bird Observatory. The proposed program will also make substantial use of collaborations with faculty members at the University of Idaho (UI) and Idaho State University (ISU).

The proposed program will train interdisciplinary scientists to use theory from biological, physical, and social sciences to contribute to basic research and solve applied problems. Students will develop new understanding of complex ecosystems, and the organisms that inhabit and interact in them, as a means for delivering actionable and understandable knowledge to our nation's public and decision-makers.

Investment in the creation of a PhD in EEB will yield a wide range of substantial benefits. First, PhD-level teaching assistants will expand the instructional capacity of an over-enrolled suite of baccalaureate programs at relatively low cost. The resulting expansion will overcome bottlenecks that now impede progress of BS-degree seeking students across biological and health sciences programs. The department will also expand use of Learning Assistants and revise their undergraduate curriculum. These changes will lead to increased student success, retention, and progression to degree; increased credit hour production (estimated at a worth of $600k); and an increase in the number of baccalaureate graduates in the biological and health sciences.

Second, PhD-level students take on more complex and longer-duration research projects compared to master's-level students, thereby increasing research productivity, increasing success in securing research grants, and enabling BSU faculty members to better collaborate with faculty members at UI and ISU. Importantly, much of the increased research productivity would involve current faculty members who have substantial latent scholarly potential that can only be realized with implementation of a PhD program. Note that increased research productivity and increased inter-institutional collaboration are goals of the Board's Strategic Plan for Research

In addition, increased research productivity will enhance the value of the university to organizations with which BSU faculty members have long-standing and productive collaborations (e.g., USGS Snake River Field Station, The Peregrine Fund, U.S. Fish and Wildlife Service, U.S. Bureau of Land Management, Idaho Department of Fish and Game) and with which partnerships are now developing (e.g., Greg Carr's Gorongosa Restoration Project).

Third, the proposed program aligns closely with the mission of the Idaho Experimental Program to Stimulate Competitive Research (EPSCoR) program, which is to build research competitiveness of the state's universities. The main area of EPSCoR investment at BSU is the Human-Environment Systems Center, which is directly related to the proposed PhD in EEB. The state has made substantial investments in support of the Idaho EPSCoR mission; for example, hundreds of thousands of dollars of the annual higher education budget are necessary to support faculty members at UI, ISU, and BSU – positions that were initially supported by EPSCoR funds. To make the most of this and other investments by the state requires Boise State University to develop the programs necessary to achieve its greatest potential in terms of research productivity, graduate education, and the long-term retention and productivity of these faculty investments.

The proposed program will also contribute to the long-term sustainability of Idaho's EPSCoR program by demonstrating substantial return on the investment of National Science Foundation (NSF) resources. Dr. Peter Goodwin, Director of Idaho's EPSCoR program, stated in his letter of support:

> *"The proposed PhD … is a logical next step to build on past investments and ensure the continued growth and sustainability of these initiatives. Failure to establish a PhD program will inhibit the research growth and ONEIDaho partnerships established across the state and beyond."*

Fourth, the program will provide place-bound Treasure Valley biologists and anthropologists with the opportunity to advance professionally. The Treasure Valley is home to a number of federal and state agencies, non-governmental organizations, environmental consulting firms, and educational institutions with employees who would benefit from the proposed program.

Finally, the proposed program will enable BSU to expand the use of Vertically Integrated Projects (VIPs), which use teams of undergraduate students, graduate students, and faculty members to solve complex research problems. VIPs are designed to increase the quality of both undergraduate and master-degree programs at Boise State University. Increased coursework associated with the proposed program also will increase the quality of existing master-degree programs in biological sciences and anthropology.

In summary, creation of a PhD in EEB at BSU entails a logical, responsible, efficient, and cost-effective use of resources. The investment will reap significant dividends in terms of building the research and educational training capacity of the state (NSF-EPSCoR goal), further establishing Idaho's higher education system as a leader in the field of ecological research and education (Idaho-EPSCoR goal), and provide numerous benefits to all of Idaho's institutions of higher education by enhancing opportunities for cross-institutional collaboration (Idaho-SBOE goal).

There exist several programs at UI and ISU that have partial overlap with the proposed PhD in EEB: UI offers PhD's in Natural Resources, in Environmental Science, and in Biology. ISU offers PhD's in Biology and in Microbiology.

IMPACT

The budget for the proposed program reaches approximately $1.5M in ongoing funding by the fourth year, with an estimated $600k derived from increased enrollments that will result from increased undergraduate teaching capacity. Also by the fourth year, approximately $1.2M of one-time funds is budgeted, with approximately $900k of that derived from federal grants.

ATTACHMENTS

Attachment 1 –Ph.D. in Ecology, Evolution, and Behavior Proposal with Appendixes A through G. Page 5
Attachment 2 – Appendix H: Faculty CVs for the proposal Page 115

STAFF COMMENTS AND RECOMMENDATIONS

Boise State University (BSU) proposes the creation of a new academic program that will award a Ph.D. in Ecology, Evolution, and Behavior. BSU projects an incoming cohort of 7 students each year with a total average enrollment of 40 students in the program at any one time once the program is fully up and running.

The proposed Ph.D., in Ecology, Evolution, and Behavior is consistent with BSU's Five-Year Plan. Currently, as per Board Policy III.Z, no institution has the statewide program responsibility to offer a Ph.D. degree in Ecology, Evolution, and Behavior. The UI has raised concerns with BSU's proposed program based on overlap with its existing Ph.D. in Natural Resources (for which it has statewide program responsibility) and its PhDs in Environmental Studies and Biology. BSU argues that although there is partial overlap, the benefits of the creation of the program far outweigh any negative aspects that arise from whatever degree of duplication that partial overlap represents.

The proposal went through the program review process and was presented to the Council on Academic Affairs and Programs (CAAP) on January 14, 2016. CAAP held considerable discussion regarding the proposed program, and discussed concerns expressed by the University of Idaho (UI) regarding statewide mission and duplication of existing programs offered by the UI. While it was acknowledged that there is some program overlap with UI programs, CAAP (a) recommended the proposal to be forwarded to IRSA with recommendation and (b) requested an interpretation of mission responsibilities in terms of statewide program responsibilities and its application to this specific program. That discussion was held at IRSA on February 4, 2016; IRSA recommends approval.

Staff recommends approval.

While the proposed budget for this program indicates BSU is not requesting new appropriated funding, Board Staff received questions about whether BSU intends to request state funding in the future (as it did with its College of Innovation and Design, for example). Upon inquiry, BSU stated it was unsure.

BOARD ACTION

I move to approve the request by Boise State University to create a new academic program that will award a Ph.D. in Ecology, Evolution, and Behavior.

Moved by _____ Seconded by _____ Carried Yes _____ No _____

Idaho State Board of Education

Proposal for **Graduate and Doctoral** Degree Program

Date of Proposal Submission:	
Institution Submitting Proposal:	Boise State University
Name of College, School, or Division:	College of Arts and Sciences
Name of Department(s) or Area(s):	Department of Biological Sciences

Program Identification for Proposed New, Modified, or Discontinued Program:

Title:	Ecology, Evolution, and Behavior *and* Ecology, Evolution, and Behavior with emphasis in Global Change Biology		
Degree:	Doctor of Philosophy		
Method of Delivery:	Face-to-Face		
CIP code (consult IR /Registrar)	26.1301 Ecology 26.1303 Evolutionary Biology 26.0708 Animal Behavior and Ethology		
Proposed Starting Date:	Fall, 2017		
Indicate if the program is:		**>>Regional Responsibility<<**	Statewide Responsibility

Indicate whether this request is either of the following:

- [x] New Graduate Program
- [x] New Doctoral Program
- [ ] New Off-Campus Graduate Program
- [ ] New Off-Campus Doctoral Program
- [ ] Contract Program/Collaborative
- [ ] Expansion of an Existing Graduate/Doctoral Program
- [ ] Consolidation of an Existing Graduate/Doctoral Program
- [ ] Discontinuation of an existing Graduate/Doctoral Program

[signature]	11/25/15		
College Dean (Institution)	Date	Vice President for Research (as applicable)	Date
John R Pelton	11/24/2015		
Graduate Dean (as applicable)		Academic Affairs Program Manager	Date
[signature]	11/28/2015		
Chief Fiscal Officer (Institution)	Date	Chief Academic Officer, OSBE	Date
[signature]	11/28/15		
Chief Academic Officer (Institution)	Date	SBOE/OSBE Approval	Date
[signature]	12/1/15		
President	Date		

Before completing this form, refer to Board Policy Section III.G., Program Approval and Discontinuance. This proposal form must be completed for the creation of each new program and each program discontinuation. All questions must be answered.

1. **Describe the nature of the request.** Will this program be related or tied to other programs on campus? Please identify any existing program, option that this program will replace.

Boise State University (BSU) proposes the creation of a new **Ph.D. in Ecology, Evolution, and Behavior (EEB)** as the next step in our progression as a research university.

The creation of a PhD in EEB will produce important benefits that include the following:

- Production of scientists able to solve complex and important problems. The proposed program will train interdisciplinary scientists to use theory from biological, physical, and social sciences to contribute to basic research and solve applied problems. Students will develop new understanding of complex ecosystems, and the organisms that inhabit and interact in them, as a means for delivering actionable and understandable knowledge to our nation's public and decision-makers.
    - The program will strengthen BSU's work with two long-standing key partners, the Peregrine Fund and the US Geological Survey's Snake River Field Station, as well as with a wide range of other organizations such as the US Bureau of Land Management and the Idaho Department of Fish and Game.
    - The program will greatly increase BSU's ability to create new partnerships, such as our new relationship with Greg Carr and his Gorongosa Restoration Project being undertaken in Gorongosa National Park in Mozambique. On September 8, 2015, a Memorandum of Understanding (Appendix A) between BSU and the Gorongosa Restoration Project was finalized; that MOU lays the groundwork for the creation of research projects that will address many of the challenges faced by Gorongosa Park. Already, BSU researchers have visited the park, and additional visits are planned.
- Increased success and sustainability of Idaho's EPSCoR efforts. Instead of representing an "unnecessary duplication" of programs among the universities, the similarity of the proposed programs with programs at the University of Idaho (UI) and Idaho State University (ISU) is highly desirable.
    - The new program will join with robust PhD programs at the University of Idaho and at Idaho State University (ISU) to strengthen research collaborations among institutions and help ensure the long-term sustainability of Idaho's EPSCoR effort. Without the proposed program, there is increased danger of losing funding and of attrition of highly-qualified faculty members. With the new program, Idaho's EPSCoR program will have greater success, to the benefit of UI and ISU.
    - A key goal of Idaho EPSCoR is to build research capacity at the PhD-level; importantly, the program relies on student cohorts across institutions to help build this capacity and to increase collaboration among Idaho's institutions. Idaho's EPSCoR effort is led by the University of Idaho, and the Project Director (UI faculty member Dr. Peter Goodwin) has lent his unequivocal support to the creation of BSU's PhD in EEB, stating in his letter of support,

"The proposed PhD … is a logical next step to build on past investments and ensure the continued growth and sustainability of these initiatives. Failure to establish a PhD program will inhibit the research growth and ONEIDaho partnerships established across the state and beyond."

Dr. Goodwin also noted that,

> *"PhD programs and PhD students carry much of the load in conducting research and bring a technical capacity and quality of student that is not possible at the undergraduate or masters level."*

- Implementation of key Program Prioritization actions. In Dickeson's (2010) program prioritization model, institutional effectiveness is increased by investing in the expansion of the strongest programs at the institution. BSU's program prioritization revealed that the programs of the Department of Biological Sciences are among the strongest at BSU: the BS in Biology, MS/MA in Biology, and MS in Raptor Biology all placed in the first quintile, and were at the 100th, 88th, and 90th percentiles respectively. Our investment will have two aspects:
  - At the graduate level, the new Ph.D. will be created, resulting in (i) the production of scientists able to work in transdisciplinary settings to solve complex ecological and evolutionary problems, (ii) increased research productivity and inter-institutional collaborations, and (iii) increased teaching capacity at the undergraduate level.
  - At the undergraduate level, the curriculum is being revised and instructional assignments restructured, resulting in (i) removal of bottlenecks to student progression in the BS Biology program, one of the largest on campus, (ii) removal of bottlenecks in courses taken by students in health sciences majors (e.g., nursing, pre-medical studies), and (iii) increased quality of the existing BS in Biology program and in the BA in Anthropology program by facilitating undergraduate training and interaction with PhD students through teaching and research opportunities.

Foundations of the proposed PhD program:

The proposed program will be built on a foundation that consists of the following:

1. ***A strong conceptual core.***

The proposed PhD in EEB is grounded in the belief that to successfully address the complex ecological and evolutionary problems of the day, science and scientists must have three key components. First, scientists must develop a traditional foundation of disciplinary depth of knowledge and expertise. Second, scientists must develop skills and expertise that transcend disciplinary boundaries, including the communication skills necessary to translate their expertise to the public and scientists outside of their discipline. Third, scientists must be adept at developing collaborative partnerships that cross disciplinary, organizational, and geographical boundaries.

2. ***A Strong EPSCoR program and robust inter-institutional collaborations.***

The proposed PhD in Ecology, Evolution, and Behavior is a natural fit for Idaho's EPSCoR program, which has a focus on human-environment interactions in its current Track 1 award, entitled "Managing Idaho's Landscape for Ecosystem Services – MILES." The MILES program is hiring 12 new faculty members in the human environment systems theme, 4 of whom will be at Boise State. The EEB PhD program will help Idaho to retain these competitive faculty members by providing an advanced graduate degree program for their graduate students. As noted by Dr. Peter Goodwin, Project Director of Idaho EPSCoR,

> *"The proposed program will provide an important institutional foundation that will build Idaho's statewide ability to compete for competitive federal research funding, to recruit high caliber faculty, attract high quality graduate students and to train Idaho's workforce for the future."*

The proposed PhD will benefit from existing collaborative research endeavors. There are numerous examples of successful (i.e. extramurally funded) inter-institutional collaborations among faculty at BSU, ISU, and UI. These include collaborations stimulated by past and on-going EPSCoR awards, cross-

institutional research projects supported by the Center for Advanced Energy Studies, and collaborative research projects funded by NSF. Examples of ongoing and recent research collaborations:

- NSF-funded research: "Modeling the Tradeoffs of Food-, Fear-, and Thermal-Scapes to Explain Habitat Use by Mammalian Herbivores". A collaboration of faculty members Forbey at BSU, and Rachlow and Thorton at UI.
- NSF-funded research: "Does noise pollution filter vertebrate communities and have cascading consequences for insects, plants and ecosystems?" A collaboration of faculty members Barber at BSU and Reinhardt at ISU.
- US Fish and Wildlife Service and US Forest Service-funded research: "Hybrid speciation in *Castilleja christii*." A collaboration of faculty members Smith at BSU and Tank at UI.
- NSF-funded research: "Integrated modeling and visualization of coupled socio-ecological systems and associated spatiotemporal patterns in ecosystem services. A collaboration of faculty members Flores at BSU and Smith at UI.
- NSF-funded research: "Novel interdisciplinary flume experiments to investigate the role of the hyporheic zone in greenhouse gas generation." A collaboration of faculty members Feris and Benner at BSU and Tonina at UI.
- NSF-funded research: "Collaborative Research: How do hydrology and biogeochemistry control carbon flux from headwater streams to the atmosphere?" A collaboration of faculty members Feris at BSU and Tonina at UI.
- US Department of Agriculture-funded research: "Enhancing greenhouse gas mitigation and economic viability of manure management systems via production of value added carbon sequestration strategies". A collaboration of faculty members Feris at BSU and Coats at UI.
- US Department of Agriculture-funded research: "Strengthening Seed Grant: Addressing the threat of Pale Cyst Nematodes (PCN) to potato crops using remote sensing." A collaboration of faculty members Glenn at BSU, Delparte at ISU and Dandurand at UI.
- NSF-funded research: "Reynolds Creek Critical Zone Observatory, Hypothesis testing and model parameterization of soil respiration across a range of experimentally altered hydroclimates to enable predictions of ecosystem carbon balance in a changing climate, Determining interactive effects of climate induced changes in precipitation regime on soil microbial community structure and function." A collaboration of faculty members Lhose at ISU, Flores and Benner at BSU, Seyfried at USDA ARS.
- US Bureau of Land Management-funded research: "Effects of Juniper Removal on the Nutritional Quality of Sagebrush in South-central Oregon." A collaboration of faculty members Forbey at BSU and Reece at UI.
- NSF-funded research: "Cascading effects of urbanization on ecosystems." A collaboration of faculty members de Graaff at BSU and Reinhardt at ISU.

3. Successful PhD Programs at Sister Institutions

The new program will join a strong family of highly successful and productive PhD programs and their faculties at UI and ISU, thereby providing ample opportunities for collaboration and for the sharing of coursework and other resources. UI offers a PhD in Natural Resources, a PhD in Biology, and a PhD in Environmental Science. ISU offers a PhD program in Biology and a PhD in Microbiology.

Dr. Michael Thomas, Director of ISU's Molecular Research Core Facility, recognized the potential for collaborations in his letter of support,

> *"As [BSU's] PhD program comes on line, they will be in a better position to join with ISU faculty in inter-institutional granting efforts that will bring new funding to both campuses. Such collaborative arrangements will become common between ISU and BSU, and both of our institutions will benefit."*

Dr. Tim Frazier, Assistant Professor in UI's Department of Geography at UI, states in his letter of support that

> *"The EEB Ph. D. program will open new opportunities to train graduate students in fields at the interface of human and natural systems, which opens a host of new collaboration avenues between my research group at the University of Idaho and faculty at Boise State.*

4. Depth in key transdisciplinary areas

As described in the following section, the faculty members of the proposed program have a wide breadth of expertise; they also have a penchant for transdisciplinary interaction. They are from three academic departments (Biological Sciences, Anthropology, and Geosciences) and one research group (Human-Environment Systems) at BSU and from two key partner organizations (the Peregrine Fund and the U.S. Geological Survey).

The program will have notable strength in the following seven areas, each of which requires a transdisciplinary perspective to achieve progress:

- Raptor biology. As top predators, raptors (birds-of-prey such as hawks, eagles, falcons, and owls) are sensitive to environmental change and are excellent indicators of ecosystem integrity. Although raptor biology is focused on a group that is relatively narrow in taxonomic terms, it is a group that is globally ubiquitous and culturally important, and many species in the group have protected status. In addition, the research of the raptor biologists at Boise State and affiliates spans a wide range of disciplines, including immunology, endocrinology, behavioral ecology, evolutionary genetics, reproductive physiology, conservation biology, and landscape ecology. Boise State is internationally recognized for research on raptor biology and maintains the nation's only Master's program in Raptor Biology. This program is supported by faculty members in the Department of Biological Sciences and key affiliate faculty from the Peregrine Fund and the USGS. Close proximity to the Morley Nelson Snake River Birds of Prey National Conservation Area and Lucky Peak Observatory (managed by Boise State's Intermountain Bird Observatory) provides exceptional opportunities to study local raptors year round. Additionally, worldwide interest in conservation of raptors and their environment takes researchers to distant field sites in Africa, South American, and other locations.
- Chemical ecology. The composition and concentration of chemicals in cells, tissues, organisms and the environment can strongly influence the behavior, distribution, and evolution of organisms. The University's investments in the Biomolecular Research Center (BRC) and in remote sensing technology in Geosciences have established exceptional opportunities for ecologists to benefit from state-of-the-art bioanalytical instrumentation to study the role of chemicals in ecological systems. For example, confocal and electron microscopy, micro-CT, and histology for imaging chemicals and x-ray diffraction, NMR, and mass-spectrometry for identifying and quantifying chemicals used primarily by biomolecular faculty allow ecologists to study chemical interactions occurring within organisms at small biological scales (cells and tissues) in the laboratory. In addition, access to near infrared spectrometers used primarily by geoscience faculty allow ecologists to study the fate and consequences of chemicals at larger spatial scales (live organisms, habitats, and landscapes) in the field.
- Plant evolution and diversity. The study of evolution involves multiple biological scales, from changes that occur at the population level from one generation to the next, to changes that occur at higher taxonomic levels and track diversity over millions of years. Botanical research at Boise State encompasses the full range of these scales and includes studies on vascular plants that are native to western North America and tropical regions of the world, plants that are invasive in North America and elsewhere, and fungal organismal diversity. The Snake River Plains herbarium, Boise State's collection of plant specimens includes over 50,000

vascular plant specimens and over 15,000 fungal collections. These collections span over 100 years of plant collecting activity and are an important resource for monitoring plant diversity.

- Biogeochemistry: Availability of nutrients, productivity of ecosystems, distributions of species and the outcomes of their interactions are commonly determined or influenced by the complex interplay between biological, chemical, geological, and hydrological factors. Mechanistic understanding and predictive quantification of these processes is hampered by complex temporally and spatially variable interactions among these factors. The focus of the field is to improve our understanding of complex biogeochemical systems and to enhance our ability to predict how they will respond to perturbation. EEB faculty and their collaborators in BSU's Department of Geosciences and at UI and ISU have long running extramurally funded projects in this area.
- Human Behavioral Ecology: *Human behavioral ecology* applies evolutionary theory to the study of human behavior, explaining how adaptive behavior is expected in response to a broad range of environmental variables. HBE examines variation in human behavior within and between populations in light of competing life-history demands of growth, development, reproduction, mate acquisition, parental care, and non-kin cooperation. The expertise in the Department of Anthropology covers a range of human somatic and reproductive effort, including resource utilization and environmental interactions (present-day, historical, and prehistoric), reproductive decision-making and parenting, effects of environmental stress on growth and development, and evolution of social norms.
- Global change biology. The phrase *Global change biology* refers to any consistent trend in the environment that affects the biological systems of a substantial part of the globe. Humans are key drivers in creating global change through climate change, introduction of invasive species, and land use change via urbanization and sprawl, to name a few. Rapid, consistent drivers of change can create threats to natural systems that may be slow to respond. However, many threats to species and systems remain poorly understood, and therefore require substantial research effort. In addition, understanding the mechanism by which populations respond to environmental change will provide insight to the evolutionary ecology of a species or life history strategy. EEB faculty members in Biological Sciences, Anthropology, and Geosciences have research programs that address issues of global change biology, the coupled nature of human behavior and changes to natural systems.
- Human-Environment Systems. The Human Environment Systems (HES) initiative is a key component of the new College of Innovation and Design, and represents a focused integration of several of the above concepts. The four new faculty members in HES will be tasked with performing research at the human-environment interface. Their research will improve our understanding of how humans respond to and drive environmental change, and will therefore help to enable smart and sustainable growth at local, regional, national, and international scales. Climate change, food security, and species conservation are several of the global sustainability problems in which human and environmental systems intersect and interact.

5. Strength of faculty

The foundation of any PhD program is its faculty.

- The proposed program has at its core the faculty of the Department of Biological Sciences, with strong research programs in raptor biology, behavioral ecology, sensory ecology, chemical ecology, endocrinology, microbial community ecology, aquatic ecology, plant and fungal evolutionary biology and systematics, ecopharmacology, plant and animal physiological ecology, terrestrial plant-soil interactions, and biogeochemistry. Faculty members from the Human Environment Systems (HES) initiative in the College of Innovation and Design will also be key participants. The first two hires will have joint appointments with the Department of

Biological Sciences and will add to the faculty base for the PhD program. Importantly, the skills and knowledge of these faculty members will add diversity and depth to graduate coursework and will expand the base of graduate advisors for the program.

- Faculty members in the Departments of Anthropology and Geosciences will be key participants in the program by advising students, teaching courses, and serving on graduate committees; thus, the program will build capacity for strong research programs in human behavioral ecology, geographic information systems, hydrology, and biogeochemistry.
- Participation of scientists from the U.S. Geological Survey's Forest and Rangeland Ecosystem Science Center (a federal research agency located on the Boise State Campus) and The Peregrine Fund, (a non-profit organization located in Boise) will create a collaborative and diverse environment for student training and a broad perspective about career paths for graduates. Already, these collaborators directly contribute to strong research programs in raptor biology (both locally and on an international scale), endangered species biology, ecosystem ecology, , biogeochemistry, global change biology, landscape ecology, conservation biology, ecological inventory and monitoring research and development, and restoration and management of ecological systems.

Over the past 9 years EEB faculty at Boise State have been awarded more than $10 million in extramural research funds (see listings in CVs in Appendix G). These faculty led efforts have contributed significantly to expanding the research portfolio at Boise State. Extramural awards have come from multiple, competitive funding agencies (e.g. NSF, USDA, NIH, BLM, Forest Service, National Park Service, DOD, EPA, etc.), and have supported both interdisciplinary and disciplinary research.

EEB faculty members at Boise State have a strong international presence, which indicates their strength as researchers and their ability to connect with collaborators world-wide. They have published with international co-authors, for example, with collaborators from China, Germany, Belgium, United Kingdom, Colombia, Jamaica, Madagascar, and New Zealand. They serve on international graduate thesis committees, routinely are invited to present at international meetings (e.g. China, Columbia, Germany, Mexico, etc.), and host international Fulbright scholars and international speakers at Boise State (e.g. scientists from Iraq, Mexico, Switzerland, Ghana, and Uruguay, among others).

EEB faculty and students perform field research in Indonesia, Central America, Asia, and Europe, activities that directly expose the international scientific community to the caliber of faculty-led research at Boise State. Boise State maintains an active Herbarium that directly contributes to international research projects via specimen exchange in both Europe and Asia. Recent data indicate data from our herbarium are being accessed globally, with the majority of international requests for material originating from Europe. The faculty member who is the director of the herbarium serves as Editor-in-Chief for Systematic Botany, an international journal with approximately 50% of the submissions coming from outside the US.

Faculty members in the Department of Anthropology have international co-authors on publications on human reproductive ecology and evolutionary demography, have collaborators in Europe, Asia, Africa, South America, India, Russia, and Canada, and have been the recipients of multiple Fulbright awards that have resulted in development of collaborations between BSU and international faculty members.

Participating Faculty Members (see CVs in Appendix H)			
Name	**Position**	**PhD Institution**	**Brief Research Description**
BSU Department of Biological Sciences			
Jesse Barber	Assistant Professor	Wake Forest U	Sensory ecology, animal behavior, conservation biology
Marc Bechard	Professor	Washington State U	Raptor biology and ecology; habitat use in raptors
Jim Belthoff	Professor	Clemson U	Behavioral ecology, animal behavior, and avian biology

Marie-Anne de Graaff	Assistant Professor	Wageningen U	Plant/Soil interactions in terrestrial ecosystems
Kevin Feris	Associate Professor	U Montana	Microbial community ecology; bioremediation studies
Jennifer Forbey	Associate Professor	U Utah	Physiological, chemical and pharmacological ecology
Eric Hayden	Assistant Professor	Portland State U	RNA evolution, biomedical & biotechnical molecules
Julie Heath	Associate Professor	U Florida	Avian biology and conservation ecology
Peter Koetsier	Professor	Idaho State U	Aquatic ecology; lotic macroinvertebrate ecology
Steve Novak	Professor	Washington State U	Plant evolutionary biology; introduced species
Ian Robertson	Professor	Simon Fraser U	Insect behavior and ecology; plant-insect interactions
Marcelo Serpe	Professor	U California Davis	Plant biochemistry and physiology
James Smith	Professor	U Wisconsin	Plant molecular systematics, cladistic analyses
Merlin White	Associate Professor	U Kansas	Fungal molecular systematics, arthropod-associated fungi
BSU Human-Environment Systems Initiative, College of Innovation and Design			
Jodi Brandt	Assistant Professor	U of Wisconsin	Land use science, remote sensing, conservation biology
Neil Carter	Assistant Professor	Michigan State U	Socio-environmental systems
BSU Department of Anthropology			
Samantha Blatt	Visiting Asst Prof	Ohio State U	Osteology, dental morphology/histology, bioarchaeology
Kathryn Demps	Assistant Professor	U California Davis	Cultural evolution, behavioral and evolutionary ecology
Christopher Hill	Professor	Southern Methodist U	Environmental archaeology-geoarchaeology
Mark Plew	Professor	Indiana U	Archaeology of Western North America
Kristin Snopkowski	Assistant Professor	U New Mexico	Human behavioral ecology, evolutionary demography
Pei-Lin Yu	Assistant Professor	Southern Methodist U	Ethnoarchaeology, human response to climate change
John Ziker	Professor	U Calif Santa Barbara	Kinship, social organization, and demography
BSU Department of Geosciences			
Shawn Benner	Associate Professor	U Waterloo	Ecohydrology, biogeochemistry
Alejandro Flores	Associate Professor	MIT	Ecohydrology and modeling, remote sensing
Nancy Glenn	Professor	U Nevada Reno	Remote sensing, image analysis, geological engineering
Matt Kohn	Distinguished Professor	Rensselaer Polytechnic Institute	Geochemistry, petrology, and paleoecology
Jen Pierce	Associate Professor	U New Mexico	Geomorphology & Paleoclimatology
BSU Intermountain Bird Observatory			
Jay Carlisle	Research Director ; Research Asst Prof	U South Dakota	Avian migration and physiological ecology
US Geological Survey			
Matthew Germino	Supervisory Research Ecologist	U Wyoming	Plant-soil-climate relationships; biophysical ecology
Todd Katzner	Research Wildlife Biologist	Arizona State U	Conservation biology, ornithology, mammalogy
Steven Knick	Supervisory Research Ecologist	U Montana	Spatial and temporal dynamics of western US shrublands
David Pilliod	Supervisory Research Ecologist	Idaho State U	Herpetology, wildlife ecology, stream & fire ecology
Douglas Shinneman	Supervisory Research Fire Ecologist	U Wyoming	Fire , landscape, restoration and, plant ecology
The Peregrine Fund			
David Anderson	Director Gyrfalcon Conservation Project	Louisiana State U	Raptor biology; ecological structure and function
Chris McClure	Dir Amer. Kestrel Partnership, Quantitative Ecol.	Auburn U	Vertebrate monitoring and ecological modeling

Rick Watson	V.P., Director International Programs	U Witwatersrand	Raptor ecology and conservation

6. Key Partnerships

Participation of scientists from three key partner organizations is important to the success of the program: the Peregrine Fund, the USGS Forest and Rangeland Ecosystem Science Center's Snake River Field Station, and the Gorongosa Restoration Project. Access to a PhD program in EEB will allow us to leverage these relationships even further, while simultaneously strengthening the operations of the partner organizations. The research scientists in both organizations are all affiliate graduate faculty in the Department of Biological Sciences and would continue in this role with the addition of a PhD in EEB. These relationships will provide immediate and important expansion of our PhD training and advisory capacity beyond that provided by the tenure-track faculty at BSU.

The Peregrine Fund, located in Boise, is a non-profit organization dedicated to conservation and study of raptors. They advance the knowledge of avian biology, ecology, and conservation through research, training, and education to improve global environmental health and to conserve biological diversity. The Peregrine Fund has on-going projects in North American, Africa, Asia, the Arctic, and the Neotropics.

The Peregrine Fund is very interested in maintaining and growing their strong connection with Boise State via new opportunities for student training at the PhD level. Peregrine Fund scientists now co-advise MS level students in the MS Raptor Biology and MS Biology programs. A former postdoctoral research associate from Boise State is the quantitative ecologist for the Peregrine Fund who collaborates with BSU EEB faculty on NSF proposals and on-going research projects in population modeling in response to noise and light pollution. The on-going collaborations between BSU and the Peregrine Fund and the involvement of MS students in Peregrine Fund research projects indicate how this relationship has helped build our current graduate programs and research portfolio; a new PhD will further strengthen these connections. As noted by Peter Jenny, President of The Peregrine Fund in his letter of support (see Appendix E),

> *"The 30-year partnership between The Peregrine Fund and Boise State University at the Master's degree level has been important for collaboration on research and student training in the field of raptor biology, ecology and conservation. A Ph.D. program in the Department of Biological Sciences would be valuable to The Peregrine Fund because it will increase opportunities for research collaboration at an advanced academic level not previously available to us locally and for which we have had to seek the collaboration of other universities in the past. The program would benefit from our partnership because of the depth and geographic scope of expertise in raptor biology and conservation brought by our scientists, and the opportunities these would provide to students participating in the Ph.D. program."*

The USGS Forest and Rangeland Ecosystem Science Center's Snake River Field Station (USGS FRESC SRFS) is located on the Boise State University campus. The scientists of the SRFS work throughout the western United States, particularly in the public lands of the Intermountain West, Great Basin, and Columbia Plateau. Their work addresses wildlife monitoring protocols; sage-grouse distribution, population trends, and habitat associations; rangeland ecology and restoration; invasive-species management; fire ecology; avian ecology; regional ecological assessments; ecosystem structure and function (including biogeochemistry); effects of global change on ecosystems, wildlife species, and habitats; alternative energy development and wildlife; and biological statistics.

The SRFS has a strong current and historic relationship with Boise State's Department of Biological Sciences. The strong cooperative relationship between BSU and the USGS has also benefitted researchers in the departments of Geosciences, Engineering, and Public Policy. The SRFS director and

BSU Biological Sciences faculty were instrumental in developing the Raptor Biology MS program at BSU and acquiring the funding necessary to support graduate teaching assistantships in that program. A number of SRFS scientists currently serve as graduate faculty at BSU. In the past 5 years, SRFS scientists have served on 17 graduate thesis committees, having acted as major advisor for 6 of those graduate students. SRFS scientists also have co-taught and delivered course content in graduate level courses in Biology and Anthropology. Finally, a number of graduates of our master's programs have found employment with the SRFS.

The new PhD will expand the depth and continuity of the teaching relationship and enable longer term research program development. It will also provide EEB PhD candidates a conduit to SRFS research and work which will allow them to develop an intimate familiarity with, and therefore become well trained for, thus providing an avenue of post-graduate career development.

As noted in the attached letter from Ken Berg, Director of the USGS FRESC, in his letter of support (see Appendix E),

> *"The research scientists of the … USGS FRESC … have enjoyed a highly collaborative and mutually beneficial relationship with the faculty, staff, and students of Boise State University (BSU), particularly those in the Biology Department, since the late 1980s."*
>
> *"USGS FRESC has other field stations on university campuses, including Oregon State University and University of Washington, which have established PhD programs. We have enjoyed long and successful collaborations with the students, faculty, and staff of these institutions, and have had the honor of playing key roles in the successful educational experiences of a great many PhD students, and the formation of many excellent scientists, resource managers, and conservation professionals. We look forward to sharing in similarly successful endeavors with BSU, and to working with all those involved in the EEB PhD program."*

Boise State has recently entered into a memorandum of understanding with Gorongosa Restoration Project at Gorongosa National Park (GNP) in Mozambique. This agreement represents a novel and valuable opportunity for research and graduate training for Boise State faculty and students as well as for developing an international exchange with students from Mozambique.

As noted in the attached letter from Dr. Piotr Naskrecki, Associate Director of the E.O.Wilson Biodiversity Laboratory of the Gorongosa Restoration Project,

> *"We believe that a partnership between Gorongosa Restoration Project and the Boise State University, recently formalized through a Memorandum of Understanding, will provide BSU students and researchers with opportunities to conduct ground-breaking projects in ecology and conservation, leading to not only advances in science but also more effective conservation of one of Africa's greatest protected areas."*

The agreement will provide early career opportunities for students and faculty to travel to GNP and integrate those experiences into the ongoing research at GNP in the form of graduate research projects at GNP. Our goal will be to provide a unique life experience and cohort building experience for our students, and to stimulate opportunities for long-term and in-depth research at GNP. In so doing, we will improve the understanding of the biodiversity and ecology of the park while producing the knowledge necessary to make well informed conservation decisions for management of GNP and other tropical ecosystems.

We will also build on our relationship with GNP to expand our portfolio of programs established for exchange of international scholars to include exchanges involving students and scientists from Mozambique coming to BSU to study and collaborate. In addition, we will develop opportunities for scientists and faculty members from Boise State to do research at GNP and to develop in short educational courses for local and regional scientists and students.

7. Strong Collaborative Relationships with Other Agencies and Organizations

Besides The Peregrine Fund and USGS FRESC, the Boise area is home to a number of other agencies and organizations with which Boise State faculty members have a long history of collaboration. The following are example quotes from letters of support located in Appendix F.

> *"In 1992, our botanists transferred the Idaho Department of Fish and Game Herbarium to Boise State's Snake River Plains Herbarium, and since that time, we have made extensive use of the specimens stored there. Now that the herbarium collections have been digitized, we access them online frequently—even daily during particular stages of our research. This herbarium is a unique and valuable resource for the Idaho Natural Heritage Program and all of Idaho."* Dr. C. Lynn Kinter, State Botanist with the Idaho National Heritage Program of Idaho Department of Fish and Game

> *"For more than 15 years, the Department of Biological Sciences at Boise State University has closely collaborated with the Idaho Fish and Wildlife Office to study and research conservation issues of concern to the Service. This work has involved past and ongoing graduate studies of Idaho's native fish, wildlife and plants including Columbia spotted frog; two endemic Idaho ground squirrels and rare southwestern Idaho native plants. The knowledge gained from these studies has been instrumental in our understanding of the ecology of these and other species of conservation concern and has served to inform our decisions on their management and protection."* Michael Carrier, State Supervisor, Idaho Fish and Wildlife Office, US Fish and Wildlife Service.

> *Over the years, BLM managers and resource specialists have directly benefitted from numerous research studies completed by BSU faculty and Master's level graduate students on a wide variety of species, ecosystems and ecosystem components relevant to the BLM."* Jeffery L. Foss, Deputy State Director, Resources, Idaho State Office, US Bureau of Land Management

> *"For over a decade the Idaho BLM State Office has been a key collaborator with BSU in the development of this herbarium. The breadth of these collections and their robust digital recordation allows for rapid, comprehensive access of salient botanical information critical to questions in ecology and evolution, and helps inform regional land management issues."* Anne Halford, Idaho State Botanist, US Bureau of Land Management.

8. Unique research infrastructure

Boise State has existing and planned research infrastructure unique to the state and region. Examples include the Dry Creek Experimental watershed and Reynolds Creek Critical Zone Observatory, Intermountain Bird Observatory, the Snake River Plains Herbarium, the Crossroads Museum, and laboratories in bioacoustics and soundscapes, endocrinology, and stable isotopes. In addition, our proximity to important and unique natural areas, such as the Snake River Birds of Prey National Conservation Area, and decision-makers in state and federal agencies will foster projects and collaborations that are relevant at the local, regional, and national level. See Appendix C for additional detail.

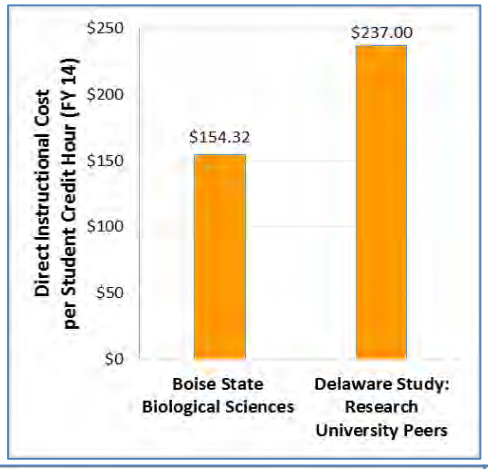
9. Highly Productive Department

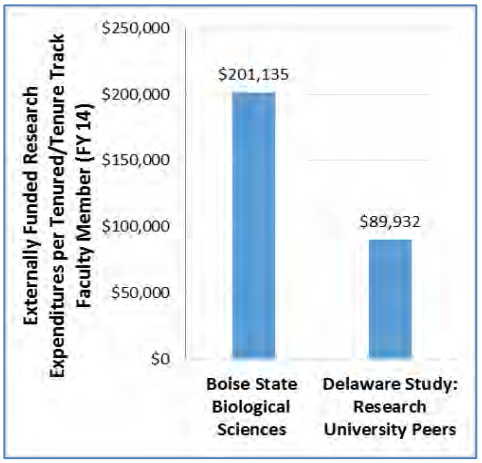
The Department of Biological Sciences is among the most productive and efficient at the university, and is therefore a "good bet" for investment of resources.

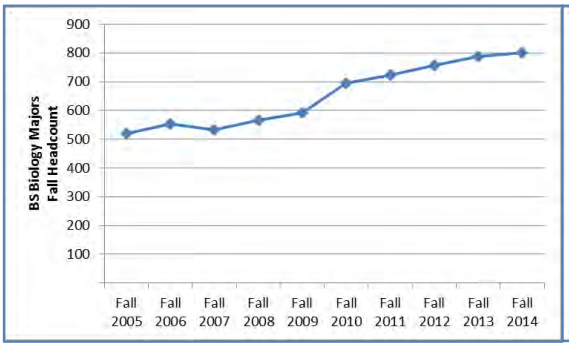
More specifics describing the productivity and efficiency of the Department of Biological Sciences are as follows:

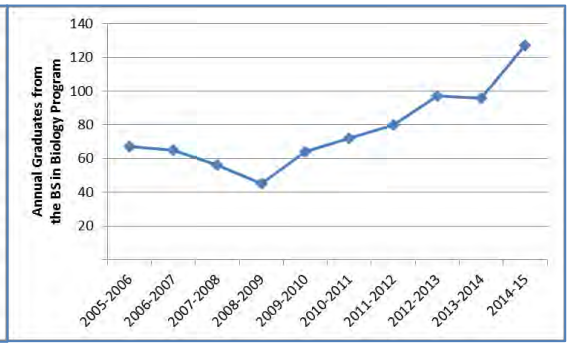
- Measures of instructional productivity for the Department of Biological Sciences for FY2014, cast in terms of the percent of Delaware Study Peers (see http://www.udel.edu/IR/cost/), indicate that the cost to deliver a student credit hour is about 65% that of Delaware Study research university peers (see figure).

- Research productivity, as measured by research expenditures, is more than twice that of Delaware Study research university peers (see figure).
- For every dollar of budget spent on instruction, the Department of Biological Sciences produces credits worth approximately $1.50 in tuition revenues.
- The undergraduate program in the Biological Sciences has seen a steady increase in the number of enrollments and graduates, as can be seen by the accompanying graphs. Enrollments and graduates have increased 54% and 89%, respectively, over the last decade, as shown in the figures below.









10. Successful history with Master's programs in the biological sciences.

The Department of Biological Sciences has a history of managing two very successful MS programs, Raptor Biology and Biology, which ranked in the top 90% and 88% of programs, respectively, during Boise State's program prioritization process. The MS in Raptor Biology was created in 1987, and has graduated 32 students in the last decade. The MS/MA in Biology was created in 1997, and has graduated 87 students in the last decade.

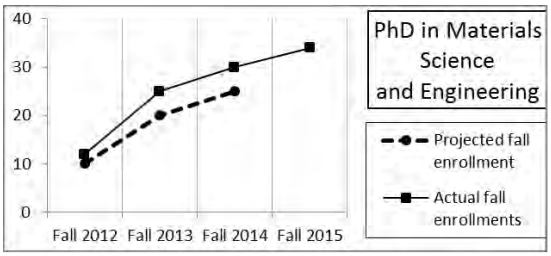
Chapters from student theses have been published articles in a wide range of journals, including top tier journals, such as: Animal Behavior, Annals of Botany, Arthropod-Plant Interactions, Botany, Canadian Journal of Zoology, Condor, Ecological Entomology, Ecology, Ecology and Evolution, Ecoscience, Environmental Entomology, Environmental Science and Technology, General and Comparative Endocrinology, HortTechnology, Hydrobiologia, Journal of Applied Ecology, Journal of Avian Biology, Journal of Field Ornithology, Journal of Freshwater Ecology, Journal of Mammalogy, Journal of Parasitology, Journal of Raptor Research, Journal of the North American Benthological Society (now Journal of Freshwater Science), Journal of Wildlife Management, Mycorrhiza, North American Journal of Fisheries Management, Plant Ecology, Plant Soil, PLoS One, Proceedings of the Royal Society of London: Series B, Soil Biology and Biochemistry, Studies in Avian Biology, The Auk,

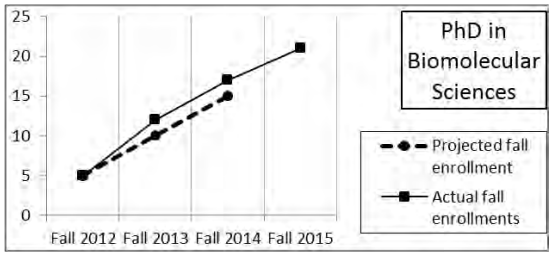
Transactions of the American Fisheries Society, Western North American Naturalist, Wildlife Biology, and Wildlife Society Bulletin.

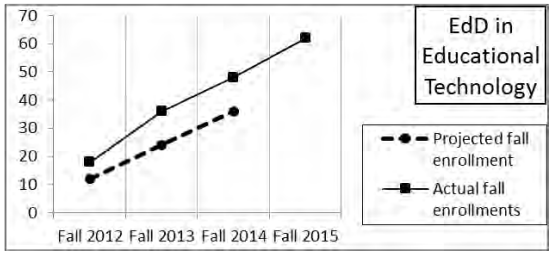
The Raptor Biology Program is an internationally recognized program with a 97% placement rate of students in career positions related to their degree program. For example, many graduates have been or are currently employed at government agencies (e.g., Alaska Department of Fish & Game; Montana Fish Wildlife and Parks, Idaho Fish and Game, Environmental Protection Agency, US Forest Service, Bureau of Land Management, US Fish & Wildlife Service, USGS), national conservation and science projects (e.g., Landscape Conservation Cooperatives and Joint Ventures), non-profit organizations (e.g., American Bird Conservancy, Rocky Mountain Bird Observatory), or as academics.

11. Past success with new doctoral programs

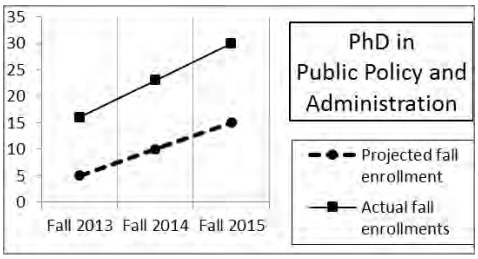
BSU has initiated five new doctoral programs since 2010. In the proposal for each program, we projected enrollments for the first three years. Thus the approval by the SBOE was, in part, based on a promised productivity from each program. The accompanying graphs depict projected enrollment and actual enrollment for each of those five programs.

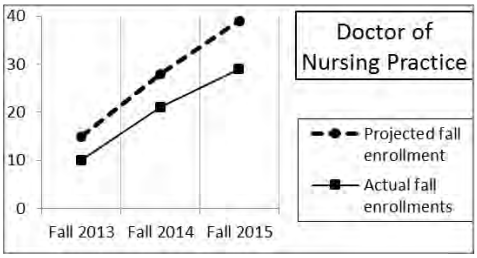






Three programs were initiated in Fall 2012: PhDs in Materials Science and Engineering and in Biomolecular Sciences and an EdD in Educational Technology. As can be seen in the figures, enrollments in all three programs surpass projections. One notable accomplishment is that the PhD in Materials Science and Engineering was able to produce three graduates in only its second year of existence and one in its third year. The first graduates from the PhD in Biomolecular Science and the EdD in Educational Technology are expected in 2015-16.





Two programs were initiated in the 2013-14 academic year, a PhD in Public Policy and Administration and a Doctor of Nursing Practice. The former is well ahead of projected enrollments and the latter enrollments robust enough to support the self-support program, although they lag somewhat behind initial projections.

2. **List the objectives of the program.** The objectives should address specific needs the program will meet. They should also identify the expected student learning outcomes and achievements. *This question is not applicable to requests for discontinuance.*

<u>Broad-scale Objectives</u>

Boise State has five objectives in the creation of this new PhD program: (i) produce scientists able to solve complex and important problems; (ii) provide access to local students to progress professionally; (iii) enhance the relevance, quality, efficiency, productivity of our existing undergraduate and graduate programs; (iv) enhance the research productivity of the faculty, and (v)

increase and enhance opportunities for collaboration with other Idaho institutions.

1. Produce scientists able to solve complex and important problems

The EEB Ph.D. program will train students in the use of novel integrative approaches that draw strength from both traditional and non-traditional knowledge sets. Students will bring to bear unique perspectives on complex problems, and graduates from this program will become the next generation of EEB scientists. A key component of this program is the development of collaboration and communication skills. Students will be expected to engage with the public, media, and policy makers to increase the dissemination of scientific knowledge and to expand the implementation of science-based decision-making.

One of the primary mechanisms for catalyzing student understanding of complex ecological challenges will be the programmatic-level emphasis and cluster structuring of student training. The goals of these two approaches are to engage students and faculty in high-level discussions of the detailed processes that structure ecosystems and human-ecosystem interactions from multiple disciplinary, agency, and public perspectives. These components of the program are built upon the premise that complex processes and problems may not necessarily be understandable, or accurate actionable solutions produced, from single disciplinary perspectives. For example, this program will have an optional emphasis in Global Change Biology that arises from the growing need to understand how natural and human systems interact in a time of global change. This emphasis will build upon strong core training in EEB with the addition of graduate coursework from the Geosciences, Anthropology, Economics, Public Policy, and other disciplines. In addition, students will have opportunities to participate in issue-focused clusters such as: invasive species biology, climate change, plant systematics, coupled human and natural systems, raptor ecology, among others.

A key component to translating scientific understanding of ecological systems to decision makers is advanced training in science communication. Therefore, students will be trained to be experts in communicating science to broad and diverse audiences. EEB scientists working on complex or contentious topics need to be prepared to, without bias, clearly present the uncertainties, present complex data visually, handle/diffuse difficult or hostile situations, talk with the press, and integrate perspectives. Our students will be trained to be able to speak with members of research groups from other disciplines, stakeholder groups, such as non-governmental organizations (NGOs), agencies, government officials, community organizations, k-12 schools, etc. and the general public.

To appropriately express the value of communications and self-regulated learning skills development, PhD students will be encouraged to acquire a new Digital Badge in Science Communication through Boise State's College of Innovation and Design (COID). Biological Sciences, Geosciences, Anthropology, Human-Environment Systems, and Communications faculty will participate in course delivery of this digital badge, thereby providing advanced communications training for PhD students and stimulating research across traditional disciplinary boundaries.

2. Enhance BSU's contribution to EPSCoR and to Idaho's research productivity

The success of Idaho EPSCoR relies on the research productivity of faculty members and on the richness of collaboration among the institutions. The creation of the PhD in EEB will be an action that Idaho EPSCoR can cite as a key component of the long-term sustainability of research productivity in Idaho, as has been done regarding the creation in 2013 of ISU's PhD in Geosciences. Idaho EPSCoR's final report for the project "Idaho Research Infrastructure Improvement: Water Resources in a Changing Climate" states, *"…the ISU Geosciences department was granted permission this year to offer a PhD degree in Geosciences. The Idaho EPSCoR program helped significantly in this success through investments in new Geoscience faculty and as a motivator and an advocate for this new degree. ISU Geosciences will now be able to attract and retain highly qualified students and increase collaboration through advising and proposal writing with faculty at other Idaho universities."*

Creation of a PhD program in EEB at BSU will make BSU, UI, and ISU collaborators more competitive for long-term support from the NSF, specifically, for a Long Term Ecological Research site (LTER) competition at NSF. These are large long-term awards (i.e. $900k/year for 5 years, with renewals every 5 years. The majority of LTER sites have been in operation for more than 2 decades. Currently there are 24 LTER sites funded by the NSF. During 2016 there will be a competition for a new LTER site specifically for semi-arid ecosystems. BSU EEB faculty members, along with collaborators at UI, ISU, USGS, and the USDA Agricultural Research Station, are extremely well positioned to be competitive for this opportunity.

Creation of the proposed program will enhance other funding opportunities.

- BSU will be able to apply for additional funding opportunities that specifically target PhD level training (e.g., NSF's Integrative Graduate Education and Research Traineeship Program, NSF's Alliances for Graduate Education and the Professoriate, and DOE's Science Graduate Student Research Program).
- BSU will be better able to pursue funding that develops connections between academic institutions and industry (e.g., NSF's Grant Opportunities for Academic Liaison with Industry Program and NSF's Science, Technology, and Society Program).

The new program will also increase BSU's contribution to the SBOE's "Strategic Research Plan for Idaho Higher Education (2016-2020)." That plan focuses on increasing research in the state, with focus on collaboration among institutions. The new PhD will enable BSU faculty members to secure more research grant funding and to better support the research and policy efforts of partners in the private and government sectors. The new program will increase BSU's contribution to the following performance measures of SBOE's strategic research plan: state-wide research expenditures, number of new grant submissions and awards that involve subawards with another Idaho institution, number of new awards involving the private sector, number of faculty members and students paid from sponsored projects, and percentage of baccalaureate students graduating in STEM disciplines and with research experience.

3. ***Enhance the relevance, quality, productivity, and efficiency of existing undergraduate and graduate programs.***

The BS in Biology program scored in the top quintile in Program Prioritization because it is relevant and of high quality, and because it is highly productive and efficient. The analyses of Program Prioritization also revealed a number of opportunities to further increase relevance, quality, productivity, and efficiency.

First, biology degree programs are laboratory-intensive, and it is the upper division laboratories that are acting as bottlenecks in Boise State's program, limiting overall capacity to create graduates and also slowing the completion of those who do progress to graduation. The proposed PhD program will create opportunities for PhD candidates to gain teaching experience in the laboratories of those upper division courses, enabling expansion of lab section capacity and throughput in a much less costly manner than the addition of tenure-track faculty members.

Second, several lower division courses required of students in health science degree programs (e.g., nursing, pre-professional, radiologic sciences, respiratory care) act as bottlenecks, limiting progression of students to graduation. The proposed PhD program will enable some shift of MS-level teaching assistant capacity to those lower division courses.

Third, at the same time the PhD program is being developed, the department is reforming its core curriculum with the support of an award from an NSF WIDER-PERSIST program. The new core will focus on evidence-based instructional practices and streamline the current curriculum by minimizing overlap and redesigning courses to (i) deliver a common set of core courses in biology that provide all students with the same strong base of biological knowledge and (ii) develop upper division tracks

within which students can become more highly trained in their sub-discipline in biology of choice.

The proposed PhD will also increase the quality and relevance of the BS in Biology program and the BA Anthropology program because it will substantially increase the number of opportunities for undergraduate students to participate in research. At present, a substantial number of BS students work with our master's students; the PhD program will increase that number. In addition, a PhD program will allow us to increase our use of Vertically Integrated Projects (VIPs), a concept pioneered at Georgia Tech (http://vip.gatech.edu/new/) and Purdue (https://engineering.purdue.edu/vip/) that is designed to promote balanced student growth through the undergraduate years, provide structure and flexibility for students and develop a strong sense of comradery that increases retention and satisfaction. The VIP structure encourages interaction between all levels of education and experience, with more senior members tutoring and working with novices, and the opportunity for new researchers to get more involved as they gain skills. The interplay between all levels in a laboratory increases productivity and develops communication skills.

At the graduate-program level, a common concern of students is that there is not enough diversity of coursework. The creation of a new PhD program will provide master's-level students in Biology and in Anthropology with a substantial expansion the diversity of available graduate-level coursework.

4. ***Provide opportunities for local students to progress and provide employees for local organizations.***

In the Treasure Valley there are a number of government, non-governmental organizations, businesses, and educational institutions with employees (i) who would benefit professionally from acquisition of a PhD in EEB but (ii) are place-bound and unable to travel to other areas of the state to pursue doctoral level education. Examples of such employers are the US Fish and Wildlife Service, the Idaho Department of Fish and Game, the US Bureau of Land Management, the Nature Conservancy, Idaho Power, and the College of Western Idaho. A PhD program located in the state's capital, where several federal and state agencies, businesses, non-governmental organizations, and educational institutions are head-quartered, would provide opportunity for professional advancement for the employees of those organizations.

> *"We believe this program provides an opportunity for CWI faculty engagement and professional development, as well as a relevant and intriguing long-term academic pathway for our students in multiple disciplines of study."* Susan Knights, Assistant Dean, STEM, College of Western Idaho
>
> *"I am a non-traditional student who is a single father and a graduate of the Boise State Biology program. I am interested in pursuing graduate work for the attenuation of an advanced degree in biology; however, relocating for graduate work is very difficult to do. Having such a program offered at Boise State would allow students like me to advance academically and professionally without forcing the family hardship of relocation."* Daniel Melody
>
> *"As a graduate of the Raptor Biology MS (2012), I would appreciate the opportunity to advance my career in science without having to subject my new family to a long-distance move." "…staying in Boise will allow me to continue to cultivate my connections in the local scientific community, and develop my knowledge of local ecology and politics."* Eric Nolte
>
> *"Since receiving my MS from Boise State, I have often thought about continuing my education and pursuing a PhD." "In my field, as the Executive Director of a university academic program, having a terminal degree would be favorable and allow for continued growth of my career and the organization I lead. However, because my family is based in Boise, Idaho, and because my current position also keeps me tied to the local community, I have not pursued a PhD in Biology."* Greg Kaltenecker, Executive Director, Intermountain Bird Observatory, Boise State University

The same organizations have a need for employees of the sort that would graduate from the proposed

program.

"In my current capacity as an epidemiologist for the Division of Public Health at the Idaho Department of Health and Welfare, I see broad potential for this program to provide both higher quality interns and prospective employees in the future." "I was pleased to see that the proposed PhD program includes coursework in modeling social behavior. There is growing interest within public health in using this type of modeling to understand such things as how influenza might spread or which set of interventions would most likely reduce obesity in a population." Robert Graff, PhD, Chronic Disease and Environmental Health Epidemiologist, Bureau of Community and Environmental Health, Idaho Division of Health and Welfare

5. Enhance contribution to and collaboration with agencies and other organizations.

Located in Boise are a number of governmental agencies and non-governmental organizations. Boise State has a long history of partnership with these organizations, and a PhD program would serve to strengthen those partnerships. The following are example quotes from letters of support located in Appendix F.

"A PhD program in Ecology, Evolution and Behavior will provide a nearby team of scientists could help Zoo Boise ensure that the funds being generated…are spent on credible projects that have a real chance for success." "Zoo Boise's latest project involves helping to restore Gorongosa National Park in Mozambique…This new program at Boise State could help increase Idaho's influence in saving a place described by Dr. E. O. Wilson as 'the most biologically diverse national park on earth.'" Steve Burns, Director, Zoo Boise.

"The envisioned PhD program contains key transdisciplinary areas for research and training which are of interest to DOE-ID in its stewardship of INO and the INL site. Especially relevant is the area of Biogeochemistry…" Richard Provencher, Manager, Idaho Operations Office, US Department of Energy.

"Canyon County Parks and specifically Celebration Park has a twenty year history of cooperative ventures with various departments at Boise State University." "We are very excited about the new Ph.D. program. We feel that it is a timely, valuable and culturally important contribution the already stellar academic offerings at your University." Tom Bicak, Director, Canyon County parks, Recreation, and Waterways.

"Having access to doctoral students who are working across disciplines to solve complex problems will be of tremendous benefit to our science center. From sharing breakthroughs of highly relevant and well-funded research programs with our adult and teen audiences to highlighting possible career paths to budding young scientists, I can see many ways that this expansion will enrich our partnership and community." Kristine Barney, Executive Director, Discovery Center of Idaho

"A Ph.D. would be able to address complex ecological and evolutionary botanical research vital to decision making of the agency and relevant to society. We would like to continue collaborative efforts with your research programs…" Alma Hanson, PhD, Forest Botanist, Natural Resources, Payette National Forest.

<u>Program Intended Learning Outcomes and Assessment Plan:</u>

Program Intended Learning Outcomes: *Students who graduate from the program will be expected to have the following skills and knowledge:*	**Direct measures of Achievement of Intended Learning Outcomes**	**Indirect Measure of Achievement of Intended Learning Outcomes**

1. Graduates will be able to pose relevant research questions and will be able to conduct independent research using the scientific method to address those questions.	Proposal and comprehensive exam, dissertation research and defense	Exit interview with students, faculty observations and discussions
2. Graduates will be able to effectively communicate the results of scientific research in both written and oral form to scientific and public audiences.	Required proposal and oral presentation, dissertation and defense, EEB 603 and 604 assignment	Exit interview with students, faculty observations and discussions, presentations at professional meetings
3. Graduates will be able to acquire and utilize information to address scientific questions.	Completion of proposal and dissertation, comprehensive exam,	Exit interview with students, faculty observations and discussions
4. Graduates will be able to apply biology, mathematics, chemistry, geosciences, or human ecology as appropriate to their research and the understanding of ecological and evolutionary processes.	Assignments in coursework, dissertation research and defense	Exit interview with students, faculty observations and discussions
5. Graduates will have achieved a level expertise in their discipline.	Dissertation research and defense, publications	Exit interview with students, faculty observations and discussions

3. Briefly describe how the institution will ensure the quality of the program (i.e., program review). Will the program require specialized accreditation (it is not necessary to address regional accreditation)? If so, please identify the agency and explain why you do or do not plan to seek accreditation. *This question is not applicable to requests for discontinuance.*

The following measures will ensure the high quality of the proposed program:

Regional Institutional Accreditation: Boise State University is regionally accredited by the Northwest Commission on Colleges and Universities (NWCCU). Regional accreditation of the university has been continuous since initial accreditation was conferred in 1941. Boise State University is currently accredited at all degree levels (A, B, M, D).

Program Review: Internal program evaluations will take place every five years as part of the normal departmental review process conducted by the Office of the Provost. This process requires a detailed self study (including outcome assessments) and a comprehensive review and site visit by external evaluators. The review process is being considerably strengthened as a result of Program Prioritization with the inclusion of new metrics and a pre-review by the Provost's Office.

Graduate College: The program will adhere to all policies and procedures of the Graduate College, which is a member of the Council of Graduate Schools (Washington, D.C.), the leading authority on graduate education in the United States. The Graduate College has broad institutional oversight of all graduate degree and certificate programs.

Departmental of Biological Sciences Oversight: The proposed new PhD in EEB will build on a significant foundation of experience within the department of managing graduate programs successfully. Existing graduate programs include MS degrees in Biology, Raptor Biology and a MA degree in Biology. The graduate student community of the department currently includes approximately 40 MS students. The majority of MS students graduate 3 years after initial matriculation, and the first cohort of EEB doctoral students will graduate in May, 2022 (assuming a

program start date of Fall 2017). Thus, the Department of Biological Sciences has the organizational structures, policies and procedures already in place to manage graduate programs successfully and to ensure that students receive the individual mentoring, guidance, and professional development needed to progress through their programs in a timely manner.

Existing graduate and undergraduate programs in the department will receive collateral benefits from the addition of the proposed new PhD program, helping them to become even stronger. The presence of advanced graduate students and their dissertation research in the department creates an environment that fosters student-to-student mentoring and creates more opportunities for hands-on participation (particularly of undergraduates) in advanced, applied research. We have seen this outcome as a byproduct of our existing Master's programs, and it is consistent with national studies of the potential benefits of research-intensive graduate programs on undergraduate education (e.g., Boyer Commission on Educating Undergraduates, 1998; NRC Committee on Undergraduate Science Education, 1999). Aspects of departmental management plans for the new PhD program are described below.

Student Mentoring and Program Assessment**:** On-going program evaluation and assessment at the department level will provide essential information to help ensure the long-term quality of the program. Assessment activities will allow monitoring of individual student progress in the program so challenges can be recognized early and managed effectively. Integrated and evaluated over time, this feedback can also be used to fine-tune and adjust the overall program design, as needed to maintain excellence. Components of the student mentoring and outcomes assessment plan include:

- *Appointment of a Major Advisor who has the primary responsibility for day-to-day mentoring and professional development of their students* – Identification of the advisor will be strongly encouraged for admission to the program.
- *Planning of academic course work* – Students will work with their advisor and committee to complete a Program Development Form (PDF), which identifies the calendar of course work necessary for students to complete their degree requirements. Each student's PDF is updated on an annual basis, providing an opportunity for the advisor and student to review the plan and make corrections, additions, etc., as necessary. Completed PDFs are placed in each student's departmental file.
- *Evaluation of the dissertation proposal* – Students must submit to their Supervisory Committee a dissertation proposal describing in sufficient detail the proposed scope of work, anticipated scientific impact, timeline, and a plan for obtaining and utilizing the resources necessary to complete the research. A complete draft of the thesis proposal must be submitted by the beginning of the third semester. The student will be required to present a 30 min oral proposal presentation with a 15-20 min questions session. The draft proposal is evaluated by the committee and returned to the student with comments and suggestions for revision (if necessary). A final dissertation proposal must be submitted by the end of the third semester. A copy of the dissertation proposal and the committee's evaluation/comments is placed in the student's departmental file.
- *Progress and competency in graded coursework* – How students perform in the classroom will provide a direct metric of progress and achievement – particularly in the early portion of the program when much of the required course work is typically taken by students.
- *The Comprehensive Examination* - As discussed below (#6), the comprehensive exam represents a significant milestone and an important assessment tool for monitoring how well students have assimilated information from various sources and integrated it into a comprehensive knowledge of Ecology, Evolution, and Behavior. It will have both an oral and written component.

- *Participation in Clusters* – Each year, students will be required to identify a cluster for participation. The EEB program will offer 4-6 clusters a year for in-depth learning in an area of EEB. Clusters will be proposed by 2-4 Department of Biological Sciences or affiliate faculty and approved by the EEB Graduate Studies Committee. Clusters may include discussion of interdisciplinary perspectives on EEB topics, common areas of research, or applied problem areas. Cluster activities could include: discussion of the primary literature, field visits, technique development, applied problem solving, or proposal or paper writing. Annual proposal of clusters will allow for motivated selection of topics while still providing in-depth access. Possible topics include: Behavioral Ecology, Molecular Ecology and Phylogenetics, Microbial Ecology, Biology of Invasive Species, Biology of Stress and Fear, Raptor Biology, Critical Zone Biology, or Climate Change. It is expected that this list of Cluster topics will be continually modified as the program grows and the important topics for discussion change with new information, new faculty, and new students.
- *Dissertation defense* – the culminating activity of the program is the oral presentation and public defense of the dissertation (discussed in more detail below).
- *Exit interview* – Following completion of the degree, as students transition out of the department, we will conduct an exit interview to evaluate their experiences in the program, determine if their expectations were met, and obtain specific suggestions for ways to improve the program.
- *3-year post-graduation follow-up interview with alumni* – The department will contact and interview alumni approximately 3 years after graduation to assess whether or not the program was effective in giving the students the practical skills and knowledge necessary to achieve success in the 'real world.' Feedback from the alumni will be factored into decisions about restructuring of coursework or other aspects of the program (as needed).

To ensure that program monitoring and outcomes assessment are conducted fairly, effectively and consistently, the Department of Biological Sciences will maintain an Education Program Director staff position beginning January 2016, with a core responsibility of organizing and implementing substantive assessment plans for all degree programs in the department, including the new PhD, and writing development proposals.

Graduate Studies Committee**:** The EEB Graduate Studies Committee (GSC) for the Ecology, Evolution, and Behavior PhD program will consist of a member of the Department of Biological Sciences who serves as the EEB program coordinator, 2-3 additional EEB faculty from the Department of Biological Sciences, and at least one faculty from an affiliate department or agency. The duties of the Graduate Studies Committee include development of recommendations for admission of prospective graduate students, decisions on transfer credits and required background courses, decisions on the award of departmental graduate fellowships and assistantships, and approval of Supervisory Committees for graduate students.

Supervisory Committee**:** The Supervisory Committee is charged with general guidance of the doctoral student, including design and approval of the program of study, administration of the comprehensive examination, supervision of the dissertation research, and participation in the dissertation defense. The Supervisory Committee consists of a major advisor who acts as chair, and at least three additional members, two of whom must be members of the University regular or research faculty and must also be members of the Graduate Faculty. Additional members may be appointed when such appointments enhance the function of the Committee. A majority of the committee membership must hold appointments in the Department of Biological Sciences or one of the affiliate EEB Departments. Students are encouraged to have at least one member of their committee who is external to the advisor's department.

Application and Admission Requirements**:** Applicants to the PhD program in Ecology, Evolution,

and Behavior will be required to have a Bachelor's or Master's degree in biological sciences, wildlife ecology, or a related discipline from an accredited college or university. Admission will be competitive and will be based on previous experience in the field, transcripts, professional references, scores on the general test of the Graduate Record Examination (GRE), and evaluation of a letter of intent describing previous research experience and the applicant's professional interests and plans for the future.

4. **List new courses that will be added to your curriculum specific for this program.** Indicate number, title, and credit hour value for each course. Please include course descriptions for new and/or changes to courses. *This question is not applicable to requests for discontinuance.*

EEB 601 PRINCIPLES AND PROCESSES IN ECOLOGY, EVOLUTION, AND BEHAVIOR I (3-3-4)(F). Discusses principal ecological processes and interactions, both biotic and abiotic, that organisms rely on and perform to acquire the necessary energy, water, carbon, and nutrients for growth, metabolism, and reproduction. Mechanisms driving evolutionary responses at the species and population levels are discussed in the context of how evolutionary processes influence ecosystem level responses to a variety of factors, including changing climate, anthropogenic use patterns, species invasions, and nutrient cycles.

EEB 602 PRINCIPLES AND PROCESSES IN ECOLOGY, EVOLUTION, AND BEHAVIOR II (3-3-4)(S). Builds on the principles and processes of ecology and evolution discussed in EEB 601. Expands and explores in the context of contemporary responses of ecosystems and organisms to changing anthropogenic influences on ecosystems. PREREQ: EEB 601.

EEB 603 SCIENCE AND COMMUNICATION I (3-0-3)(F). Focuses on philosophy and process of conducting science, concept development, and experimental design. Emphasizes practical skills in sampling schemes, data management, metadata, accessing publicly available data, and using research-related software. Development of written and oral skills through preparing proposals and papers and delivering presentations. Application of different strategies for communicating with other scientists, collaborators, decision-makers, media, and the public.

EEB 604 SCIENCE AND COMMUNICATION II (3-0-3)(S). Continues the focus, skills development and practice begun in EEB 604. PREREQ: EEB 603.

EEB 605 CURRENT RESEARCH IN EEB (2-0-2). Invited and contributed presentations on current topics in ecology, evolution, and behavior. Examines presentation style and effective techniques. Examination of literature on current topics, contributing to speaker scheduling and hosting. May be repeated for credit.

EEB 606 SCIENCE AND SOCIETY IN THE GREAT BASIN (3-0-3). Case studies by local biologists from academia, government agencies, and private organizations using science to solve ecological problems in the Great Basin. Examines how different stakeholders study, manage, and conserve the wildlife, plants, soils and climate that shape the Great Basin. Includes applied communication of science to the public through outreach that promotes management of healthy landscapes and wildlife in local ecosystems.

EEB 607 QUANTITATIVE METHODS FOR POPULATION AND HABITAT ANALYSIS (2-2-3). Theory and methods of how to use empirical data to make valid inferences about populations and habitats. Uses software and literature applied to various types of analyses of population and habitat data and models, including traditional, Bayesian, and hierarchical models that explain survival, occupancy, and abundance. Focus on reliable estimation of population parameters, measures of precision for estimates, and use of covariates to explain population patterns.

EEB 608 SPATIAL ECOLOGY (3-0-3). Focuses on both techniques (geospatial mapping and modeling) and problems (landscape connectivity, animal movement strategies associated with spatial ecology). Examination of mechanisms that can cause spatial pattern formation in species distributions and of metapopulation dynamics and dispersal strategies. Selection and use of appropriate software for spatial analyses. Includes both theoretical sessions and computer exercises.

EEB 609 ADVANCED COMMUNITY ECOLOGY (3-0-3). Fundamentals of community ecology and current theories and quantitative tools for determining community assembly rules, describing diversity patterns, and linking community structure to community functions.

EEB 610 MICROBIAL ECOLOGY (3-0-3). Focuses on the relationships among and biogeochemical role of microorganisms in natural communities. Topics structured to demonstrate the linkages between microbial ecology, diversity, and evolution. Strengths, limitations, and caveats of modern microbial methods for assessing ecological interactions. Role of microbial metabolism in controlling elemental cycling on local to global scales.

EEB 501 SENSORY ECOLOGY AND EVOLUTION (3-0-3). Examination of how information transmission, via various sensory systems, mediates animal behavior and shapes biological processes, such as predator/prey interactions and species' distributions. Discussion of the impacts of anthropogenic sensory pollution on ecological function.

EEB 611 CHEMICAL ECOLOGY AND EVOLUTION (3-0-3). Surveys topics related to the chemical ecology and co-evolutionary interactions between plant and herbivores. Material focuses on quantifying doses of chemical defenses in plants and responses of herbivores to those defenses from an evolutionary, physiological, pharmacological and ecological perspective. Design, conduct, analyze and present an experiment testing and hypothesis related to chemical ecology and evolution.

EEB 612 PLANT ECOPHYSIOLOGY (3-0-3). Responses of plants in terrestrial ecosystems to, and interaction with, environmental conditions. Physiological responses of plants and their ecosystems to environmental factors and stressful conditions. Interaction of plants with environment to capture, use and cycle resources such as carbon, water and nutrients. Emphasis on plant responses and plant-soil-atmosphere interactions from a global environmental change perspective such as increased carbon dioxide concentration and temperature and altered precipitation patterns.

EEB 613 LANDSCAPE AND CONSERVATION GENOMICS (3-0-3). Application of evolutionary analysis to real-world biological problems. Use of large data sets and diverse computational approaches in analyzing population structure, signatures of natural selection, and demographic and disease-related processes. Emphasizes human-driven global changes that accentuate or disrupt natural evolutionary processes and linkages at the individual, population, community, and species levels. Includes a focus on the consequences of landscape-level patterns to the spatial genetic structure of populations.

EEB 614 PHYLOGENETICS AND ADVANCED EVOLUTION (3-0-3). Explores the basics of phylogenetics, applications, and current software used to generate histories of organisms. Interpretation of macro-evolutionary processes using phylogenetic history. Topics include multiple sequence alignment, genomic data analysis, generation of phylogenetic trees via parsimony, likelihood and Bayesian methods as well as networks. Examines phylogenetic trees for ancestral character state reconstruction, molecular dating, biogeography, climate shifts, and species trees.

EEB 615 BIODIVERSITY AND ECOSYSTEM FUNCTION (3-0-3). Quantifies patterns of biodiversity and discusses the ecological implications of biodiversity loss at the level of the community, ecosystem and landscape. Community ecology focus on biotic interactions such as competition, trophic interactions, bottom-up and top-down control and stability of food webs. Biodiversity impacts on interactions between organisms and the abiotic environment. Landscape level focus on effects of changes in biodiversity on structure and dynamics of natural and cultural landscapes.

EEB 616 THE CARBON DILEMMA (3-0-3). Explores tradeoffs between different ecosystem functions and services provided by carbon. Several (interlinked) scientific questions important for resolving or managing carbon are discussed and novel research questions are identified.

EEB 617 ECOSYSTEM ECOLOGY (3-0-3). Influence of biological, ecological and physical processes on energy and elemental cycling (C, N, P). Consideration of roles of microorganisms, plants and animals and

whole ecosystems. Factors regulating the ecosystem function, including soils, climate, disturbance, and human activities, are considered from the molecular to the global scale.

EEB 618 EARTH'S BIOGEOCHEMICAL CYCLES AND CLIMATE CHANGE (3-0-3). Examines the underlying natural science of global change. Presents and evaluates major processes affecting C, N, and P cycles at ecosystem levels with biogeochemical ecosystem models. At the global scale level, the C, N, and P cycles are examined across the Earth's compartments. Emphasizes how these cycles are linked and how regulation among cycles takes place. Functioning of natural cycles and the anthropogenic effects on these cycles are assessed.

EEB 619 MODELING SOCIAL BEHAVIOR (3-0-3). A survey of modeling approaches used to analyze social behavior from an evolutionary/ecological perspective. Focus on analytical, agent-based, and statistical modeling.

EEB 620 POPULATION GENETICS (3-0-3). Theoretical population genetics and its relationship to natural and experimental populations. Single locus and multilocus systems, history of a gene in a population, diffusion approximations, suitability of models to natural and experimental populations. Theories of selection, neutrality, drift, recombination, mutation, and isolation and statistical tests and experimental methods for detecting these forces.

EEB 621 ADVANCED ECOLOGICAL DATA ANALYSIS (3-0-3). Utilizes existing datasets. Provides 'hands-on' training in data analysis with goal of publishable article. Focuses on data issues, selection of appropriate models and problems of interpretation. Topics vary by participants, but may include mixed models, non-linear modeling, scripting, and manipulating data.

5. **Please provide the program completion requirements to include the following and attach a typical curriculum to this proposal as Appendix B.** *For discontinuation requests, will courses continue to be taught?*

Credit hours required:	66
Credit hours required in support courses:	23
Credit hours in required electives:	13
Credit hours for thesis or dissertation:	30
Total credit hours required for completion:	66

6. **Describe additional requirements such as preliminary qualifying examination, comprehensive examination, thesis, dissertation, practicum or internship, some of which may carry credit hours included in the list above.**

Comprehensive Examination**:** The objective of the comprehensive examination is to judge depth and breadth of knowledge in Ecology, Evolution, and Behavior. The examination is to be developed and administered by the Supervisory Committee. A student must take the comprehensive examination prior to the end of their fifth semester. The Comprehensive exam will consist of both a written and oral portion test.

The written portion may consist of either: 1) a review paper on a topic in Ecology, Evolution, or Behavior that has been approved by the Supervisory Committee, or 2) written responses to a series of questions developed by the Supervisory Committee. The Supervisory Committee, with input from the student, will choose the format for the written portion of the exam.

The supervisory committee will conduct the oral portion of the exam after successful completion of the written portion of the exam. During the oral exam students are expected to demonstrate solid, in–depth, academic knowledge related to Ecology, Evolution, and Behavior. The decision of whether a student passes or fails the comprehensive exam rests with the committee members. If a student fails the initial examination, the committee has the option of allowing a student to repeat the examination one time. If a repeat examination is granted by the Supervisory Committee, it must

occur within 3 months of the initial examination. Failure of the Comprehensive Examination will result in dismissal from the Ph.D. program.

Dissertation Requirements: The dissertation must be the result of independent and original research by the student and must constitute a significant contribution to ecological and evolutionary knowledge equivalent to multiple peer-reviewed publications. The style and format of the dissertation are to conform to the standards of the Department of Biological Sciences and the Graduate College.

Dissertation Defense: A public defense of the dissertation is scheduled after the Supervisory Committee has reviewed a draft that is considered to be nearly a final version. The defense committee consists of the student's entire supervisory committee plus a graduate faculty representative (GFR). The date of the defense is determined jointly by the Supervisory Committee and the student and must be consistent with any guidelines provided by the Graduate College. The first part of the defense will be a public oral presentation of the dissertation. The second part will be an oral exam. At the conclusion of the final oral examination, the GFR calls for a vote by the voting members of the defense committee to determine the examination result which must be either pass or fail. A student who fails the defense may be permitted to try again but failure a second time will result in dismissal from the program.

Final Approval of the Dissertation: If the defense is completed with a result of pass, the Supervisory Committee prepares a statement describing final requirements such as additions or modifications to the dissertation and any additional requirements such as archival of data. When these requirements have been met, the approval page of the dissertation is signed by the Chair of the Committee.

7. Identify similar programs offered within Idaho or in the region by other colleges/universities.
If the proposed request is similar to another state program, provide a rationale for the duplication.

As can be seen by the following table, every research university in Idaho and in adjacent states has a PhD program similar to that proposed at Boise State University. Such programs are highly typical of research universities.

Listing of Relevant PhD Programs at Research Universities in States adjacent to Idaho
(Includes all institutions with the Carnegie Basic Classifications of "Research University [high research activity]" and "Research University [very high research activity]." Also includes Boise State University, which presently has the Carnegie Basic Classification of "Master's Universities [larger programs]" but which is expected to be reclassified to as "Research University [high research activity]" in 2015)

State	University	Relevant PhD programs
Idaho	Idaho State University	PhD in Biological Sciences PhD in Microbiology
	Boise State University	PhD in Ecology, Evolution, and Behavior (proposed)
	University of Idaho	PhD in Natural Resources PhD in Biological Sciences PhD in Environmental Science
Montana	University of Montana	PhD in Anthropology PhD in Fish and Wildlife Biology PhD in Organismal Biology and Ecology PhD in Systems Ecology PhD in Forestry

	Montana State University	PhD in Biological Sciences PhD in Fish and Wildlife Biology PhD in Microbiology PhD in Ecology and Environmental Sciences
Nevada	University of Nevada Las Vegas	PhD in Anthropology PhD in Biological Sciences PhD in Environmental Science
	University of Nevada Reno	PhD in Anthropology PhD in Ecology, Evolution, and Conservation Biology
Oregon	University of Oregon	PhD in Anthropology PhD in Biology PhD in Environmental Sciences, Studies, and Policy
	Portland State University	PhD in Biology
	Oregon State University	PhD in Applied Anthropology PhD in Botany & Plant Pathology PhD in Environmental Sciences PhD in Fisheries Science PhD in Forest Ecosystems and Society PhD in Rangeland Ecology & Management PhD in Sustainable Forest Management PhD in Wildlife Science PhD in Zoology
Utah	University of Utah	PhD in Anthropology PhD Ecology, Evolution, Organismal Biology PhD in Microbial Biology
	Utah State University	PhD in Biology PhD in Ecology PhD in Forestry PhD in Range Science PhD in Wildlife Biology PhD in Fisheries Biology
Washington	University of Washington	PhD in Aquatic & Fishery Sciences PhD in Biology PhD in Biocultural Anthropology PhD in Environmental & Forest Sciences PhD in Microbiology PhD in Oceanography PhD in Quantitative Ecology & Resource Management
	Washington State University	PhD in Anthropology PhD in Botany PhD in Environmental & Natural Resource Sciences PhD in Zoology
Wyoming	University of Wyoming	PhD in Anthropology PhD in Ecology PhD in Rangeland Ecology and Watershed Management PhD in Zoology and Physiology

In Idaho, no state institution has statewide responsibility for any program in the biological sciences (CIP code 26.xx Biological and Biomedical Sciences.)

Idaho State University offers two programs that have some overlap with the proposed program: a PhD in Biology and a PhD in Microbiology. University of Idaho offers three programs that have some overlap with the proposed program: a PhD in Biology, a PhD in Natural Resources, and a PhD in Environmental Science. The University of Idaho offers two other programs with a lesser similarity to the proposed program, a PhD in Bioinformatics and Computational Biology and a PhD in Water Resources.

SBOE Policy III.Z specifies that "unnecessary" duplication of programs should be avoided. That is, a new program should be created only if it is not feasible for existing programs at other institutions to fulfill the need for the proposed program, and only if it provides a net benefit to the state and its citizens.

Given the existence of two similar programs at ISU and three similar programs at UI,
why does it make sense to offer a PhD in Ecology, Evolution, and Behavior at BSU?

First, failure to approve the program would directly contradict the mission of the Idaho EPSCoR program. That mission is to build research competitiveness of the state's universities, and a successful EPSCoR program requires success at all three of Idaho's universities. Approval of the proposed program will be a significant win for Idaho's EPSCoR program, and will demonstrate a huge return on investment, thereby making future proposals to NSF and other EPSCoR participating agencies more likely to be successful. To repeat a quote from Dr. Peter Goodwin, Project Director of Idaho EPSCoR,

> *"The proposed PhD … is a logical next step to build on past investments and ensure the continued growth and sustainability of these initiatives. Failure to establish a PhD program will inhibit the research growth and ONEIDaho partnerships established across the state and beyond."*

The state has made substantial investments in support of the Idaho EPSCoR mission; for example, more than $700K of the annual higher education budget is necessary to support 12 faculty members at UI, ISU, and BSU that are being funded initially by EPSCoR funds. To make the most of this and other investments by the state requires that BSU develop the programs necessary to achieve its greatest potential in terms of research productivity and graduate education.

Second, failure to approve the proposed program would contradict the intent of SBOE's "Strategic Research Plan for Idaho Higher Education." Approval will expand funding opportunities (especially from federal agencies), increase inter-institutional collaboration, and enable the use of PhD students to provide greater depth and scope of research than can master's students.

Third, creation of the program directly follows from the principles of Program Prioritization.

- Creation of the program represents investment of resources in top quintile programs.
- Undergraduate programs in the Biological Sciences are at full capacity, requiring additional investment to meet demand. Masters students in the Biological Sciences are currently producing high-level theses through research programs with ample external funding to support PhD students. Consequently, the development of a PhD program at this time is timely, allowing the department to expand undergraduate instructional capacity through faculty and teaching assistantships while developing additional graduate coursework in a synergistic fashion.
- We estimate that the new program, in conjunction with curricular revision, will yield more than $600k in revenue by year three resulting from increased enrollments associated with current and future demand.

Fourth, no other program in the state can provide many of the benefits that will result from the proposed program.

- No other program can provide local, place-bound Treasure Valley biologists with the opportunity to advance professionally. The Treasure Valley is the home for a number of federal and state agencies, non-governmental organizations, environmental consulting firms, and educational institutions, each with employees who would benefit.
- No other program in the state can provide the same strong partnerships to the US Geological Service's Snake River Field Station, the Peregrine Fund, and the Gorongosa Restoration Project. These organizations have strong ties to Boise State, and both will benefit from involvement with the proposed program.
- No other program has the same combination of strengths in the transdisciplinary areas of raptor biology, global change biology, plant evolution and diversity, chemical ecology, biogeochemistry, human behavioral ecology, and human-environment systems. Therefore, no other program will bring the same perspectives to bear on solving the complex problems that face us.

Degrees/Certificates offered by school/college or program(s) within disciplinary area under review

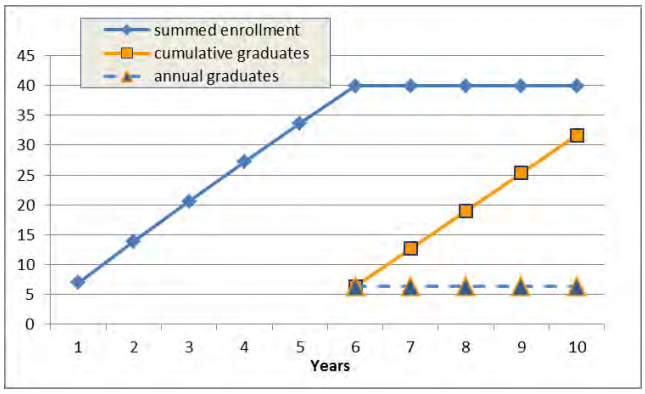
Institution and Degree name	Level	Specializations within the discipline (to reflect a national perspective)	Specializations offered within the degree at the institution
BSU Proposed: PhD in Ecology, Evolution, and Behavior (CIP codes 26.1301, 26.1303, 26.0708)	doctoral	BSU's proposed program includes the following three fields: CIP 26.1301 Ecology. CIP Definition: A program that focuses on the scientific study of the relationships and interactions of small-scale biological systems, such as organisms, to each other, to complex and whole systems, and to the physical and other non-biological aspects of their environments. Includes instruction in biogeochemistry; landscape and/or marine/aquatic dynamics; decomposition; global and regional elemental budgets; biotic and abiotic regulation of nutrient cycles; ecophysiology; ecosystem resilience, disturbance, and succession; community and habitat dynamics; organismal interactions (co-evolution, competition, predation); paleoecology; and evolutionary ecology. CIP 26.1303 Evolutionary Biology. CIP Definition: A program that focuses on the scientific study of the genetic, developmental, functional, and morphological patterns and processes, and theoretical principles; and the emergence and mutation of organisms over time. Includes instruction in molecular and morphological systematics; genetics and development; evolutionary transformation; paleobiology and paleontology; morphogenesis; mutation; locomotor, biomechanical and craniodental form and function; evolutionary theory; and systematic biology. CIP 26.0708 Animal Behavior and Ethology. CIP Definition: A program that focuses on the scientific study of the psychological and neurological bases of animal sensation, perception,	Transdisciplinary strengths in: >Raptor biology >Chemical ecology >Plant evolution and diversity >Global change biology >Biogeochemistry >Human behavioral ecology Specific areas of specialization depend on the expertise of individual faculty members.
ISU: PhD in Biology (CIP code 26.0101) PhD in Microbiology (CIP code 26.0502)	doctoral		The ISU Department of Biological Sciences website lists four core research areas: >Ecology and Evolution >Biomedical, Anatomy & Physiology >Biochemistry, Microbiology, and Molecular Biology >Science Education Specific areas of specialization depend on the expertise of individual faculty members.
UI PhD in Biology (CIP code 26.0101) PhD in Natural Resources (CIP code 03.0201)	doctoral		The UI Department of Biological Sciences website states that research in the department is clustered in four main focus areas: >Reproductive Biology, >Evolution and Ecology, >Neurobiology, and >Cellular and Molecular Biology. The UI PhD in Natural Resources has participation by three departments, which indicate the areas of emphasis a student could

PhD in Environmental Science (CIP code 03.0104)		cognition, behavior, and behavioral interactions within and outside the species. Includes instruction in ethology, behavioral neuroscience, neurobiology, behavioral evolution, cognition and sensory perception, motivators, learning and instinct, hormonal controls, reproductive and developmental biology, community ecology, functional behavior, and applications to specific behaviors and patterns as well as to specific phyla and species.	explore: Conservation Social Sciences; Fish and Wildlife Sciences; and Forest, Rangeland, and Fire Sciences Department. The UI PhD in Environmental Science "emphasizes an integrated approach for students committed to studying and solving environmental problems. Over 100 faculty from throughout the university work across traditional disciplines to provide students with a comprehensive education in environmental mitigation and problem solving

8. **Describe the methodology for determining enrollment projections.** If a survey of student interest was conducted, attach a copy of the survey instrument with a summary of results as **an Appendix**. *This question is not applicable to requests for discontinuance.*

Our estimate is based on the following:

1. All students will be on funded assistantships, either state-funded teaching assistantships, research grant-funded research assistantships, or training grant-funded assistantships.
2. Six years to finish the program.
3. Incoming cohort of 7 students each year.
4. A yearly probability of attrition of 2%, yielding a 9.6% attrition probability during the six year career.
5. There will be more than sufficient numbers of incoming students to fill the incoming cohort, resulting from recruitment efforts and from interest among alumni and existing students.



The above assumptions yield the following results (as depicted in the accompanying figure:

1. An estimated 6.5 students will graduate each year, once the sixth year of the program is reached.
2. A total average enrollment of 40 students in the program at any one time once the program is fully up and running.
3. Of those 40 enrolled, 22 will be on state-funded assistantships and a minimum of 18 will be on grant-funded assistantships. The size of our incoming cohort will be adjusted in accordance with the number of grant-funded assistantships held by students.

9. **Enrollment and Graduates.** Using the chart below, provide a realistic estimate of enrollment at the time of program implementation and over three year period based on availability of students meeting the criteria referenced above. Include part-time and full-time (i.e., number of majors or other relevant data) by institution for the proposed program, last three years beginning with the current year and the previous two years. Also, indicate the projected number of graduates and graduation rates.

Institution	Relevant Enrollment Data			Number of Graduates			Graduation Rate
	Current (Fall 2014)	Year 1 Previous	Year 2 Previous	Current (2014-15)	Year 1 Previous	Year 2 Previous	
BSU: **PhD in Ecology, Evolution, and Behavior (proposed)**	The program will begin in Fall of 2017. We project that we will admit cohorts averaging 7 students each year. This will yield the projected enrollments depicted above, leveling out at roughly 40 once the program is fully up and running.			We project that first students will graduate from the program after 6 years in the program. Based on cohort size and on a typical attrition rate of 10%, we project an average of 6.5 graduates per year once the program is fully up and running.			6.5 per year
ISU **PhD in Biology**	11	12	15	3	1	6	~5 per year
PhD in Microbiology	2	1	1	0	0	1	~1 per year
UI **PhD in Biology (includes Microbiology, Molec. Bio., & Biochem)**	15	19	21	7	5	3	~5 per year
PhD in Natural Resources	45	59	61	17	8	10	~9 per year
PhD in Environmental Science.	31	31	27	7	4	6	~4 per year

10. **Will this program reduce enrollments in other programs at your institution?** If so, please explain.

No. Creation of the new program will create a vibrant research and teaching culture that will attract undergraduates and additional Master's students.

11. **Provide verification of state workforce needs such as job titles requiring this degree.** Include State and National Department of Labor research on employment potential.
Using the chart below, indicate the total projected job openings (including growth and replacement demands in your regional area, the state, and nation.) Job openings should represent positions which require graduation from a program such as the one proposed. Data should be derived from a source that can be validated and must be no more than two years old. T*his question is not applicable to requests for discontinuance*.

a. Describe the methodology used to determine the projected job openings. If a survey of employment needs was used, please attach a copy of the survey instrument with a summary of results as in an **Appendix.**

The proposed program will provide local, place-bound students with access to a program that will advance them professionally. The Treasure Valley is the home for a number of federal and state agencies, non-governmental organizations, environmental consulting firms, and educational institutions, each potentially with employees who would benefit.

To calculate the figures in the above table:

1. We used US Department of Labor data only because it includes information on educational level. State-level need is estimated from national-level data.
2. Although "Postsecondary Teachers" includes positions relevant to the proposed program (e.g., community college instructors in biology), that classification is very broad, including all disciplines, and would yield a gross overestimate of need; therefore that classification was not included.
3. Five other classifications were included: Zoologists and Wildlife Biologists; Biological Scientists, All Other; Conservation Scientists; Environmental Scientists and Specialists, Including Health; and Anthropologists and Archeologists. Each of these classifications is undoubtedly broader than the set for which the proposed program would prepare students. In partial compensation, we deliberately did not include two classifications that would include some jobs for which the proposed program is relevant: Microbiologists and Hydrologists.
4. We calculated the nationwide number of new openings as the number of job openings times the percent in that job who hold doctorates. This is very likely an underestimate given that the level of education required for such jobs is increasing over time. The resulting number was divided by 10 to yield the yearly number of job openings.
5. We calculated the number of existing bachelor's level and master's level employees who could benefit from advancing with a doctoral degree as the average of 2010 and 2020 employment numbers times the sum of the percentages of bachelor's and master's employees presently in those jobs. The resulting number was divided by 10 to reflect that the pool of potential students is finite, and would be replenished by retirements and other job transitions.
6. State need was calculated as 0.5% of the national need to reflect the percent of the nation's population in Idaho. Local regional need was calculated as 50% of the state need to reflect the percent of Idaho's population in the local area.

		A	B	C	D	E	F	=C*K	= ((A+B)/2)*(D+E)
2010 National Employment Matrix title and code		**Employment**		**Job openings due to growth and replace-ment needs, 2010-20**	**Percent of Employees at each educational level (2009)**			**Nationwide number of new openings at Doctoral level (1000's)**	**Nationwide number of existing Bachelor's and Master's who could potentially advance with doctorate (1000's)**
		2010	**2020**		**Bachelor's degree**	**Master's degree**	**Doctoral or professional degree**		
Zoologists and Wildlife Biologists	19-1023	19.8	21.3	5.9	44.4	28.8	21.2	1.3	15.0
Biological Scientists, All Other	19-1029	35.8	38.0	10.3	44.4	28.8	21.2	2.2	27.0
Conservation Scientists	19-1031	23.4	24.6	4.0	63.5	17.5	3.9	0.2	19.4
Environmental Scientists and Specialists, Including Health	19-2041	89.4	106.1	43.2	48.1	35.6	10.0	4.3	81.8
Anthropologists and Archeologists	19-3091	6.1	7.4	3.8	36.7	36.9	16.1	0.6	5.0
							Totals>>>	**8.5**	**148.3**
							Yearly need>>	**0.9**	**14.8**
				actual number needed per year (not in 1000's)>>				**850.0**	**14827.8**
							Total national need:		**15677.8**
							State need (0.5% of national):		**78.4**
							Regional need (50% of state need):		**39.2**
Excluded from Calculations									
Postsecondary Teachers	25-1000	1,756.0	2,061.7	586.1					
Microbiologists	19-1022	20.3	22.9	7.2	44.4	28.8	21.2		
Hydrologists	19-2043	7.6	9.0	3.6	48.1	35.6	10.0		

	Year 1	Year 2	Year 3
Local (Regional)	39	39	39
State	78	78	78
Nation	15,678	15,678	15,678

b. Describe how the proposed change will act to stimulate the state economy by advancing the field, providing research results, etc.

The proposed program will stimulate the economy by acting as a vehicle for bringing in additional federal funding. We conservatively estimate that the program, once fully up and running, will result in an increase of $3M in federal funding entering Idaho per year. In addition, results from research projects will result in more enlightened and efficient use of state and federal funds for managing natural systems. Finally, strong graduate programs attract undergraduate students (including those from out of state) who are interested in eventually pursuing graduate degrees. Evidence of this benefit exists for the MS in Raptor Biology program, which attracts undergraduate students to the Department of Biological Sciences who are interested in gaining research experience with birds of prey.

c. Is the program primarily intended to meet needs other than employment needs, if so, please provide a brief rationale.

The new program will increase opportunities for collaboration among faculty members at the three institutions and increase the amount of federal grant money flowing into Idaho. The EPSCoR program strives to increase the strength of inter-institutional collaborations; therefore creating programs that increase collaboration opportunities will create a more successful and robust EPSCoR program.

The proposed program will provide important research on a variety of challenges that face humans and the natural systems we depend on, including global climate change, invasive species, and endangered species. The proposed program has strengths in the transdisciplinary areas of raptor biology, global change biology, plant evolution and diversity, chemical ecology, biogeochemistry, and human behavioral ecology. Importantly, the program focuses on training scientists to better communicate with a wide range of audiences; thus, EEB graduates will be able to address a societal gap – a disconnect between science, public knowledge, and policy – and will therefore be able to speak to the direct application of research results to decision-making.

The program will provide strong partnerships to the US Geological Service's Snake River Field Station, The Peregrine Fund, and the Gorongosa Restoration Project. All three organizations have strong ties to Boise State, and all will benefit from involvement with the proposed program.

As collateral benefits, the program will: (i) increase efficiency in undergraduate biology and health sciences programs, (ii) increase quality and relevance of undergraduate programs because of increased opportunity for research experience, and (iii) increase richness of coursework available to existing master's level programs in biology, anthropology, and geosciences.

12. Will any type of distance education technology be utilized in the delivery of the program on your main campus or to remote sites? Please describe. *This question is not applicable to requests for discontinuance.*

The proposed program will be delivered primarily face-to-face. However, it is anticipated that several courses will be shared among the three universities.

13. Describe how this request is consistent with the State Board of Education's strategic plan and institution's ~~role and~~ mission. *This question is not applicable to requests for discontinuance.*

SBOE Strategic Plan	Relevance of proposed program
GOAL 1: A WELL EDUCATED CITIZENRY >Objective B: Higher Level of Educational Attainment – Increase the educational attainment of all Idahoans through participation and retention in Idaho's educational system.	>The proposed program will provide local professionals with the opportunity to advance professionally
GOAL 2: CRITICAL THINKING AND INNOVATION The educational system will provide an environment for the development of new ideas, and practical and theoretical knowledge to foster the development of individuals who are entrepreneurial, broadminded, think critically, and are creative. >Objective A: Critical Thinking, Innovation and Creativity – Increase research and development of new ideas into solutions that benefit society.	>The proposed program will focus on research that will address important problems, e.g., global climate change
GOAL 3: EFFECTIVE AND EFFICIENT DELIVERY SYSTEMS Ensure educational resources are used efficiently. Objective A: Cost Effective and Fiscally Prudent – Increased productivity and cost-effectiveness.	The proposed program: >will provide additional teaching capacity that will help alleviate bottleneck courses and promote graduation of students with baccalaureate degrees, in support of Complete College Idaho >builds on already strong master's programs >will enhance the quality and relevance of undergraduate and master's programs

The proposed program aligns remarkably well with the SBOE's *"Strategic Research Plan for Idaho Higher Education (2016-2020),"* and will contribute substantially to three goals, four objectives, and six performance measures listed below.

Goal 1: Increase research at, and collaboration among, Idaho universities and colleges to advance areas of research strength and opportunity.

Objective 1.A: Ensure growth and sustainability of public university research efforts.

Performance Measure 1.A.1: Statewide amount of total annual research and development expenditures as reported in the National Science Foundation (NSF) Higher Education Research and Development Survey.

Objective 1.C: Expand joint research ventures among the state universities.

Performance Measure 1.C.1: Number of new fully sponsored project proposals submitted by an Idaho University that involve a subaward with another Idaho institution of higher education (in either direction).

Performance Measure 1.C.2: Number of new fully sponsored project awards to an Idaho University that involve a subaward with another Idaho institution of higher education (in either direction).

Goal 2: Create research and development opportunities that strengthen the relationship between state universities and the private sector.

Objective 2.A: Increase the number of sponsored projects involving the private sector.

Performance Measure 2.A.1: Number of new sponsored projects involving the private sector.

Goal 4: Enhance learning and professional development through research and scholarly activity.

Objective 4.A: Increase the number of university and college students and staff involved in sponsored project activities.

Performance Measure 4.A.1: Number of undergraduate and graduate students paid from sponsored projects.

Performance Measure 4.A.2: Percentage of baccalaureate students who graduated in STEM disciplines and had a research experience.

Performance Measure 4.A.3: Number of faculty and staff paid from sponsored projects.

The highlighted portions of Boise State University's mission statement are especially relevant to the proposed program:

Boise State University is a ***public, metropolitan research university*** *offering an array of undergraduate and* ***graduate degrees*** *and experiences that foster student success, lifelong learning, community engagement,* ***innovation and creativity****.* ***Research and creative activity advance new knowledge and benefit students, the community, the state and the nation****.* ***As an integral part of its metropolitan environment the university is engaged in professional*** *and continuing education programming,* ***policy issues****, and promoting the region's economic vitality and cultural enrichment.*

The proposed program has substantial relevance to Boise State's core themes regarding Undergraduate Education, Graduate Education, and Research and Creative Activity, as described in the following table:

BSU Core Themes	Relevance of proposed program
Core Theme One: Undergraduate Education Our university provides access to high quality undergraduate education that cultivates the personal and professional growth of our students and meets the educational needs of our community, state, and nation. We engage our students and focus on their success.	
>Core Objective 1.1: Access and completion. Students of all backgrounds have the opportunity and support needed to pursue and successfully complete their undergraduate degree programs.	>The proposed program will provide additional teaching capacity, which will reduce bottlenecks for biology and health sciences majors, facilitating timely completion and supporting Complete College Idaho.
>Core Objective 1.2: Relevance. Our undergraduate students develop depth and breadth in the skills, knowledge, and experiences required to ensure their success in the 21st	>The research experience gained by undergraduate students will be highly relevant

century world. >Core Objective 1.3: Quality. In addition to developing depth of knowledge, understanding, and skill in their respective disciplines, our undergraduate students are engaged in an education that stresses the liberal arts. They master enduring skills and habits of mind that transcend disciplinary boundaries, achieve a breadth of knowledge and understanding over a range of disciplines, receive a solid grounding in civic and ethical responsibility, and become aware of the global community and their connection to it.	to their success. >The research experience gained by undergraduate students will increase the quality of education for those students.
Core Theme Two: Graduate Education Our university provides access to graduate education that addresses the needs of our region, is meaningful in a global context, is respected for its high quality, and is delivered within a supportive graduate culture. >Core Objective 2.1: Access. We provide students of all backgrounds with access to graduate educational opportunities in formats that are appropriate, flexible, accessible, and affordable. >Core Objective 2.2: Relevance. Our graduate students develop skills, knowledge, and experiences that are relevant and valuable locally, regionally, nationally, and globally. >Core Objective 2.3: Quality. Our graduate programs are composed of advanced and integrated learning experiences that provide disciplinary depth and interdisciplinary connections, and that reinforce the overall scholarly output of the university.	>The proposed program will provide opportunities for professional advancement for place-bound local biologists. >The program is focused on the solving of highly relevant problems. >The program will make use of "cluster" structure of student training to engage students in learning from a multidisciplinary perspective.
Core Theme Three: Research and Creative Activity Through our endeavors in basic and applied research and in creative activity, our researchers, artists, and students create knowledge and understanding of our world and of ourselves, and transfer that knowledge to provide societal, economic, and cultural benefits. Students are integral to our faculty research and creative activity. >Core Objective 3.1: Access. Community members can connect with and benefit from our researchers, artists, and students. Our students are true collaborators in our activities. >Core Objective 3.2: Relevance. Our efforts in research and creative activity have direct and beneficial impact on the community, state, nation, and global community. >Core Objective 3.3: Quality. We pursue research and creative activity that brings about discovery of fundamental knowledge and produces a better understanding of the human condition and our world. The work of our researchers, artists, and students has substantial disciplinary impact and contributes to the overall reputation of the university.	>The proposed program will provide relevant research to our key partner organizations as well as to other agencies, non-governmental organizations, etc., in the area. >Research pursued by graduate students and faculty members will focus on problems of high relevance. >The program builds on highly successful and high quality master's programs. Focus on quality is a key attribute of all doctoral programs at Boise State.

14. Describe how this request fits with the institution's vision and/or strategic plan. *This question is not applicable to requests for discontinuance.*

Goals of Institution Strategic Plan ~~Mission~~	Proposed Program Plans to Achieve the Goal
Goal 1: Create a signature, high quality educational experience for all students.	>The proposed program will be one-of-a-kind because of its six transdisciplinary strengths. >It will enhance the quality of undergraduate programs, and will increase the quality of the Raptor Biology master's program, the only master's program in raptor biology in the nation.
Goal 2: Facilitate the timely attainment of educational goals of our diverse student population.	>A side benefit of the proposed program is a decrease in the bottleneck courses that affect biology and health sciences majors, thereby supporting Complete College Idaho.
Goal 3: Gain distinction as a doctoral research university.	>The proposed program will substantially increase the research output of faculty members, the reputation of the university, and the number of doctoral graduates.
Goal 4: Align university programs and activities with community needs.	>The proposed program will provide place-bound biologists with opportunities for further education. >The program will increase the productivity of our two key partners: the Peregrine Fund and the USGS. >The program will provide research highly relevant to locally-based organizations.
Goal 5: Transform our operations to serve the contemporary mission of the university.	>Creating the proposed program follows directly from the tenets of program prioritization: the university should invest in the departments and programs (such as those of the Department of Biological Sciences) that are of the highest effectiveness and efficiency. >The program will have important collateral benefits in increasing efficiency and quality of existing undergraduate and graduate programs.

15. Is the proposed program in your institution's Five-Year plan? Indicate below. *This question is not applicable to requests for discontinuance.*

Yes x No _____

If not on your institution's Five-Year plan, provide a justification for adding the program.

16. Explain how students are going to learn about this program and where students are going to be recruited from (i.e., within institution, out-of-state, internationally). For requests to discontinue a program, how will continuing students be advised of impending changes and consulted about options or alternatives for attaining their educational goals?

Recruitment to the program will be coordinated with the recruiting staff of the graduate college. Recruitment at a local level of local, place-bound professionals will occur primarily by informal contact between faculty members and those professionals and their organizations. We anticipate some recruitment of highly qualified Boise State undergraduate and master's-level students.

Because of the transdisciplinary nature of the program, we believe that the program will have broad appeal, enabling us to recruit students nationally and internationally as well. In the field of ecology,

evolution, and behavior, students are motivated to apply to graduate programs because of the strength of faculty research and program reputation. Our recruitment plan has a 3-pronged approach for attracting high quality applicants: 1) support of faculty travel to professional conferences, 2) create a highly visible and informative web presence, and 3) support the visits of colleagues from external institutions. Faculty attendance at professional conferences serves several important functions for research, including networking to recruit students into labs. Students attend conferences to meet potential mentors, and conferences provide excellent opportunities for faculty members to meet applicants in-person and to judge the quality of their past research experience by attending oral or poster presentations. Also, potential applicants will likely make use of the internet to search for graduate programs. We intend to have a highly visible web presence, with up-to-date information on opportunities, success stories, and where-are-they-now information about graduates. Finally, we will host regular visits from colleagues at other research institutions to give seminars and have informal meetings with graduate students and faculty. Such visits are key to publicizing a strong and successful training program. These colleagues quickly become part of program by recruiting at their home institution when they suggest their students apply to Boise State.

17. In accordance with Board Policy III.G., an external peer review is required for any new doctoral program. Attach the peer review report as **Appendix D**.

18. Program Resource Requirements. Using the ***Excel spreadsheet*** provided by the Office of the State Board of Education indicate all resources needed including the planned FTE enrollment, projected revenues, and estimated expenditures for the first three fiscal years of the program. Include reallocation of existing personnel and resources and anticipated or requested new resources. Second and third year estimates should be in constant dollars. Amounts should reconcile budget explanations below. If the program is contract related, explain the fiscal sources and the year-to-year commitment from the contracting agency(ies) or party(ies). Provide an explanation of the fiscal impact of the proposed discontinuance to include impacts to faculty (i.e., salary savings, re-assignments).

Notes:

1. The budget information that follows depicts the first three years of the program, beginning with FY18, and therefore does not depict the program at full capacity, which will occur in the sixth year of the program.
2. The budget information that follows includes only those expenditures and resources that are associated with the PhD program. As is described in the text of the proposal, the proposed PhD program is moving forward at the same time as a major revision of the curriculum and teaching structure of the undergraduate BS Biology curriculum. That revision, which has its own associated costs, is based on results from Program Prioritization, is in support of the Complete College Idaho Initiative, and will result in an increased number of BS Biology graduates as well as a shortened time to degree and increased quality of the program.

Program Resource Requirements.

- Indicate all resources needed including the planned FTE enrollment, projected revenues, and estimated expenditures for the first **four** fiscal years
- Include reallocation of existing personnel and resources and anticipated or requested new resources.
- Second and third year estimates should be in constant dollars.
- Amounts should reconcile subsequent pages where budget explanations are provided.
- If the program is contract related, explain the fiscal sources and the year-to-year commitment from the contracting agency(ies) or party(ies).
- Provide an explanation of the fiscal impact of any proposed discontinuance to include impacts to faculty (i.e., salary savings, re-assignments).

I. PLANNED STUDENT ENROLLMENT

	FY 18		FY 19		FY 20		FY 21	
	FTE	Headcount	FTE	Headcount	FTE	Headcount	FTE	Headcount
A. New enrollments	7.0	7	14.0	14	21.0	21	28.0	28
B. Shifting enrollments	0	0	0	0	0	0	0	0

Budget Notes:

I.A. Headcount is estimated from the model described in section 8 above. Student FTE is calculated as 1.0 FTE per 24 credits in one year.

II. REVENUE

	FY 18		FY 19		FY 20		FY 21	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
1. New Appropriated Funding Rec	$0	$0	$0	$0	$0	$0	$0	$0
2. Institution Funds	$418,242	$50,000	$658,753	$350,000	$840,877	$350,000	$939,485	$350,000
3. Federal		$196,641		$394,416		$666,728		$894,290
4. New Tuition Revenues from Increased Enrollments	$150,000	$0	$300,000	$0	$450,000	$0	$600,000	$0
5. Student Fees	$0	$0	$0	$0	$0	$0	$0	$0
6. Additional Tuition Revenue	$0	$0	$0	$0	$0	$0	$0	$0
Total Revenue	$568,242	$246,641	$958,753	$744,416	$1,290,877	$1,016,728	$1,539,485	$1,244,290

Budget Notes:

II.3. Grants and agency funding is considered one-time funding and is shown here to fund:

Summer salary for faculty members accounting for one-third of faculty FTE devoted to dissertation credit hours.

GA salaries at $25k for 1, 2, 3, and 6 students in FY18, FY19, FY20, and FY21 respectively

Tuition waivers for the same GA's

Operating expenses (@$10k) for 7, 14, 21, and 28 students in FY18, FY19, FY20, and FY20 respectively

Postdoctoral researchers: 1, 2, 4, 4 FTE in FY18, FY19, FY20, and FY20 respectively

II.4. Projected additional tuition revenue that will result from increased retention and recruitment in the undergraduate biology program.

Ongoing is defined as ongoing operating budget for the program which will become part of the base.

One-time is defined as one-time funding in a fiscal year and not part of the base.

III. EXPENDITURES

	FY 18		FY 19		FY 20		FY 21	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
A. Personnel Costs								
1. FTE	9.6	2.2	17.2	4.4	24.2	7.7	29.1	11.1
2. Faculty	$77,771	$14,981	$148,162	$30,803	$222,331	$56,837	$291,919	$82,440
3. Adjunct Faculty	$0	$0	$0	$0	$0	$0	$0	$0
4. Graduate Assistants	$150,000	$25,000	$300,000	$50,000	$450,000	$75,000	$550,000	$150,000
5. Research Personnel	$81,300	$45,000	$110,550	$90,000	$110,550	$180,000	$110,550	$180,000
6. Directors/Administrators	$10,000	$0	$10,000	$0	$10,000	$0	$10,000	$0
7. Administrative Support Personn	$40,000	$0	$40,000	$0	$40,000	$0	$40,000	$0
8. Fringe Benefits	$85,175	$22,993	$132,049	$46,281	$170,008	$88,893	$202,364	$103,854
9. Other:								
Total FTE Personnel and Costs	$444,246	$107,975	$740,761	$217,084	$1,002,889	$400,730	$1,204,833	$516,294

Budget Notes:

III.A.1. FTE is the sum of FTEs for all rows. Graduate assistants are counted as 1.0FTE each.

III.A.2. "Faculty" costs consist of the portions of the percent of salary assigned to this program as per the tables in Section 18.a.

Grants are assumed to pay for summer salary for most faculty members, and much of graduate student advising occurs during summer.

In order to depict the contribution of grant funds to graduate student advising,

we make the assumption that that faculty salary costs associated with one-third of dissertation credit hours is covered by grants

III.A.4. Graduate assistantships awarded to students @ $25k for an 11 month appointment.

State funded: 6, 12, 18, and 22 in FY 18, 19, 20, and 21 respectively.

Grant funded: estimated at 1, 2, 3, 6 in FY 18, 19, 20, and 21 respectively.

III.A.5. Consists of research personnel on appropriated funding (first four) and grant funding (Postdocs):

0.5FTE of a Database and collections manager

0.65 FTE of a GIS and visualization expert

0.33 FTE for research faculty member charged with program development and assessment and with grant writing

0.65 FTE for a statistician/modeler

Grant funded postdoctoral researchers: 1.0, 2.0, 4.0, 4.0 FTE in FY 18, 19, 20, and 21 respectively.

III.A.6. Administrator is the director of the PhD program, who will received 0.13 FTE of salary in addition to standard 9-month salary.

III.A.7. Support personnel is a 1.0FTE administrative staff member

III.A.8. Fringe is calculated as 35% for staff and faculty and 8% for graduate assistants

	FY 18		FY 19		FY 20		FY 21	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
B. Operating Expenditures								
1. Travel	$30,000	$7,000	$30,000	$14,000	$30,000	$21,000	$30,000	$28,000
2. Professional Services	$0	$0	$0	$0	$0	$0	$0	$0
3. Other Services	$0	$0	$0	$0	$0	$0	$0	$0
4. Communications	$0	$0	$0	$0	$0	$0	$0	$0
5. Materials and Supplies	$0	$70,000	$0	$140,000	$0	$210,000	$0	$280,000
6. Rentals	$0	$0	$0	$0	$0	$0	$0	$0
7. Materials & Goods for Manufacture & Resale	$0	$0	$0	$0	$0	$0	$0	$0
8. Miscellaneous	$24,000	$0	$24,000	$0	$24,000	$0	$24,000	$0
9. Tuition Waivers & Ins @$11,666	$69,996	$11,666	$139,992	$23,332	$209,988	$34,998	$256,652	$69,996
Total Operating Expenditures	$123,996	$88,666	$193,992	$177,332	$263,988	$265,998	$310,652	$377,996

Budget Notes:

III.B.1. Travel consists of

$30k per year of recruitment costs (faculty travel to professional meetings and campus visits for top applicants)

$1000 per year per GA for student travel to professional meetings; grant funded.

III.B.5. Materials and supplies for graduate student research are assumed to be funded by faculty-obtained grants; estimated at $10k per student per year. Considered one-time

III.B.8. Miscellaneous consists of

$12k to 36k for publication costs

$12k miscellaneous operating expenses

III.B.9: Tuition waivers and insurance are required for all students on graduate assistantships @$11,666 each

	FY 18		FY 19		FY 20		FY 21	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
C. Capital Outlay								
1. Library Resources	$0	$0	$24,000	$0	$24,000	$0	$24,000	$0
2. Equipment	$0	$50,000	$0	$350,000	$0	$350,000	$0	$350,000
Total Capital Outlay	$0	$50,000	$24,000	$350,000	$24,000	$350,000	$24,000	$350,000
D. Capital Facilities Construction or Major Renovation								
E. Indirect Costs (overhead)	$0	$0	$0	$0	$0	$0	$0	$0
TOTAL EXPENDITURES:	$568,242	$246,641	$958,753	$744,416	$1,290,877	$1,016,728	$1,539,485	$1,244,290
Net Income (Deficit)	$0	$0	$0	$0	$0	$0	$0	$0

Budget Notes:

III.C.1. Library consists of new journal titles required to support the proposed program.

III.C.2. Equipment consists of

two new field vehicles @ $25k purchased each year

$300k of faculty startup in each of three years

a. Personnel Costs

Faculty and Staff Expenditures

Project for the first three years of the program the credit hours to be generated by each faculty member (full-time and part-time), graduate assistant, and other instructional personnel. Also indicate salaries. After total student credit hours, convert to an FTE student basis. Please provide totals for each of the three years presented. Salaries and FTE students should reflect amounts shown on budget schedule.

Notes:

1. The following faculty salary tables depict typical levels of effort and cost associated with the proposed program. Given that the start date is two years away, the information that follows can only be regarded as placeholder, illustrative information.

FY2018 (salaries depicted using constant FY2016 dollars) **Name, Position & Rank**	**Annual Salary Rate (9 month base rate)**	**Faculty FTE Assignment to this Program**	**Value of FTE Effort to this Program**	**Projected Student Credit Hours**	**FTE Students** (1 FTE = 24 credits taken in a year)
Biological Sciences					
Jesse Barber, Asst Prof	$69,618	0.08	$5,802	10	0.42
Marc Bechard, Prof	$89,415	0.08	$7,451	10	0.42
James Belthoff, Prof	$89,524	0.08	$7,460	10	0.42
Marie-Anne de Graaff, Asst Prof	$67,476	0.08	$5,623	10	0.42
Kevin Feris, Assoc Prof	$93,787	0.08	$7,816	10	0.42
Jennifer Forbey, Assoc Prof	$75,983	0.08	$6,332	10	0.42
Eric Hayden, Asst Prof	$67,476	0.00	$0	0	0.00
Julie Heath, Assoc Prof	$76,149	0.13	$9,519	21	0.88
Peter Koetsier, Prof	$87,756	0.13	$10,970	21	0.88
Stephen Novak, Prof	$88,068	0.13	$11,009	21	0.88
Ian Robertson, Prof	$87,402	0.13	$10,925	21	0.88
Marcelo Serpe, Prof	$87,714	0.00	$0	0	0.00
James Smith, Prof	$88,192	0.00	$0	0	0.00
Merlin White, Assoc Prof	$75,754	0.04	$3,156	7	0.29
To be named	$65,000	0.00	$0	0	0.00
To be named	$65,000	0.00	$0	0	0.00
To be named	$65,000	0.00	$0	0	0.00
To be named	$65,000	0.00	$0	0	0.00
Anthropology					
Samantha Blatt, Vis Asst Prof	$53,522	0.13	$6,690	17	0.71
Kathryn Demps, Asst Prof	$54,704	0.00	$0	0	0.00
Mark Plew, Prof	$79,394	0.00	$0	0	0.00
Kristin Snopkowski, Asst Prof	$54,621	0.00	$0	0	0.00
Pei-Lin Yu, Asst Prof	$54,621	0.00	$0	0	0.00
John Ziker, Prof	$82,199	0.00	$0	0	0.00
Geosciences					
Shawn Benner, Assoc Prof	$87,298	0.00	$0	0	0.00
Alejandro Flores, Assoc Prof	$74,007	0.00	$0	0	0.00
Nancy Glenn, Prof	$105,831	0.00	$0	0	0.00
Matt Kohn, Prof	$93,580	0.00	$0	0	0.00
Jennifer Pierce, Assoc Prof	$72,968	0.00	$0	0	0.00
Human Environmental Systems, CID					
Jodi Brandt, Asst Prof	$75,005	0.00	$0	0	0.00
Neil Carter, Asst Prof	$75,005	0.00	$0	0	0.00
To be named	$75,005	0.00	$0	0	0.00
To be named	$75,005	0.00	$0	0	0.00
USGS and Peregrine Fund	N/A	0.00		0	0.00
Totals		**1.17**	**$92,752**	**168**	**7.00**

FY2019 (salaries depicted using constant FY2016 dollars) Name, Position & Rank	Annual Salary Rate (9 month base rate)	Faculty FTE Assignment to this Program	Value of FTE Effort to this Program	Projected Student Credit Hours	FTE Students (1 FTE = 24 credits taken in a year)
Biological Sciences					
Jesse Barber, Asst Prof	$69,618	0.08	$5,802	10	0.42
Marc Bechard, Prof	$89,415	0.08	$7,451	10	0.42
James Belthoff, Prof	$89,524	0.08	$7,460	10	0.42
Marie-Anne de Graaff, Asst Prof	$67,476	0.21	$14,058	31	1.29
Kevin Feris, Assoc Prof	$93,787	0.08	$7,816	10	0.42
Jennifer Forbey, Assoc Prof	$75,983	0.08	$6,332	10	0.42
Eric Hayden, Asst Prof	$67,476	0.08	$5,623	10	0.42
Julie Heath, Assoc Prof	$76,149	0.08	$6,346	10	0.42
Peter Koetsier, Prof	$87,756	0.21	$18,283	31	1.29
Stephen Novak, Prof	$88,068	0.21	$18,348	31	1.29
Ian Robertson, Prof	$87,402	0.08	$7,284	10	0.42
Marcelo Serpe, Prof	$87,714	0.08	$7,310	10	0.42
James Smith, Prof	$88,192	0.13	$11,024	21	0.88
Merlin White, Assoc Prof	$75,754	0.13	$9,469	21	0.88
To be named	$65,000	0.13	$8,125	21	0.88
To be named	$65,000	0.04	$2,708	7	0.29
To be named	$65,000	0.04	$2,708	7	0.29
To be named	$65,000	0.00	$0	0	0.00
Anthropology					
Samantha Blatt, Vis Asst Prof	$53,522	0.21	$11,150	31	1.29
Kathryn Demps, Asst Prof	$54,704	0.00	$0	0	0.00
Mark Plew, Prof	$79,394	0.04	$3,308	7	0.29
Kristin Snopkowski, Asst Prof	$54,621	0.00	$0	0	0.00
Pei-Lin Yu, Asst Prof	$54,621	0.00	$0	0	0.00
John Ziker, Prof	$82,199	0.00	$0	0	0.00
Geosciences					
Shawn Benner, Assoc Prof	$75,629	0.00	$0	0	0.00
Alejandro Flores, Assoc Prof	$71,885	0.13	$8,986	21	0.88
Nancy Glenn, Prof	$103,293	0.00	$0	0	0.00
Matt Kohn, Prof	$91,333	0.00	$0	0	0.00
Jennifer Pierce, Assoc Prof	$72,968	0.00	$0	0	0.00
Human Environmental Systems, CID					
Jodi Brandt, Asst Prof	$75,005	0.08	$6,250	10	0.42
Neil Carter, Asst Prof	$75,005	0.04	$3,125	7	0.29
To be named	$75,005	0.00	$0	0	0.00
To be named	$75,005	0.00	$0	0	0.00
USGS and Peregrine Fund	N/A	0.00		0	0.00
Totals		**2.33**	**$178,965**	**336**	**14.00**

FY2020 (salaries depicted using constant FY2016 dollars) **Name, Position & Rank**	**Annual Salary Rate (9 month base rate)**	**Faculty FTE Assignment to this Program**	**Value of FTE Effort to this Program**	**Projected Student Credit Hours**	**FTE Students** (1 FTE = 24 credits taken in a year)
Biological Sciences					
Jesse Barber, Asst Prof	$69,618	0.28	$19,145	39	1.63
Marc Bechard, Prof	$89,415	0.28	$24,589	39	1.63
James Belthoff, Prof	$89,524	0.15	$13,429	18	0.75
Marie-Anne de Graaff, Asst Prof	$67,476	0.15	$10,121	18	0.75
Kevin Feris, Assoc Prof	$93,787	0.28	$25,791	39	1.63
Jennifer Forbey, Assoc Prof	$75,983	0.15	$11,397	18	0.75
Eric Hayden, Asst Prof	$67,476	0.21	$14,058	31	1.29
Julie Heath, Assoc Prof	$76,149	0.08	$6,346	10	0.42
Peter Koetsier, Prof	$87,756	0.21	$18,283	31	1.29
Stephen Novak, Prof	$88,068	0.08	$7,339	10	0.42
Ian Robertson, Prof	$87,402	0.13	$10,925	17	0.71
Marcelo Serpe, Prof	$87,714	0.08	$7,310	10	0.42
James Smith, Prof	$88,192	0.13	$11,024	17	0.71
Merlin White, Assoc Prof	$75,754	0.13	$9,469	17	0.71
To be named	$65,000	0.21	$13,542	31	1.29
To be named	$65,000	0.08	$5,417	10	0.42
To be named	$65,000	0.13	$8,125	21	0.88
To be named	$65,000	0.00	$0	0	0.00
Anthropology					
Samantha Blatt, Vis Asst Prof	$53,522	0.15	$8,028	18	0.75
Kathryn Demps, Asst Prof	$54,704	0.00	$0	0	0.00
Mark Plew, Prof	$79,394	0.04	$3,308	7	0.29
Kristin Snopkowski, Asst Prof	$54,621	0.08	$4,552	10	0.42
Pei-Lin Yu, Asst Prof	$54,621	0.13	$6,828	21	0.88
John Ziker, Prof	$82,199	0.08	$6,850	10	0.42
Geosciences					
Shawn Benner, Assoc Prof	$75,629	0.00	$0	0	0.00
Alejandro Flores, Assoc Prof	$71,885	0.00	$0	0	0.00
Nancy Glenn, Prof	$103,293	0.00	$0	0	0.00
Matt Kohn, Prof	$91,333	0.13	$11,417	21	0.88
Jennifer Pierce, Assoc Prof	$72,968	0.00	$0	0	0.00
Human Environmental Systems, CID					
Jodi Brandt, Asst Prof	$75,005	0.21	$15,626	31	1.29
Neil Carter, Asst Prof	$75,005	0.08	$6,250	10	0.42
To be named	$75,005	0.00	$0	0	0.00
To be named	$75,005	0.00	$0	0	0.00
USGS and Peregrine Fund	N/A	0.00		0	0.00
Totals		**3.63**	**$279,168**	**504**	**21.00**

FY2021 (salaries depicted using constant FY2016 dollars) Name, Position & Rank	Annual Salary Rate (9 month base rate)	Faculty FTE Assignment to this Program	Value of FTE Effort to this Program	Projected Student Credit Hours	FTE Students (1 FTE = 24 credits taken in a year)
Biological Sciences					
Jesse Barber, Asst Prof	$69,618	0.28	$19,145	39	1.63
Marc Bechard, Prof	$89,415	0.28	$24,589	39	1.63
James Belthoff, Prof	$89,524	0.15	$13,429	18	0.75
Marie-Anne de Graaff, Asst Prof	$67,476	0.28	$18,556	39	1.63
Kevin Feris, Assoc Prof	$93,787	0.15	$14,068	18	0.75
Jennifer Forbey, Assoc Prof	$75,983	0.23	$17,729	28	1.17
Eric Hayden, Asst Prof	$67,476	0.15	$10,121	18	0.75
Julie Heath, Assoc Prof	$76,149	0.15	$11,422	18	0.75
Peter Koetsier, Prof	$87,756	0.28	$24,133	39	1.63
Stephen Novak, Prof	$88,068	0.28	$24,219	39	1.63
Ian Robertson, Prof	$87,402	0.28	$24,036	39	1.63
Marcelo Serpe, Prof	$87,714	0.15	$13,157	18	0.75
James Smith, Prof	$88,192	0.21	$18,373	31	1.29
Merlin White, Assoc Prof	$75,754	0.08	$6,313	10	0.42
To be named	$65,000	0.13	$8,125	17	0.71
To be named	$65,000	0.21	$13,542	31	1.29
To be named	$65,000	0.13	$8,125	17	0.71
To be named	$65,000	0.21	$13,542	31	1.29
Anthropology					
Samantha Blatt, Vis Asst Prof	$53,522	0.19	$10,258	25	1.04
Kathryn Demps, Asst Prof	$54,704	0.08	$4,559	10	0.42
Mark Plew, Prof	$79,394	0.00	$0	0	0.00
Kristin Snopkowski, Asst Prof	$54,621	0.08	$4,552	10	0.42
Pei-Lin Yu, Asst Prof	$54,621	0.08	$4,552	10	0.42
John Ziker, Prof	$82,199	0.21	$17,125	31	1.29
Geosciences					
Shawn Benner, Assoc Prof	$75,754	0.08	$6,313	10	0.42
Alejandro Flores, Assoc Prof	$65,000	0.00	$0	0	0.00
Nancy Glenn, Prof	$65,000	0.00	$0	0	0.00
Matt Kohn, Prof	$65,000	0.13	$8,125	21	0.88
Jennifer Pierce, Assoc Prof	$65,000	0.00	$0	0	0.00
Human Environmental Systems, CID					
Jodi Brandt, Asst Prof	$75,005	0.28	$20,626	39	1.63
Neil Carter, Asst Prof	$75,005	0.08	$6,250	10	0.42
To be named	$75,005	0.08	$6,250	10	0.42
To be named	$75,005	0.04	$3,125	7	0.29
USGS and Peregrine Fund	N/A	0.00		0	0.00
Totals		**4.93**	**$374,359**	**672**	**28.00**

Assumptions of the above calculations:

1. Enrollments of 7, 14, 21, and 28 in FY18, 19, 20, and 21 respectively.
2. Students take a full time load of 12 credits per semester.
3. Full time equivalency (FTE) is calculated according to SBOE guidelines of 12 credits per semester equals one FTE.
4. Students in first two years take on average, each semester, 7 credits of coursework and graduate seminar and 5 credits of research.
5. Students in year three through six take on average, each semester, 9 credits of dissertation coursework and 3 credits of coursework/graduate seminar.

6. Faculty assignments to courses and to graduate students are arbitrary at this time because this model is constructed for illustrative purposes only.
7. One faculty FTE equals 24 credits of course load or 120 credits of dissertation credits per year.
8. Salaries of faculty members are FY2016 salaries for a 9-month base, and are kept constant in FY16 dollars for purposes of this model.

Project the need and cost for support personnel and any other personnel expenditures for the first three years of the program.

Research Personnel			
FY2018 (calculated using constant FY2016 dollars) **Name, Position & Rank**	**Annual Salary Rate (12 month base rate)**	**FTE Assignment to this Program**	**Value of FTE Effort to this Program**
To be named, Database and collections manager	$45,000	**0.5**	$22,500
To be named, Research Faculty	$60,000	**0.33**	$19,800
To be named, Statistician and modeler	$60,000	**0.65**	$39,000
Postdoctoral Researchers (1)	$45,000	**1.0**	$45,000
Totals:		**2.48**	**$126,300**

Research Personnel			
FY2019 (calculated using constant FY2016 dollars) **Name, Position & Rank**	**Annual Salary Rate (12 month base rate)**	**FTE Assignment to this Program**	**Value of FTE Effort to this Program**
To be named, Database and collections manager	$45,000	**0.5**	$22,500
To be named, GIS visualization	$45,000	**0.65**	$29,250
To be named, Research Faculty	$60,000	**0.33**	$19,800
To be named, Statistician and modeler	$60,000	**0.65**	$39,000
Postdoctoral Researchers (2)	$45,000	**2.0**	$90,000
Totals:		**4.13**	**$200,550**

Research Personnel			
FY2020 and subsequent years (calculated using constant FY2016 dollars) **Name, Position & Rank**	**Annual Salary Rate (12 month base rate)**	**FTE Assignment to this Program**	**Value of FTE Effort to this Program**
To be named, Database and collections manager	$45,000	**0.5**	$22,500
To be named, GIS visualization	$45,000	**0.65**	$29,250
To be named, Research Faculty	$60,000	**0.33**	$19,800
To be named, Statistician and modeler	$60,000	**0.65**	$39,000
Postdoctoral Researchers (4)	$45,000	**4.0**	$180,000
Totals:		**6.13**	**$290,550**

Database and collections manager: Manage herbarium and vertebrate collections, assist with data storage, database construction, archiving data, preparing data for publication, retrieving data from public sources, data sharing. Will result in increased data integrity and will meet requirements of external funders and journals for data storage and sharing.

Data visualization: will provide expertise in spatial data analysis and enhanced visual representation of findings. Consult with faculty and students on spatially explicit data, mapping, and visualization. Will result in the development of skill sets for efficient visual communication with scientists and non-scientists.

Research faculty member: focused on PhD, master's and undergraduate program development and assessment. Will pursue extramural grant funding opportunities for program development and the building of infrastructure.

Statistician and modeler: Provide statistical consulting to students and faculty. Results in increased quality of experimental design and analysis, increased proposal success, and increased likelihood of publishing in high impact journals. Will contribute to student training and thereby increase graduate placement: quantitative skills are #1 predictor of employment in EEB fields.

Support Personnel			
FY2018 and subsequent years (calculated using constant FY2016 dollars) **Name, Position & Rank**	**Annual Salary Rate (12 month base rate)**	**FTE Assignment to this Program**	**Value of FTE Effort to this Program**
To be named, Administrative Support	$40,000	**1**	$40,000
Totals:		**1**	**$40,000**

EEB Program Administrative Assistant: will provide increased capacity for grants administration; will handle paperwork associated with awards, travel, and assessment for graduate programs; will coordinate recruitment and answer general inquiries; will provide data management for program; will do web development.

Graduate Assistants			
FY2018 (calculated using constant FY2016 dollars) **Name, Position & Rank**	**Annual Salary Rate (12 month base**	**FTE Assignment to this Program**	**Value of FTE Effort to this Program**
To be named, Graduate Assistants (appropriated funded)	$25,000	**6**	$150,000
To be named, Graduate Assistants (grant and agency funded)	$25,000	1	$25,000
Totals:		**7**	**$175,000**

FY2019 (calculated using constant FY2016 dollars) Name, Position & Rank	Annual Salary Rate (12 month base	FTE Assignment to this Program	Value of FTE Effort to this Program
To be named, Graduate Assistants (appropriated funded)	$25,000	**12**	$300,000
To be named, Graduate Assistants (grant and agency funded)	$25,000	2	$50,000
Totals:		**14**	**$350,000**

FY2020 (calculated using constant FY2016 dollars) Name, Position & Rank	Annual Salary Rate (12 month base	FTE Assignment to this Program	Value of FTE Effort to this Program
To be named, Graduate Assistants (appropriated funded)	$25,000	**18**	$450,000
To be named, Graduate Assistants (grant and agency funded)	$25,000	3	$75,000
Totals:		**21**	**$525,000**

FY2020 (calculated using constant FY2016 dollars) Name, Position & Rank	Annual Salary Rate (12 month base	FTE Assignment to this Program	Value of FTE Effort to this Program
To be named, Graduate Assistants (appropriated funded)	$25,000	**22**	$550,000
To be named, Graduate Assistants (grant and agency funded)	$25,000	6	$150,000
Totals:		**28**	**$700,000**

One set of graduate assistantships will be teaching assistants funded from appropriated funds. Six new assistantships will be added each of the first three years of the program and four more will be added in the fourth year, for a total of 22.

Another set of graduate assistantships will be research assistants funded from faculty research grants, training grants, and agency funds. It is expected that in many cases, students will rotate off of teaching assistantships and onto research assistantships, thereby freeing up teaching assistantships for incoming students. We conservatively estimate that by year 7 of the program, 18 students will be on funded research assistantships.

Administrative Expenditures

Describe the proposed administrative structure necessary to ensure program success and the cost of that support. Include a statement concerning the involvement of other departments, colleges, or other institutions and the estimated cost of their involvement in the proposed program.

Administrators			
FY2018 and subsequent years (calculated using constant FY2016 dollars) Name& Position	Annual Salary Rate (9 month base rate)	FTE Assignment to this Program	Value of FTE Effort to this Program
To be named, Director of PhD EEB Graduate Program, Associate Professor	$75,000	0.13	$10,000
Totals:		**0.13**	**$10,000**

b. Operating Expenditures

Briefly explain the need and cost for operating expenditures (travel, professional services, etc.)

1. Travel consists of:
    a. $30k per year of recruitment costs (faculty travel to professional meetings and campus visits for top applicants)
    b. $1000 per year per GA for student travel to professional meetings; grant funded.
2. Materials and supplies are funded by faculty-obtained grants; estimated at $10k per student per year. Considered one-time because not appropriated.
3. Miscellaneous consists of:
    a. $12k to 36k for publication costs
    b. $12k miscellaneous operating expenses
4. Tuition waivers and health insurance are required for all students on graduate assistantships @$11,666

c. Capital Outlay

(1) Library resources
    (a) Evaluate library resources, including personnel and space. Are they adequate for the operation of the present program? If not, explain the action necessary to ensure program success.
    (b) Indicate the costs for the proposed program including personnel, space, equipment, monographs, journals, and materials required for the program.
    (c) For off-campus programs, clearly indicate how the library resources are to be provided.

Library resources are nearly adequate for the proposed program because of the following:

1. Boise State has a long history with master's level programs in biology and anthropology and with doctoral and master's programs in geosciences, and has therefore built up substantial library resources in those areas.
2. Albertsons Library has been unwavering in its pursuing contracts with publishers that provide a wide range of journal accessibility instead of one-by-one accessibility.
3. Albertsons Library has enhanced interlibrary loan accessibility to those resources not owned by the library.

Albertson Library has estimated that the additional resources necessary for the program, in the form of journal titles requested by the faculty of the proposed program, can be purchased for $23,000 per year.

Title	Publisher	Price
Biology Letters	The Royal Society	$2,164
Current Biology	Cell Press	$4,884
Evolution and human behavior (previous title: Ethology and Sociobiology	Elsevier	$1,577

ISME Journal	Nature Publishing Group	$1,372
Journal of Theoretical Biology	Elsevier	$6,612
Nature Climate Change	Nature Publishing Group	$3,593
Proceedings of the Royal Society B: Biological Sciences	The Royal Society	$2,696
Total new subscriptions cost		$22,898

(2) Equipment/Instruments
Describe the need for any laboratory instruments, computer(s), or other equipment. List equipment, which is presently available and any equipment (and cost) which must be obtained to support the proposed program.

Equipment required for the proposed program falls into two categories:

1. Access to field vehicles is very important to the program, and during the first three years of the program, four (of a total of six) field vehicles will be purchased at ~$25,000 each.
2. Start-up costs for two new faculty members, to be hired during the first three years of the program, at $300k each. Specifics of the use of those funds will depend on the specifics of the research programs of the faculty members hired.

d. Revenue Sources

(1) If funding is to come from the reallocation of existing state appropriated funds, please indicate the sources of the reallocation. What impact will the reallocation of funds in support of the program have on other programs?

The strategy we will use for assigning necessary reallocation of state funds will be similar to that used for four PhD programs we have implemented over the last decade in Materials Science & Engineering, Electrical & Computer Engineering, Biomolecular Science, and Public Policy and Administration. The overall budget of the proposed program is designed to increase incrementally, year by year, over a 6 year period, thereby enabling us to accrue the necessary reallocation of appropriated funding through a combination of salary savings derived from the replacement of retired senior faculty with new junior faculty and fee revenues that result from increased enrollment. Our primary focus will be on ensuring permanent appropriated funding for faculty members, staff members, and graduate assistants.

Coincident with the creation of the PhD program will be a substantial revision of the undergraduate curriculum. The additional teaching capacity created by the PhD program and the increased quality and efficiency of the undergraduate program (resulting from the impact of the PhD program and from curricular revision) are expected to result in increased retention and recruitment of biology majors and increased retention of students in service courses offered by the Department of Biological Sciences. Increased retention and recruitment will result in an increase in tuition revenue that is projected to eventually exceed $600,000. Such a tuition increase will reduce our reliance on the reallocations described above.

(2) If the funding is to come from other sources such as a donation, indicate the sources of other funding. What are the institution's plans for sustaining the program when funding ends?

Not Applicable

(3) If an above Maintenance of Current Operations (MCO) appropriation is required to fund the program, indicate when the institution plans to include the program in the legislative budget request.

Not Applicable

(4) Describe the federal grant, other grant(s), special fee arrangements, or contract(s) to fund the program. What does the institution propose to do with the program upon termination of those funds?

The budget of the proposed program relies on federal grants and agency funds for summer salary, graduate assistantship salary and tuition/insurance, operating expenses for graduate assistantships (estimated at $10k per year each), and postdoctoral researchers. Long term sustainment of required funding is feasible because:

1. Program faculty members have a history of high success with securing grants.
2. New staff members hired as part of the program will increase success in securing grants.
3. The creation of the new program will enable faculty members to seek PhD training grants.
4. New faculty members will be hired with the expectation of grant success, and the granting of tenure will depend on success in securing grants.

(5) Provide estimated fees for any proposed professional or self-support program.

Not Applicable

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MEMORANDUM OF UNDERSTANDING

THIS MEMORANDUM OF UNDERSTANDING ("**MOU**" or "**Agreement**") is made on the ____ day of _____ of 2015. This Agreement is effective July 1, 2015 ("Effective Date") and expires on June 30, 2018 ("Termination Date").

BETWEEN

1) PARQUE NACIONAL DA GORONGOSA ("**PNG**"), represented by the Park Administrator, Mateus Mutemba, and the GORONGOSA RESTORATION PROJECT ("**GRP**"), represented by G.C. Carr and referred to herein as the "**Grantors**"; and

2) Boise State University an institution of higher education of the State of Idaho and located at 1910 University Drive, Boise Idaho United States of America, and referred to herein as the "**Permittee**."

3) Grantors and Permittee together are collectively referred to herein as "Parties" and individually as a "Party."

WHEREAS

A. By Internal Resolution nº 4/2007, of December 18th, the Government of Mozambique approved the Agreement for the Long Term Administration of PNG with the Greg Carr Foundation, Inc., a Delaware, general non-profit corporation, (now conducting business as GRP) (the "**LTA**"). The purpose of the LTA is: "to jointly develop the administration of the [PNG]

in order to ensure that the ecosystem will be preserved and that a sustainable tourism industry will be established."

B. The PNG Scientific Services Department under the LTA is responsible to "to collect and evaluate" scientific data in respect of PNG and to "develop relationships with world-class academic and other scientific institutions."

C. The Permittee is a public metropolitan research university with more than 22,000 students. Located in Idaho's capital city, Permittee has a growing research portfolio and plays a crucial role in the region's knowledge economy and famed quality of life. Examples include:

   i. Permittee is an important center of production, dissemination and transfer of knowledge;

   ii. Permittee has aptitudes and know-how in many relevant areas; and

   iii. Permittee has, as part of its mission, the creation, analysis, transfer and dissemination of culture, science and technology which, through investigation, academic training and service delivery to the community, contributes to social and economic development, protection of the environment, promotion of social justice and citizenship awareness and responsibility, and thus to the consolidation of the power based in knowledge.

D. The Permittee and the Grantors are in the process of investigating collaboration opportunities to facilitate the further scientific description and exploration of the PNG and the work of the Permittee. The Parties anticipate that long-term agreements may result from pursuing collaboration opportunities.

E. The Parties desire to encourage and promote cooperation in research, learning, training, and services as per Exhibit A to this MOU, attached hereto and incorporated herein by this reference.

F. The Parties desire the form and cost for individual activities of cooperation under this MOU to be agreed upon by both Parties and that each project entered into by the Parties under this MOU will be governed by its own project document.

G. The Parties endeavor to facilitate all formalities in connection with the preparation, negotiation and implementation of activities within the framework of this MOU and to maintain close and direct contact.

H. Neither Party desires to have any legal obligation to the other Party with respect to any matter referred to in this MOU, unless and until a written formal agreement implementing the principles herein has been executed by duly authorized representatives of the Parties.

I. Except as otherwise expressly provided in the formal agreement mentioned above, each Party desires to pay all of its own costs, expenses and liabilities incurred in connection with this MOU.

J. Neither Party desires to have the other Party use any of its tradenames, service marks, trademarks or logos (collectively, the "Marks") without first giving express written approval, and that if such written permission is granted, the Parties desire that the non-owing Party will comply with the owning Party's reasonable requirements, including using the "circle R" indication of a registered trademark (i.e., ®). For Permittee, such permission can only be granted by Permittee's Office of Trademark Licensing and Enforcement; applications for such permission should be sent via email to licensing@boisestate.edu.

NOW THEREFORE, in consideration of the foregoing recitals, mutual promises hereinafter contained and other valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties agree as follows:

1. PURPOSE AND SCOPE OF WORK

A. Collaboration between Grantors and Permittee could include:

i. Permittee staff and students working with Grantors conducting studies, developing research, and undertaking student opportunities at PNG or elsewhere.

ii. This specifically allows: (a) Permittee staff and Grantors to jointly develop research opportunities and to pursue joint grant opportunities; and (b) for the development of student independent study and internship opportunities including the development of graduate and post-doc research opportunities.

B. The research may include (but are not limited to):

i. Formation of collaborations with organizations to plan, design, and implement programs;

ii. Economic evaluation of the programs and assistance with program financing; and

iii. Study of the impact of cultural, social, and economic policies and approaches.

C. Substantive areas of collaboration may include, without limitation, the following sectors, and at the intersection of one or more of these sectors:

i. Wildlife, including birds;

ii. Environmental;

iii. Economic Development;

iv. Policy;

v. Education;

vi. Water;

vii. Weather and climate change;

viii. Geosciences;

ix. Biology including, without limitation, global change biology and ecology, evolution and behavior;

x. Human and natural ecosystem interfaces;

xi. Anthropology; and

xii. Archeology.

D. The purpose of this Agreement is to authorize the Permittee to conduct scientific research, and related educational programming, in the PNG to gain a deeper understanding of interactions and organisms occurring areas of the PNG. This is a not-for-profit project being conducted for academic and educational-related purposes.

2. GRANTORS' UNDERTAKINGS

A. Pursuant to this Agreement, the Grantors hereby acknowledge the Permittee may require reasonable access to all areas of PNG subject to time and spatial restrictions for safety, logistical and other reasons as decided from time to time by PNG management.

B. As a demonstration of a long lasting collaboration, the Grantor will offer two naming benefits to the Permittee including (i) naming of a "Boise State University Suite" located on one of the scientific accommodation units and referring to it as such and (ii) representing the "Boise State University" academic logo alongside other partners at the entrance of the E.O. Wilson Science Laboratory. Per recital J herein above, all use of Permittee's name and/or logo must be pre-authorized by Permittee's Office of Trademark Licensing and Enforcement.

3. SCIENTIFIC SUPPORT SERVICES

A. Grantors will make available Scientific Support Services to the Permittee in order to facilitate scientific research. These Scientific Support Services

will include, but are not limited to, research permits, ranger support, laboratory and office use, accommodations (e.g., lodging and meals), vehicle usage and others. Fees associated with Scientific Support Services are subject to change over time.

B. The Grantors hereby agree to a "Favored Nation" clause to protect the Permittee and ensure that fees associated with Scientific Support Services will remain as low as those paid by other parties utilizing Scientific Support Services.

C. Notwithstanding recital H herein above, upon signing of this Agreement, the Permittee agrees to pay USD 50,000 to the Grantors specifically and only for Permittee's future use of Scientific Support Services. Costs incurred by the Permittee for the use of Scientific Support Services will be deducted from the USD 50,000 pre-payment. As of the Termination Date (or earlier if this Agreement is terminated before the Termination Date), Grantors will promptly refund Permittee that portion of the USD 50,000 pre-payment Permittee has not expended, if any.

4. TRANSFER BY THE PERMITTEE

A. The Permittee may not, without the prior written consent of the Grantors, cede, assign or transfer this Agreement or any of its rights, interests, or obligations hereunder.

5. <u>KEY CONTACTS AND NOTICES</u>

A. Any notice to be given under this Agreement shall be in writing and shall be effective when delivered by: (i) certified mail with return receipt requested; (ii) hand delivery with signature or delivery receipt provided by a third party courier service (e.g., FedEx, UPS); or (iii) facsimile transmission if verification of receipt is obtained to the designated

representative of the Party as indicated below. A Party may change its designated representative for notice purposes at any time by written notice to the other Party. The initial representatives of the Parties are as follows:

GRANTORS
Marked for the attention of: Director of Scientific Services

Physical address:
Parque Nacional da Gorongosa
Edifício da Ami SDV
Av. Poder Popular
Nr. 264 Quinto Andar
Beira, Moçambique

Email: stalmans@gorongosa.net; science@gorongosa.net
Cell: +258 823003418

PERMITTEE
Marked for the attention of: Karen Henry, Executive Director, Office of Sponsored Programs

Physical address:
Boise State University
Office of Sponsored Programs
1910 University Drive
Boise, Idaho 83725-1135 (USA)

Email: osp@boisestate.edu
Telephone: +1 (208) 426-4420
Facsimile: +1 (208) 426-1048

6. MISCELLANEOUS

A. Governing Law, Jurisdiction and Venue. This Agreement shall be governed by and construed under the laws of the State of Idaho, United States of America without regard to its principles or rules of conflicts of laws. Any claim arising under or related to this Agreement shall be filed and tried in the State District Court, Ada County, State of Idaho, United

States of America. Nothing in this Agreement shall be construed as impairing the general powers of the Grantors for supervision, regulation, and control of PNG property.

B. The Agreement may be modified by written consent of all of the Parties to cover the need for any alterations that may arise subsequent to the Effective Date of this Agreement.

C. If any term or provision of this Agreement is held to be invalid or illegal, such term or provision shall not affect the validity or enforceability of the remaining terms and provisions.

D. No term or provision of this Agreement shall be waived and no breach excused unless such waiver or consent shall be in writing and signed by the Party claimed to have waived or consented. No waiver of a breach shall be deemed to be a waiver of a different or subsequent breach.

E. This Agreement terminates upon the earliest of the Parties entering into a formal long-term agreement superseding this MOU, the Termination Date, or mutual agreement. Either Party may terminate this Agreement, without cause, upon not less than ninety (90) days' written notice, given in accordance with the Notice provisions of this Agreement. Termination of this Agreement shall not relieve a Party from its obligations incurred prior to the termination date. Surviving any termination or expiration are: (i) any cause of action or claim of either Party, accrued or to accrue, because of any breach or default by the other Party; and (ii) any provisions in this Agreement that by their nature are intended to survive.

F. The recitals and exhibit of this Agreement are incorporated herein by this reference as if set forth in full herein.

G. This Agreement may be executed in multiple counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same Agreement. Facsimile signatures and e-mailed PDF copies

of original signatures shall both be deemed to be original signatures for all applicable purposes.

7. VARIATIONS

Any addition, amendment, change, extension or cancellation to this Agreement shall be binding only if in writing and signed by authorized representatives of each Party.

8. DISPUTE RESOLUTION

The Parties shall use their best efforts to settle any disputes between themselves amicably.

IN WITNESS WHEREOF, the Parties have executed this Agreement effective as of the Effective Date.

BOISE STATE UNIVERSITY

By: Mark Rudin
Title: Vice President, Division of Research and Economic Development

PARQUE NACIONAL DA GORONGOSA

By: M. Mutemba
Title: Park Administrator

GORONGOSA RESTORATION PROJECT

By: G.C. Carr
Title: Director and Member of Oversight Committee of Parque Nacional da Gorongosa

EXHIBIT A

Non-exhaustive List of Examples of Cooperation in Research, Learning, Training and/or Services

Research

- Involvement by Permittee staff and students in existing research and monitoring projects;
- Defining and implementing new research projects;
- Publishing the results of research in the PNG.

Learning

- Visits to and stay in the PNG by groups of students and staff from Permittee for formal classes and informal learning as part of a structured Permittee teaching program.

Training

- Hosting of PNG interns and young scientists at Permittee for formal and informal training;
- Training of PNG interns, technicians and other Mozambican scientists in various research techniques, including bird capture, sampling and monitoring;
- Participation by Permittee staff as instructors in various training courses offered by PNG for PNG staff and other Mozambican researchers;
- In-service training of Mozambican field assistants who aid Permittee staff and students with the field and laboratory aspects of research and monitoring projects in the PNG.

Appendix B: Curriculum

Doctor of Philosophy in Ecology, Evolution, and Behavior	
Course Number and Title	*Credits*
EEB 601 Principles and Processes in Ecology, Evolution, and Behavior I EEB 602 Principles and Processes in Ecology, Evolution, and Behavior II EEB 603 Science and Communication I EEB 604 Science and Communication II	4 4 3 3
EEB 605 Current Research in EEB (2 cr)	4
Quantitative Requirement (choose at least 1 course from the following): ANTH 504 Statistical Methods in Anthropology (3 cr) BIOL 601 Biometry (4 cr) BIOL 603 Advanced Biometry (4 cr) EEB 607 Quantitative Methods for Population and Habitat Analysis (3 cr) EEB 621 Advanced Ecological Data Analysis (3 cr) GEOPH 522 Data Analysis and Geostatistics (3 cr) GEOS 505 Introduction to Numerical Methods for the Geosciences (3 cr) MATH 572 Computational Statistics (3 cr) MATH 573 Time Series Analysis (3 cr) MATH 574 Linear Models (3 cr)	3-4
Approved electives courses in ANTH, BIOL, BMOL, BOT, EEB, GEOS, ZOOL or related fields as approved by the supervisory committee and by the coordinator of the EEB doctoral program.	13-14
EEB 691 Doctoral Comprehensive Examination	1
EEB 693 Dissertation	30
Total	66

Doctor of Philosophy in Ecology, Evolution, and Behavior Emphasis in Global Change Biology	
Course Number and Title	*Credits*
EEB 601 Principles and Processes in Ecology, Evolution, and Behavior I EEB 602 Principles and Processes in Ecology, Evolution, and Behavior II EEB 603 Science and Communication I EEB 604 Science and Communication II	4 4 3 3
EEB 605 Current Research in EEB (2 cr)	4
Quantitative Requirement (choose at least 1 course from the following): ANTH 504 Statistical Methods in Anthropology (3 cr) BIOL 601 Biometry (4 cr)	3-4

BIOL 603 Advanced Biometry (4 cr) EEB 607 Quantitative Methods for Population and Habitat Analysis (3 cr) EEB 621 Advanced Ecological Data Analysis (3 cr) GEOPH 522 Data Analysis and Geostatistics (3 cr) GEOS 505 Introduction to Numerical Methods for the Geosciences (3 cr) MATH 572 Computational Statistics (3 cr) MATH 573 Time Series Analysis (3 cr) MATH 574 Linear Models (3 cr)	
Human Behavior and Ecology (choose 1-2 courses from the following): ANTH 501 Adaptation And Human Behavior (3 cr) ANTH 502 Human Evolutionary History and Development (3 cr) ANTH 521 Human Paleoecology of North America (3 cr) ANTH 530 Advanced Topics in Evolutionary Anthropology (3 cr) ANTH 531 Economic Anthropology (3 cr) ANTH 532 Game Theory and Human Cooperation (3 cr) CRP 502 Economic Applications to Community and Regional Planning (3 cr) CRP 551 Sustainable Development (3 cr)	3-6
Earth Sciences (choose 1-2 courses from the following): BIOL 628 Geographic Information Systems in Biology (3 cr) GEOG 570 (GEOS 570) Earth System Science and Global Warming (3 cr) GEOS 511 Hydrology: Land-Atmosphere Interaction (3 cr) GEOS 580 Selected Topics in Watershed Hydrology (1-3 cr) GEOS 585 Selected Topics in Isotope Geoscience (1-3 cr) GEOS 605 Topics in Geomorphology (3 cr) GEOS 607 Paleoclimatology and Paleoceanography (3 cr) GEOS 620 Coupled Land-Atmosphere Modeling (3 cr) GEOS 621 Global Hydrologic Change (3 cr) GEOS 633 (CE 633) Contaminant Hydrogeology (3 cr) GEOS 636 Stable Isotope Geochemistry (3 cr) GEOS 638 Radiogenic Isotope Geochemistry and Geochronology (3 cr)	3-6
Approved elective courses in ANTH, BIOL, BMOL, BOT, EEB, GEOS, ZOOL or related fields as approved by the supervisory committee and by the coordinator of the EEB doctoral program.	4-5
EEB 691 Doctoral Comprehensive Examination	1
EEB 693 Dissertation	30
Total	66

Appendix C: Unique Infrastructure Resources

Snake River Plains Herbarium: 50,000, and growing, collections of vascular plants primarily from southwest Idaho over the past 50 or so years. Historical and current collections map vegetation and vegetation change. The private lichen collection of Dr. Roger Rosentreter is also housed here and is likely to be turned over to Boise State in the near future - approximately 15,000 collections of lichens make this a premiere collection.

Consortium of Pacific Northwest herbaria: Online searchable website for plant collections. Data from Boise State's plant collections are contributed to this and merge with data from an additional 50+ collections in the region.

Raptor Research Center: The Raptor Research Center offers faculty and students the unusual opportunity to pursue research in the field of raptor biology and ecology. Its staff provides administrative as well as logical support. The Center supports field research by supplying research field vehicles and field equipment. Through its affiliation with the Department of Biological Sciences, the Center also offers research opportunities to conduct laboratory focused studies with faculty in the department. The Center also supports research buy funding travel for faculty and students to scientific meetings and to provide support for publication costs such as page charges.

Intermountain Bird Observatory: The Intermountain Bird Observatory is a non-profit academic research and community outreach program of Boise State University focused on impacting human lives and contributing to conservation through a combination of research, education, and community engagement. We conduct many research and monitoring projects across the region and do so in collaboration with numerous partners, including faculty and students (both graduate and undergraduate) at Boise State University. We maintain a remote field site where we have long-term, on-going research on songbird and raptor migration. This site has been used to study the effects of climate change on migration phenology and energetics, the effects of noise on bird distributions and behavior, and other topics related to global change and ecology. In particular, many graduate students have designed innovative and successful Master's thesis projects around our existing research and monitoring program, which allows students access to long-term data sets while also conducting shorter-term experimental studies.

Biomolecular Research Center: The Biomolecular Research Center (BRC) at Boise State is a collaborative research center designed to provide a supportive environment for interdisciplinary research and education with opportunities for students and faculty members alike. The focus of the BRC is the study of biomolecules with emphasis on proteins and protein interactions. The BRC represents a comprehensive collection of instrumentation and facilities ideal for the characterization of biomolecules and their role in a variety of biomedical and environmental processes. The university recently provided approximately $1.5 million to remodel 5,195 square feet of laboratory and office space to support instrumentation and a shared research core facility in the BRC. The mission of the center is to facilitate multidisciplinary research and research training programs in biomolecular sciences with a goal of increasing the level of biomolecular research achieved at Boise State University and in our region. To support current and future collaborative science, the BRC provides networking and training events for students, staff and faculty investigators at Boise State such as grant writing and publication writing events, hosting nationally recognized researchers for seminars, sponsoring training for shared scientific research instrumentation and support for travel to external trainings and conference events. In addition to internal support, the BRC also provides networking and collaboration opportunities with other Idaho institutions through the Idaho INBRE Network. These institutions include College of Western Idaho, Northwest Nazarene University, College of Idaho and the Boise Veterans Affairs Medical Center in the Treasure Valley; College of Southern Idaho in the Magic Valley, Idaho State University and Brigham Young University-Idaho in eastern Idaho; as well as University of Idaho, Lewis-Clark State College and North Idaho College in Idaho's panhandle. Through these long-held Idaho research collaborations, investigators,

staff and students are additionally offered the opportunity for networking and collaboration with the wider Western IDeA states including Alaska, Hawaii, Nevada, New Mexico, Wyoming and Montana. This broader collaboration expands the possibilities of for growth in research collaboration and resource exchange for all the biomedical research investigators in our region.

Crossroads Museum: In cooperation with Canyon County Parks, Recreation and Waterways the Department of Anthropology shares responsibility for the Crossroads Museum located near Melba, Idaho within Celebration Park-- Idaho's only archaeological park. Crossroads is a working field station housing classroom and laboratory facilities and a 20 bed dormitory. The facility hosts archaeological, biological, ecological and geological programs through the Desert Studies Institute—a cooperative program between the Department of Anthropology and Canyon County. The facility provides research opportunities for natural science faculty and students conducting research in southwestern Idaho.

Sensory ecology laboratory: A Sensory Ecology Laboratory is located on the 2nd floor of the Science Building on the campus of Boise State University. The computer room (15m2) has 6 computing workstations for graduate students. The lab room (20m2) is equipped with a hood and counter space. The animal housing room (12m2) is a certified animal care facility with stainless steel counters and cabinetry on a separate HVAC system. The indoor flight room (7m x 8m x 3.5m, 56m2) is a custom-designed animal imaging (bioacoustic and videographic) facility, engineered for a low background sound level (anechoic foam lining on all walls and ceiling, custom HVAC system and double walls) outfitted with 4 high speed cameras and illuminated with infrared floodlights. 4 ultrasonic microphones, 4 sonic microphones and 6 broadband speakers are mounted in the facility.

Stable isotope laboratory. The Stable Isotope Laboratory (SIL) is an education, research, training and service facility within the Department of Geosciences at Boise State University. This isotope ratio mass spectrometer facility serves research and teaching needs for stable isotope ratio users principally within the Departments of Geosciences, Biological Sciences, and Anthropology. Our analytical flexibility and competitive rate structure promote stable isotope services for research and industry and foster collaborations with other universities as well as federal, state and local agencies. The BSU SIL houses two main instruments:1) A 2010 ThermoFisher Delta V Plus continuous flow isotope ratio mass spectrometer coupled with ConFlo IV/EA, TC/EA, and GasBench II. This instrumentation allows measurement of the stable isotopes of hydrogen, carbon, nitrogen, oxygen and sulfur (δD, δ13C, δ15N, δ18O and δ34S) on a diversity of natural samples (carbonate, phosphate, organic plant, animal, soil, sediment, water, and atmospheric gas). We accommodate both natural abundance and isotopically enriched samples for all the species mentioned above. 2) A 2011 Los Gatos Research Liquid Water Isotope Analyzer, which is a Cavity Ring-Down (spectroscopic) instrument for the measurement of the stable isotopes of hydrogen and oxygen in liquid water samples. The SIL also maintains extraction lines and sample preparation facilities for numerous materials including carbonates, phosphates (both CO3 and PO4 components), plant and animal water, bulk organic matter, collagen, chitin and keratin, and cellulose.

Appendix D1: Report of External Evaluators

Site Visit Report

Review of the Proposal for Doctor of Philosophy (PhD) in Ecology, Evolution, and Behavior and Ecology, Evolution, and Behavior with an emphasis in Global Change Biology

Site Visit 6-7 October 2014

Lynn Bohs, University of Utah

Anthony Fiumera, Binghamton University

Julie Young, USDA National Wildlife Research Center, Utah State University

Overall Recommendation

The review team was impressed with the quality of research within the Departments of Biological Sciences, Anthropology, and Geosciences that would contribute to a Ph.D. program in Ecology, Evolution, and Behavior (EEB). The productivity of faculty and students and high level of extramural funding is remarkable. We were especially impressed with the enthusiasm for developing a Ph.D. program we observed within the university and local community. The addition of a Ph.D. program in EEB at Boise State University (BSU) will advance its research capabilities, increase the prestige of the department and university, and help it gain national and international recognition. We recommend implementing a Ph.D. program. We expect a successful program if funded at the requested level.

Strengths of Proposal

Faculty Productivity and Innovation: The existing faculty, housed in several departments, is one of the many strengths of this interdisciplinary Ph.D. proposal. As outlined in the proposal, participating faculty have a strong record of extramural funding, more than $10 million in the last 9 years. They are also publishing in prominent journals such as *Proceedings of the National Academy of Sciences*, *Applied and Environmental Microbiology*, and the *Journal of Wildlife Management*. Their work is internationally recognized as highlighted by numerous international collaborations. The research being conducted in ecology, evolution, and behavior at BSU is also highly innovative, utilizing novel technologies to address important scientific questions that will benefit the local community.

Graduate Student Mentoring: The faculty members also appear to be excellent mentors for their existing M.S. students. The current graduates students used the terms, "*accessible*", "*available*", "*willing to help*", "*helps me network with future employers*" when describing their faculty mentors. The relationship between the

faculty and their students is also evident in terms of graduate student productivity. Many M.S. students are authors on multiple published articles in peer-reviewed journals.

Existing Interdisciplinary Collaborations: The established collaborations within and between departments is another existing strength. Faculty members from Anthropology, Biological Sciences, and Geosciences are collaborating and mentoring students together. Experience working with individuals from a diversity of areas will be critical for EEB students to succeed in the future.

Agency Relationships: The program has strong existing ties with local federal and state agencies and non-profit research organizations, including USGS, DOD, BLM, US Forest Service, USFWS, Idaho Department of Health and Welfare, and the Peregrine Fund. The agencies and organizations work closely with faculty and graduate students to accomplish shared goals. The proximity of agency offices, BSU, and field sites enables a strong foundation for collaborative studies.

Local Ecosystem: The sagebrush-steppe ecosystem is the focus of many current and continuing research projects at BSU conducted by faculty spread across multiple departments. The location of Boise in the midst of this ecosystem facilitates accessibility to field sites and long term projects. The fragility of this system in the face of changes in climate, land use, invasive species, etc. means that research in this area is highly relevant to land management, recreation, conservation, and local economies. The BSU faculty and regional partners such as the Peregrine Fund, USGS, BLM, and US Forest Service make this a premier location for the integrated study of sagebrush steppe. The proposed Ph.D. program will make BSU a destination for students and researchers involved in studying this system.

Local Community: Located in southwestern Idaho far from the other flagship universities of Idaho, BSU serves place-bound students. Boise is the state capital and one of the largest metropolitan areas in Idaho, so BSU can take advantage of considerable home-grown talent as well as contribute expertise to state-wide issues of natural resource management.

Broad and Integrative Focus: The faculty and partner institutions have considerable expertise at all levels, from biogeochemistry to human impacts and land use. This holistic, transdisciplinary approach is highly appealing and effective in addressing complex problems beyond the scope of a single department or college. It is likely that the new Ph.D. program will expand expertise at BSU to be even more effective in examining complex ecosystem-scale issues.

Raptor Program: The raptor biology program is a well-known and respected program, with 97% of the graduates obtaining jobs in their field. It currently recruits excellent graduate students from across the U.S. and attracts global financial support. The program's global reputation can be leveraged to recruit high-quality Ph.D. students during the initial years of the EEB program, a critical component to the long-term success of a Ph.D. program.

Program Support: There was universal enthusiasm for developing this Ph.D. program. The proposal was built from the ground-up, developed by faculty within the various affiliated departments. Throughout the review process, support was evident from graduate students, faculty, and university administration. There was also strong support from federal and state agencies and non-profit research organizations within the community.

Well Prepared: The proposal was well thought out. It is evident that the faculty and administration used past experiences in developing new Ph.D. programs to develop this proposal and its components. The likelihood of this program succeeding is strong because the university has experience creating new Ph.D. programs and several faculty have been engaged in the process previously (e.g., Molecular Biosciences).

Areas of Improvement

Coursework: The formal coursework requirements for the proposed Ph.D. program seem too high and may limit graduate student and faculty productivity. The focus of the Ph.D. should be the research experience. We feel that formal coursework should be kept to a minimum such that students can focus on their research projects. Extensive coursework requirements could also limit research opportunities for students that need to be in the field during specific times of the year. Furthermore, the number of new classes that are proposed may place too high a teaching burden on faculty. A limited number of new courses could benefit both the existing M.S. program and also the proposed Ph.D. program. We suggest a reduction in the amount of formal coursework required for the Ph.D. degree and consider offering a smaller number of new courses and propose a timeline for the long term establishment of these courses.

Graduate Student Involvement: There was a lack of input by graduate students on this proposal and in general with departmental issues. M.S. student involvement in writing this proposal could enhance its quality, especially if their input was used to determine which new classes to propose. A graduate student representative at faculty meetings would facilitate communication between faculty and graduate students and give students a voice.

Expertise in Animal Behavior: While faculty from the Anthropology Department are well-suited to study aspects of human behavior, there is a lack of faculty highlighted in the proposal that focus on animal behavior. The department should consider using 1-2 of the faculty lines created within this proposal to hire faculty that specialize on animal behavior but can work on interdisciplinary studies.

Education/Outreach: The current proposal does not explicitly include a strong education/outreach component. Scientific outreach is a national priority in STEM disciplines and a required component as Broader Impacts in NSF grant proposals. Graduate students should be encouraged and trained in education and outreach to K-12 students, underserved communities, and the general public as an integral part of their graduate training. External funding opportunities exist for implementing outreach initiatives outside the avenues for funding basic research. The proposed EEB program might consider hiring a faculty or staff member dedicated to coordinating outreach efforts to provide novel opportunities for interaction of students and scientists with the community. Such a person could also oversee a graduate course on Scientific Communication and Outreach.

Recruitment: The success of the Ph.D. program will hinge on the recruitment of high quality graduate students. Special emphasis on recruiting excellent students will be especially important in the early years of the program. Ideas for recruitment strategies include producing an excellent web page, personal interactions with faculty and current and former BSU students at meetings, and a recruiting weekend that will bring promising applicants to BSU to meet faculty, see the facilities, and network with other potential graduate students. Social events to introduce and welcome new graduate students and ongoing activities are important in creating a cohesive scientific and social community among the graduate students and faculty.

Graduate Student Support: The stipend level is important to attract and retain high quality students and the proposed Ph.D. stipend seems competitive for the region. However, the differential pay scales between M.S. and Ph.D. student may lead to Ph.D. to M.S. attrition or a "two-tiered system". Although the proposed Ph.D. proposal would increase the stipends of M.S. students there will be differential pay between the students. What would stop a "M.S." student from enrolling in the Ph.D. program to secure the higher rate of funding only to drop down to the M.S. and complete the M.S. degree? The Biology Department does expect that most students enrolling in the program will already have M.S. degrees, so this may not be a valid concern.

Areas of Strength: The six areas of strength should be modified into a broader conceptual framework. As written, the six areas do not fully capture the integration of fields. The framework could stress the vertical integration of faculty strengths and expertise, from biogeochemistry to human behavioral ecology. Using a holistic approach and highlighting overlapping areas of expertise among faculty will be more effective in communicating the transdisciplinary nature of the proposal, which was very evident during the review process.

Relationship with Other Universities in Idaho

The committee does not see the proposed Ph.D. program at BSU as duplicating or being in conflict with other Idaho institutions. In fact, we believe the addition of a Ph.D. program at BSU will enable additional opportunities for collaboration and enhancement of graduate education and research in Idaho. Since duplication seems to be a concern, we recommend amending the proposal to address this issue head-on. The strengths of the other institutions should be identified and acknowledged explicitly in the proposal and statements included to the effect that duplication in these areas is neither present nor planned.

Geographic Location: BSU is geographically quite distant from the two other major universities in Idaho. As such, it serves a considerable local clientele rooted in the area and unable to attend these other institutions. Boise's location in the sagebrush-steppe ecosystem allows a unique opportunity to examine multiple layers of questions related to the biology and use of this endangered system. Faculty expertise concentrated on this ecosystem is not duplicated elsewhere and constitutes an impressive base of knowledge for studies of the local and regional landscape.

Human Ecology and Behavior: The inclusion of faculty in Anthropology in the EEB program is unique and not duplicated elsewhere to our knowledge. Incorporating human history, impacts, and perceptions is critical for successful management of regional ecosystems.

Agency Relationships: There are several agencies based out of Boise and the local area that want to further collaborative relationships by supporting Ph.D. students and their research projects. The proximity of such organizations and the focal ecosystem are unique to BSU. Agencies based within the region expressed appreciation in being able to work directly and in-person with faculty and students at BSU. A Ph.D. program would not diminish or duplicate collaborations at other universities but work to strengthen existing relationships between BSU faculty and regional organizations and agencies.

Core Facilities: Expensive molecular facilities are already partitioned among Idaho research institutions. For example, Boise State maintains a state of the art proteomics facility while University of Idaho maintains a genomics facility. This non-redundancy enhances the overall capabilities of researchers at Idaho institutions in a very complementary manner.

Appendix D2: Response to External Reviewers focused on "Areas of Improvement" Identified by Reviewers.

Reviewers: "Coursework: The formal coursework requirements for the proposed Ph.D. program seem too high and may limit graduate student and faculty productivity. The focus of the Ph.D. should be the research experience. We feel that formal coursework should be kept to a minimum such that students can focus on their research projects. Extensive coursework requirements could also limit research opportunities for students that need to be in the field during specific times of the year. Furthermore, the number of new classes that are proposed may place too high a teaching burden on faculty. A limited number of new courses could benefit both the existing M.S. program and also the proposed Ph.D. program. We suggest a reduction in the amount of formal coursework required for the Ph.D. degree and consider offering a smaller number of new courses and propose a timeline for the long term establishment of these courses."
BSU Response: The EEB plan requires the minimum amount of coursework allowable by the Boise State Graduate College. We require 4 core courses, 2 seminars, and 1 quantitative course. We feel the benefits of cohort building and shared knowledge in the core out-weigh the trade-offs in coursework burden. However, we agree with the reviewers about the high course load. To address the issue of course-load, we have provided a lot of flexibility in the list of courses that satisfy each requirement. For example, there are 11 possible courses that could satisfy the quantitative requirement. We will continue to work with the Graduate College in institutional reform that would allow for reduced course requirements

Reviewers: "Graduate Student Involvement: There was a lack of input by graduate students on this proposal and in general with departmental issues. M.S. student involvement in writing this proposal could enhance its quality, especially if their input was used to determine which new classes to propose. A graduate student representative at faculty meetings would facilitate communication between faculty and graduate students and give students a voice."
BSU Response: This is a great idea. Since the review, the graduate students have formed the Biology Graduate Students Association which is a group of students that work with department leadership to build more regular bridges in formal and informal interactions. In addition, we will have a graduate student representative participate in the EEB Graduate Studies Committee.

Reviewers: "Expertise in Animal Behavior: While faculty from the Anthropology Department are well-suited to study aspects of human behavior, there is a lack of faculty highlighted in the proposal that focus on animal behavior. The department should consider using 1-2 of the faculty lines created within this proposal to hire faculty that specialize on animal behavior but can work on interdisciplinary studies."
BSU Response: Although animal behavior faculty members were not highlighted in the proposal, **w**e in fact have several faculty members who study animal behavior, and therefore have a: Jesse Barber, James Belthoff, Jennifer Forbey, Julie Heath, and Ian Robertson.

Reviewers: "Education/Outreach: The current proposal does not explicitly include a strong education/outreach component. Scientific outreach is a national priority in STEM disciplines and a required component as Broader Impacts in NSF grant proposals. Graduate students should be encouraged and trained in education and outreach to K-12 students, underserved communities, and the general public as an integral part of their graduate training. External funding opportunities exist for implementing outreach initiatives outside the avenues for funding basic research. The proposed EEB program might consider hiring a faculty or staff member dedicated to coordinating outreach efforts to provide novel opportunities for interaction of students and scientists with the community. Such a person could also oversee a graduate course on Scientific Communication and Outreach."
BSU Response: This program will include a new research faculty position that specializes in science education and science communication. This person will help to build opportunities for graduate students to practice their communication and outreach skills. Furthermore, we should point out that two faculty, Drs. Forbey and

Heath, have strong outreach components of their research. Forbey's lab runs *IdahoWatch* and *Adopt a Scientist*. IdahoWatch aims to bring the field to the classroom. Working with local teachers, IdahoWatch helps inspire critical thinking while teaching real-life in the field techniques to students. Heath's *Project BoB: Blogging with Biologists* pairs college students conducting research with elementary school students in virtual conversations about research, biology, and careers in science.

Reviewers: "Recruitment: The success of the Ph.D. program will hinge on the recruitment of high quality graduate students. Special emphasis on recruiting excellent students will be especially important in the early years of the program. Ideas for recruitment strategies include producing an excellent web page, personal interactions with faculty and current and former BSU students at meetings, and a recruiting weekend that will bring promising applicants to BSU to meet faculty, see the facilities, and network with other potential graduate students. Social events to introduce and welcome new graduate students and ongoing activities are important in creating a cohesive scientific and social community among the graduate students and faculty."
BSU Response: We like this idea and will have an open-house week where potential students come to participate in department tours, seminars, and events. We will include visits to field sites.

Reviewers: "Graduate Student Support: The stipend level is important to attract and retain high quality students and the proposed Ph.D. stipend seems competitive for the region. However, the differential pay scales between M.S. and Ph.D. student may lead to Ph.D. to M.S. attrition or a "two-tiered system". Although the proposed Ph.D. proposal would increase the stipends of M.S. students there will be differential pay between the students. What would stop a "M.S." student from enrolling in the Ph.D. program to secure the higher rate of funding only to drop down to the M.S. and complete the M.S. degree? The Biology Department does expect that most students enrolling in the program will already have M.S. degrees, so this may not be a valid concern."
BSU Response: We have similar concerns, thus we will work to increase stipends for MS students. Faculty will work with applicants to decide which program will best suit applicants' needs and career objectives.

Reviewers: "Areas of Strength: The six areas of strength should be modified into a broader conceptual framework. As written, the six areas do not fully capture the integration of fields. The framework could stress the vertical integration of faculty strengths and expertise, from biogeochemistry to human behavioral ecology. Using a holistic approach and highlighting overlapping areas of expertise among faculty will be more effective in communicating the transdisciplinary nature of the proposal, which was very evident during the review process."
BSU Response: We appreciate this comment and have revised our proposal to reflect that concept that we are bridging across several field to build depth and strength in studies of human and environmental systems. At the same time, Boise State has created a new research center, the Human-Environment Systems initiative, which will be an important partner in providing support for the EEB program.

EPSCoR in Idaho

Experimental Program to Stimulate Competitive Research

875 Perimeter Drive, University of Idaho, Moscow ID 83844-3029
Tel: 208-885-5842 Fax: 208-885-5111 E-mail: epscor@uidaho.edu
http://www.uidaho.edu/epscor

October 6, 2014

Dr. Jim Munger
Vice Provost for Academic Planning
Boise State University
Boise, ID 83725

Dear Dr. Munger:

The EPSCoR program supports the Idaho Science and Technology (S&T) Plan through several funding mechanisms including the Research Infrastructure Improvement (RII) awards. Under the deliberate guidance of the State EPSCoR Committee, Idaho's Universities and Colleges work together to build critical mass of faculty, students and equipment across the state in key areas under a philosophy of ONEIdaho. These important investments are also intended to support University Strategic Plans and assist colleges and departments achieve their aspirations. Building Idaho's research enterprise in the key areas highlighted by the State S&T Plan requires equipment, talented faculty, undergraduate and graduate students. PhD programs and PhD students carry much of the load in conducting research and bring a technical capacity and quality of student that is not possible at the undergraduate or masters level.

Idaho EPSCoR, Boise State University and other Universities have invested significantly during the past 5-year Track 1 Award (Water Resources in a Changing Climate) and the current Track 1 Award (Managing Idaho's Landscape for Ecosystem Services - MILES). The proposed PhD in Biological Sciences is a logical next step to build on past investments and ensure the continued growth and sustainability of these initiatives. Failure to establish a PhD program will inhibit the research growth and ONEIDaho partnerships established across the state and beyond. These investments have included the creation of new faculty positions and the support of nationally recognized early career faculty such as Dr. de Graaff and Dr. Feris in Biological Sciences. Other current EPSCoR faculty supported at Boise State University include Dr. Heath, Dr. Barber, and Dr. Demps and these EPSCoR supported faculty will also be key future faculty participants in the proposed PhD. It will be difficult to retain highly productive young researchers in this area of Biological Sciences without a PhD program as PhD students are a key element in the research enterprise and an important career metric for most researchers. The loss of key faculty or lack of PhD students will be a serious detriment to developing our state-wide capabilities in natural resource management.

The proposed program will provide an important institutional foundation that will build Idaho's state-wide ability to compete for competitive federal research funding, to recruit high caliber faculty, attract high quality graduate students and to train Idaho's workforce for the future.

Sincerely,

P. Goodwin

Peter Goodwin
Idaho EPSCoR Project Director

United States Department of the Interior
U. S. GEOLOGICAL SURVEY

Forest & Rangeland Ecosystem Science Center
777 NW 9th, Suite 400
Corvallis, OR 97330-6169

November 24, 2015

Jim Munger, PhD
Vice Provost for Academic Planning
Professor of Biological Sciences
Boise State University
Boise, ID 83725

Dear Dr. Munger,

The research scientists of the U.S. Geological Survey's Forest and Rangeland Ecosystem Science Center (USGS FRESC) have enjoyed a highly collaborative and mutually beneficial relationship with the faculty, staff and students of Boise State University (BSU), particularly those in the Biology Department, since the late 1980s. Together, we have promoted a research and educational partnership in the ecological and natural resource disciplines to achieve improvements in the conservation and management of natural systems in Idaho and the western United States. The creation of a Doctor of Philosophy in Ecology, Evolution and Behavior (PhD, EEB) will significantly expand the capacity of USGS and BSU to cooperatively engage in relevant, multidisciplinary research that will provide scientific understanding and technology needed to meet the increasingly complex demands of rapidly changing natural systems.

FRESC's Snake River Field Station (SRFS), which is located on BSU campus, was initially created as a Raptor Research Center, and its scientists were key to the development of BSU's Raptor Research program. Although birds of prey remain an important focus for SRFS, the science capability and research programs have expanded in recent years and diversified to meet the needs of resource managers throughout the western US. This growth has occurred in part because SRFS scientists have been highly successful in working at the cutting edge of environmental research, which includes wildlife monitoring, sage-grouse biology, rangeland ecology and restoration, invasive species, fire ecology, plant physiological ecology, avian ecology, ecosystem structure and function, effects of climate change on ecosystems, alternative energy development/wildlife interactions, and biological statistics.

As BSU Biology has grown in similar directions, the strong cooperative relationship between BSU and the USGS has been advantageous to the teaching, research, and extension activities of both institutions. For instance, USGS scientists have adjunct affiliations with BSU. In that capacity, they co-teach courses and seminars, provide guest lectures, and serve on graduate committees, often as major advisors of student research. In the last 5 years, USGS scientists have participated on 17 graduate-student committees and have been major advisors to 6 of those. USGS scientists have benefited from the energy and stimulation that students bring to their research programs, and from the personal satisfaction that comes from leading and mentoring future scientists. In turn, USGS has funded research assistant positions, increased the breadth of training opportunities and added to the diversity of job-related experiences available to BSU students. The addition of PhD students will greatly expand on these benefits. PhD students bring a higher level of dedication and professionalism to the relationship. Their longer-running and more complex research pursuits are better matches with the scope and scale of typical USGS research projects, so

they can be more involved in the full life-cycle of the scientific process, and realize finished products and publications with their degree programs. As a result, throughout the USGS, when both PhD and MS students are available as collaborators, financial and training investments in PhD students are often higher than for MS students (which in 2012/13 USGS provided $105,000 to support BSU MS student research).

We also expect the number and scope of our interactions with BSU faculty to increase with the addition of an EEB PhD program. USGS scientists collaborate on numerous interdisciplinary research projects with BSU faculty members. Although Biology is the primary partner, we also work with members of Geosciences, Engineering, and Public Policy and Administration. USGS has co-authored grants with BSU, and provided direct funding for science. For instance, in the last two years, USGS brought approximately $885,000 to BSU.As more graduate students, particularly PhDs, are brought into the mix, the variety and amount of research performed by BSU will increase, as will the opportunities for collaboration. Just as we have increasingly shared research, we have also shared research infrastructure. This includes laboratory capacity, field sites, equipment and instrumentation, and geographic information systems (GIS) support. As the PhD program grows, so will the shared infrastructure resource, improving the research capacity of Biology faculty and USGS scientists alike.

One of the most important interactions of this collaboration has been the USGS's ability to hire BSU students and graduates into pre-professional and professional positions. Over the last 5 years, we have employed 41 students to support various research projects. We provide on-the-job training, convey a variety of skills useful in both field and lab science, and expose them to future career paths in federal science, resource management, and conservation. Many BSU graduates are hired into professional positions by the USGS and other government agencies as a result of their federal training, experiences, and professional connections. Given the strong presence of USGS partner agencies such as the U.S. Fish and Wildlife Service, the Bureau of Land Management, and Idaho Fish and Game in Boise, BSU students have a ready conduit for realizing career opportunities. Conversely, many current, local employees of USGS and its partner agencies are interested in furthering their education. Some of these agencies have programs that support employee development, and having access to a local PhD program in the center of Idaho's resource management community may be highly desirable.

USGS FRESC has other field stations on university campuses, including Oregon State University and University of Washington, which have established PhD programs. We have enjoyed long and successful collaborations with the students, faculty and staff of these institutions, and have had the honor of playing key roles in the successful educational experiences of a great many PhD students, and the formation of many excellent scientists, resource managers, and conservation professionals. We look forward to sharing in similarly successful endeavors with BSU, and to working with all those involved in the EEB PhD program.

Sincerely,

Ken S. Berg

Ken Berg, Director
U.S. Geological Survey, Forest and Rangeland Ecosystem Science Center

THE PEREGRINE FUND

CONSERVING BIRDS OF PREY WORLDWIDE

Headquarters
World Center for Birds of Prey
5668 West Flying Hawk Lane
Boise, ID 83709
United States of America
208.362.3716

Arizona Field Office
P.O. Box 6123
Marble Canyon, AZ 86036

Africa Field Office
P.O. Box 45111
Nairobi, Kenya 00100

Madagascar Field Office
B.P. 4113
Antananarivo (101)
Madagascar

30 October 2015

Jim Munger, Ph.D.
Vice Provost for Academic Planning
Professor of Biological Sciences
Boise State University
Boise, ID 83725

Dear Professor Munger:

I am writing to express our enthusiastic support for the proposed Ph.D. program in Ecology, Evolution, and Behavior at Boise State University.

The 30-year partnership between The Peregrine Fund and Boise State University at the Master's degree level has been important for collaboration on research and student training in the field of raptor biology, ecology and conservation. A Ph.D. program in the Department of Biological Sciences would be valuable to The Peregrine Fund because it will increase opportunities for research collaboration at an advanced academic level not previously available to us locally and for which we have had to seek the collaboration of other universities in the past. The program would benefit from our partnership because of the depth and geographic scope of expertise in raptor biology and conservation brought by our scientists, and the opportunities these would provide to students participating in the Ph.D. program.

Since founding in 1970 The Peregrine Fund has supported graduate student research with training, supervision and finances as part of our mission to develop capacity for raptor research and conservation worldwide. Since moving from our origins at Cornell University to Boise in 1984 and forming the partnership with Boise State University, we have assisted the graduation of 65 M.Sc. and 24 Ph.D. students. Among Master's students 25% graduated from Boise State University, while 63% graduated from universities in Africa, Asia, Europe and Latin America. Among Doctoral students, 67% graduated from other U.S. and 33% from other foreign universities. A Ph.D. program at Boise State University would facilitate the greater participation of higher level students in our programs locally and internationally.

One of the advantages of training students is that we have the opportunity to select the best to continue working with us to achieve meaningful conservation of raptors, their habitats, and the biodiversity they support around the world. Among Boise State University Master's graduates we now employ Russell Thorstrom who directs our island conservation projects from Madagascar to the Caribbean; Hernan Vargas who directs our student training and research program in Latin America; David Anderson who directs our Arctic climate change program; and others have gone on to important conservation and research positions from Alaska to Mongolia.

The opportunity to collaborate with researchers at Boise State University is vital to The Peregrine Fund's need to answer critical conservation questions requiring a diversity of expertise that we could not support on our own. We have benefitted from specialized spatial, statistical, eco-physiological and population ecology analyses and advice. We have also partnered in bringing international scientific conferences to Boise State University that advance the state of knowledge on issues such as lead (Pb) poisoning of wildlife and humans from spent ammunition, and the effects of climate and other environmental change on predator-prey dynamics in the Arctic. Solutions to these conservation problems would likely also benefit from the inter-disciplinary nature of the proposed Ph.D. program since solutions often revolve around human behavior and an understanding of social anthropology.

A Ph.D. program at Boise State University might benefit employees of The Peregrine Fund by providing an opportunity to advance academically while concurrently working on conservation projects. We encourage employees to expand their training, and currently have one employee enrolled in a Ph.D. program at a university in Arizona.

We wish you success in bringing the Ph.D. program in EEB to Boise State University. Participation of scientists from The Peregrine Fund would be an important contribution to the success of the program and would simultaneously strengthen the operations of The Peregrine Fund in achieving our mission to conserve raptors, their habitats, and biodiversity worldwide.

Sincerely yours,

J. Peter Jenny
President

Laboratório de Biodiversidade E.O.Wilson, Parque Nacional da Gorongosa, Moçambique

E.O. Wilson Biodiversity Laboratory, Gorongosa National Park, Mozambique

Chitengo, November 30th, 2015

Jim Munger, PhD
Vice Provost for Academic Planning
Professor of Biological Sciences
Boise State University
Boise, ID 83725

Dear Prof. Munger,

On behalf of the E.O. Wilson Biodiversity Laboratory at Gorongosa National Park in Mozambique I would like to express our strong support for the creation of a new Doctoral Degree Program in Ecology, Evolution, and Behavior at the Boise State University.

The Wilson Laboratory in Gorongosa, a new scientific facility in Mozambique's flagship protected area, exists to facilitate research that informs the national park's restoration efforts, and to provide logistical base and support for students and scientists, both local and visiting, who are interested in conducting long-term projects in ecology, biodiversity conservation, and other aspects of organismal biology. Opened in March 2014, the laboratory is quickly becoming Mozambique's most important hub of research in conservation biology, with emphasis on synergistic collaboration and fostering Mozambican students and young researchers. It currently includes basic laboratory facilities (microscopes, cold storage for fresh material and frozen tissue samples, an oven etc.) as well as a synoptic herbarium and an entomological collection. In 2016 the laboratory will be expanded to include a chemical laboratory and a DNA facility dedicated to extraction and amplification of genetic material. The Wilson Laboratory provides comfortable accommodation for 14 students/researchers, which will be expanded in 2016 to allow for at least 30 concurrent visitors to laboratory.

Gorongosa National Park (GNP) offers unparalleled opportunities for research in a variety of biological questions and conservation problems. It is home to some of the biologically richest and geologically most diverse ecosystems on the African continent. Situated at the southernmost end of the African Great Rift Valley, it encompasses four major ecological zones, each with its own climate, water regime, plant communities, and animals. It covers an area of approximately 4,000 km^2 and spans the elevation gradient from sea-level floodplains of Lake Urema to high alpine meadows of Mt. Gorongosa. Its borders encompass caves and deep gorges of the Cheringoma Plateau, vast savannas of the Valley floor, and the relict rainforest of Mt. Gorongosa. Since 2012 researchers have documented the presence of 3,860 species of animals and plants in the park, including

146 species of mammals and 405 species of birds. The avifauna of the park is particularly rich in water birds, with globally significant breeding colonies of several species of storks and others. Equally importantly, raptors (Acciptridae) are represented by 29 species, including 5 species of globally threatened vultures. The invertebrate fauna of Gorongosa, while still insufficiently documented, appears to be exceptionally rich, including many freshwater crustaceans and cave arthropods. The vascular flora of the park consists of 1,713 documented species, including several endemics. The synoptic collection of animals and plants at the Wilson Lab provides a convenient resource for identification of species for visiting students and researchers.

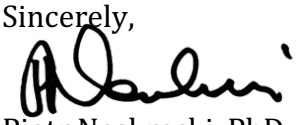
In addition to projects focusing on organismal interactions or ecological processes, Gorongosa provides the perfect platform to explore the intersection of natural and anthropogenic ecosystems. The growing pressure from the human population around the park creates a high risk of human-animal conflict, and researchers at the Wilson Lab, in collaboration with the Dept. of Conservation and the Dept. of Agriculture at GNP, are actively pursuing projects that aim to mitigate the human impact on the protected area, while helping improve the livelihood of its surrounding communities by developing modern sustainable agriculture that offers alternatives to hunting and slash-and-burn practices.

Examples of doctoral projects recently or currently being conducted in the park include:

- Asymmetric reassembly of ungulate communities in Gorongosa National Park (Princeton University)
- Landscape ecology of war-driven mammal decline in Gorongosa National Park (Princeton University)
- Human-wildlife interactions in Gorongosa National Park (University of California, Berkley)
- Population dynamics of lions in Gorongosa National Park (University of California, Santa Cruz)
- Tri-trophic interaction in fungal-arboreal-avian assemblages (Coimbra University, Portugal)

We believe that a partnership between Gorongosa Restoration Project and the Boise State University, recently formalized through a Memorandum of Understanding, will provide BSU students and researchers with opportunities to conduct ground-breaking projects in ecology and conservation, leading to not only advances in science but also more effective conservation of one of Africa's greatest protected areas.

Sincerely,



Piotr Naskrecki, PhD
Associate Director, E.O. Wilson Biodiversity Laboratory
Gorongosa Restoration Project

College of Western Idaho

Academic Affairs
P.O. Box 3010
Nampa, ID 83653

Dr. Jim Munger
Vice Provost for Academic Planning
Professor of Biological Sciences
Boise State University
Boise, ID 83725

November 23, 2015

Dear Dr. Munger:

College of Western Idaho offers this letter in support of Boise State University's proposed Ph.D. program in Ecology, Evolution, and Behavior (EEB). We believe this program provides an opportunity for CWI faculty engagement and professional development, as well as a relevant and intriguing long-term academic pathway for our students in multiple disciplines of study.

Ecology, Evolution, and Behavior poses a potential for future partnerships between College of Western Idaho and Boise State University faculty. Many of CWI's masters-prepared faculty members are BSU graduates, including faculty teaching Anthropology, Geology, and Biology. Notably, our ecology and field biology faculty is a graduate of BSU's Raptor Biology program and is now a mentor in BSU's Research Experience for Undergraduates in Raptor Research. He continues to work with his former BSU graduate professors as well as with current BSU undergraduate students conducting raptor research. Our Geology faculty member is a graduate of BSU's Geosciences program and maintains his connection with the program by leading student studies abroad through Boise State's Summer Field Camp Program in Geology. These examples illustrate the continued engagement of former graduates in Boise State programs—a connection that benefits current BSU students, as well as CWI faculty and, by extension, the community college students they teach.

Students become familiar with long-term options through the relationships they form with faculty, and their goals are often inspired by faculty who are actively engaged in their discipline. CWI faculty engagement with BSU counterparts strengthens the transfer pathway for students. When choosing a major, community college students often consider the extended academic pathways that are locally accessible; a Ph.D. program in EEB broadens graduate level options for associate degree transfer students from several majors.

Additionally, local access to a Ph.D. program in EEB also provides an option for graduate progression or professional development that would be of interest to our faculty from a broad range of disciplines. Partnership with the four-year universities in the state is extremely important to CWI's mission and we look forward to future opportunities for collaboration and collegial engagement with BSU.

Sincerely,

Brenda Pettinger
Assistant Vice President for Academic Affairs

phone 208.562.3305
brendapettinger@cwidaho.cc

United States Department of the Interior
Fish and Wildlife Service
Idaho Fish And Wildlife Office
1387 S. Vinnell Way, Room 368
Boise, Idaho 83709
Telephone (208) 378-5243
http://www.fws.gov/idaho

SEP 1 0 2014

Jim Munger, PhD
Vice Provost for Academic Planning
Professor of Biological Sciences
Boise State University
Boise, ID 83725

Dear Jim Munger:

I am writing this letter to express support for the creation of a new PhD. in Ecology, Evolution, and Behavior (EEB) Program at Boise State University. The proposed expansion of the Department of Biological Sciences graduate programs will further enhance the already high quality of Boise State University graduates, many of whom are currently employed by the US Fish and Wildlife Service's Idaho Fish and Wildlife Office here in Boise.

For more than 15 years, the Department of Biological Sciences at Boise State University has closely collaborated with the Idaho Fish and Wildlife Office to study and research conservation issues of concern to the Service. This work has involved past and ongoing graduate studies of Idaho's native fish, wildlife and plants including Columbia spotted frog; two endemic Idaho ground squirrels and rare southwestern Idaho native plants. The knowledge gained from these studies has been instrumental in our understanding of the ecology of these and other species of conservation concern and has served to inform our decisions on their management and protection. Creation of the EEB PhD program would allow even more opportunities for long term research projects that would provide even more benefit to the Service.

The Service's Idaho and Fish and Wildlife Office currently employs five fish and wildlife biologists with degrees from Boise State's Department of Biological Sciences graduate programs. That is testament to the excellent preparation Boise State graduates receive for careers in state and federal natural resource jobs. Additionally, creation of a new PhD program will foster new fields of research as well as new and exciting graduate degree options for natural resource professionals in Idaho.

We have a strong and sustained interest in continuing our collaborative relationship with Boise State's Department of Biological Sciences. Therefore, BSU's proposed new EEB PhD program at Boise State has my fullest support.

Sincerely,

Michael Carrier
State Supervisor

Department of Energy
Idaho Operations Office
1955 Fremont Avenue
Idaho Falls, ID 83415

September 26, 2014

Dr. James Munger
Professor & Vice Provost for Academic Planning
Department of Biology
Boise State University
Boise, ID 83725-1515

SUBJECT: Support of Boise State University's Proposal for Creation of New Ph.D.

Dear Dr. Munger:

I am writing to support Boise State University's proposal for creation of a new Ph.D. in Ecology, Evolution, and Behavior (EEB), which is intended to prepare scientists to work in transdisciplinary settings to solve the complex ecological and evolutionary problems of the day. Based on the proposal as presented, it seems likely that creation of this new doctoral program would enhance the beneficial relationship between Department of Energy, Idaho Operation Office (DOE-ID) and Boise State University (BSU).

DOE-ID and the Idaho National Laboratory (INL) have had very positive experiences with BSU. BSU is one of the partners in the Center for Advanced Energy Studies, (CAES), and through CAES has provided important research which supports the DOE mission in areas including oxidation studies on zirconium materials in low-enriched uranium fuels, irradiation creep in graphite, and examination of the materials properties of oxide fuels and oxide dispersion strengthened (ODS) alloys for nuclear reactors. Policy researchers at BSU affiliated with CAES have performed important studies on "up-front financing options for energy efficiency for small businesses" and on the "economic impact of small modular reactors". Recently, under a $2.8 million grant from the U.S. Department of Energy's SunShot Initiative, a group of researchers from Idaho, including Boise State and the INL, developed ***PVMapper***, a geographic information system (GIS) that helps large-scale photovoltaic project developers take social preferences and constraints into account when siting new solar energy plants. All of these examples demonstrate that the research at BSU supports the mission of the Energy Department to "ensure America's security and prosperity by addressing its energy, environmental and nuclear challenges through transformative science and technology solutions".

As a partner in CAES, BSU provides leadership for the Microscopy and Characterization Suite (MaCS), a state-of-the-art materials characterization laboratory that provides cross-cutting capabilities that supports INL and the DOE in several important areas of research and development. MaCS is complementary to the Boise State Center for Materials Characterization (BSCMC) that was established in 2006. The MaCS facility has made it possible for researchers to examine irradiated fuel at the nanoscale level, and this capability has resulted in a new

understanding of how nuclear fuel changes throughout the fuel's irradiation life cycle. Data from the MaCS lab has been used to establish new models and simulation of irradiated nuclear fuel at the atomic and meso-scale levels.

Boise State Students have proven integral to the success of CAES. The INL has had numerous BSU interns and students over the last several years. These students have contributed to DOE-relevant research, including research on biomass for producing biofuels, research on geothermal systems, and the research funded by the Nuclear Energy University Programs.

The INL comprises almost 900 square miles of primarily sagebrush-steppe ecology, is positioned over the Snake River Plain aquifer, and has supported and continues to support numerous facilities since its inception. Managing the site requires an understanding of the ecology, the potential impacts and benefits of any new actions, and consideration of input from the public and other stakeholders such as federal land-management agencies and the state of Idaho. The ability to integrate these kinds of inputs from multiple disciplinary, agency, and public perspectives into a decision process is one of the goals of the proposed Ph.D. in Ecology, Evolution, and Behavior, a worthwhile endeavor.

The envisioned PhD program contains key transdisciplinary areas for research and training which are of interest to DOE-ID in its stewardship of INL and the INL site. Especially relevant is the area of *Biogeochemistry*, which will examine the productivity of ecosystems, distributions of species and the outcomes of their interactions and how those interactions are determined or influenced by the complex interplay between biological, chemical, geological, and hydrological factors. Improving our understanding of complex biogeochemical systems and enhancing our ability to predict how they will respond to perturbation could potentially be relevant to DOE decision-making about activities on the INL site.

While the DOE-ID cannot commit to any future funding or employment to BSU or its students, clearly the DOE encourages graduate level education in the field of science and technology.

Again, DOE-ID expresses support to Boise State in its quest to create a new PhD program in Ecology, Evolution, and Behavior. This program would add to the already strong and mutually beneficial relationship between DOE and Boise State University.

Sincerely,

Richard Provencher, Manager
Idaho Operations Office

Friends of ZOOBOISE
www.zooboise.org
355 Julia Davis Drive • Boise, Idaho 83702 • (208) 608-7760 • (208) 384-4194 fax

November 29, 2015

Jim Munger, PhD
Vice Provost for Academic Planning
Professor of Biological Sciences
Boise State University
Boise, Idaho 83725

Dear Jim:

I am writing on behalf of Zoo Boise to support Boise State University's efforts to create a new PhD program in Ecology, Evolution and Behavior. A few years ago Zoo Boise has changed its mission into to help address the extinction crisis. Visitors to Zoo Boise help generate hundreds of thousands of dollars on an annual basis to help fund conservation projects in Idaho and around the world. As you know, successful conservation depends on a number of factors.

First and foremost is solid science. A PhD program in Ecology, Evolution and Behavior will provide a nearby team of scientists could help Zoo Boise ensure that the funds being generated by hundreds of thousands of Idahoans are spent on credible projects that have a real chance for success.

The second factor is partnerships. Successful conservation work requires teams of people with different skill sets to tackle all the different challenges. PhD level biologists are always key members of these teams. In the past, Boise State biologists have worked with Zoo Boise and the College of Idaho on our Southern Idaho ground squirrel project. In return, Zoo Boise has worked with Boise State Professor, Dr. Jesse Barber, to provide holding space for bats used in his predator-prey research.

Zoo Boise's latest project involves helping to restore Gorongosa National Park in Mozambique. Gorongosa, once one of Africa's most important parks, was destroyed during a civil war. Nearly all the mammals were killed and eaten by the soldiers. One million acres was essentially emptied of all its animal life. Gorongosa is now being restored. Animals are finding the way back to the park and others are being reintroduced. Guiding and studying this process, arguably one of the greatest ecological experiments of all time, will requires generations of future PhD level scientists. Already, Marc Bechard of Boise State is studying Hooded Vultures in the Park and several members of BSU's Intermountain Bird Observatory are currently in the park studying the bird life. Soon, Dr. Jesse Barber will be in Gorongosa studying the interactions between bats and insects. The restoration of Gorongosa has numerous ties to Idaho. The effort is being led by Greg Carr, an Idahoan from Ketchum, Zoo Boise, and Bob Poole, a wildlife film maker from Ketchum. This new program at Boise State could help increase Idaho's influence in saving a place described by Dr. E. O. Wilson as the "most biologically diverse national park on earth."

ASSOCIATION OF ZOOS & AQUARIUMS

A PhD program is built on the foundation of a solid undergraduate biology department. Zoo Boise has benefited from Boise State biology graduates who are now employed as Zookeepers, served as interns and make up a good portion of our volunteer program. Building a PhD program on top of that solid will only increase the opportunities for Zoo Boise and Boise State to work together even more in the future.

Zoo Boise supports Boise State University's efforts to create this new doctoral program and urge the Idaho State Board of Education to support this effort.

Sincerely,

Steve Burns
Director
Zoo Boise

United States Department of the Interior
BUREAU OF LAND MANAGEMENT
Idaho State Office
1387 South Vinnell Way
Boise, Idaho 83709-1657

SEP 30 2014

Dr. James Munger, Ph.D.
Vice Provost for Academic Planning
Professor of Biological Sciences
Boise State University
Boise, Idaho 83725

Dear Dr. Munger,

Thank you for your letter of September 6, 2014, regarding a proposed new Doctoral program at Boise State University (BSU). The Bureau of Land Management (BLM) is highly supportive of the proposed Doctoral Program in Ecology, Evolution and Behavior. Over the years, BLM managers and resource specialists have directly benefitted from numerous research studies completed by BSU faculty and Master's level graduate students on a wide variety of species, ecosystems and ecosystem components relevant to the BLM. For example, past research efforts led by Drs. Bechard, Belthoff, Novak, Wicklow-Howard, you and others, encompassed various raptors of concern, Columbia spotted frogs, biological soil crusts and migratory songbirds. Idaho BLM has recently worked closely with Dr. Jennifer Forbey and her laboratory on important research related to pygmy rabbit and sage-grouse diet selection and habitat quality, topics that are helping to refine how we conserve and manage habitat for these species of concern.

As you may be aware, Idaho BLM also supports the Intermountain Bird Observatory (IBO) (previously the Idaho Bird Observatory), via a recently initiated Interagency Assistance Agreement with the U.S. Fish and Wildlife Service. The IBO provides crucial expertise in the conservation and monitoring of migratory songbirds, raptors and other species, so we anticipate that the Observatory would also benefit from a Doctoral program at BSU by providing advanced opportunities for graduate students to pursue more in-depth studies of birds in the Intermountain Region.

Over the years, numerous BSU graduates have gone on to become employed as biologists, botanists, ecologists, managers or in other roles in the BLM, many having completed Master's degrees at BSU. A Ph.D. program would provide additional opportunities for graduate students as well as working professionals to pursue advanced studies, furthering career options and opportunities.

In closing, the BLM's current and future needs will always revolve around employing graduates with solid biological and ecological expertise in species, ecosystems and ecosystem processes. Increasingly, it is becoming crucial that graduates possess a solid, working understanding of how these factors relate to resource management and land use planning, and that they are able to see the big picture and think "outside the box". The proposed Doctoral program would facilitate that.

As you proceed, we encourage you to ensure that the Doctoral program embrace a strong applied ecology emphasis focused on contemporary land management issues including landscape ecology, species-habitat relationships, ecosystem processes, and climate change vulnerability. Thank you for the continued coordination between BSU and Idaho BLM.

Sincerely,

Jeffery L. Foss
Deputy State Director
Resources

The Nature Conservancy
Protecting nature. Preserving life.™

Southwest Office
950 W. Bannock St.
Suite 210
Boise, ID 83702

Tel (208) 343-8826
Fax (208) 343-8892

nature.org

October 3, 2014

Jim Munger, PhD
Vice Provost for Academic Planning
Professor of Biological Sciences
Boise State University
Boise, ID 83725

Dear Dr. Munger,

It is with enthusiasm that I support Boise State University (BSU) creating a new PhD in Ecology, Evolution, and Behavior. As a BSU alumnus, I am proud to see the university continuing to develop and evolve in developing rigorous, scientific and relevant programs. I benefited greatly from BSU's outstanding Environmental Health program, which focused on the scientific and programmatic skills needed to succeed in the workforce while also emphasizing the importance of strong written and verbal communications.

As the former Director of the Department of Environmental Quality and the current State Director for The Nature Conservancy, I have had the opportunity to work with and supervise many BSU graduates and students. Employers, like the DEQ and The Nature Conservancy, have benefited greatly from having a qualified applicant pool for employment and for working in partnership with BSU in many areas of research.

It is critical in maintaining a strong workforce in Idaho that students and employees have opportunities to pursue advance degrees in the scientific and natural resource areas. The Nature Conservancy is an organization based on scientific principles and a hallmark of our success is collaboration with other organizations. Our employees often pursue advanced degrees and this particular degree would be of great interest to our scientists. In addition, it would provide value to collaborate with BSU on research within this area.

Sincerely,

Toni Hardesty

Toni Hardesty
State Director

100% post-consumer materials

IDAHO DEPARTMENT OF
HEALTH & WELFARE

C. L. "BUTCH" OTTER – Governor
RICHARD M. ARMSTRONG – Director

SONJA SCHRIEVER, RN – Chief
BUREAU OF COMMUNITY & ENVIRONMENTAL HEALTH
450 West State Street, 6th Floor
PO Box 83720
Boise, ID 83720-0036
PHONE 208-334-6950
FAX 208-334-6573

September 10, 2014

Dr. John P. Ziker
Professor and Chair, Department of Anthropology, Boise State University
1910 University Drive
HEMG, Room 55
Boise, Idaho 83725-1950

Dear John Ziker,

After reviewing the proposal for a PhD program in Evolution, Ecology, and Behavior at Boise State University (led by the Department of Biological Sciences in conjunction with the Departments of Anthropology and Geosciences) I wholeheartedly express my support in this endeavor. In my current capacity as an epidemiologist for the Division of Public Health at the Idaho Department of Health and Welfare, I see broad potential for this program to provide both higher quality interns and prospective employees in the future. In addition, several aspects of the proposed program's goals and coursework would be of particular value to my organization. Perhaps of highest importance in this regard would be providing training to growing body of students on how to effectively communicate the results of scientific research to both scientific and public audiences, along with training on how to pose scientific research questions and how to conduct research using the scientific method.

The interdisciplinary nature of public health is increasingly needed for us to better understand and prepare for future public health threats. As such, there is high potential for the Division of Public Health to become consumers of information produced from the proposed program. Information on the science of global change may produce a range of key insights including a better understanding of climate change impacts, and any consequent human health effects, in Idaho along with insight into the biology of invasive species in the state (in particular those with zoonotic disease potential). I was pleased to see that the proposed PhD program includes coursework in modeling social behaviors. There is growing interest within public health in using this type of modeling to understand such things as how influenza might spread or which set of interventions would most likely reduce obesity in a population. Having a pool of graduates with a skill set in modelling has the potential to provide great value to our everyday public health work. In short, I am confident that the knowledge gained, and products produced, by students of the proposed PhD program would be of value to the Division of Public Health and enthusiastically support the above mentioned Boise State University departments in this endeavor.

Sincerely,

Dr. Robert Graff, PhD
Chronic Disease and Environmental Health Epidemiologist
Bureau of Community and Environmental Health, Division of Public Health, Idaho Department of Health and Welfare

DISCOVERY CENTER OF IDAHO
Idaho's Hands-on Science Center

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WWW.DCIDAHO.ORG

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October 4, 2014

Jim Munger, PhD
Vice Provost for Academic Planning
Professor of Biological Sciences
Boise State University
1910 University Drive
Boise, ID 83725

Dear Dr. Munger,

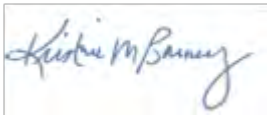
I am excited to hear of your plans to propose a Ph.D. in Ecology, Evolution, and Behavior. As an alumna of the Department of Biological Sciences (DBS) and the leader of a nonprofit partner organization, I can attest to the strength of your current programs and the benefits that this new program will provide to our community.

The Discovery Center relies on the expertise of partners like Boise State's DBS to offer a wide array of educational programming. As leaders in informal science education, we are a portal to the public and pride ourselves on offering a casual and fun venue for scientists to connect with the community and share their work. We regularly invite Boise State DBS faculty and students to participate in our programming and are grateful for the breadth and depth of experience they bring as well as the department's strong culture of collaboration.

The areas on which this Ph.D. program will focus are of critical importance to our community. Having access to doctoral students who are working across disciplines to solve complex problems will be of tremendous benefit to our science center. From sharing breakthroughs of highly relevant and well-funded research programs with our adult and teen audiences to highlighting possible career paths to budding young scientists, I can see many ways that this expansion will enrich our partnership and community.

I enthusiastically support your proposal and look forward to working with the new students and faculty your program will attract!

Sincerely,



Kristine Barney
Executive Director
(M.A. 2009)

Idaho Botanical Garden

2355 Old Penitentiary Rd
Boise, ID 83712
PHONE (208) 343-8649
FAX (208) 343-3601
www.idahobotanicalgarden.org
info@idahobotanicalgarden.org

September 29, 2014

Dr. Jim Munger, PhD
Vice Provost for Academic Planning
Professor of Biological Sciences
Boise State University
Boise, ID 83725

Dear Dr. Munger:

We are writing in support of Boise State University's proposal to create a new Ph.D. in Ecology, Evolution, and Behavior (EEB), to be housed and administered in the Department of Biological Sciences. The Idaho Botanical Garden serves many roles in the community, from providing a venue for weddings, concerts and memorials, to our holiday lights and harvest festival extravaganzas, from multiple levels of educational programming, to plant and seed collections, botanical and horticultural collaborations, and conservation efforts. We do not claim to be a scientific institution, but, because of our 4,000 member base, our network reaches across the educational and financial spectrum of the Treasure Valley. To this end, we have worked with BSU Biology Department faculty by providing sites (undeveloped buffer areas in the foothills) for field experimental studies, and we use the Snake River Plain Herbarium for reference purposes, depositing specimens, and seeking taxonomic advice. The Idaho Botanical Garden hires and collaborates with graduates of BSU's Biology Department, particularly those with a botany emphasis, as it provides a local and ready pool of qualified individuals to assist with our native plant propagation, seed collection, and plant collection accessioning efforts.

The proposal to create a new Ph.D at BSU will facilitate collaborative opportunities between BSU and the Idaho Botanical Garden, particularly in the field of invasive plant species ecology and native plant biology, taxonomy, and conservation. We look forward to such opportunities, and appreciate the chance to offer our support.

Sincerely,
Christine Wiersema, Executive Director Ann DeBolt, Botanist

Canyon County Parks, Recreation and Waterways
1115 Albany St., Caldwell, ID 83605
Lake Lowell Office: 208-440-4600
Celebration Park: 208-455-6022

23 September, 2014

To: Dr. Kevin Feris, Chair, Department of Biology, BSU

From: Tom Bicak, Director

Re: New Ph.D. in Ecology, Evolution and Behavior

Dear Dr. Feris:

This letter is in support of the proposed Ph.D. program in Ecology, Evolution and Behavior at Boise State University. Canyon County Parks and specifically Celebration Park has a twenty year history of cooperative ventures with various departments at Boise State University. The Desert Studies Institute, an Extended Studies program, Archaeological Field Schools and a myriad of workshops bringing together regional faculty, agencies and students have enriched the academic and off-campus opportunities for the Boise State community. We are very excited about the new Ph.D. program. We feel that it is a timely, valuable and culturally important contribution to the already stellar academic offerings at your University. This program creates great potential for world-class research, and for training scholars with a keen understanding of the physical and biological worlds and the ability to apply their powerful knowledge to our contemporary issues and problems. It would be difficult to identify a more noble scholarly endeavor than the proposed Ph.D. in Ecology, Evolution and Behavior.

Canyon County Parks continues to grow its infrastructure with the Crossroads Museum and programing to enhance the undergraduate and graduate education locally and nationwide. We look forward to working with your doctoral students and your students in general as they realize their academic aspirations.

Sincerely,

Tom Bicak

Director

Idaho State
UNIVERSITY

Department of Biological Sciences
College of Science and Engineering
921 South 8th Avenue, Stop 8007 • Pocatello, Idaho 83209-8007

9 September 2014

Dr. Kevin Feris
Chair, Department of Biological Sciences
Boise State University

Dear Dr. Feris,

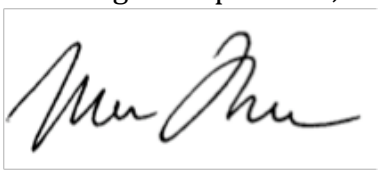
I'm writing to express my strong support for Boise State University's NOI describing their proposed PhD in Ecology, Evolution and Behavior. My motivation for supporting BSU's NOI is simple: **a healthy PhD program at BSU is in the best interest of ISU**. It is undeniable that their proposed PhD degree will foster increased research on the BSU campus by enhancing their competitiveness for extramural funding. I contend that it will improve the research enterprise on **our** campus, too. I see at least four tangible benefits for ISU as a result of BSU's proposed program:

- The largest benefit to ISU is in **collaborative research opportunities** with our colleagues at BSU. As their PhD program comes on line, they will be in a better position to join with ISU faculty in inter-institutional granting efforts that will bring new funding to both campuses. Such collaborative arrangements will become common between ISU and BSU, and both of our institutions will benefit. To facilitate this, I propose we invite BSU faculty to ISU every semester for research seminars and encourage faculty at both institutions to invite their colleagues to sit on PhD advisory committees.
- The **creation of joint programs for research and training**, modeled after the successful Center for Advanced Energy Studies (CAES), and the NIH Infrastructure Network for Biomedical Research Excellence (INBRE) programs, build on partnerships between institutions that each bring something useful to the table. With the proposed PhD program, BSU will be able to form new and productive partnerships with ISU that will strengthen both institutions.
- As director of **ISU's Molecular Research Core Facility (MRCF)**, I am thrilled by prospect of increased research activity at BSU, which will result in larger numbers of samples processed at the MRCF. Our second largest pool of academic customers (after ISU), BSU faculty constitutes an essential part of the demand for next-generating sequencing and advanced imaging.
- Metropolitan regions with PhD-granting institutions **enhance industry and economic development**. This has held back Boise for many years. The benefits of enhanced economic activity in Boise will be felt in Pocatello, too, by providing opportunities for our graduates and by increasing state tax revenue (that will find its way to ISU).

There has been concern about program duplication, but I would like to see that concern put to rest. While ISU and UI have various PhD programs in the biological sciences, the uniqueness of a graduate program is reflected in the constitution of the faculty and students that contribute to the program, not in the titles of the coursework that the students take. This program is an essential addition to BSU that will also benefit similar (but distinct) programs at ISU and UI.

Phone: (208) 282-3765 • Fax: (208) 282-4570 • www.isu.edu/bios

Last, I'd like to point out that supporting this NOI is simply the right thing for ISU to do. In the past, reluctance to do so was on perceived and historical antagonism between institutions of higher education in Idaho. But this antagonism was misplaced and unproductive. True rivalries are based not on attempts to hold back the competition, but on comparative achievements. The lamentable argument that ISU or UI would benefit by hamstringing BSU's evolution was simply dishonorable and counterproductive. As faculty members strive to play a larger role in the responsible stewardship of our great institution, it behooves us to recognize and embrace opportunities to form partnerships with our sister institutions. For ISU, arrangements with BSU, with whom we have so much to gain as partners, are of utmost importance.



Michael A. Thomas
Professor, Department of Biological Sciences
Academic Director, Molecular Research Core Facility

University of Idaho
College of Science

Geography Department
McClure Hall 203
PO Box 443021
Moscow, Idaho 83844-3021
Phone: 208-885-6216
Fax: 208-885-2855
geog@uidaho.edu
www.scihome.uidaho.edu/geography

Prof. James Munger
Vice Provost for Academic Planning
Office of the Provost
Boise State University
1910 University Dr.
Boise, ID 83725

Dear Professor Munger:

It is my pleasure to provide this letter of collaborative support for Boise State University's Ph. D. proposal in Ecology, Evolution, and Behavior (EEB). This unique doctoral program represents an important opportunity to: (1) strengthen research collaborations between our universities, (2) develop mutually beneficial and non-duplicative degree programs to meet the research challenges of the 21st century, and (3) add research capacity and graduate student training to the state.

The EEB Ph. D. program will open new opportunities to train graduate students in fields at the interface of human and natural systems, which opens a host of new collaboration avenues between my research group at the University of Idaho and faculty at Boise State. As a geographer, my research interests lie in topics relating to risk assessment and perception, vulnerability, hazards, climate change impacts, and resilience and mitigation and adaptation. The EEB Ph. D. program will allow me to develop competitive research proposals to the National Science Foundation (and other federal and state agencies) with faculty like Alejandro Flores, Jennifer Forbey, Nancy Glenn, Julie Heath and others at Boise State. I anticipate these research proposals being oriented around issues of sustainability, climate change, and land management that are central to Idaho's economy and environment. These collaborative projects have the potential to bring enthusiastic graduate students to the EEB Ph. D. program and graduate programs at the University of Idaho to work as a team to address critical issues facing Idaho.

To conclude, I am happy to provide this letter of collaborative support for my colleagues at Boise State and look forward to working as a team with their faculty and students for the benefit of all Idaho.

Sincerely,

Tim G. Frazier
Assistant Professor
Department of Geography & Faculty in The Bio-Regional Planning Program
Director - Hazards and Climate Impacts Research Center (HazCIRC)
Co Director - GIS and Education Outreach Center (GISEOP)
University of Idaho

Jason Kreitler
Research geographer
Western Geographic Science Center, USGS
970 Lusk Street
Boise, ID 83706

September 18, 2014

Professor Kevin Feris
Department of Biology
Boise State University
Boise, ID 83725

Dear Professor Feris:

This letter has two purposes, both of which are related to potential future collaborative opportunities with Biology Department faculty and students at Boise State. On multiple occasions colleagues have mentioned your department is petitioning the State Board of Education for a doctoral program in biology. I am very supportive of this, and could potentially help support students in ecology and biology at BSU. As an early career researcher I would benefit from an increased graduate enrolment for potential research assistants and research opportunities. I am currently employing four students, but only one at Boise State. For convenience and ease of communication I would prefer if all my research assistants were local.

Furthermore, if a graduate student's interests aligned closely with mine, or my participation would be particularly useful, I would be interested in advising or serving on graduate committees as an affiliated faculty. Many of my colleagues from the Snake River Field Station are affiliated faculty and find it rewarding and useful.

Please let me know if I can provide additional support as you prepare your case for a doctoral program in biology, and when convenient I would welcome the chance to discuss affiliated status.

Sincerely,

Jason Kreitler

CC: Julie Heath

IDAHO DEPARTMENT OF FISH AND GAME
600 S Walnut / P.O. Box 25
Boise, Idaho 83707

C.L. "Butch" Otter / Governor
Virgil Moore / Director

October 15, 2014

Jim Munger, Ph.D.
Vice Provost for Academic Planning
Professor of Biological Sciences
Boise State University
Boise, ID 83725

Dear Jim:

As you know, I have worked closely with Boise State University's (BSU) Department of Biological Sciences since the mid-1990s. I have been an active member of the Adjunct Graduate Faculty (served as the major advisor to five successful graduate students in the MS and MA programs) and have taught numerous upper division courses for the Department. I now work for the Idaho Department of Fish and Game (IDFG) as Manager of the agency's Wildlife Diversity Program – a statewide staff of 16 FTEs with primary responsibility for managing those species not hunted, fished, or trapped (i.e., nongame and threatened/endangered wildlife, and rare plants).

In my current capacity with IDFG, I am aware of several BSU graduates that currently work for either IDFG or our federal partners in the field of natural resource management (i.e., the U.S. Fish and Wildlife Service, the Bureau of Land Management, or the U.S. Forest Service). Numerous BSU faculty (and their students) also collaborate closely with my program specifically on research projects involving raptors, small mammals, insects, and plants.

As a result of these experiences, therefore, I believe I have an ideal perspective from which to wholeheartedly support BSU's proposal to create a new Ph.D. program in Ecology, Evolution, and Behavior (EEB). The development of a Ph.D. in EEB is a natural extension of what is currently a very solid program and one which, in my opinion, is long overdue.

Besides the obvious benefit to BSU and its students and faculty, a Ph.D. in EEB would generate new opportunities for my staff, as well as other IDFG employees in the Treasure Valley, to pursue higher education – something that I know several are interested in doing. In reality, a doctoral program at BSU provides the only practical way Boise-based staff could achieve such a goal. In addition, one-third of my staff (5 FTEs) possess a Ph.D. from other institutions; having BSU graduates with a Ph.D. in the local community would therefore be significant when I am recruiting new personnel during future job openings.

Another significant benefit of a Ph.D. in EEB to the program here at IDFG that I manage, would be the opportunity for enhanced collaboration on research projects of mutual interest. Information needs on nongame birds, including raptors, as well as a large suite of other *Species of Greatest Conservation Need* identified in Idaho's State Wildlife Action Plan are far beyond the capacity of my small staff. As such, I could envision active engagement by Ph.D. students and EEB faculty on advanced research topics with applied natural resource management implications.

Finally, a Ph.D. program in EEB might generate additional opportunities for IDFG and other agency staff in the Treasure Valley to join BSU's Adjunct Graduate Faculty; in doing so they could potentially advise Ph.D. students, serve on graduate student committees, and teach upper division courses. Wildlife professionals outside of academia have the ability to further expand graduate student experiences and knowledge. We also play a key role in helping such students prepare for entry into the applied sciences workforce when they graduate from a program such as a Ph.D. in EEB.

In summary, I fully endorse BSU's proposal to develop a new Ph.D. program in EEB. Benefits to the Department of Biological Sciences, BSU, the local community, agencies such as IDFG, and the State of Idaho are numerous, tangible, and clear. If there's any additional information I can provide to help support this important proposal, please do not hesitate to contact me at rex.sallabanks@idfg.idaho.gov or on (208) 287-2754.

Sincerely,

Rex Sallabanks

Rex Sallabanks, Ph.D.
Manager, Wildlife Diversity Program

IDAHO DEPARTMENT OF FISH AND GAME
600 S Walnut / P.O. Box 25
Boise, Idaho 83707

C.L. "Butch" Otter / Governor
Virgil Moore / Director

26 September 2014

Kevin Feris, Department Chair
Department of Biological Sciences
1910 University Dr. MS1515
Boise State University
Boise, Idaho 83725-1515

Dear Dr. Feris:

I am writing in support of the creation of a new Ph.D. program in Ecology, Evolution, and Behavior (EEB) at Boise State University. The Department of Biological Sciences is well-positioned to provide a high-quality Ph.D.-level educational experience, and such a program would benefit the university, the State of Idaho, and the field of biology as a whole.

Over the past decade or more, I have had many collegial interactions with Boise State faculty members and found them to be very knowledgeable in their fields and helpful to my botany research in the Idaho Natural Heritage Program. In recent years, the most notable connections have been with rare plant research by Jim Smith and Ian Robertson. I found their studies to be thorough, high-quality, and directly applicable to important conservation questions. Also, Boise State faculty member Steve Novak was a very helpful member of my Ph.D. committee when I was a student at Washington State University. Ph.D. students would benefit greatly by working with faculty members of this caliber.

In my botany research at Idaho Department of Fish and Game, I have employed undergraduate and graduate students from the Department of Biological Sciences and found them to be well-prepared for the roles in which they were hired, particularly work on rare plants, native plant communities, and invasive species.

In 1992, our botanists transferred the Idaho Department of Fish and Game Herbarium to Boise State's Snake River Plains Herbarium, and since that time, we have made extensive use of the specimens stored there. Now that the herbarium collections have been digitized, we access them online frequently—even daily during particular stages of our research. This herbarium is a unique and valuable resource for the Idaho Natural Heritage Program and all of Idaho. It will be well-utilized by Ph.D. students, and will benefit from their contributions.

Apart from my work here at Idaho Department of Fish and Game, I have served as Adjunct Graduate Faculty in BSU's Department of Biological Sciences. I taught four courses (Plant Diversity and Evolution in 2006, and the first half of the spring semester of General Biology in 2005, 2006, and 2009), guest-lectured in other courses on several occasions, and took two teaching workshops. During that time, I talked with undergraduate lab assistants and graduate

researchers, attended biology seminars, and used the greenhouse, herbarium, and laboratories. In each instance, I was very pleased with the students and the teaching and research facilities.

In summary, I whole-heartedly support the creation of a new Ph.D. program in EEB, and look forward to continued interactions with the Department of Biological Sciences.

Most sincerely,

C. Lynn Kinter, Ph.D.
State Botanist
Idaho Natural Heritage Program

United States Department of Agriculture | **Forest Service** | **Payette National Forest** | **Supervisor's Office 500N Mission Street McCall, ID 83638**

File Code: 2670
Date: September 15, 2014

Jim Smith, Ph.D.
Director of Snake River Plains Herbarium
Department of Biology
Boise, State University
Boise, ID 83725-1515

Dear Dr. Smith:

Your goal of developing a Ph.D. program in Ecology, Behavior and Plant Evolution and Diversity at Boise State is exciting. As the Forest botanist on the Payette National Forest who has worked with the Biology Department in the past on collaboration efforts in botany, I feel the Ph.D. program would be very useful to the Forest Service.

A Ph.D. would be able to address complex ecological and evolutionary botanical research vital to the decision making of the agency and relevant to society. We would like to continue collaborative efforts with your research programs and look forward to working with you on future projects as funding is forthcoming.

Sincerely,

/s/ Alma M. Hanson
Alma M. Hanson Ph.D.
Forest Botanist, Natural Resources
Payette National Forest

Kevin Feris, Biological Sciences Department Chair
Boise State University
Department of Biology
Science Bldg. Room 217-B
Boise, ID 83725-1515

Dear Dr. Feris,

The upcoming development of a new Ph.D program in Ecology, Evolution and Behavior at Boise State University will increase collaborations across other biological disciplines within BSU and other educational institutions. One such discipline is Plant Evolution. The study of evolution can occur at multiple biological scales, from changes that occur at the population level from one generation to the next to changes that occur at higher taxonomic levels and track diversity over millions of years. Botanical research at Boise State encompasses the full range of these scales and includes studies on vascular plants that are native to western North America and tropical regions of the world, plants that are invasive in North America and elsewhere as well as fungal organismal diversity.

Of key interest to any new biological program is The Snake River Plains Herbarium, Boise State's collection of plant specimens includes over 50,000 vascular plant specimens and over 15,000 fungal collections. The emphasis of the collections is mainly on south and central Idaho, but includes representatives of global diversity. These collections span over 100 years of plant collecting activity and are an important resource for monitoring plant diversity.

For over a decade the Idaho BLM State Office has been a key collaborator with BSU in the development of this herbarium. The breadth of these collections and their robust digital recordation allows for rapid, comprehensive access of salient botanical information critical to questions in ecology and evolution, and helps inform regional land management issues. Thank you for the opportunity to provide support of this program and highlight the value botanical resources such as The Snake River Plains Herbarium play in past, current and future research endeavors.

Sincerely,

Anne S. Halford

Anne S. Halford
BLM Idaho State Botanist
1387 S. Vinnell Wy.
Boise, ID 83709

BOISE STATE UNIVERSITY
DEPARTMENT OF BIOLOGICAL SCIENCES
Intermountain Bird Observatory

26 September 2014
James Munger, PhD.
Vice Provost for Academic Planning
Professor of Biological Sciences
Boise State University
Boise, ID 83725

Dear Dr. Munger,

I am writing to you in support of the newly-proposed PhD program in Ecology, Evolution, and Behavior at Boise State University. As a graduate from Boise State's MS in Raptor Biology program, I have been very successful in the field of avian biology and conservation. My training and experiences gained through Boise State have opened doors, made introductions, and have allowed me to build a lasting and rewarding professional career in science and academia. Boise State University does a great job in preparing its graduates for real-world futures, and a quick look at where its Raptor Biology and Biology graduates have been placed shows their far-reaching impact on not only national, but also international research and conservation efforts.

Since receiving my MS from Boise State, I have often thought about continuing my education and pursuing a PhD. This terminal degree would certainly help me with fundraising efforts, academic standing, and increased compensation. In my field, as the Executive Director of a university academic program, having a terminal degree would be favorable and allow for continued growth of my career and the organization I lead. However, because my family is based in Boise, Idaho, and because my current position also keeps me tied to the local community, I have not pursued a PhD in Biology.

Having such a program here at Boise State would open up many new doors for someone like myself. I think that there are many qualified candidates who are similarly tied to this community who could contribute greatly to Boise State by entering a Doctorate program in Ecology, Evolution, and Behavior. I fully support this endeavor and hope that it is looked upon favorably by the State Board of Education and both public and private funding entities. This program would be a wonderful addition to Boise State University and would personally benefit me in my career. I look forward to establishment of this new program at Boise State and wish you luck in this endeavor.

Sincerely,

Greg Kaltenecker

Gregory S. Kaltenecker, Executive Director
Intermountain Bird Observatory
Boise State University
Boise, ID 83725

1910 University Drive Boise, Idaho 83725-1515
Phone (208) 426-4354 Fax (208) 426-1040 ibo@boisestate.edu ibo.boisestate.edu

Dear Dr. Munger,

I was very excited to hear from you about the proposed PhD in Ecology, Evolution, and Behavior at Boise State University. My wife and I, after some time traveling around hunting for work, have decided to return to Boise. We are expecting our first child at the end of October. As a graduate of the Raptor Biology MS (2012), I would appreciate the opportunity to advance my career in science without having to subject my new family to a long-distance move.

Currently I am working for the BSU Biology department as an adjunct instructor, teaching Human Anatomy and Physiology Labs, as I did as a Teaching Assistant. At my current level of education, and in the present political climate, full-time work in ornithological research is frequently only available on short-term contract. I have been judged well-qualified for several permanent positions at government agencies and nonprofit organizations, but I have lost these opportunities to candidates with PhD degrees or more local knowledge.

Pursuing a PhD in Ecology, Evolution, and Behavior in Boise seems to be an ideal solution. The proposed new curriculum includes many courses of great interest to me, and, I believe, to my potential employers. The availability of new teaching assistantships for upper-division labs would also be an exciting opportunity for me. Furthermore, staying in Boise will allow me to continue to cultivate my connections in the local scientific community, and develop my knowledge of local ecology and politics.

I'll be crossing my fingers, and looking forward to news of this program's approval.

Sincerely,

Eric G. Nolte

Dear Dr. Munger,

My name is Jacob Newman-Holmquist and I am writing to you about my interest in the PhD program that you are proposing at Boise State University. I graduated from Boise State in 2007 with my BS in Biology with an emphasis is Environmental Biology. At that time I things in my life made it difficult to go straight to graduate school. Over the past seven years I have put in over 500 applications to various organizations and with each of the five interviews I had gotten each position was filled with someone with a master's degree. The only work that I have been able to find that uses my degree is a part time summer job with a company that collects bugs that are helping control invasive species (toad flax, green spurge, and knap weed.) This job is far from a career but it gets me out in the field and doing something that I love. Over the few years or so my situation in life has vastly improved. I got married and just recently adopted my 7 year old step-son. We moved to Missoula, MT three years ago to take care of my grandmother's estate after she passed. I was hoping while I was here I would able to find employment with the forest service or fish and game or return to school at the University of Montana but the job prospects are the same as in Boise and we decided that my wife going to nursing school now and me going to graduate school after she graduated was our best option. At this point in our lives we are planning on moving back to Boise in two years after my wife graduates and the family affairs up here are taken care of. After that I was planning on trying to get a master's degree at Boise State so when I received your email about the PhD program I was thrilled.

I think that Boise State offering this degree would allow me to reach my full potential as a scientist. A PhD degree would allow me to not only further my career but also allow me to study things that I otherwise would not be able to do. I have always been curious about naturally rare species and what has driven them to be rare. Are they a new species that just hasn't had the time to grow their population or are they an old species whose time on the planet has just about run out? Or is it something totally different that just hasn't been thought of before? These questions run through my mind every time I see a news article or report but in my current position I am unable to do much except think and speculate. I also am intrigued by the epidemic of invasive species. Having Dr. Novak for several of my classes as well as my current summer job I cannot help but want to figure out a way to manage the growth of the invasive species epidemic and wanting to find new and efficient ways of getting our land back to a more natural state.

For me, Boise State offering this program is very important. I am married and have a 7 year old son and my wife and I want to have more children. Although going somewhere else is not a complete impossibility, our entire family support structure is in Boise. My mother and father as well as my sister, mother-in-law, two brother-in-laws and numerous aunts, uncles and cousins all live in the treasure valley. If we moved somewhere else we would have to delay our family until I graduated but if we stayed in Boise we could live in my mother's rental property for minimal costs as well as have the support from my other family members for child care. It would also mean that my children could grow up around family and not have to be moving around every couple of years. My seven year old has already lived in four different states and I want him to be able to feel stable and secure and make friends that he won't have to leave in a few years.

Overall I think a PhD program in Ecology, Evolution, and Behavior would not only benefit me but the whole community in Boise. It would create a base of educated and knowledgeable scientists that

could teach the city, state and surrounding areas more about what is going on in this world and develop a core of scientists that this country is severely lacking in. The scientific community needs more voices in the world and giving people the opportunity to get the education and experience needed to get their voices heard is vitally important. I want to be one of those voices.

Sincerely,

Jacob Newman-Holmquist

Dr. Munger

I am writing in response to the proposed implementation of a new Ph.D. program at Boise State. I am in full support of the creation of a new program, a PhD in Ecology, Evolution, and Behavior. As a student and a native Idahoan, I would be interested in enrolling in such a program due chiefly to the five primary areas of focus proposed. My research interests lie in direct alignment with these areas. Specifically, Chemical Ecology and how the production and distribution of naturally occurring chemical compounds can directly affect the spatial dispersion of species and species behavior.

I am a non-traditional student who is a single father and a graduate of the Boise State Biology program. I am interested in pursuing graduate work for the attenuation of an advanced degree in biology; however, relocating for graduate work is very difficult to do. Having such a program offered at Boise State would allow students like me to advance academically and professionally without forcing the family hardship of relocation. Additionally, as stated in the program proposal, implementation of such a program would result in higher collaborations and funding flow to the university which would have a direct feedback into the local economy. Local landscape and species diversity also make Boise State the ideal place for such a program.

Located on the convergence of three distinct biomes with multiple micro-climate regions, micro-scale ecosystems and riparian corridors scattered throughout, the Treasure Valley is the ideal location for such transdisciplinary programs focused on natural systems. With desert shrub scape habitat, coniferous forests, and grassy mountain meadows all within a 20 minute drive from each other and connected by a network of streams and waterways, the Treasure Valley is the perfect place to study ecosystem interactions as well as anthropogenic effects on those systems. Additionally, the Treasure valley and adjacent valleys of southern Idaho are among the most geologically active locations in the west. Boise State is situated in the heart of the Treasure Valley with easy and inexpensive access to all of this making it the perfect institution for such a transdisciplinary program.

For me personally, the ability to pursue such a degree locally would aid greatly in helping me achieve my professional goals while maintaining family cohesiveness. The attenuation of such a degree would make me and others potential students similarly situated more competitive in the professional market with greater opportunities for success. In a classical positive feedback cycle, this success would, in turn, reflect great credit on the program, faculty, department and university as a whole; solidifying, at least in part, Boise States quest to become a competitive research institution of distinction. Thank you for your time and attention.

Respectfully:
Daniel P. Melody

Dr. James Munger,

I recently graduated from Boise State with a M.Sc. degree in Raptor Biology (August 2013), under the guidance of Dr. Julie Heath. I am currently employed full-time as Conservation Biologist at the raptor-research non-profit HawkWatch International, based in Salt Lake City, Utah. While I am not currently searching for enrollment in a PhD program, I foresee myself possibly being interested in pursuing a PhD in the future. I would potentially be interested in pursuing a PhD in Ecology, Evolution, and Behavior from Boise State, however it would likely be project specific. Meaning that my pursuit of enrollment in a PhD program (Boise State or another institution) would depend greatly on the specific research project I would be focused on. Have recently graduated, I am also looking to take some time off from academic life to further pursue my research interests. That being said, I could see myself looking to enroll in a PhD program within the next 5 years.

My experiences as a Master's student at Boise State were generally positive, and I would do it again given the choice. However, if I were to pursue a PhD at Boise State, I would like to see some changes, particularly in the diversity of coursework offered to graduate students. As it stands, there are very few graduate level courses offered to only graduate students. Most of my Master's coursework was in classes featuring mainly undergraduate students, and there were even limited choices within these upper-level undergraduate courses. I would like to see a commitment to the expansion of coursework consistently offered to graduate students at Boise State before I would potentially pursue a PhD here.

Sincerely,

Neil Paprocki
Conservation Biologist
HawkWatch International
2240 South 900 East
Salt Lake City, UT 84106
npaprocki@hawkwatch.org

Lillian McKinley
24979 Hartley Lane
Middleton, ID 83644

James Munger
Boise State University
1910 University Drive
Boise, ID 83725

To James Munger:

The purpose of this letter is to express my full support of the proposed Ph.D. Program in Ecology, Evolution, and Behavior at Boise State University. I completely believe that Boise State University and the City of Boise have the resources to facilitate this program successfully. There are already great achievements in the Master's programs at Boise State, including the unique M.S. in Raptor Biology program. Add in the many unique resources in the community, such as the Intermountain Bird Observatory, the Peregrine Fund, USGS, and the Dry Creek Experimental Watershed, and a sure-fire recipe for success will be made. This is why I think that it is definitely time for Boise State to expand its Ph.D. options by adding a Ph.D. in Ecology, Evolution, and Behavior.

I personally love the Boise area and would love to be able to stay in the area to pursue my doctorate. I really enjoyed my undergraduate studies at Boise State and am sad to have to move away to pursue graduate school. Other Idaho institutions have similar programs to the one being proposed at Boise State and I believe that it is definitely time that Boise State begins to compete with these other colleges. If a Ph.D. program in Ecology, Evolution, and Behavior at Boise State is developed, I guarantee that I will apply to the program.

My main organisms of interest are Birds of Prey and Boise State is the premiere location to study these creatures. The addition of a Ph.D. program in Ecology, Evolution, and Behavior would give students further opportunity to study Birds of Prey and advance their careers. This is exactly the type of program I would like to enroll in and I am in full support of adding a Ph.D. program in Ecology, Evolution, and Behavior to Boise State University's degree programs. I hope that I and many other students are given the opportunity to apply to be doctoral candidates at Boise State in this field and I fully believe that this program will benefit Boise State and the City of Boise.

Thank you,

Lillian McKinley

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Appendix H: Curricula Vitae of Participating Faculty Members			
Name	**Position**	**Brief Research Description**	**Page**
BSU Department of Biological Sciences			
Jesse Barber	Assistant Professor	Sensory ecology, animal behavior, conservation biology	H-2
Marc Bechard	Professor	Raptor biology and ecology; habitat use in raptors	H-12
Jim Belthoff	Professor	Behavioral ecology, animal behavior, and avian biology	H-19
Marie-Anne deGraaff	Assistant Professor	Plant/Soil interactions in terrestrial ecosystems	H-26
Kevin Feris	Associate Professor	Microbial community ecology; bioremediation studies	H-34
Jennifer Forbey	Associate Professor	Physiological, chemical and pharmacological ecology	H-52
Eric Hayden	Assistant Professor	RNA evolution, biomedical & biotechnical molecules	H-65
Julie Heath	Associate Professor	Avian biology and conservation ecology	H-68
Peter Koetsier	Professor	Aquatic ecology; lotic macroinvertebrate ecology	H-83
Steve Novak	Professor	Plant evolutionary biology; introduced species	H-99
Ian Robertson	Professor	Insect Behavior and Ecology; Plant-insect interactions	H-122
Marcelo Serpe	Professor	Plant biochemistry and physiology	H-128
James Smith	Professor	Plant molecular systematics, cladistic analyses	H-133
Merlin White	Associate Professor	Fungal molecular systematics, arthropod-associated fungi	H-151
BSU Human-Environment Systems Initiative, College of Innovation and Design			
Jodi Brandt	Assistant Professor	Land use science, remote sensing, conservation biology	H-165
Neil Carter	Assistant Professor	Socio-environmental systems	H-171
BSU Department of Anthropology			
Samantha Blatt	Visiting Asst Prof	Bioarchaeology; growth and development; osteology	H-177
Kathryn Demps	Assistant Professor	Human behavioral ecology; cultural evolution	H-185
Christopher Hill	Professor	Geoarchaeology; historical ecology	H-189
Mark Plew	Professor	Human ecology, ethnobiology	H-204
Kristin Snopkowski	Assistant Professor	Human behavioral ecology and demography	H-242
Pei-Lin Yu	Assistant Professor	Ethnoarchaeology; Neolithic Asia; climate change	H-247
John Ziker	Professor	Human kinship; evolution of cooperation	H-259
BSU Department of Geosciences			
Shawn Benner	Associate Professor	Ecohydrology, biogeochemistry	H-281
Alejandro Flores	Associate Professor	Ecohydrology and modeling, remote sensing	H-287
Nancy Glenn	Professor	Remote sensing, image analysis, geological engineering	H-299
Matt Kohn	Distinguished Prof	Geochemistry, petrology, and paleoecology	H-323
Jen Pierce	Associate Professor	Geomorphology & Paleoclimatology	H-350
BSU Intermountain Bird Observatory			
Jay Carlisle	Res Director	Avian migration and physiological ecology	H-366
USGS Forest and Rangeland Ecosystem Science Center's Snake River Field Station			
Matthew Germino	Superv Res Ecol	Plant-soil-climate relationships; biophysical ecology	H-370
Todd Katzner	Res Wildl Biol	Ecology, animal movement, conservation biology	H-380
Steven Knick	Superv Res Ecol	Spatial and temporal dynamics of western US shrublands	H-399
David Pilliod	Superv Res Ecol	Herpetology, wildlife ecology, stream & fire ecology	H-406
Douglas Shinneman	Superv Res Fire Ecol	Fire , landscape, restoration and, plant ecology	H-415
The Peregrine Fund			
David Anderson	Dir Gyrfal Cons Proj	Raptor biology; ecological structure and function	H-420
Chris McClure	Dir. Amer Kest Par	Vertebrate monitoring and ecological modeling	H-423
Rick Watson	VP, Dir Int Prog	Raptor ecology and conservation	H-427

Jesse R. Barber

Boise State University, Department of Biological Sciences
1910 University Drive, Boise, ID, 83725-1515
EMAIL jessebarber@boisestate.edu **OFFICE** 208-426-3202 **CELL** 208-789-1123

EDUCATION

Ph.D.	Wake Forest University	Biology	2007
M.S.	University of Wyoming	Zoology & Physiology and Neuroscience	2002
B.S.	University of Wyoming	Psychology with honors	1998

PROFESSIONAL APPOINTMENTS

Assistant Professor
2011 – Present. Boise State University, Department of Biological Sciences

Postdoctoral Research Associate
2007-2011. Colorado State University, Department of Fish, Wildlife and Conservation Biology in collaboration with the Natural Sounds and Night Skies Division of the National Park Service.

TEACHING EXPERIENCE

Boise State University
General Biology II (BIOL 192, Introductory course, second half - Animal Biodiversity, 4 credits, Spring Semester, ~200 students, taught 4 times)
Comparative Vertebrate Anatomy and Lab (ZOOL 301 and 301L, Undergraduate course with two labs per week, 4 credits, Fall Semester, taught 4 times)
Sensory Ecology (BIOL 497/597, Graduate/Undergraduate course, 3 credits, Fall or Spring Semester, taught 2 times)
Bioacoustics (BIOL 597, Graduate course, 3 credits, Spring Semester, taught 2 times)
Graduate Seminars (BIOL 598; Topics: Sensory Pollution, Trophic Cascades, Protected Areas in a Changing World, 1 credit each, Fall and Spring Semesters)

RESEARCH GRANTS

2014-2018 **National Science Foundation, Dynamics of Coupled Natural and Human Systems (600K Total, *300K to Boise State*)** CNH: Soundscapes as an element in coupled human and natural systems. *PI* with Co-PIs: Peter Newman (Penn State), Chris Monz (Utah State) and Clint Francis (Cal Poly).

2014-2016 **National Park Service (95K)** The Phantom Gas Field: Impacts of energy extraction noise on ecosystems, *PI*

2011–2015 **National Science Foundation - Integrative Organismal Systems (269K)** Collaborative Research: Alternative strategies and evolutionary routes in the escalation of the bat-moth arms race: Ultrasonic stridulation in hawkmoths, *PI* with Co-PI Akito Kawahara.

2011-2015	**National Park Service (267K)** Roadway noise and foraging behavior in bats and birds: A phantom field experiment, *PI*
2013-2014	**French Guiana Nouragues Travel grant (12K)** Bat-hawkmoth interactions at the Nouragues tropical research station, *Co-PI* with A. Kawahara (Florida)
2013	**NESCent NSF Catalysis grant (travel and meeting costs for 25 participants, April 24-28 2014)** Anthropogenic Sensory Stimuli as Drivers of Evolution: A conceptual synthesis and roadmap for an integrated citizen-science research network, *Co-PI* with Caren Cooper (Cornell) and Clint Francis (Cal Poly).
2013	**Idaho EPSCoR, National Science Foundation (11K)** Cascading effects of noise pollution on ecosystems, *PI* (an ongoing collaboration with Keith Reinhardt (Idaho State; plant physiologist).
2012	**Osher Faculty Research Grant, Boise State University (4K)** Monitoring forest owl migration, expanding community outreach and assessing the impacts of anthropogenic noise on owl hunting ability, *Co-PI* with Greg Kaltenecker (Idaho Bird Observatory).
2011	**Michigan Technological University (120K, *2K to Boise State*)**, Michigan Coastal Management Program, State of Michigan, Offshore bat activity over Lake Michigan wind resource areas, 2011, *Co-PI* with Joseph Bump (Michigan Tech)
2010	**American Philosophical Society (5K)** Bat-moth interactions in the Old World, *PI*
2008	**University of Wyoming-NPS Research Center (2.2K)** Background sound level and avian predator-prey interactions, *PI*
2007	**American Museum of Natural History (1.5K)** Biosonar jamming in the bat-moth arms race, *PI*
2005	**Richter Foundation (5K)** Biosonar jamming in the Ecuadorian cloud forest, *PI*

PROPOSALS IN REVIEW

National Science Foundation - Division of Environmental Biology, full proposal (*pending*) Collaborative Research: RUI: Direct and indirect effects of natural sounds on the structure of vertebrate insectivore communities, with Clint Francis (Cal Poly). 1 million (522K to Boise State).

National Geographic Society's Committee for Research and Exploration, full proposal (*penidng*) Moth tails divert bat attack: The evolution of acoustic deflection in the bat-moth arms race. *PI*. 25K.

PUBLICATIONS

Monz C, D'Antonio A, Lawson S, **Barber JR**, Newman P (*in press*) The Ecological Implications of Visitor Transportation in Parks and Protected Areas: Examples From Research in US National Parks. *Journal of Transport Geography.*

Bunkley JP and **Barber JR** (2015) Noise Reduces Foraging Efficiency in Pallid Bats (*Antrozous pallidus*). *Ethology* 121(11):1116-1121.

Ware HE, McClure CJW, Carlisle J, **Barber JR** (2015) A phantom road experiment reveals traffic noise is an invisible source of habitat degradation. *Proceedings of the National Academy of Sciences* 112(39):12105-12109.

Swaddle J, Francis C*, **Barber JR***, Cooper C*, Kyba CMC, Dominoni D, Shannon G, Aschehoug E, Goodwin S, Kawahara AY, Luther D, Spoelstra K, Voss M, Longcore T (2015) A framework to assess evolutionary responses to anthropogenic light and sound. *Trends in Ecology and Evolution* 30(9):550-560. ***Outcome of NSF NESCent Catalysis grant: *Co-PI* with C. Francis, PI C. Cooper.**

McClure CJW, Korte AC, Heath JA, **Barber JR** (2015) Pavement and riparian forest shape the bird community along an urban river corridor. *Global Ecology and Conservation* 4:291-310.

Kawahara* AY**, Barber* JR** (2015) Tempo and mode of anti-bat ultrasound production and sonar jamming in the diverse hawkmoth radiation. *Proceedings of the National Academy of Sciences* 112(20): 6407-6412. ****Authors contributed equally***

Barber JR, Leavell BC, Keener AL, Breinholt JW, Chadwell BA, McClure CJW, Hill GM, Kawahara AY (2015*)* Moth tails divert bat attack: evolution of acoustic deflection. *Proceedings of the National Academy of Sciences* 112(9):2812-2816.

Bunkley JP, McClure CJW, Kleist NJ, Francis CD, **Barber JR** (2015) Anthropogenic noise alters bat activity levels and echolocation calls. *Global Ecology and Conservation* 3:62-71.

Ponce F, Breinholt J, Hossie T, **Barber JR**, Janzen D, Hallwachs W and Kawahara AY (2014) Molecular phylogeny and evolution of larval eyespots in *Eumorpha* hawkmoths. *Molecular Ecology* DOI:10.1111/syen.12111

Bunkley JP and **Barber JR** (2014) An observation of apparent teaching behavior in the pallid bat, *Antrozous pallidus*. *Western North American Naturalist* 74(2):249-252.

McClure CJW, Ware HE, Carlisle J, Kaltenecker G, **Barber JR** (2013) An experimental investigation into the effects of traffic noise on distributions of birds: Avoiding the phantom road. *Proceedings of the Royal Society of London Series B* 80: 20132290.

Barber JR*, Kawahara AY* (2013) Hawkmoths produce anti-bat ultrasound. *Biology Letters* 9: 20130161. ****Authors contributed equally***

Francis CD*, **Barber JR*** (2013) A framework for understanding noise impacts on wildlife: an urgent conservation priority. *Frontiers in Ecology and the Environment.* doi:10.1890/120183
****Authors contributed equally***

Brown CL, Hardy AR, **Barber JR**, Fristrup KM, Crooks KR, Angeloni LM (2012) The Effect of Human Activities and Their Associated Noise on Ungulate Behavior. *PLoS ONE* 7(7): e40505.

Barber JR, Burdett CL, Reed SE, Warner KA, Formichella C, Crooks KR, Theobald DM, Fristrup KM (2011) Anthropogenic noise exposure in protected natural areas: estimating the scale of ecological consequences. *Landscape Ecology*. 26:1281-1295.

Corcoran AJ, **Barber JR**, Hristov NI, Conner WE (2011) How do tiger moths jam bat sonar? *Journal of Experimental Biology*. 214:2416-2425.

Barber JR, Crooks K, Fristrup K (2010) The costs of chronic noise exposure for terrestrial organisms. *Trends in Ecology and Evolution*. 25(3):180-189.

Corcoran AJ*, Conner WE*, **Barber JR*** (2010) Anti-bat tiger moth sounds: Form and function. *Current Zoology*. 56(3):358-369. ***Authors contributed equally***

Corcoran AJ, **Barber JR**, Conner WE (2009) Tiger moth jams bat sonar. *Science*. 325:325-327.

Barber JR, Brown C, Fristrup KM, Hardy AR, Angeloni L, Crooks KR (2009) Conserving the wild life therein: The effects of man-made noise on animal ecology. *Park Science* 26:26-31.

Barber JR, Chadwell B, Garrett N, Schmidt-French B, Conner WE (2009) Naïve bats discriminate arctiid moth warning sounds but generalize their aposematic meaning. *Journal of Experimental Biology*. 212:2141-2148.

Barber JR, Conner WE (2007) Acoustic mimicry in a predator-prey interaction. *Proceedings of the National Academy of Sciences* 104(22): 9331-9334.

Barber JR, Conner WE (2006) Tiger moth responses to a simulated bat attack: Timing and duty cycle. *Journal of Experimental Biology* 209:2637-2650.

Barber JR, Razak KA, Fuzessery ZM (2003) Can two streams of auditory information be processed simultaneously? Evidence from the gleaning bat *Antrozous pallidus*. *Journal of Comparative Physiology A* 189:843-855.

PUBLICATIONS IN REVIEW (manuscripts available upon request)

McClure CJW, Ware HE, Carlisle JD, **Barber JR** (*in review*) Noise pollution from a phantom road alters the age structure of a community of migrating birds. *Biological Conservation*.

Mason TJ, McClure CJW, **Barber JR** (*in review*) Anthropogenic noise impairs owl hunting behavior. *Biological Conservation.*

Zhong M, Hill GM, Gomez JP, Plotkin D, **Barber JR**, Kawahara AY (*in review*) Characterizing Lepidoptera wing shape with geometric morphometrics: Saturniid hind wings as a case study. *Journal of the Lepidopterists Society.*

Breinholt JW, Mitter C, Zwick A, Regier JC, **Barber JR**, Kawahara AY (*in review*) Correlated evolution of body size, proboscis length and larval host plant use in hawkmoth pollinators: a phylogenetic perspective. *Oikos.*

BOOK CHAPTERS

Newman P, Taff D, **Barber JR**, Fristrup K (2015) Natural Soundscapes. In: *Wildland recreation: ecology and management*. Edited by Hammitt, WE, Cole DN, Monz, C. John Wiley & Sons.

Conner WE, Hristov NI**, Barber JR** (2008) Sound strategies: Acoustic aposematism, startle and sonar jamming. In: *Tiger Moths and Wooly Bears: Behavior, Ecology and Evolution of the Arctiidae*. Edited by W.E. Conner. Oxford University Press.

RECENT PRESENTATIONS

100th Annual Ecological Society of America Meetings, August 9-14 2015, Baltimore, MD. *Symposium*: Ecological Acoustics: Conceptual and Technological Advances in Ecology Through Sound. Invited Talk: *An experimental investigation into the effects of traffic noise on birds: The Phantom Road project.*

Plenary Address at the International Ecology and Transportation Meetings in Malmo, Sweden, Sept. 16-19, 2014. Talk: *An experimental investigation into the effects of traffic noise on birds: The Phantom Road project*.

The Wildlife Society, Milwaukee WI, Oct. 5-10 2013. Invited Talk: *An experimental investigation into the effects of traffic noise on distributions of birds: Avoiding the phantom road*.

Animal Behavior Society, Boulder CO, July 27-Aug. 1 2013. Invited Talk: *The function and evolution of hawkmoth anti-bat sounds.*

Lepidopterists Society Annual Meeting, Gainseville, FL, June 27-July 1 2013. Talk: *The function and evolution of hawkmoth anti-bat sounds.*

Society for Integrative and Comparative Biology, San Francisco, CA, Jan. 3-7, 2013. *Symposium*: When Predators Attack: Sensing and Motion in Predator-Prey Interactions, Invited Talk: *Escalation of the bat-moth arms race.*

Idaho Chapter of the Wildlife Society, Boise, ID, March 5-8, 2012. Talk: *Anthropogenic noise exposure: estimating the scale of ecological consequences.*

Grand Teton Resource Symposium, Grand Teton National Park, UWNPS Research Station, Sept. 5-8, 2011, Invited Talk: *The costs of anthropogenic noise exposure for wildlife*.

Federal Aviation Administration, Aviation Noise Impacts Roadmap Annual Meeting in Washington DC, April 19-20, 2011, Invited Talk: *Anthropogenic noise exposure in protected natural areas: estimating the scale of ecological consequences.*

RECENT INVITED SEMINARS

Idaho State University, Oct. 2014; University of Montana, March 2013; University of Colorado, Boulder, March 2013; University of California, Riverside, Oct. 2011

EXAMPLE STUDENT PRESENTATIONS

Bunkley JP, Barber JR. Living in Noise: The Effects of Anthropogenic Noise on the Foraging Efficiency of a Gleaning Bat and Distributions of a Natural Bat Assemblage. The Wildlife Society, 2013 Annual Conference, Milwaukee WI, Poster Presentation

Bunkley JP, Barber JR. *Hunting in Noise: How Road and Gas Compressor Noise Affect the Foraging Efficiency of a Gleaning Bat.* 50th Animal Behavior Society Meeting, Boulder, CO, July 28 - August 1, 2013. Talk. #Featured in Science News: "Noise may disrupt a bat's dinner: Mechanical cacophony can drown out the whispers of moving insect prey", Susan Milius, August 7, 2013

Bunkley JP, Barber JR. The Idaho Chapter of The Wildlife Society Conference, Coeur d'Alene Idaho, 11-14 March, 2013, *Hunting in Noise: How Road and Gas Compressor Noise Affect Foraging Latency in the Gleaning Bat*, *Antrozous pallidus*. Talk.

Keener AL, Barber JR. 2014. *Investigating Subtle Behavior in a Predator-Prey Interaction using the Pallid Bat (Antrozous pallidus).* Presented at the 2014 Idaho Conference on Undergraduate Research. Boise State University, Boise, ID. Talk.

Keener AL, Barber JR. 2014. *Can bats tell footstep sounds apart?: A test of novel prey discrimination in the pallid bat, Antrozous pallidus.* Presented at the 11th Annual Undergraduate Research and Scholarship Conference. Boise State University, Boise, ID. Poster

Mason JT, **McClure CJW**, Barber JR. Talk: *The impact of natural gas compressor station noise on northern saw-whet owl hunting ability*. American Ornithological Union, 23-28 Sept. 2014.

McClure, C.J.W., H.E. Ware, J. Carlisle, G. Kaltenecker, and J. R. Barber. An experimental investigation into the effects of traffic noise on distributions of birds: Avoiding the phantom road. Presented at 131st Stated Meeting of the American Ornithologists' Union. Chicago, IL. August 14, 2013.

Ware HE, McClure CJW, Carlisle JD, Barber JR. Talk*: Road noise reduces foraging and stopover efficency of migrating songbirds*. American Ornithological Union, Estes Park, CO, 23-28 Sept. 2014.

Ware HE. Talk: *Does road noise degrade stopover habitat for migrating songbirds?* Joint Meeting of the Idaho Chapter and Northwest Section of The Wildlife Society, 3-8 March, 2014. *#Best Student Talk Award*.

EXAMPLE STUDENT AWARDS

JP Bunkley (graduate student)
2013 Bat Conservation International Student Research Scholarship, 2013, $2500
Idaho Chapter of The Wildlife Society Student Scholarship, 2013, $250

AL Keener (undergraduate researcher)
Northwest Scientific Association Student Award, 2014, $1,500

McNair Research Scholarship, 2014, $2,800
McNair Scholar, Boise State University

J Rubin (graduate student)
Sigma Xi Grants in Aid of Research, 2015, $500
Boise State, Michael W. Butler Ecological Research Award, 2015, $3000

HE Ware (graduate student)
Best Student Presentation, Idaho Chapter of the Wildlife Society Conference, 2014.
Educator of the Year Golden Eagle Audubon Society, 2014
Idaho Chapter of the Wildlife Society Graduate Student Scholarship, 2013
Western Field Ornithologists Scholarship Membership, Student Award, 2012

RECENT OUTREACH AND POLICY PRESENTATIONS

Invited Panel Discussion: Bridging Research on the Responses of Terrestrial and Marine Animals to Anthropogenic Sound, The Wildlife Society Annual Conference, Milwaukee WI, Oct. 5-10 2013

Presentation on bat hunting behavior filmed with high-speed cameras, 2013 White-Nose Syndrome Workshop, Boise, ID, Sept. 3-6 2013.

Workshop on Noise in Communities and Natural Areas, Denver, CO, *Noise Changes Animal Behaviors and Distributions*, Aug, 27, 2013.

Held a Viewing of a Documentary on Light Pollution ('*The City Dark'*) at the Student Union Building on Boise State University campus. April, 11 2012.

Southwest Idaho Birders Association, Nampa, ID, *The Costs of Anthropogenic Noise Exposure for Animals,* Dec. 13, 2012.

Golden Eagle Chapter of the Audubon Society, Boise ID, *The Costs of Anthropogenic Noise Exposure for Animals*, Dec. 06, 2011.

University of California, Riverside, Conservation Biology Brown Bag Series, *The Costs of Anthropogenic Noise Exposure for Wildlife*, Oct. 21, 2011.

Federal Aviation Administration, Aviation Noise Impacts Roadmap Annual Meeting in Washington DC, April 19-20, 2011. I was the sole representative for the ecological/wildlife biology community explaining to government administrators the data on noise impacts to wildlife. This opportunity arose from a working group I helped organize a few months earlier—Wildlife Response to Aviation Noise In Protected Natural Areas, at the USDOT/Volpe Center in Cambridge, MA, Sept. 21-21, 2010.

OUTREACH TEACHING AND PUBLICATION

Spring 2012: Osher Lifelong Learning Institute, *Sensory Worlds of Animals*. This course, targeted at the Osher Institute's population of learners over 55 years of age, consisted of 4 meetings of 2 hours each. Approximately 60 students.

Idaho Watchable Wildlife Newsletter, Idaho Fish and Game, *A Louder World for Wildlife*, Summer 2012.

PROFESSIONAL SERVICE

Reviewer for Conservation Biology, Journal of Experimental Biology, Environmental Management, Frontiers in Physiology, Biodiversity and Conservation, Proceedings of the Royal Society of London Series B, Biology Letters, Animal Behaviour, Frontiers in Ecology and Evolution, Acta Chiropterologica

External reviewer for the Smithsonian Institution, Canada Foundation for Innovation, National Science Foundation, Biotechnology and Biological Sciences Research Council of the UK

Panel Member for the National Science Foundation

UNIVERSITY SERVICE

Member of the Institutional Animal Care and Use Committee, 2011-2015 (rejoining in 2016).
Member of the Human-Environment Interactions Cluster Hiring Committee, 2014-2015.

DEPARTMENTAL SERVICE

Member of the Undergraduate Curriculum Revision Committee, 2013-present
Member of Hiring Committee, 2013-2014
Member of the Transitional Working Group, Summer 2013
Seminar series organizer 2012/2013 academic year

CURRENT MENTORING

Eli Cinto Meija M.S. Graduate Student
Juliette Rubin M.S. Graduate Student
Mitch Levenhagen M.S. Graduate Student

Undergraduate Researchers (9): Adam Keener, Krystie Miner, Melissa Eschenbrenner, Kelzie Hafen, Amanda Lofthus, Amanda Hardy, Brett Howell, Nate Azevedo, Michael Brownlee

M.S. Graduate Committee Member: Tempe Reagan, Erin Pikcilingis, Sara Pourzamani.

Member of PhD Committee: Peter Houlihan (University of Florida, Akito Kawahara's lab)

PAST MENTORING

Dr. Chris JW McClure	Postdoctoral Scholar
Jessie Bunkley	M.S. Graduate Student
Allison Korte	M.S. Graduate Student (originally the late Al Dufty's student)
Heidi Ware	M.S. Graduate Student
Tate Mason	M.S. Graduate Student

Undergraduate Researchers (13): Jacque Pena, Roy Olvera, Mackenzie Whyte, Adrianna Romero, Patrick Niedermeyer, Cydney Middleton, Leo Ohyama, Zoe Mroz, Taylor Parker, Annie Baxter, Jillian Greene, Bailee Riesberg, Kaisha Young

Graduate Committee Member: Gina Patton, Erin Wonder, Jamie Groves, Rob Spaul

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PROFESSIONAL ORGANIZATIONS

North American Society for Bat Research
Society for Conservation Biology
Animal Behavior Society

SELECT PRESS

Hawkmoths jam bat sonar (Kawahara and Barber 2015): covered by National Geographic magazine, Phys.org and other news outlets. 5-15.
Moth tails divert bat attack (Barber et al. 2015): covered by Science, National Geographic magazine, Science News, Popular Science, Smithsonianmag.com, Phys.org and other news outlets. 2-15
David Attenborough's Conquest of the Skies featured our bat-moth research in a recent film. 1-2015
Phantom Road paper (McClure et al. 2013): covered by Science News, BBC, NPR and other news outlets, 11-2013.
Hawkmoth Anti-bat Ultrasound Discovery (Barber and Kawahara 2013): covered by Science News, Nature, BBC, National Geographic, Natural History Magazine, LiveScience and other news outlets, 7-2013.
New York Times Magazine, 'Whisper of the Wild', 3-2012
NPR All Things Considered, Bat-Moth Interaction, 2-2012
U.S. News and World Report, Soundscapes, 3-11-11
NPR Morning Edition, Soundscapes, 3-03-11

REFERENCES

William E. Conner (Ph.D. Advisor)
Professor
Wake Forest University
Department of Biology
Phone: (336) 758-5315
conner@wfu.edu

Kevin Crooks (Postdoctoral Mentor)
Professor
Colorado State University
Dept. Fish, Wildlife and Cons. Biology
(970) 491-7936
kcrooks@warnercnr.colostate.edu

Kurt Fristrup (Postdoctoral Mentor)
Senior Scientist
National Park Service
Natural Sounds and Night Skies Division
(970) 267-2102
kurt_fristrup@nps.gov

Kevin Feris (Current Chair)
Associate Professor
Boise State University
Department of Biological Sciences
(208) 426-5498
kevinferis@boisestate.edu

CURRICULUM VITAE - MARC BECHARD

NAME

Marc Joseph Bechard

EDUCATION

B.A. in Biology, State University of New York, Oswego, 1971
M.S. in Botany, Washington State University, Pullman, 1974
Ph.D. in Zoology, Washington State University, Pullman, 1980

PROFESSIONAL EXPERIENCE

1972-73: Teaching Assistant, Department of Biology, Washington State University, Pullman, Washington
1973-74: Laboratory Technician, Air Pollution Research Center, Washington State University, Pullman, Washington
1974-75: Research Technician, Department of Plant and Soil Sciences, University of Idaho, Moscow, Idaho
1975-80: Teaching Assistant, Department of Biology, Washington State University, Pullman, Washington
1980-81: Assistant Professor, Department of Natural Sciences, University of La Verne, La Verne, California
1981-83: Assistant Professor, Department of Biological Sciences, Marshall University, Huntington, West Virginia
1983-85: Assistant Professor, Department of Biology, Boise State University, Boise, Idaho
1985-88: Associate Professor, Department of Biology, Boise State University, Boise, Idaho
1988-90: Professor and Coordinator of Graduate Studies, Department of Biology, Boise State University, Boise, Idaho
1990-98: Professor, Associate Chair, and Coordinator of Graduate Studies, Department of Biology, Boise State University, Boise, Idaho
1998-present: Professor, Department of Biology, Boise State University, Boise, Idaho
2013-present: Director, Raptor Research Center, Department of Biology, Boise State University, Boise, Idaho

GRADUATE LEVEL TEACHING

Biology 606 – Raptor Ecology
Biology 597 – Special Topics
Biology 594 – Graduate Seminar

GRANT FUNDING (LAST 10 YEARS)

Idaho Power Company. 2005. Pesticide and heavy metal contamination in Bald Eagles nesting in southern Idaho. Grant amount $36,000.

U.S. Fish and Wildlife Service. 2005. Use of bird deterrents to reduce mortality of Ospreys and other birds at fish farms in Colombia. Grant amount $64,000.

Idaho Department of Fish and Game. 2006. Heavy metal contamination in Bald Eagles in Idaho. Total grant amount - $15,000.

U.S. Fish and Wildlife Service and Bureau of Reclamation. 2008. Effects of recreational developments on the population of Bald Eagles at Lake Cascade. Total grant amount - $31,000.

Iberdrola Renewables, Horizon Wind, First Wind. 2010. Mortality of fledgling ferruginous, red-tailed, and Swainson's hawks at wind farms in eastern Oregon. Grant amount $150,000.

PUBLICATIONS (LAST 10 YEARS)

Anderson, D.L., D.A. Wiedenfield, M.J. Bechard, and S.J. Novak. 2004. Avain diversity in the Moskitia Region of Honduras. *Ornitologia Neotropical* 15:447-482.

Ojeda, V., M.J. Bechard, and A. Lanusse. 2004. Primer registro de nidificación del peuquito (*Accipiter chilensis*) en Argentina. *El Hornero* 19:41-43.

Fairhurst, G.D., and M.J. Bechard. 2005. Relationships between winter and spring weather and Northern Goshawk (*Accipiter gentilis*) reproduction in northern Nevada. *Journal of Raptor Research* 39:229-236.

Bechard, M.J., and C.S. Weidensaul. 2005. Feather molt by Swainson's Hawks (*Buteo swainsoni*) on the austral grounds of Argentina. *Ornitologia Neotropical* 16:267-270.

Colorado, G.J., M.J. Bechard, C. Márquez, and A.M. Castaño. 2006. Raptor migration in the Cauca River valley of northern Colombia. *Ornitologia Neotropical* 17:161-172.

Bechard, M.J., G.D. Fairhurst, and G.S. Kaltenecker. 2006. Occupancy, productivity, turnover, and dispersal of Northern Goshawks in portions of the northeastern Great Basin. *Studies in Avian Biology* 31:100-108.

Bechard, M.J., C. Márquez-Reyes, and H.F. Lopez Arévalo. 2007. The threat of Central and South American aquaculture facilities to Ospreys and other piscivorous birds. Pages 78-87 *in* Neotropical raptors (K.L. Bildstein, D.R. Barber, and A. Zimmerman, Eds.). Hawk Mountain Sanctuary, Orwigsburg, PA, U.S.A.

Bildstein, K.L., M.J. Bechard, P. Porras, E. Campo, and C.J. Farmer. 2007. Seasonal abundances and distributions of Black Vultures (*Coragyps atratus*) and Turkey Vultures (*Cathartes aura*) in Costa Rica and Panama: evidence for reciprocal migration in the Neotropics. Pages 47-60 *in* Neotropical raptors (K.L. Bildstein, D.R. Barber, and A. Zimmerman, Eds.). Hawk Mountain Sanctuary, Orwigsburg, PA, U.S.A.

Hasselblad, K., and M.J. Bechard. 2007. Male Northern Goshawk home ranges in the Great Basin of south-central Idaho. *Journal of Raptor Research* 41:150-155.

Marti, C.D., M.J. Bechard, and F.M. Jacksic. 2007. Food habits. Pages 129-154 *in* Raptor research and management techniques (D.M. Bird, and K.L. Bildstein, Eds.). Hancock House Publishers, Blaine, WA, U.S.A.

Baladron, A.V., L.M. Biondi, M.S. Bo, A.I. Malizia, and M.J. Bechard. 2009. Red-backed Hawks supply food to scavenging Chimango Caracaras. *Emu* 109:260-264.

Bechard, M.J., D.N. Perkins, G.S. Kaltenecker, and S. Alsup. 2009. Mercury contamination in Idaho Bald Eagles, *Haliaeetus leucocephalus*. *Bulletin of Environmental Contamination and Toxicology* 83:698-702.

Bildstein, K.L., M.J. Bechard, C. Farmer, and L. Newcomb. 2009. Narrow sea crossings present a significant barrier to migrating Griffon Vultures *Gyps fulvus. Ibis* 151:382-391.

Rogers, H.M., M.J. Bechard, G.S. Kaltenecker, and A.M. Dufty, Jr. 2010. Modulation of the adrenocortical stress response in three North American *Accipiters* during fall migration. Journal *of Raptor Research*

Bechard, M.J., C.S. Houston, and J.H. Sarasola. 2010. Swainson's Hawk (*Buteo swainsoni*). *In* A. Poole and F. Gill [Eds.], The birds of North America, No. 265. The Academy of Natural Sciences, Philadelphia, PA and The American ornithologists' Union, Washington, DC.

Kochert, M.N., M.R. Fuller, L.S. Schueck, L. Bond, M.J. Bechard, B. Woodbridge, G.L. Holroyd, M.S. Martell, and U. Banasch. 2011. Migration patterns, use of stopover areas, and austral summer movements of Swainson's Hawks. Condor 113:89-106.

Houston, C.S., P.D. McLoughlin, J.T. Mandel, M.J. Bechard, M.J. Stoffel, D.R. Barber, and K.L. Bildstein. 2011. Breeding home ranges of migratory Turkey Vultures near their northern limit. Wilson Journal of Ornithology 123:472-478.

Sarasola, J.H., J.J. Negro, M.J. Bechard, and A. Lanusse. 2011. Not as similar as thought: Sexual dichromatism in Chimango Caracaras is expressed in exposed skin but not the plumage. Journal of Ornithology 152:473-479.

Keeley, W.H., and M.J. Bechard. 2011. Flushing distances of Ferruginous Hawks nesting in rural and exurban New Mexico. Journal of Wildlife Management 75:1034-1039.

Baladron, A.V., M.S. Bo, A.I. Malizia, and M.J. Bechard. 2011. Food habits of the Roadside Hawk (*Buteo magnirostris*) during the nonbreeding season in the southeastern Pampas of Argentina. Journal of Raptor Research 45:257-261.

De Lucas, M., M. Ferrer, M.J. Bechard, and A.R. Munoz. 2012. Griffon Vulture mortality at wind farms in southern Spain: distribution of fatalities and active mitigation measures. Biological Conservation 147:184-189.

Ferrer, M., M. de Lucas, G.F.E. Janss, E. Casado, A.R. Munoz, M.J. Bechard, and C.P. Calabuig. 2012. Weak relationship between risk assessment studies and recorded mortality in wind farms. Journal of Applied Ecology 49:38-46.

Baladron, A.V., A. I. Malizia, M.S. Bo, M.S. Liebana, and M.J. Bechard. 2012. Population dynamics of the Southern Short-tailed Opossum (*Monodelphis dimidiata*) in the Pampas of Argentina. Australian Journal of Zoology 60:238-245.

Hedlin, E.M., C.S. Houston, P.D. McLoughlin, M.J. Bechard, M.J. Stoffel, D.R. Barber, and K.L. Bildstein. 2013. Winter ranges of migratory Turkey Vultures in Venezuela. Journal of Raptor Research 47:145-152.

Miller, R.A., J.D. Carlisle, M.J. Bechard, and D. Santini. 2013. Predicting nesting habitat of Northern Goshawks in mixed aspen-lodgepole pine forests in a high-elevation shrub-steppe dominated landscape. Open Journal of Ecology 3:109-115. Doi:10.4236/oje.2013.32013

PRESENTATIONS

Bechard, M.J., M.N. Kochert, M.R. Fuller, B. Woodbridge, and J.H. Sarasola. 2005. Aspects of the annual migration of Swainson's Hawks (*Buteo swainsoni*) between North and South America. XI Reunión Argentina de Ornitológia, Asociación Ornitológia del Plata, Buenos Aires, Argentina.

Maceda, J.J., J.H. Sarasola, L. Bragagnolo, M. Santillán, R. Pereyra Lobos, M. Reyes, A. Lanusse, and M.J. Bechard. 2005. Nidoes activos de Águila Coronada (*Harpyhaliaetus coronatus*) en las provincias de La Pampa y Mendoza, Argentina. XI Reunión Argentina de Ornitológia, Asociación Ornitológia del Plata, Buenos Aires, Argentina.

Bildstein, K.L., M.J. Bechard, P. Porras, y E. Campos. 2006. Seasonal abundances and distributions of Black (*Coragyps atratus*) and Turkey (*Cathartes aura*) Vultures in Costa Rica and Panama: evidence of reciprocal migration in the Neotropics. Neotropical Raptor Congress, Iguazu Falls, Argentina.

Maceda, J.J., V. Salvador, J. Sarasola, L. Sympson, M. Santillan, M. Reyes, L. Bragagnolo, M.J. Bechard, A, Lanusse, y C. Solaro. 2006. Comportamento y monitero de nidos del aguila coronada (*Harpyhaliaetis coronatus*) en el centro de Argentina a partir de video camara. Neotropical Raptor Congress, Iguazu Falls, Argentina.

Marquez, C., M.J. Bechard, y V.H. Venegas. 2006. Efectividad de metodos de proteccion para evitar la depredacion de peces por parte del aguila pescadora (*Pandion haliaetus*) y otras aves piscivoras en infrastructura piscicola en Colombia. Neotropical Raptor Congress, Iguazu Falls, Argentina.

Shook, J.E., and M.J. Bechard. 2006. Dietary analysis of Northern Hawk Owls in interior Alaska. Alaska Bird Conference, Juneau, Alaska.

Sympson, L., A. Trejo, P. Capllonch, V. Sympson, V. Ojeda, M. Gelain, M.J. Bechard, Y K.L. Bildstein. 2006. Distribucion y patrones migratorios del aguilucho andino (*Buteo albigula*). Neotropical Raptor Congress, Iguazu Falls, Argentina.

Zucchini, M., M.J. Bechard, and K.L. Bildstein. 2006. Flight strategies of Neotropical migrant raptors in Panama. Neotropical Raptor Congress, Iguazu falls, Argentina.

Hasselblad, K.W., and M.J. Bechard. 2006. Northern Goshawk foraging habitat selection in central Idaho, U.S.A. North American Ornithological Conference, Veracruz, Mexico.

Keeley, W.H., and M.J. Bechard. 2006. Comparison of Ferruginous Hawk diet between two grasslands in New Mexico. North American Ornithological Conference, Veracruz, Mexico.

Perkins, D.N., M.J. Bechard, S.J. Novak, and J.F. Smith. 2006. Population genetics of Bald Eagles (*Haliaeetus leucocephalus*) in southern Idaho: interactions of life history with reductions in population size. North American Ornithological Conference, Veracruz, Mexico.

Houston, C.S., D.R. Barber, M.J. Bechard, J. Mandel, K.L. Bildstein, and K. Machin. 2006. New information on Turkey Vulture movements. North American Ornithological Conference, Veracruz, Mexico.

Marquez, C., M.J. Bechard, V. Vanegas. 2007. The effectiveness of using bird deterrent devices to reduce fish depredation by Ospreys (*Pandion haliaetus*) and other fish-eating birds at aquaculture facilities in Colombia. VIII Neotropical Ornithological Congress, Maturin, Venezuela.

Zucchini, M., M.J. Bechard, and K.L. Bildstein. 2007. Flight strategies of Neotropical migrant raptors in Panama. Raptor Research Foundation Annual Meeting, Allentown, PA, U.S.A.

Alsup, S., M.J. Bechard, and M.N. Kochert. 2008. Productivity of Swainson's Hawks nesting in urban and suburban areas of southern Idaho. Raptor Research Foundation Annual Meeting, Missoula, MT, U.S.A.

Alsup, S., M.J. Bechard, M.N. Kochert. 2008. Productivity of Swainson's hawks nesting in urban and suburban areas of Idaho. Wildlife Society Annual Meeting, Tampa, FL, U.S.A.

Bechard, M.J., C. Marquez, and V.H. Vanegez. 2008. Mortality of Ospreys and other birds at fish farm facilities in Central and South America. American Ornithologists' Union Annual Meeting, Portland, OR, U.S.A.

Kochert, M.N., M.R. Fuller, L. Schewick, M.J. Bechard, B. Woodbridge, G. Holroyd. 2008. Aspects of the migration of Swainson's Hawks. Raptor Research Foundation Annual Meeting, Missoula, MT U.S.A.

Kochert, M.N., M.R. Fuller, L. Schewick, M.J. Bechard, B. Woodbridge, and G. Holroyd. Aspects of the migration of Swainson's Hawks. Idaho Chapter, Wildlife Society Meeting, Boise, ID, U.S.A.

Marti, C., M.J. Bechard, and F. Jaksic. 2008. Raptor Food Habits. Raptor Research Foundation Annual Meeting, Missoula, MT, U.S.A.

Bechard, M.J., L. Sympson, D. Barber, and K.L. Bildstein. 2010. The White-throated: the first transequatorial migrant from southern South America. Bird Migration and Global Change: Movement ecology and conservation strategies. Algeciras, Spain.

Kolar, P., and M.J. Bechard. 2010. Mortality of fledgling hawks at wind farms in eastern Oregon. Wind Energy Working Group Annual Meeting, Denver, CO.

Bechard, M.J., L. Sympson, D. Barber, and K.L. Bildstein. 2011. The White-throated Hawk: the first transequatorial migrant raptor from southern South America. Neotropical Ornithological Congress, Cuzco, Peru.

Miller, R.A., L.L. Lapinel, J.D. Carlisle, M.J. Bechard, and D. Santini. 2011. Northern Goshawk (*Accipiter gentilis*) breeding and productivity relative to prey abundance within the Sawtooth National Forest. Raptor Research Foundation Annual Meeting, Duluth, MN.

Kolar, P., and M.J. Bechard. 2011. Impacts of wind turbines on *Buteo* hawk nesting success and fledgling mortality in the Columbia Plateau Ecoregion. Raptor Research Foundation Annual Meeting, Duluth, MN.

Bechard, M.J., and P. Kolar. 2012. Impacts of wind farms on the nesting and mortality of hawks in eastern Oregon. I Congreso Iberico sobre Energia Eolica y Conservacion de la Fauna, Jerez, Spain.

Kolar, P., M.J. Bechard. 2012. Impacts of wind farms on the nesting and mortality of fledgling hawks in eastern Oregon. Wind Energy Working Group Annual Meeting, Denver, CO.

Miller, R.A., J.D. Carlisle, M.J. Bechard, and D. Santini. 2013. Predicting nesting habitat of Northern Goshawks in mixed aspen-lodgepole pine forests in a high-elevation shrub-steppe dominated landscape. Great Basin Consortium, January 14-15, 2013, Boise State University, Boise ID.

Miller, R.A., J.D. Carlisle, and M.J. Bechard. 2013. Breeding ecology of the Northern Goshawk (*Accipiter gentilis*) within a unique prey and forest landscape of the western United States. Idaho Chapter of the Wildlife Society, March 11-13, 2013, Coeur d'Alene, ID.

RESEARCH RELATED SERVICE

1996: Co-Chairman, Local Committee for the joint meeting of the American Ornithologists' Union and Raptor Research Foundation, Boise State University, Boise, Idaho.
1996-2001: Editor-in-Chief, *The Journal of Raptor Research*
2000-present: Faculty Advisor, Idaho Bird Observatory
2001-present: Director, El Centro para Estudio y Conservación de las Aves Rapaces en la Argentina, Facultad de Ciencias exactas y Naturales, Universidad de La Pampa, Santa Rosa, La Pampa, Argentina
2004-present: Associate Editor, *The Journal of Wildlife Management*
2004-2013: Associate Editor, *The Auk*
2004-present: Board member, Neotropical Raptor Network, The Peregrine Fund, Inc., Boise, Idaho
2006: Chair, Scientific Program Committee for the meeting of the Neotropical Raptor Network, Iguazu Falls, Argentina

GRADUATED GRADUATE STUDENTS

Dawn McAnis – major professor
Robin Spahr – committee member
Jennifer Smith – co-major professor
Ted Swem – major professor
Tad Phelps – major professor
Jim Younk – major professor
Al Leary – major professor
Aimee Pope – major professor
Loren Gilson – committee member
William Kelley – major professor
Dusty Perkins – major professor
Heather Rogers – major professor
Patrick Kolar – major professor
James Birkelman – major professor
Edward Levine – major professor
Kristin Hasselblad – major professor
Laurie Hanaska-Brown – major professor
Gregory Kaltenecker – major professor
Graham Fairhurst –major professor
Rhonda Smith – major professor

Curriculum vita
James R. Belthoff

Education

Ph.D. 1992 Clemson University, Zoology
M.S. 1987 Eastern Kentucky University, Biology
B.S. 1982 Colorado State University, Wildlife Biology

Professional Experience

Department Chair (2006 - 2010)
Associate Department Chair (2005 - 2006)
Director of Graduate Studies (2003 - 2006)
Professor (2001 - present)
Associate Professor (1998 - 2001)
Assistant Professor (1993 - 1997)
Department of Biological Sciences, Boise State University, Boise, Idaho 83725.
Senior Biologist (1992 - 1993)
3D/Environmental Services, Inc., 781 Neeb Road, Cincinnati, Ohio 45233.
Research Assistant (1991 - 1992)
U.S. Fish and Wildlife Service, SC Cooperative Wildlife Research Unit, Department of Aquaculture, Fisheries, and Wildlife, Clemson University, Clemson, South Carolina 29634.

Graduate Level Teaching Experience

Advanced Biometry (BIOL 603)
Advanced Topics in Animal Behavior (BIOL 562)
Animal Behavior with Laboratory (ZOOL 534)
Applied Raptor Biology (BIOL 605)
Basic and Applied Data Analysis in Biology (BIOL 525)
Basic and Applied Statistics using Computers (BIOL 597)
Behavioral Ecology (BIOL 533)

Graduate Seminars (BIOL 598)
Applied Biostatistics
Advanced Biostatistics (several different topics, including Mixed Modeling, Survival Analysis, Circular Statistics)
Applied Avian Biology
Avian Mating Systems
Current Research in Ecology and Evolution
GK-12 Informal Education in Science Learning Centers
Selected Topics in Dispersal and Migration

Grant Funding (last 10 years)

2013-2015 *Idaho Transportation Department*. Assessing feasibility of mitigating barn owl-vehicle collisions in southern Idaho. $89,000
2013-2016 *National Science Foundation*. Research Experiences for Undergraduates (REU) Site – Raptor Research. $338,526
2012-2014 *U.S. Fish and Wildlife Service*. The prevalence of plague-causing *Yersinia pestis* in fleas infesting burrowing owls. $48,386
2009-2011 *Boise National Forest, USDA Forest Service*. Forest owls. $5,000

2009-2012 *National Science Foundation*. Acquisition of a stable isotope mass spectrometer for Earth science and ecological research (Co-PI). $376,603

2008-2009 *U.S. Fish & Wildlife Service*. Role of contaminants in roadway mortality of barn owls. $5,000

2008-2013 *National Science Foundation*. Utilizing local resources and education settings to stimulate K-12 learning (Co-PI). $2.21 million

2006 *Federal Highway Administration/Idaho Department of Transportation*. Mitigating barn owl mortality along highways. $12,000

2008-2010 *U.S. Department of Agriculture National Research Initiative, CREES*. Understanding linkages between agricultural and natural systems: trophic structure, pesticide exposure, and costs and benefits of group living. $100,000

2005-2006 *Boise National Forest, USDA Forest Service*. Breeding ecology of flammulated owls and effects of forestry practices. $22,000

2005-2006 *Idaho Department of Fish and Game State Wildlife Grant*. Flammulated Owls and Idaho's Dry Forests. $20,764

2004 *U.S. Bureau of Land Management*. Burrowing owl surveys in the Shoshone Field Office. $18,000

2004 *Boise State University Faculty Research Grant Program*. Raptor mortality along Interstate Highways in s. Idaho: Assessment, analysis, and possible mitigation strategies. $5,000

Refereed Publications (last 10 years)

*Riding, C.S. and J.R. Belthoff. Removal of old nest material decreases reuse of artificial burrows by burrowing owls. *Wildlife Society Bulletin*: in review.

*Boves, T.J. and J.R. Belthoff. Ornamentation in North American barn owls: Does spottiness indicate quality in *Tyto alba pratincola? Condor:* submitted.

*Scholer, N.M., M. Leu, and J.R. Belthoff. 2014. Factors associated with flammulated owl and northern saw-whet owl occupancy in southern Idaho. *Journal of Raptor Research*: 48:128-141.

*Boves, T.J. and J.R. Belthoff. 2012. Roadway mortality of barn owls in Idaho, USA. *Journal of Wildlife Management* 76:1381-1392.

Bush, S.E., S.M. Villa, *T.J. Boves, D. Brewer, and J.R. Belthoff. 2012. Influence of bill and foot morphology on the ectoparasites of barn owls. *Journal of Parasitology* 98:256-261.

*Welty, J.L, J.R. Belthoff, J.R. Egbert, and H. Schwabl. 2012. Relationships between yolk androgens and nest density, laying date, and laying order in western burrowing owls (*Athene cunicularia hypugaea*). *Canadian Journal of Zoology* 90:182-192.

Faircloth, B.C., A. Title, K. Tan, *J. Welty, J.R. Belthoff, and P.A. Gowaty. 2010. Eighteen microsatellite loci developed from western burrowing owls (*Athene cunicularia hypugaea*). *Conservation Genetics Resources* DOI: 10.1007/s12686-010-9214-5.

Johnson, D.H., D.C. Gillis, M.A. Gregg, J.L. Rebholz, J.L. Lincer, and J.R. Belthoff. 2010. Users guide to installation of artificial burrows for burrowing owls. Tree Top Inc., Selah, Washington. 34 pp.

Hunt, W.G., R. Watson, J.L. Oaks, C.N. Parish, K.K. Burnham, R.L. Tucker, J.R. Belthoff, and G. Hart. 2009. Lead bullet fragments in venison from rifle-killed deer: potential for human dietary exposure. *PLoS ONE* 4: e5330. doi:10.1371/journal.pone.0005330

*Barnes, K.P. and J.R. Belthoff. 2008. Probability of detection of flammulated owls using nocturnal broadcast surveys. *Journal of Field Ornithology* 79:321-328.

*Leppert, L., T.V. Zadorozhny, J.R. Belthoff, A.M. Dufty, Jr., S.L. Stock, G. Kaltenecker, and J.F. Smith. 2006. Sex identification in four owl species from Idaho: DNA and morphometrics. *Journal of Raptor Research* 40:291-294.

*Moulton, C.E., *R.S. Brady, and J.R. Belthoff. 2006. Association between burrowing owls and agriculture: potential underlying mechanisms. *Journal of Wildlife Management* 70:708-716.

*Moulton, C.E., *R.S. Brady, and J.R. Belthoff. 2005. A comparison of breeding season food habits of burrowing owls nesting in agricultural and nonagricultural habitat in Idaho. *Journal of Raptor Research*: 39:429-438.

Belthoff, J.R. 2005. Using artificial nests to study nest predation in birds. *The American Biology Teacher* 67:105-110.

*Moulton, C.E., *R.S. Brady, and J.R. Belthoff. 2004. Territory defense of nesting burrowing owls: responses to simulated conspecific intrusion. *Journal of Field Ornithology* 75:288-295.

Conference Presentations (last 10 years)

*Wade, J.L. and J. Belthoff. 2014. Behavioral responses of burrowing owls to experimental conspecific brood parasitism. Annual Meeting of the Raptor Research Foundation, Corpus Christi, Texas.

Pourzamani, S.M., *J.L. Wade, S. Wysocki, J. Holderman, and J. Belthoff. 2014. Assessment of road proximity, land use, and power transmission lines on characteristics of predator and scavenger visits to burrowing owl nests in the Morley Nelson Snake River Birds of Prey National Conservation Area (NCA), Idaho. Annual Meeting of the Raptor Research Foundation, Corpus Christi, Texas.

*Regan, T., C. McClure, A. Kociolek, M. Lowe, and J. Belthoff. 2014. Modeling occupancy of barn owls in southern Idaho, USA in relation to roadway mortality. Annual Meeting of the Raptor Research Foundation, Corpus Christi, Texas.

*Pikcilingis, E., S. Hanser, J. Thompson, C. Badten, E. Yensen, A. Kociolek, M. Lowe, and J. Belthoff. 2014. Relationships between prey abundance and barn owl-vehicle collisions along Interstate 84 in southern Idaho: Does small mammal abundance drive variation in roadway mortality of owls? Annual Meeting of the Raptor Research Foundation, Corpus Christi, Texas.

S. Wysocki, *J.L. Wade, S.M. Pourzamani, and J. Belthoff. 2014. Is sunbathing in burrowing owls a response to ectoparasite infestation? 2014 Annual Meeting of the Raptor Research Foundation, Corpus Christi, Texas.

*Wade, J.L. and J.R. Belthoff. 2014. Responses of burrowing owls to experimental changes in clutch size: Are burrowing owls determinate or indeterminate egg-layers? Fourth International Burrowing Owl Symposium, Pasco, Washington.

Thompson, J., *E. Pikcilingis, S. Hanser, C. Badten, and J. Belthoff. 2014. Relationship between prey abundance and barn owl-vehicle collisions along Interstate 84 in southern Idaho. Annual meeting of the M.J. Murdoch Charitable Trust, Partners in Science, Vancouver, Washington.

Badten, C., *E. Pikcilingis, S. Hanser, J. Thompson, and J. Belthoff. 2014. Relationship between prey abundance and barn owl-vehicle collisions along Interstate 84 in southern Idaho. Fourth Annual Idaho Conference on Undergraduate Research, Boise State University, Boise, Idaho.

Belthoff, J.R. 2012. Ecology, behavior and management of burrowing owls in southern Idaho. Burrowing Owl Symposium, Annual meeting of the Society of Range Management, Spokane, Washington.

*Boise State GK-12 Team. 2012. Scientists in learning centers: Boise State's innovative GK-12 partnership with informal science educators. Annual meeting of the National Science Foundation GK-12 program, Washington, DC.

*Groves, J. and J.R. Belthoff. 2012. Investigation of behavioral responses of burrowing owls to experimental brood parasitism in southwestern Idaho. Annual meeting of The Wildlife Society, Portland, Oregon.

Belthoff, J.R. 2011. Roadway mortality of barn owls in the USA. The Barn Owl Trust, Ashburton, Devon, United Kingdom.

Viskupic, K. and *Boise State GK-12 Team. 2011. Professional development for graduate students through outreach partnerships with science learning centers. Annual meeting of the Geological Society of America, Minneapolis, Minnesota.

*Boise State GK-12 Team. 2011. Reciprocal benefits of non-traditional GK-12 partnerships at Boise State University. 2010. Annual meeting of the National Science Foundation GK-12 program, Washington, DC.

*Boise State GK-12 Team. 2010. Integrating Boise State University research into the K-12 STEM Curriculum through partnerships with informal science centers. Annual meeting of the National Science Foundation GK-12 program, Washington, DC.

*Scholer, M.N., M. Leu, L.M. Nutt, and J.R. Belthoff. 2010. Using woodpecker occurrence to improve occupancy models for flammulated owls (*Otus flammeolus*): the role of biotic factors in modeling avian habitat. Joint Meeting of the American Ornithologists' Union and Cooper Ornithological Society, San Diego, California.

*Scholer, M.N., M. Leu, L.M. Nutt, and J.R. Belthoff. 2010. Using woodpeckers to predict the occurrence of cavity nesting owls. Annual meeting of the Raptor Research Foundation. Colorado State University, Fort Collins, Colorado.

*Welty, J., *K. McVey, *M. Stuber, and J. Belthoff. 2008. Costs and benefits of group living in owls. Annual meeting of the Idaho Wildlife Society. Boise, Idaho.

*McVey, K., J. Belthoff, *M. Stuber, and *J. Welty. 2008. How does introduction of agriculture alter ecosystem dynamics?: Stable isotopes analysis of trophic relationships and food webs of burrowing owls. Annual Meeting of the Idaho Wildlife Society, Boise, Idaho.

*Stuber, M.J., *K. McVey, *J. Welty, J. Belthoff, M. Hooper, and D. Russell. 2008. Ecotoxicological risk and exposure: A comparative assessment of burrowing owls in natural and agricultural habitats in southern Idaho. Annual Meeting of the Idaho Wildlife Society, Boise, Idaho.

*Welty, J., *K. McVey, *M. Stuber, and J. Belthoff. 2008. Costs and benefits of group living in burrowing owls (*Athene cunicularia*). Annual Meeting of the Raptor Research Foundation, Missoula, Montana.

*McVey, K., *M. Stuber, *J. Welty, and J. Belthoff. 2008. How does introduction of agriculture alter food web dynamics?: stable isotopes analysis of trophic relationships and food webs of burrowing owls (*Athene cunicularia*). Annual Meeting of the Raptor Research Foundation, Missoula, Montana.

*Stuber, M.J., *K. McVey, *J. Welty, J. Belthoff, M. Hooper, and D. Russell. 2008. Ecotoxicological risk and exposure: A comparative assessment of burrowing owls in natural and agricultural habitats. Annual Meeting of the Raptor Research Foundation, Missoula, Montana.

*McVey, K., J. Belthoff, *M. Stuber, and *J. Welty. 2008. How does introduction of agriculture alter ecosystem dynamics?: Stable isotopes analysis of trophic relationships and food webs of burrowing owls. Annual Meeting of the Wildlife Society, Miami, Florida.

*Stuber, M.J., *K. McVey, *J. Welty, J. Belthoff, M. Hooper, and D. Russell. 2008. Ecotoxicological risk and exposure: A comparative assessment of burrowing owls in natural and agricultural habitats in southern Idaho. Annual Meeting of the Wildlife Society, Miami, Florida.

Belthoff, J., *J. Welty, *K. McVey, and *M. Stuber. 2008. Understanding linkages between agricultural and natural systems: Trophic structure, pesticide exposure, and costs and benefits of group living. Annual Project Directors Meeting, USDA NRI CSREES, Managed Ecosystems Panel, Madison, Wisconsin.

*Boves, T.J. and J.R. Belthoff. 2007. Ornamentation in North American barn owls: Does spottiness indicate quality in *Tyto alba patincola*? AAAS Pacific Division, Boise, Idaho.

*Welty, J. and J.R. Belthoff. 2007. Costs and benefits of group living in owls. AAAS Pacific Division, Boise, Idaho.

*Welty, J. and J.R. Belthoff. 2007. Costs and benefits of group living in burrowing owls. Annual meeting of the Animal Behavior Society, Burlington, Vermont.

*Boves, T.J. and J.R. Belthoff. 2007. Roadway mortality of raptors in southern Idaho. Annual meeting of the Idaho Conservation League, Stanley, Idaho.

*Boves, T.J. and J.R. Belthoff. 2006. Roadway mortality of raptors in southern Idaho. Joint Annual Meeting of the Northwest Scientific Association and Idaho Chapter of the Wildlife Society. Boise, Idaho.

*Riding, C. and J.R. Belthoff. 2006. Old nest material affects burrow reuse by burrowing owls. Joint Annual Meeting of the Northwest Scientific Association and Idaho Chapter of the Wildlife Society. Boise, Idaho.

*Taylor, N.A. and J.R. Belthoff. 2005. Adult female body condition in Burrowing Owls (*Athene cunicularia*): examining effects on nestling sex ratios and management implications. Annual meeting of the Raptor Research Foundation, Green Bay, Wisconsin.

*Boves, T.J. and J.R. Belthoff. 2005. Roadway mortality of raptors in southern Idaho. Annual meeting of the Raptor Research Foundation, Green Bay, Wisconsin.

*Barnes, K.P. and J.R. Belthoff. 2005. Ecology of Flammulated Owls in Boise National Forest, Idaho. Annual meeting of the Raptor Research Foundation, Green Bay, Wisconsin.

Belthoff, J.R., A.M. Dufty, Jr. and K.P. Able. 2005. Patterns of corticosterone secretion in house finches from sedentary and migratory ranges in North America. European Science Foundation Scientific Programme on Optimality in Bird Migration Final Conference: Migration in the life-history of birds. Wilhelmshaven, Germany.

*Taylor, N.A. and J.R. Belthoff. 2004. Nestling sex ratio variation in burrowing owls (*Athene cunicularia*). Annual meeting of the Raptor Research Foundation, Bakersfield, California.

*Riding, C. and J.R. Belthoff. 2004. Effects of nest sanitation on burrow reuse by burrowing owls (*Athene cunicularia*). Annual meeting of the Raptor Research Foundation, Bakersfield, California.

Recent Research-Related Service

Member, Boise State University Institutional Animal Care and Use Committee (IACUC)
Member, Boise State University Faculty Research Advisory Committee
Boise State University Foundation Scholar Award For Research Committee
Department of Biology Graduate Student Research Award Committee
Chair, Editorial Committee, Northwest Scientific Association
Chair, Local Organizing Committee, 2003 annual meeting of the Animal Behavior Society, Boise State University
Local Organizing Committee, 2002 annual meeting of the Northwest Scientific Association, Boise State University
Member, Raptors of the Northwest and 4th Burrowing Owl Symposium Scientific Advisory Committees
Associate Editor, Journal of Raptor Research
National Science Foundation Animal Behavior Panel

Referee For:
American Midland Naturalist, American Naturalist, Animal Behaviour, Animal Conservation, Auk, Behavioral Ecology, Condor, Evolution, Journal of Field Ornithology, Journal of Raptor Research, Journal of the Idaho Academy of Science, Journal of Wildlife Management, National Park Service Network Vital Signs Program, Journal of Arid Environments, National Science Foundation, Natural Sciences and Engineering Research Council of Canada, Oecologia, Ornis Fennica, Proceedings of The Royal Society of London, Southwestern Naturalist, U.S. Geological Survey, Wildlife Society Bulletin, Wilson Journal of Ornithology.

Recent Honors Awards:
Fellow, American Ornithologists' Union.
Certified Wildlife Biologist – professional certification by The Wildlife Society.
President's Research and Scholarship Award (presented by Dr. Bob Kustra, Boise State University President).

College of Arts and Sciences Award for Outstanding Research (presented by Dr. Phil Eastman, Dean, College of Arts and Sciences).

Service on Graduate Student Committees

Major Advisor for:

Ethan Ellsworth (1993 - 1997) Raptor Biology
Postfledging behavior and dispersal of juvenile western screech-owls.

R. Andrew King (1994 - 1996) Raptor Biology
Postfledging dispersal and behavioral ecology of burrowing owls in southwestern Idaho.

Brian Herting (1995 - 2001) Raptor Biology
Seasonal effects of testosterone on aggression and vocalizations in western screech-owls.

Brian Smith (1996 - 1999) Raptor Biology
Nest-site selection, ectoparasites, and mitigation techniques: studies of burrowing owls and artificial burrow systems.

Kurt Zwolfer (1996 - 1999) Raptor Biology
Physiological ecology of roost site selection in wintering western screech-owls.

Courtney Frost (1998 - 2000, Co-advisor with S. Novak) Biology
Examination of genetic population structure in an introduced bird, the house finch.

Catherine Rideout (1999 - 2001) Biology
Effects of habitat fragmentation on shrub-steppe birds in southeastern Idaho.

Colleen Moulton (2000 - 2003) Raptor Biology
The relationship between burrowing owls and agriculture: tests of hypotheses related to energetics and increased prey availability.

Ryan Brady (2000 - 2004) Raptor Biology
Nest lining behavior, nest microclimate, and nest defense behavior of burrowing owls.

Kelly Riley (2001 - 2005) Biology
Pedigree analysis in burrowing owls.

Nicole Taylor (2002 - 2005) Raptor Biology
Burrowing owl offspring sex ratios: long-term trends and a test of the Trivers and Willard hypothesis.

Corey Riding (2003 - 2010) Raptor Biology
Breeding dispersal in birds: the effects of ectoparasites and nest sanitation.

Than Boves (2004 - 2007) Raptor Biology
Raptor mortality along Interstate Highways in s. Idaho: Assessment, analysis, and possible mitigation strategies.

Keith Barnes (2004 - 2007) Raptor Biology
Post-fledging behavior and breeding ecology of flammulated owls in managed forests.

Justin Welty (2005 - 2010) Raptor Biology
Burrowing owls and agroecosystems: costs and benefits of group living.

Katie McVey (2006 – 2011) Raptor Biology
Trophic ecology of burrowing owls in natural and agricultural habitats and an analysis of predator communities using stable isotopes of carbon and nitrogen.

Matt Stuber (2006 – present) Raptor Biology
Ecotoxicology risk and exposure for burrowing owls in agroecosystems.

Micah Scholer (2008 – 2011) Raptor Biology
Land cover and topographic effects on cavity-nesting owl occurrence and the role of species interactions in structuring cavity-nesting owl communities.

Tom Dixon (2012 – 2013) Raptor Biology
Examination of genetic mating system in burrowing owls using microsatellite analysis.

Jamie Groves (2012 – 2014) Raptor Biology
Experimental effects of conspecific nest parasitism on behavior and parental investment in burrowing owls.
Chris Porterfield (2012 – present) Raptor Biology
Pheomelanin pigment as an indicator of condition in migratory raptors in Idaho.
Erin Pikcilingis (2013 – present) Raptor Biology
Barn owl mortality along roadways: landscape ecology and feasibility of mitigation.
Tempe Regan (2013 – present) Raptor Biology
Occupancy and behavior of barn owls in a highway corridor in relation to roadway mortality.

Graduate Committee Member for:
Julie Heath, Raptor Biology (1993 - 1996)
Laura Valutis, Raptor Biology (1994 - 1997)
Chris Danilson, Raptor Biology (1993 - 1998)
Robert Prokop, Raptor Biology (1993 - 1998)
Shannon Livingston, Raptor Biology (1996 - 2000)
Kevin Warner, Biology (1997 - 2000)
Janice Engle, Biology (1997 - 2001)
Shanie Holman, Biology (1997 - 2000)
Steven Lewis, Raptor Biology (1998 - 2001)
Karl DeHart, Raptor Biology (1998 - 2003)
Allyson Turner, Biology (1998 - 2001)
Catherine Wightman, Raptor Biology (1998- 2001)
Steve Lysne, Biology (2001 - 2003)
Michael Butler, Raptor Biology (2003 - 2006)
Hollie Leavitt, Biology (2003 - 2007)
Will Keeley, Raptor Biology (2003 - 2009)
Matt Stutzman, Biology (2003 - present)
Wyatt Williams, Biology (2004 - 2008)
Vittoria Marzot, Biology (2004 - 2008)
Scott Graham, Raptor Biology (2006 - 2011)
Dana Owens, Raptor Biology (2008 – present)
Chris Porterfield, Raptor Biology (2010 - 2012)
Kevin Glueckert, Biology (2010 - 2014)
James Tate Mason (2011 - present)
Graham Frye, Biology (2011 - 2013)
Jessie Bunkley, Biology (2011 - 2013)
Erin Wonder, Raptor Biology (2011 - 2013)
Marcella Fremgen, Biology (2013 – present)
Shawn Smith, Raptor Biology (2013 – present)

CURRICULUM VITAE - MARIE-ANNE DE GRAAFF

Department of Biological Sciences
Boise State University
Boise ID, 83725
Phone: (208) 426-1256
E-mail: marie-annedegraaff@boisestate.edu

Education

- Ph.D. - Environmental Science, Wageningen University, the Netherlands (2007)
- M.Sc. - Nature Conservation and Development, Wageningen University, the Netherlands (2003)
- B.Sc. - Forestry and Nature Management, Wageningen University, the Netherlands (2001)

Positions held

- Assistant Professor - Department of Biological Sciences, Boise State University (2010-present)
- Postdoctoral Research Associate – Biosciences Division, Molecular Microbial Ecology Group, Oak Ridge National Laboratory (2008-2010)
- Professional Researcher – Department of Plant Sciences, University of California, Davis (2003-2007)
- Professional Researcher – Department of Agronomy and Range Science, University of California, Davis (2002-2003)

Teaching

- Instructor 'Introduction to Biology – Diversity of Life', Boise State University (2011, 2013, 2015)
- Instructor 'General Ecology', Boise State University (2012, 2013, 2014, 2015)
- Instructor 'Conservation Biology', Boise State University (2011, 2013)
- Instructor 'Ecosystem Ecology', Boise State University (2010, 2012, 2015)
- Instructor – 'Global Climate Change and Food Security: Feast or Famine?' Boise State University (2011)
- Instructor 'Plant-Soil Relations and Ecosystem Processes under Climate Change' Boise State University (2011)
- Instructor 'Global Climate Change and Solutions: ecological, social and economic perspectives' Boise State University (2013)
- Instructor 'Agricultural Challenges in the 21st Century: How to Feed 9 Billion People Without Destroying the Earth?' Boise State University (2014)

Graduate students mentored

- Andrew Austreng (2010-2012) – committee member (MS, Geosciences, BSU)
- Janina Dierks (2012 – 2014) – main advisor (MS, Biology, BSU)
- Xochi Campos (2011- present) – main advisor (MS, Biology, BSU)
- Xavier Gagne (2013 – present) – committee member (MS, Geosciences, BSU)

- Peggy Martinez (2014 – present) – main advisor (MS, Biology, BSU)
- Hasini Delvine (2014 – present) – main advisor (MS, Biology, BSU)
- Ryan Will (2015 – present) – committee member (MS, Geosciences, BSU)
- Hamid Dashti (2015 – present) – committee member (PhD, Geosciences, BSU)

Undergraduate students mentored

Kelly Rula (2010); Nathan Whitley (2011); Jamie Hicks (NSF REU - 2011); Aislinn Johns (NSF REU – 2011); Jessica van der Veen (NSF REU - 2011); Jacklynn Donahue (2011); Zach Hoefer (2011); Jaron Adkins (Boise State Student Research Program Fellowships, and Student Research Program Travel Award - 2011-2015); Ian Duvall (2011-2013); Michael Anderson (2012-2014); Ariane Shannon (NSF REU - 2013-2014); Mac Jones (Boise Cascade Corporation Environmental Research Fellowship - 2012-2014); Mary Finnel (2013-2014); Kimberly Tate (2013-2014); Trevor Thornton (2014-2015); Leslie Nichols (2013-present); Billy Bringman (2014-present); Micki Keiser (2015-present); Elise Thiel (2015-present); Riley Jones (2015-present); Ashlee Webb (2015-present).

Refereed Publications

(19 refereed publications, 9 since starting at Boise State, with two more in review)

*Denotes graduate student author; ** Denotes undergraduate student author

- Austreng A*, **de Graaff M-A**, Pellant M, Pierce J, Benner S (*in revision*) Large Soil Carbon Losses Follow Cheatgrass Invasion of Sagebrush.
- Morris GP, Hu Z, Grabowski PP, Borevitz JO, **de Graaff M-A**, Miller RM, Jastrow JD (2015) Genotypic diversity effects on biomass production in native perennial bioenergy cropping systems. *Global Change Biology Bioenergy* (in press).
- Adkins J**., Jastrow JD, Morris G, Six J, **de Graaff M-A** (2015) Effects of switchgrass cultivars and intraspecific differences in root morphology on soil carbon stabilization. *Geoderma* – (in press).
- **de Graaff M-A**, Adkins J**., Kardol P, Throop HL (2015) A meta-analysis of soil biodiversity impacts on the carbon cycle. *Soil* 1, 257-271.
- **de Graaff M-A,** Throop HL, Verburg PSJ, Arnone JA, Campos X* (2014) A synthesis of climate change and vegetation cover effects on biogeochemical cycling in shrub dominated drylands. *Ecosystems* 5, 931-945.
- Smith AP*, Marin-Spiotta E, **de Graaff M-A**, Balser TC (2014) Microbial community structure varies across soil organic matter aggregate pools during tropical land cover change. *Soil Biology & Biochemistry* 77, 292-303.
- **de Graaff M-A,** Jastrow JD, Gillette S, Johns A**, Wullschleger SD (2014) Differential priming of soil carbon driven by soil depth and root impacts on carbon availability. *Soil Biology & Biochemistry* 69, 147-156.
- **de Graaff M-A,** Jastrow JD, Six J, Wullschleger S (2013) Variation in root architecture among switchgrass cultivars impacts root decomposition rates. *Soil Biology & Biochemistry*, 58, 198-206

- **de Graaff M-A**, Schadt CW, Six J, Schweitzer JS, Rula K**, Classen AT (2011) Elevated CO_2 and plant species diversity interact to slow root decomposition. *Soil Biology & Biochemistry* 43, 2347-2354.
- **de Graaff M-A**, Castro H, Classen AT, Garten CT, Schadt CW (2010) Root exudates mediate plant residue decomposition rates by regulating the microbial community structure. *New Phytologist* 188,1055-1064.
- **de Graaff M-A**, Six J, van Kessel C (2009) Rhizodeposition-induced decomposition increases N availability to wild and cultivated wheat genotypes. *Soil Biology & Biochemistry,* 41, 1094-1103.
- **de Graaff M-A**, Six J, van Kessel C (2008) The impact of long-term elevated CO_2 on C and N retention in stable SOM pools. *Plant and Soil* 303, 311-321.
- **de Graaff M-A.**, van Groenigen KJ, Six J, Hungate B, van Kessel C (2006) Interactions between plant growth and soil nutrient cycling under elevated CO_2: a Meta-Analysis. *Global Change Biology* 12, 1-15.
- Hungate BA, van Groenigen KJ, Six J, Jastrow JD, Luo Y, **de Graaff M-A**, van Kessel C, Osenberg CW (2009) Assessing the effect of elevated CO_2 on soil carbon: a comparison of four meta-analyses. *Global Change Biology* 15, 2020-2034.
- **de Graaff M-A**, Six J, van Kessel C (2007) Elevated CO_2 increases rhizodeposition and microbial immobilization of root-derived nitrogen. *New Phytologist* 173, 778–786.
- Van Goenigen KJ, **de Graaff MA**, Six J, Harris D, Kuikman P, van Kessel C (2006) The impact of elevated CO_2 on soil C and N dynamics: a meta-analysis. *In: Managed Ecosystems and CO_2: Case Studies, Processes, and Perspectives*. (Eds: Nösberger J, Long SP, Norby RJ, Stitt M, Hendrey GR, Blum H). Springer-Verlag, Berlin, Heidelberg, Germany.
- Van Kessel C, Boots B, **de Graaff M-A**, Six J (2006) Soil C and N sequestration in a grassland following 10 years of Free Air CO_2 Enrichment. *Global Change Biology* 12, 1-13.
- Van Groenigen KJ, Six J, Hungate B, **de Graaff M-A**, van Breemen N, van Kessel C (2006) Element interactions limit soil carbon storage. *Proceedings of the National Academy of Sciences* 103, 6571-6574.
- **de Graaff M-A**, Six J, van Kessel C (2006) Prolonged elevated atmospheric CO_2 does not affect decomposition of plant material. *Soil Biology & Biochemistry* 38, 187-190.
- **de Graaff M-A**, Six J, Harris D, van Kessel C (2004) Decomposition of soil and plant carbon from pasture systems after 9 years of exposure to elevated CO_2: impact on C cycling and modeling. *Global Change Biology* 10, 1922-1935.

Presentations with published abstracts (last 5years)
(25 presentations with published abstracts, seven invited talks in organized symposia and workshops at international meetings since 2010)

*Denotes graduate student author; ** Denotes undergraduate student author

- **de Graaff M-A,** Jastrow J, Six J, Wullschleger S (2015) Fine root morphology as a driver of root and soil organic carbon decay rate. Ecological Society of America Annual Meeting, Baltimore, MD. *Invited.*

- Campos X*, **de Graaff M-A** (2015) Precipitation impacts on litter decomposition 57th Annual Symposium of the Idaho Academy of Science and Engineering, Boise, ID. (Best Graduate Student Oral Presentation Award)
- Adkins J**, **de Graaff M-A** (2015) A meta-analysis of soil biodiversity impacts on the carbon cycle. 57th Annual Symposium of the Idaho Academy of Science and Engineering, Boise, ID.
- Bringman B**, Johns A**, **de Graaff M-A** (2015) The impact of fuel reduction treatments on soil microbial processes and forb performance in a degraded semi-arid ecosystem. Great Basin Consortium Conference, Boise, ID.
- **de Graaff M-A** (2014) Root controls on soil organic matter stabilization and destabilization. The Sixth International Workshop on Soil and Sedimentary Organic Matter Stabilization and Destabilization, Kiawah Island, SC.
- Johns A**, **de Graaff M-A** (2014) Herbicide impacts on forb performance in degraded sagebrush steppe ecosystems. Society for Ecological Restoration, Redmond, OR.
- Dierks J*, **de Graaff M-A** (2014) The impact of a shifting arbuscular mycorrhizal fungal community on native plant performance and carbon cycling. Soil's Role in Restoring Ecosystem Services, Soil Science Society of America, Sacramento, CA.
- **de Graaff M-A** (2014) At the root of sustainable bioenergy: using genetic variation in root traits to maximize soil carbon sequestration and biomass yields. USDA-NIFA AFRI Sustainable Bioenergy Annual Project Director (PD) Meeting, Arlington, VA. *Invited.*
- **de Graaff M-A** (2014) Root controls on soil organic carbon dynamics. Ecological Society of America Annual Meeting, Sacramento, CA. *Invited*
- Smith P*, Marin-Spiotta E, **de Graaff M-A**, Balser TC (2014) Testing the significance of microbial ecology for soil carbon stabilization with tropical land cover change. Ecological Society of America Annual Meeting, Sacramento, CA.
- **de Graaff M-A** (2013) Root controls on soil organic carbon dynamics. Annual Meeting of the Ecological Soeciety of Germany, Switzerland and Austria, Potsdam, Germany. *Invited*
- **de Graaff M-A,** Morris G, Jastrow J, Six J (2013) At the root of sustainable bioenergy production: using genetic variation in root traits to maximize soil carbon restoration and biomass yields. AAIC 25th Annual Meeting "New Crops: Bioenergy, Biomaterials, and Sustainability" Washington D.C., 2013. *Invited*
- **de Graaff M-A**, Six JW, Jastrow JD, Wullschleger S (2012) Differential priming of soil carbon driven by soil depth and root impacts on carbon lability. American Geophysical Union Fall Meeting, San Francisco, CA. *Invited*
- Adkins J**., **de Graaff M-A**, Jastrow J. D., Wullschleger S (2012) Switchgrass cultivars differentially affect soil carbon stabilization. American Geophysical Union Fall Meeting, San Francisco, CA.
- Joy S**., Huber DP*, Lohse KA, Germino MJ, **de Graaff M-A**., Feris K (2012) Shifts in timing and magnitude of precipitation modulate soil carbon pools in semi-arid ecosystems. American Geophysical Union Fall Meeting, San Francisco, CA.
- **de Graaff M-A**, Six JW, Jastrow J. D., Wullschleger S (2012) Differential priming of soil carbon driven by soil depth and root impacts on carbon lability. Ecological Society of America Annual Meeting, Portland, OR.

- Smith P*, Marin-Spiotta E, **de Graaff M-A**, Balser TC (2012) Microbial community and soil carbon dynamics vary with season and forest age along a tropical successional chronosequence. Ecological Society of America Annual Meeting, Portland, OR.
- **de Graaff M-A**, van der Veen J**, Germino MJ, Hicks J** (2012) Changes in soil aggregate dynamics following 18 years of experimentally increased precipitation in a cold desert ecosystem. North West Science Association meeting, Boise, ID. *Invited.*
- **de Graaff M-A**, van der Veen J**, Germino MJ, Hicks J** (2012) Changes in soil aggregate dynamics following 18 years of experimentally increased precipitation in a cold desert ecosystem. AAAS meeting, Boise, ID.
- Huber K*, Lohse K, Germino MJ Feris K, Reinhardt K, **de Graaff M-A,** (2012) Effects of climate shifts and plant community on carbon and nitrogen cycling in semi arid rangelands. AAAS meeting, Boise, ID.
- Feris K, Jilek C**, Huber K*, Reinhardt K, **de Graaff M-A**, Lohse K, Germino MJ (2012) Influence of precipitation regime on microbial decomposition patterns and community structure in semi arid ecosystems: altered roles of bacteria and fungi. AAAS meeting, Boise, ID.
- Austreng AC*, Olin PH, Hummer A, Pierce JL, **de Graaff M-A,** Benner S (2011) Carbon sequestration in semi-arid ecosystems: potential benefits of sagebrush restoration. American Geophysical Union Fall Meeting, San Francisco, CA.
- Jilek C**, Lalor S, Huber D, Reinhardt K, **de Graaff MA**, Lohse K, Germino MJ Feris K (2011) Influence of precipitation regime on microbial decomposition patterns in semi-arid ecosystems. American Geophysical Union Fall Meeting, San Francisco, California.
- **de Graaff M-A**, Schadt CW, Six JW, Jastrow JD, Garten CT, Randolph-Phillips J, Wullschleger S (2010) Root architecture controls over root decomposition rates in Switchgrass. American Geophysical Union Fall Meeting, San Francisco, California.
- **de Graaff M-A**, Classen AT, Castro HF, Garten CT, Schadt CW (2010) Root exudates mediate plant residue decomposition rates by regulating the microbial community structure. ESA annual meeting, Pittsburgh, PA.

<u>*Invited seminars*</u>
(10 invited seminars given at Agencies (USGS, BLM, USDA), National Labs, and Universities in Europe and the US)

- Linking plant-soil relations to ecosystem processes in a changing climate. University of New Hampshire – Durham, NH. (2014)
- Biotic and abiotic controls on belowground ecosystem processes in a changing world. Idaho State University. (2011)
- Biotic and abiotic controls on belowground ecosystem processes in a changing world. Boise State University, Dept. of Geosciences. (2011)
- At the root of soil carbon and nutrient cycling. USDA – ARS, Boise, ID (2011)
- Linking plant-soil relations to ecosystem processes in a changing climate. University of Wisconsin – Madison, WI (2011)
- At the root of soil carbon and nutrient cycling. Wageningen University, the Netherlands (2011)

- Biotic and abiotic controls on belowground ecosystem processes in a changing world. Boise State University, Boise, ID (2010)
- Linking root exudation to microbial community dynamics. Deutsche Forschungzentrum, Jülich, Germany (2009)
- At the root of soil nutrient cycling. The University of Tennessee, Knoxville, TN (2008)
- Interactions between plants and soil nutrient cycling under elevated CO_2: implications for soil C sequestration. Oak Ridge National Laboratory, Oak Ridge, TN (2007)

Funding
($3,349,863 in total funding; $1,460,932 directly to Boise State)

- Collaborative Research: RUI: Litter decomposition in drylands: Linking high-resolution temporal and spatial variability in abiotic drivers with ecosystem models. **De Graaff M-A** (PI) *NSF* Pending: $298,402– to Boise State (2015 – 2019).
- Reynolds Creek Carbon Critical Zone Observatory. **De Graaff M-A** (Co-investigator). NSF. Funded: $2,500,000. $611,069 – to Boise State (2013 – 2018).
- At the root of sustainable bioenergy: using genetic variation in root traits to maximize soil carbon sequestration and biomass yields. **de Graaff M-A** (PI) *USDA-NIFA*. Funded: $493,210 (2012 – 2015).
- Mycorrhizal fungi in sage steppe ecosystems and their applicability for restoration. **de Graaff M-A.** (PI) *ID National Guard*. Funded: $42,065 (2012-2014).
- Impacts of fuel reduction treatments on plant-soil feedbacks in cheatgrass dominated ecosystems of the Intermountain West. **de Graaff M-A** (PI) *Bureau of Land Management & US Forest Service.* Funded: $16,000 (2012-2015).
- Impact of precipitation shifts on soil carbon and nutrient dynamics in semi-arid grasslands. **de Graaff M-A** (PI) *NSF-EPSCoR*. Funded: $51,214 (2011-2013)
- Carbon and nutrient dynamics in semi arid ecosystems: responses to climate change from mechanisms to landscape processes. **de Graaff M-A** (PI) *NSF-EPSCoR – Innovative Working Group*. Funded: $8,384 (2011)
- Impact of precipitation shifts on soil carbon dynamics in semi-arid grasslands. **de Graaff M-A** (PI) *NSF-EPSCoR REU.* Funded: $10,000 (2011)
- Impacts of fuel reduction treatments on plant-soil feedbacks in cheatgrass dominated ecosystems of the Intermountain West. **de Graaff M-A** (PI) *USGS*. $9000 (2011-2014)
- Root and soil depth controls on microbial utilization of labile soil C inputs. **de Graaff M-A** (PI) *DOE*. Funded: $219,990 (2010-2013)

Professional Affiliations

- American Geophysical Union (AGU) (2004-present)
- Ecological Society of America (ESA) (2007-present)

<u>*Professional Service*</u>
(Manuscript reviewer for 17 journals, chair of three organized symposia, organizer of two workshops, invited expert contributor to three international workshops, NSF panelist (2X), and USDA-NIFA panelist)

- *Manuscript reviewer:* Science, Global Change Biology, Geoderma, New Phytologist, Journal of Applied Ecology, Soil Science, Ecosystems, Soil Biology & Biochemistry, Plant and soil, Biogeochemistry, Agriculture, Ecosystems and Environment, Environmental and Experimental Botany, Ecosphere, Ecology Letters, Plos-one, Journal of Ecology.
- *Invited Workshop*: ARPA-E Expert Workshop: Phytosequestration, Chicago, IL, 2015.
- *Organized symposium/ session chair:* Global Challenges to Ecosystems. 57th Annual Symposium of the Idaho Academy of Science and Engineering, Boise, ID, 2015.
- *Invited Workshop*: DOE Expert Workshop: Improved Representation of Roots in Models. Oak Ridge National Laboratory, Oak Ridge, TN, 2014.
- *Participation in proposal review pane*l: NSF, 2014.
- *Organized symposium/ session chair:* Responses of Sagebrush-Steppe Ecosystems to a Changing Climate. Proceedings of the American Association for the Advancement of Science, Boise, ID, 2012.
- *Participation in proposal review pane*l: USDA-NIFA, 2012.
- *Organizer of workshop*: Carbon and nutrient dynamics in semi-arid ecosystems: responses to climate change from mechanisms to landscape processes. 2011 (Jemez Springs, NM), 2012 (Boise, ID).
- *Participation in proposal review pane*l: NSF-DDIG, 2011.
- *Invited International workshop*: German Science Foundation Expert Workshop: Estimating the amount and fate of plant-derived belowground nitrogen, Hohenheim, Germany, 2011.
- *Organized symposium/ session chair:* Carbon and Nitrogen Dynamics in Semi-Arid Ecosystems: Responses to Climate Change from Mechanisms to Landscape Processes. The 3rd annual EPSCoR Tri-State Western Consortium Meeting. Santa Ana Pueblo, New Mexico, 2011.

<u>*University Service*</u>
- *Committee member:* Search committee for a shop engineer, 2013.
- *Committee chair:* Top 10 scholar's selection committee, 2012.
- *Committee member:* Committee for curriculum revision of the Environmental Studies Program at BSU, 2011.

<u>*Departmental Service*</u>
- *Committee member:* Undergraduate curriculum revision committee – working to reform the undergraduate curriculum of the department and incorporate novel teaching methods into core classes, 2013- present.
- *Committee member:* EEB PhD program development committee, 2013-2014.

- *Committee member*: Michael Buttler Ecological Research Award selection committee, 2012, 2014.
- *Committee member:* Transitional working group – working to transition organizational structure of the department, 2013.
- *Committee member:* Search committee for a science education faculty member, 2013; 2014.
- *Committee member:* Research Committee – Biology Department, 2010-2011.
- *Hosted departmental speakers:* Aimee Classen (2011); Johan Six (2012); Alain Plante (2014); Terry Henkel (2014).

Community Service

- *Ecovillage Project*: Urban farming project in Boise in which I integrate research, teaching and outreach. My aim is to establish a community outreach project that informs the local community about the importance of soil health for sustainable food production in a changing world, and promote healthy eating habits.
- *Juvenile Diabetes Research Foundation – board member of UT/ ID chapter:* Tasks include: educating the local community about type 1 diabetes, supporting the local community of type 1 diabetics, coordinating fund raising events, attending and/or coordinating advocacy events, attending monthly meetings of the Idaho Leadership Committee of JDRF, and coordinating internships for Boise State students with JDRF, 2013- present.
- *STEM education:* Expose children from the Boise State Children's Center (pre-school) and K-12 students to STEM education and research by giving presentations at summer camps and providing tours through my lab.

Curriculum Vitae: Kevin Feris
Microbial Ecologist
Department of Biology
Boise State University
1910 University Dr.
Boise ID 83725
Phone: 208-426-5498
email: kevinferis@boisestate.edu

Education and Training
University of California at Davis
Postdoctoral Research Associate
2003 – 2005

University of Montana
Ph.D Microbial Ecology, 2003

University of Alaska Anchorage
B.S. Biology, 1995
Minor in Chemistry

Professional Positions

2015 - current	Professor, Department of Biology, Boise State University, Boise, ID
2014 - current	Department Chair, Department of Biology, Boise State University, Boise, ID
2010 - 2015	Associate Professor, Department of Biology, Boise State University, Boise, ID
2005 - 2010	Assistant Professor, Department of Biology, Boise State University, Boise, ID
2003 - 2005	Postdoctoral research associate, Soil Microbial Ecology Lab, The University of California at Davis, Davis, CA.

Student Training/Advising:
Graduate Students (for which I was, or am, the PI):

- *Angelo Sanfilippo*, M.S. Biological Sciences. Expected graduation date: Fall 2017. Thesis title "Elucidating microbial, geochemical, and DOC quality/quantity controls on respiration and carbon export from the hyporheic zone."
- *Tiffany Farrell,* M.S. Hydrologic Sciences. Expected graduation date: Fall 2014. Thesis title: "Do the distribution of denitrifying functional genes control the production of N2O in the hyporheic zone?".
- *Patrick Thomas,* M.S. Biological Sciences. Expected graduation date: Fall 2015. Thesis title "Effects of algal diversity on carbon sequestration, nutrient capture, grazing resistance, and productivity in dairy wastewater"
- *Jeric Harper,* M.S. Biological Sciences. Expected graduation date: Fall 2015. Thesis title "Integration of Effluent Produced from the Pre-treatment of Dairy Manure for a Semi-continuous Algal Growth Platform"

- *Annika Quick, PhD Geosciences.* Expected graduation date Fall 2015. Thesis title "Modeling hyporheic flow paths to quantify geochemical, microbial, and hydraulic controls on nitrous oxide production in stream sediments"
- *Maxine Prior. Graduated Summer 2013.* Development of third generation biofuels from anerobic digester effluent. Maxine is a graduate of the MS in Agricultural and Biological Engineering program at the University of Idaho. I was her direct research advisor and she is performing her thesis research in my lab at Boise State. Current status: Laboratory technician, Boise City Wastewater Treatment Plant, Boise ID. Soon to return to the Feris lab as a Research Technician to continue work on Algal production from agricultural wastewaters.
- *Daniel Stanaway. Graduated Summer 2012.* Daniel joined the lab in the Spring of 2009. Project: Determining the effects of chronic heavy metal stress on whole system metabolism in the Clark Fork River. Current status: Hydologic sciences consultant Brown and Caldwell, Boise ID.
- *Patrick Sorensen. Graduated Spring 2011*. Patrick joined the lab in the Spring of 2009. Project: Assessing the responses of terrestrial microbial communities global change induced alterations in the hydrologic properties of a semi-arid ecosystem. Current status: Ph.D. candidate Boston University. Recently received a NSF Doctoral dissertation improvement grant: Spring 2014.
- *Brian Deis. Defended Fall 2011*, official graduation date Spring 2012. Use of whole cell encapsulation strategies for the development of a novel consolidated bioreactor for cellulosic ethanol production from regional lignocellulosic feedstocks. Current status: Senior Microbiologist, Idaho Bureau of Laboratories.
- *Pamela Hess*. Graduated with M.A. Fall 2013. Pam joined my lab and the Biology graduate program during Fall 2006 with a B.S. in Geological Sciences. Current status: Environmental Scientist, U.S. Army National Guard. Boise, ID.

In addition, am currently or have recently completed my duties a thesis committee member for the following Biology and Hydrology graduate students:

- Ian Penn (current, M.S. Hydrologic Sciences, thesis title: Investigation of the relationship between nutrients and algae growth in the Lower Boise River)
- Hasini Delvinne (current, M.S. Biology, thesis title: Soil organic carbon and its temperature sensitivity along an elevation gradient in a semi-arid ecosystem)
- Aislin Johnns (current, M.S. Biology, thesis title: The impact of diversity on nitrogen cycling efficiency in switchgrass.)
- Peggy Martinez (current, M.S. Biology, thesis title: Plant response to above-ground vertebrate browsing: A systemic feedback?)
- Xochi Campos (graduated Fall 2015, M.S. Biology)
- Janina Dierks (graduated Spring 2014, MS Biology)
- Matt Weaver (graduated Spring 2012, M.S. Hydrology)
- Emma Wilson (graduated Spring 2013, M.S. Biology)
- Panagiota Louka (graduated Fall 2012, M.S. Biology)
- Janet Layne (M.S. Biology, graduated Spring 2011)
- Cory Hanley (M.S. Biology, graduated Summer 2009)

- Jason Besecker (M.S. Biology, graduated Summer 2008)

Graduate Teaching experience:

- Biology 498/598 Special Topics: Global Climate Change and Solutions: ecological and socio-economic perspectives. In this seminar we explore the major impacts of climate change on ecological and human systems and discuss a variety of solutions aimed at mitigating climate change. These solutions include biological carbon sequestration in terrestrial ecosystems, and the use of biofuels to reduce greenhouse gas emissions. We approach these solutions from ecological, social and economic perspectives, and ultimately aim to gain a better understanding of the ecological and socio-economic opportunities and problems associated with efforts to mitigate the adverse effects of climate change on society.
- Biology 497/597, Microbial Ecology 3 credits. Students acquire a fundamental knowledge of microbial ecology by comparing and contrasting ecological interactions in microbial communities to those observed in macrobial communities.
- Biology 598/498 Special Topics: Central Metabolic Theory of Ecology and it's application in Microbial Ecology. Graduate seminar.
- Biology 415/515 Microbial Physiology, 4 credits. New Spring 2014. A study of the physiology of microorganisms focusing on anabolic and catabolic processes. Course material is often presented in the context of applications of microbial physiology in a variety of contexts including biofuels, wastewater treatment, nutrient cycles, and fermented foods.
- Biology 415/415G Applied and Environmental Microbiology, 4 credits. An examination of the unique aspects of microbial metabolism and their utility in applied and environmental settings. Strong emphasis is placed on energetics of metabolism, community interactions, ecosystem services/properties and applications in industrial settings.
- Subsurface Microbiology Block Inland Northwest Research Alliance Subsurface Science Graduate Program Core Course. An examination of the communities, processes, metabolisms, and mechanisms of contaminant transformation in the subsurface. Emphasis on the physical, chemical, and hydrological controls on community structure and function and process rates.
- Biology 598/498 Special Topics: Microbial Ecology of Fluvial Ecosystems. Graduate seminar discussing current microbial ecology literature with a focus on flowing water systems.

Current Funding:

2014-2017 NSF Hydrologic Science: "Collaborative Research: How do hydrology and biogeochemistry control carbon flux from headwater streams to the atmosphere?" PIs: Roy Haggerty (OSU), Kevin Feris (BSU). Co-PIs: Danielle Tonina (UI), Shawn Benner (BSU). Feris portion of the proposal: $198,255, total award $.

2012-2015 NSF Hydrologic Sciences: "Collaborative Research: Novel interdisciplinary flume experiments to investigate the role of the hyporheic zone in greenhouse gas generation" PI: Daniele Tonina (UI); PI: Kevin

Feris, Co-PI: Shawn Benner (BSU). Total funding: $497,496.

2012-2015 USDA NIFA Climate. PI: Feris, K. P.; Co-PIs: Coats, E. (UI), McDonald, A. (UI); Post-Guillen, D (INL), Hamilton, M. (CAES). Title: "Enhancing greenhouse gas mitigation and economic viability of manure management systems via production of value added carbon sequestration". $681,143.

2012-2015 Idaho National lab. PIs: Deborah Newby (INL), Feris, K. P. (BSU), Erik Coats (UI) "Integrated Approach to Algal Biofuel, Bio-power, and Agricultural Waste Management". $250,153.

Pending Proposals:

2015 July 2015, USDA BRDI. PIs: Erik Coats (UI), McDonald, A. (UI), Feris, K. P. (BSU), Newby, D. (INL). "Biobased Products from Waste Organic Matter - Diversifying the Product Portfolio to Increase Economic Feasibility of Biofuel Production." Total funds requested: $1,997,819

2015 September 2015, USDA SBIR. PIs: Kevin Feris (BSU), Maxine Passero (Cyanergy LLC.). "Algae Crop Protection: Broad Spectrum Invasive Species Strategy". Total funds requested: $100,000.

Recent completed funding:

2010-2013 April 2010, Center for Advanced Energy Studies: "Design and Operational Improvements, and LCA in Anaerobic Digestion of Fermented Dairy Manure Using a 2-Stage process." PI: Erin Searcy (INL), Co-PIs: A Briones (UI), E Coats (UI), K Feris (BSU), D Keiser (UI), T Magnuson (ISU), A McDonald (UI), D Shrestha (UI). Total funding level: $592,000; Feris share of funding: $74,001.

2008-2011 NSF Epscor RII award. Whole project lead PI: Greg Bohach, Co-PI: Von Walden. Collaborator: Kevin Feris. Total funding level $4,075,472, Feris share of funding: $214,159 (6-1-08 to 5-31-11). Funding acquired for new hire in Boise State Biology department: $189,150. Project title: Idaho EPSCoR RII: Water Resources in a Changing Climate.

2008-2011 NSF MRI: PI: Denise Winget, Co-PIs: Sara Heggland, Nixon Jamee, Kevin Feris, Alex Punnoose. Total funding level: $503,775 (08-08-08 to 7-31-11), Project title: MRI: Acquisition of a FACS (Fluorescent Activated Cell Sorter) to Support Collaborative Research and Education in Biomolecular sciences and nanomaterials applications (DBI Proposal # 0821233).

2008-2011 Center for Advanced Energy Studies. Boise State PI: Kevin Feris, Co-PIs: Greg Bala (INL), Tim Magnusen (ISU), John Van Gerpen (UI). Total funding level $450,000 Feris share of funding: $81,000 (10-1-08 to 9-30-11). Project title: Development of Lignocellulosic Ethanol Production Potential in Idaho.

2010-2013 April 2010, INL LDRD: "Specific biological responses to nano metal oxides." PI: James Hendrickson, Co-PIs: Kevin Feris, Robert Fox,

	Yoshiko Fujita, Gregory Bala, Steven Aust**.** Total funding level: $450,000; Feris share of funding: $123,279.
2007-2010	NSF Division of Ecological Biology: Collaborative Research Grant Project title: "Chronic Ecosystem Stress Project". PI: Kevin Feris. Funding Level: $128,759. (9-1-07 to 8-31-09). PIs for University of Montana portion of this collaborative project: Philip Ramsey, James Gannon
2009-2010	NSF REU Supplemental Funding: PI: Kevin Feris. Total funding level $7,000 (June 1, 2009 to May 31, 2010), Project title: Year 2 REU Supplemental support for Collaborative Research: Chronic Stress in Ecosystems Project (DEB Proposal # 0717449)
2007-2010	National Science Foundation: MRI panel: PI: Alex Punnoose, Co-PI's: Tomoko Fujiwara, Kevin Feris, Jerry Harris, Darryl Butt. Total funding level: $584,000 (9-1-07 to 8-31-10). Proposal title: MRI: Acquisition of an XPS system for Interdisciplinary Research and Education.
2008-2009	Inland Northwest Research Alliance: INRA Subsurface Biotechnology and Bioremediation Research Initiative. PI: Kevin Feris. Total funding level: $15,665 (3-1-08 to 3-31-09). Proposal title: INRA supplemental funding for Collaborative Research: Chronic Stress in Ecosystems Project.
2008	Center for Advanced Energy Studies Collaborative Research Grant. PIs: Kevin Feris (BSU) and Joni Barnes (INL). Proposal title: "Consolidated Bioprocessing of Agricultural Wastewater Treatment and Bioenergy Production. Funding level: $70,000 (4-27-07 to 8-31-08).
2006	INRA SSRI/SSGP Core Sequence Development and Instruction Summer 2006 and Academic Year 2006-07. PI: Kevin Feris. Funding level: $14,553. Proposal Title: Feris Proposal for INRA SSRI/SSGP Core Sequence Development and Instruction Summer 2006 and Academic Year 2006-07.
2006	Center for Advanced Energy Studies Mini Grant. PIs: Kevin Feris (BSU) and Joni Barnes (INL). Funding level: $26,000 (7-17-06 to 9-30-06). Proposal title: Development of a multi-species *Rhodopseudomonad* H_2 producing photosynthetic anaerobic microbial system.
2006	Boise State Faculty Research Grant. PI: Kevin Feris. Funding Level: $5000 (7-1-06 to 6-30-07). Proposal title: Impacts of Ethanol on Anaerobic Production of Tert-Butyl Alcohol (TBA) from Methyl Tertiary Butyl Ether (MTBE) in Groundwater.
2006	University of California Water Resources Center Research Grant: "Does the release of ethanol amended gasoline into anaerobic freshwater aquifers accelerate the biological transformation of methyl-tert-butyl ether (MTBE) to tert-butyl alcohol (TBA)?" $60,000 (7-1-05 to 6-30-07).
2005	NSF EPSCoR Equipment funds, 9-05 to 5-06. Funding level: $21,500. PI(s): Kevin Feris, Greg Hampikian. An Applied Biosystems 310 Prism Genetic Analyzer is Necessary Research Infrastructure for the Department of Biology.

2005 NSF EPSCoR Faculty Start Up Augmentation Program. $10,350 (9-31-05 to 5-31-06)

Refereed Publications (* = publications with student authors):

1. *Smith, S.A., Hughes, E., Coats, E.R., Brinkman, C.K., McDonald, A., Harper, J.R. **Feris, K.P.,** Newby, D. N. (2015a). Toward sustainable dairy manure utilization: Upcycling algal biomass cultured on waste substrate to enhance VFA and biogas synthesis. Journal of Chemical Technology & Biotechnology.
2. *Passero, M., Cragin, B., Coats, E.R., McDonald, A.G. & **Feris, K.P**. (2015). Dairy wastewaters for algae cultivation, polyhydroxyalkanote reactor effluent versus anaerobic digester effluent. Bioenergy Research. DOI: 10.1007/s12155-015-9619-9.
3. *Passero, M.L., Cragin, B., Hall, A.R., Staley, N., Coats, E.R., McDonald, A.G. *et al.* (2014). Ultraviolet radiation pre-treatment modifies dairy wastewater, improving its utility as a medium for algal cultivation. *Algal Research*, 6, Part A, 98-110.
4. *Wilson, E.R., Smalling, K.L., Reilly, T.J., Gray, E., Bond, L., Steele, L. *et al.* (2014). Assessing the Potential Effects of Fungicides on Nontarget Gut Fungi (Trichomycetes) and Their Associated Larval Black Fly Hosts. *JAWRA Journal of the American Water Resources Association*, 50, 420-433.
5. *Sorensen, P.O., Germino, M.J. & **Feris, K.P.** (2013). Microbial community responses to 17 years of altered precipitation are seasonally dependent and coupled to co-varying effects of water content on vegetation and soil C. *Soil Biology and Biochemistry*, 64, 155-163.
6. Coats, E.R., Searcy, E., **Feris, K. P.**, Shrestha, D., McDonald, A.G., Briones, A. *et al.* (2013). An integrated two- stage anaerobic digestion and biofuel production process to reduce life cycle GHG emissions from US dairies. *Biofuels, Bioproducts and Biorefining*, 7, 459-473.
7. *McTee, M.R., Gibbons, S.M., **Feris, K.P.**, Gordon, N.S., Gannon, J.E. & Ramsey, P.W. (2013). Heavy metal tolerance genes alter cellular thermodynamics in Pseudomonas putida and river Pseudomonas spp. and influence amebal predation. *FEMS microbiology letters*, 347, 97-106.
8. *Rasa, E., Bekins, B.A., Mackay, D.M., Sieyes, N.R., Wilson, J.T., **Feris, K.P.** *et al.* (2013). Impacts of an ethanol- blended fuel release on groundwater and fate of produced methane: Simulation of field observations. *Water Resources Research*, 49, 4907-4926.
9. *Stanaway, D., Haggerty, R., Benner, S., Flores, A. & **Feris, K. P.** (2012). Persistent metal contamination limits lotic ecosystem heterotrophic metabolism after more than 100 years of exposure: A novel application of the resazurin resorufin smart tracer. *Environmental science & technology*, 46, 9862-9871.
10. *Ramsey, P.W., Gibbons, S.M., Rice, P., Mummey, D.L., **Feris, K.P.**, Moore, J.N. *et al.* (2012). Relative strengths of relationships between plant, microbial, and environmental parameters in heavy-metal contaminated floodplain soil. *Pedobiologia*, 55, 15-23.
11. *Gibbons, S.M., **Feris, K.P.**, McGuirl, M.A., Morales, S.E., Hynninen, A., Ramsey, P.W. *et al.* (2011). Use of microcalorimetry to determine the costs and benefits to Pseudomonas putida strain kt2440 of harboring cadmium efflux genes. *Applied and environmental microbiology*, 77, 108-113.
12. ***Feris, K.P.,** Otto, C., Tinker, J., Wingett, D., Punnoose, A., Thurber, A. *et al.* (2009a). Electrostatic interactions affect nanoparticle-mediated toxicity to gram-negative bacterium

Pseudomonas aeruginosa PAO1. *Langmuir*, 26, 4429-4436.

13. ***Feris, K.P.**, Ramsey, P.W., Gibbons, S.M., Frazar, C., Rillig, M.C., Moore, J.N. *et al.* (2009b). Hyporheic microbial community development is a sensitive indicator of metal contamination. *Environmental science & technology*, 43, 6158-6163.
14. Wang, H., Wingett, D., Engelhard, M.H., **Feris, K.P.**, Reddy, K., Turner, P. *et al.* (2009). Fluorescent dye encapsulated ZnO particles with cell-specific toxicity for potential use in biomedical applications. *Journal of Materials Science: Materials in Medicine*, 20, 11-22.
15. *Hanley, C., Layne, J., Punnoose, A., Reddy, K., Coombs, I., Coombs, A. *et al.* (2008). Preferential killing of cancer cells and activated human T cells using ZnO nanoparticles. *Nanotechnology*, 19, 295103.
16. ***Feris, K. P.**, Mackay, D., Sieyes, N.d., Chakraborty, I., Einarson, M., Hristova, K. *et al.* (2008). Effect of ethanol on microbial community structure and function during natural attenuation of benzene, toluene, and o-xylene in a sulfate-reducing aquifer. *Environmental science & technology*, 42, 2289-2294.
17. Drenovsky, R.E., **Feris, K.P.**, Batten, K.M. & Hristova, K. (2008). New and current microbiological tools for ecosystem ecologists: towards a goal of linking structure and function. *The American Midland Naturalist*, 160, 140-159.
18. Mackay, D., de Sieyes, N., Einarson, M., **Feris, K.P.**, Pappas, A., Wood, I. *et al.* (2007). Impact of ethanol on the natural attenuation of MTBE in a normally sulfate-reducing aquifer. *Environmental science & technology*, 41, 2015-2021.
19. *Reddy, K.M., **Feris, K.P.**, Bell, J., Wingett, D.G., Hanley, C. & Punnoose, A. (2007). Selective toxicity of zinc oxide nanoparticles to prokaryotic and eukaryotic systems. *Applied physics letters*, 90, 213902.
20. Mackay, D.M., de Sieyes, N.R., Einarson, M.D., **Feris, K.P.**, Pappas, A.A., Wood, I.A. *et al.* (2006). Impact of ethanol on the natural attenuation of benzene, toluene, and o-xylene in a normally sulfate-reducing aquifer. *Environmental science & technology*, 40, 6123-6130.
21. Noske, M.N., Jacobson, L., Einarson, M.D., **Feris, K.P.**, De Sieyes, N.R., MaCkay, D.M. *et al.* (2006). Impact of Ethanol on the Natural Attenuation of Benzene, Toluene, and o-Xylene in a Normally Sulfate-Reducing Aquifer. *Environmental science & technology*, 6123-6130.
22. Ramsey, P.W., Rillig, M.C., **Feris, K.P.**, Holben, W.E. & Gannon, J.E. (2006). Choice of methods for soil microbial community analysis: PLFA maximizes power compared to CLPP and PCR-based approaches. *Pedobiologia*, 50, 275-280.
23. Ramsey, P.W., Rillig, M.C., **Feris, K.P.**, Gordon, N.S., Moore, J.N., Holben, W.E. *et al.* (2005a). Relationship between communities and processes; new insights from a field study of a contaminated ecosystem. *Ecology letters*, 8, 1201-1210.
24. Ramsey, P.W., Rillig, M.C., **Feris, K.P.**, Moore, J.N. & Gannon, J.E. (2005b). Mine waste contamination limits soil respiration rates: a case study using quantile regression. *Soil Biology and Biochemistry*, 37, 1177-1183.
25. **Feris, K.P.**, Hristova, K., Gebreyesus, B., Mackay, D. & Scow, K. (2004a). A shallow BTEX and MTBE contaminated aquifer supports a diverse microbial community. *Microbial ecology*, 48, 589-600.
26. **Feris, K.P.**, Ramsey, P.W., Frazar, C., Rillig, M., Moore, J.N., Gannon, J.E. *et al.* (2004b). Seasonal dynamics of shallow-hyporheic-zone microbial community structure along a heavy-metal contamination gradient. *Applied and environmental microbiology*, 70, 2323-2331.
27. **Feris, K.P.**, Ramsey, P.W., Rillig, M., Moore, J.N., Gannon, J.E. & Holben, W.E. (2004c). Determining rates of change and evaluating group-level resiliency differences in hyporheic

microbial communities in response to fluvial heavy-metal deposition. *Applied and environmental microbiology*, 70, 4756-4765.

28. Ramsey, P.W., **Feris, K.P.**, Rillig, M., Gannon, J.E., Moore, J.N. & Holben, W.E. (2004). Determination Rates of Change and Evaluating Group-Level Resiliency Differences in Hyporheic Microbial Communities in Response to Fluvial Heavy-Metal Deposition. *Applied and Environmental Microbiology*, 70, 4756-4765.
29. Holben, W.E., **Feris, K.P.**, Kettunen, A. & Apajalahti, J.H. (2004). GC fractionation enhances microbial community diversity assessment and detection of minority populations of bacteria by denaturing gradient gel electrophoresis. *Applied and environmental microbiology*, 70, 2263-2270.

Conference Presentations:
Channel and Catchment Morphology, Spatial Intermittency, and Carbon Chemistry of a Headwater Stream., San Francisco, CA, Poster, Status: Accepted, **O'Donnell, C. (Presenter/Author)**, Wondzell, S. (Author), Feris, K. P. (Author), Tonina, D. (Author), Haggerty, R. (Author), December 18, 2015, Conference Name: American Geophysical Union Fall Meeting

Characterizing biogeochemical processes in the hyporheic zone using flume experiments and reactive transport modeling, San Francisco, CA, Poster, Status: Accepted, **Quick, A. (Presenter/Author)**, Farrell, T. (Author), Reeder, J. (Author), Tonina, D. (Author), **Feris, K. P.**, Benner, S. G., December 16, 2015, Conference Name: American Geophysical Union Fall Meeting

Statistical Modeling to Predict N2O Production Within the Hyporheic Zone by Coupling Denitrifying Microbial Community Abundance to Geochemical and Hydrological Parameters, San Francisco, CA, Poster, **Farrell, T. (Presenter/Author)**, Quick, A. (Author), Reeder, J. (Author), Tonina, D. (Author), Benner, S. G., **Feris, K. P.**, December 15, 2015, Conference Name: American Geophysical Union Fall Meeting

Differences in the temperature sensitivity of soil organic carbon decomposition in a semi-arid ecosystem across an elevational gradient, San Francisco, CA, Poster, Status: Accepted, **Delvinne, H.**, Johns, A., **Feris, K. P.**, de Graaff, M.-A., December 14, 2015, Conference Name: American Geophysical Union Fall Meeting

Microbial ecology at the Reynolds Creek CZO, Argonne National Lab, Lecture, Status: Presented, **Feris, K. P. (Presenter/Author)**, November 16, 2015, Conference Name: Cross CZO Microbial Ecology Workshop, Sponsoring Organization: NSF

A trait-based predictive model of grazing resistance in algal polycultures, Washington, D.C., Poster, Status: Presented, **Thomas, P. (Presenter)**, Newby, D. N. (Author), **Feris, K. P. (Author)**, October 9, 2015, Conference Name: Algal Biomass Summit, Sponsoring Organization: DOE

Pilot Scale Algae Cultivation: UV Pre-Treatment Improves Integrity of C. vulgaris in Dairy Wastewater, San Diego, CA, Poster, Status: Presented, **Passero, M. (Presenter/Author)**, Hillsbury, R. (Author), MacDonald, A. (Author), Newby, D. T.

(Author), Coats, E. (Author), **Feris, K. P. (Author)**, June 9, 2015, Conference Name: Algal Biomass, Biofuels, Bioproducts, Sponsoring Organization: Elsvier

Mixing anaerobic digester and polyhydroxyalkanoate reactor effluent to minimize nutrient input and water consumption of large scale algal growth operations, San Diego, CA, Poster, **Harper, J. (Presenter/Author)**, Coats, E. (Author), Newby, D. N. (Author), **Feris, K. P.**, June 8, 2015, Conference Name: Algal Biomass, Biofuels, Bioproducts, Sponsoring Organization: Elsvier

Species richness increases productivity of algae cultivated in dairy wastewater, San Diego, CA, Lecture, Status: Accepted, **Thomas, P. (Presenter/Author)**, Coats, E. (Author), **Feris, K. P. (Author)**, June 7, 2015, Conference Name: Algal Biomass, Biofuels, Bioproducts, Sponsoring Organization: Elsvier

Enhancing Greenhouse Gas Mitigation and Economic Viability of Anaerobic Digestion Systems: Optimizing Algal Biomass and Carbohydrate Production, System integration, Economic Modeling, and Education and Outreach, Washington, D.C., Poster, Status: Presented, **Feris, K. P. (Presenter/Author)**, Coats, E. (Author), MacDonald, A. (Author), Guileen, D. (Author), Thomas, P. (Author), Hillsbury, R. (Author), Stowe, E. (Author), Wei, L. (Author), Hartzell, D. (Author), Breuer, M. (Author), April 8, 2015, Conference Name: USDA NIFA Project Directors Meeting

Enhancing Greenhouse Gas Mitigation and Economic Viability of Anaerobic Digestion Systems: Optimizing Fermentation, PHA and AD reactors, and Enhancing Biomass Recovery for Commodity Production, Washington, D.C., Poster, Status: Presented, **Feris, K. P. (Presenter/Author)**, Coats, E. (Author), MacDonald, A. (Author), Guileen, D. P. (Author), Thomas, P. (Author), Hillsbury, R. (Author), Stowe, E. (Author), Wei, L. (Author), Hartzell, D. (Author), Breuer, M. (Author), April 8, 2015, Conference Name: USDA NIFA Project Directors Meeting

Upcycling Dairy Manure(Finding Alternative Uses of a High-value Substrate), Boise, ID, Lecture, Status: Presented, **Coats, E. (Presenter/Author)**, **Feris, K. P.**, Newby, D. T. (Author), MacDonald, A. (Author), February 25, 2015, Conference Name: Western Initiative for the Dairy Environment (WIDE)

Flume experiments elucidate relationships between microbial genetics, nitrogen species and hydraulics in controlling nitrous oxide production in the hyporheic zone, San Francisco, Poster, Status: Presented, Quick, A. (Presenter), Farrell, T. (Author), Reeder, W. (Author), **Feris, K. P.**, Tonina, D. (Author), Benner, S. (Author), December 12, 2014, Conference Name: American Geophysical Union

Enhancing Greenhouse Gas Mitigation and Economic Viability of Anaerobic Digestion Systems: Algal Carbon Sequestration and Bioplastics Production, Twin Falls, ID, Poster, Status: Presented, **Feris, K. P.**, Coats, E. (Author), McDonald, A., Post-Guillen, D., September 16, 2014, Conference Name: Sustainable Western Dairy and Related Industries Workshop

Integrated Approach to Algal Biofuel, Biopower, and Agricultural Waste Management, Twin Falls, ID, Poster, Status: Presented, **Feris, K. P.**, Coats, E. (Author), McDonald, A. (Author), Newby, D., September 16, 2014, Conference Name: Sustainable Western Dairy and Related Industries Workshop

Enhancing Greenhouse Gas Mitigation and Economic Viability of Anaerobic Digestion Systems: Algal Carbon Sequestration and Bioplastics Production, Gainesville, FL, Poster, Status: Presented, **Feris, K. P. (Presenter/Author)**, Newby, D. (Author), Coats, E. (Author), McDonald, A. (Author), Post-Guillen, D. (Author), January 7, 2014, Conference Name: NIFA Climate Change Project Directors Meeting,

Soil organic carbon and its temperature sensitivity along an elevational gradient in a semi-arid ecosystem, Reynolds Creek, Poster, Status: Presented, Delvinne, H. (Presenter/Author), **Feris, K. P. (Author)**, Flores, A. (Author), Benner, S. (Author), deGraaff, M.-A. (Author), September 2014, Conference Name: Reynolds Creek CZO All Hands Meeting

Integrated Approach to Algal Biofuel, Biopower, and Agricultural Waste Management, Washington, D.C., Lecture, Status: Presented, Newby, D., **Feris, K. P.**, Coats, E., March 15, 2014, Conference Name: DOE Algal Biofuels Strategy Meeting,

Carbon availability and the distribution of denitrifying organisms influence N_2O production in the hyporheic zone. Farrell, T. B.; Quick, A. M.; Reeder, W. J.; Tonina, D.; Benner, S. G.; Feris, K. P. American Geophysical Union, Fall Meeting 2013,

Dissolved oxygen concentration profiles in the hyporheic zone through the use of a high density fiber optic measurement network. Reeder, W. J.; Quick, A. M.; Farrell, T. B.; Benner, S. G.; Feris, K. P.; Tonina, D. American Geophysical Union, Fall Meeting 2013

Modeling hyporheic flow paths to quantify nitrous oxide production in stream sediments. Quick, A. M.; Farrell, T. B.; Reeder, W. J.; Feris, K. P.; Tonina, D.; Benner, S. G. American Geophysical Union, Fall Meeting 2013

Nutrient Sequestration using Algae with AD Systems**.** Kevin Feris (BSU), Maxine Prior (UI), Erik R. Coats (UI), Erin Searcy (DOE), Donna Post Guillen (INL), Sam Alessi (INL). EPA Agstar Conference, Indianapolis, IN June 2013.

Integrated 2-stage Anaerobic digestion of Dairy Manure for Reducing Greenhouse Gas Emissions. Erik R. Coats, P.E., Ph.D. - Associate Professor of Civil Engineering, Kevin Feris (BSU), Maxine Prior (UI), Erin Searcy (INL). EPA Agstar Conference, Indianapolis, IN June 2013.

Reynolds Creeek Critical Zone Observatory. Kathleen A. Lohse , Mark Seyfried, Shawn Benner, Nancy Glenn, Alejandro Flores, Colden Baxter, Benjamin Crosby Marie-Anne de Graaf, Kevin Feris, Bruce Finney, Gerald Flerchinger, Sarah Godsey, James McNamara, Daniel Marks, Jennifer Pierce, Keith Reinhardt, AGU Chapman conference, December 2013.

Got Fuel? Integrated Approach to Algal Biofuel, Bio-power, and Agricultural Waste Management. Boise State Materials Science Program Seminar Series, Invited talk.

October, 2013.

Problems into Solutions: Bioenergy, Biofuels, and Bioplastics from Agricultural Wastewater. Kevin Feris, Erik Coats, Deborah Newby Maxine Prior, Nathan Staley, Amy Hall. Biomolecular PhD program Open House, Boise ID. April, 2013.

Problems into Solutions: Bioenergy, Biofuels, and Bioplastics from Agricultural Wastewater. Kevin Feris, Erik Coats, Deborah Newby Maxine Prior, Nathan Staley, Amy Hall. Green Expo, Boise ID. April, 2013.

M. Prior, B. Cragin, A. Hall, N. Staley, E. Coats, K. Feris. Ultraviolet Radiation Pre-treatment Modifies Dairy Wastewater, Improving Its Utility as a Medium for Algal Cultivation. Algal Biomass, Biofuels, and Bioproducts. Toronto, Canada June 2013.

CAES BioEnergy Initiative External Review. Erik R. Coats, Kevin Feris, Center for Advanced Energy Studies, Idaho Falls, ID. January 2013.

Feris, K. P. (Presenter/Author), Jilek, C. (Author), Huber, D. (Author), Reinhardt, K. (Author), de Graaff, M.-A. (Author), Lohse, K. (Author), Germino, M. (Author), AAAS NW Meeting, "Influence of precipitation regime on microbial decomposition patterns and community structure in semi arid ecosystems: altered roles of bacteria and fungi.," AAAS, Boise.

Feris, K. P. (Author), Campos, X. (Presenter/Author), Germino, M. (Author), Forbey, J. S. (Author), de Graaff, M.-A., 2012 Idaho EPSCoR and Idaho NASA EPSCoR Annual Meeting, "Precipitation impacts on plant-derived soil C input and soil C dynamics," Idaho EPSCoR, Boise, ID. (Presented and/or Published: October 2, 2012).

Feris, K. P. (Presenter/Author), Jilek, C. (Author), Huber, D. (Author), Reinhardt, K. (Author), de Graaff, M.-A. (Author), Lhose, K. (Author), Germino, M. (Author), AAAS Pacific Division Annual Meeting, "Influence of Precipitation Regime on Microbial Decomposition Patterns and Community Structure in Semi-Arid Ecosystems: Altered Roles of Bacteria and Fungi," AAAS, Boise, ID. (Presented and/or Published: June 25, 2012).

Feris, K. P. (Other), de Graaff, M.-A. (Other), AAAS Pacific Division Annual Meeting, "Responses of sagebrush-steppe ecosystems to a changing climate," AAAS, Boise, ID. (Presented and/or Published: June 25, 2012).

Feris, K. P. (Author), Jilek, C. (Author), Huber, D. (Author), Reinhardt, K. (Author), de Graaff, M.-A. (Author), Lhose, K. (Author), Germino, M. (Author), Epscor Tri-State Meeting, "Effect of Precipitation Regime on Microbial Decomposition Patterns in Semi-Arid Ecosystems," Idaho EPSCoR, Sun Valley, ID. (Presented and/or Published: April 2, 2012).

Feris, K. P. (Presenter/Author), The Idaho Solid Waste Association Annual Meeting, "Anaerobic Digestion in Idaho: Potential for Waste Mitigation and Energy Production,"

The Idaho Solid Waste Association, Boise, ID. (Presented and/or Published: March 13, 2012).

Feris, K. P. (Presenter/Author), Boise State Faculty Senate Faculty Panel on Renewable Energy, "Bioenergy and Biofuels," BSU Faculty Senate, Boise, ID. (Presented and/or Published: March 13, 2012).

Feris, K. P., Coats, E. (Presenter), Searcy, E. (Presenter), Idaho Research Symposium: Energy Connected, "Design and Operational Improvements, and LCA in Anaerobic Digestion of Fermented Dairy Manure Using a 2-Stage process," Center for Advanced Energy Studies, Idaho Falls, ID.

Feris, K. P. (Presenter/Author), Coats, E. (Author), Post-Guillen, D. (Author), Hamilton, M. (Author), McDonald, A. (Author), Idaho Research Symposium: Energy Connected, "Enhancing Greenhouse Gas Mitigation And Economic Viability Of Anaerobic Digestion Systems: Algal Carbon Sequestration And Bioplastics Production," Center for Advanced Energy Studies, Idaho Falls, ID.

Influence of Precipitation Regime on Microbial Decomposition Patterns in Semi-Arid Ecosystems. Carrie Jilek[1], David Huber[2], Keith Reinhardt[2], Marie-Anne de Graaff[1], Katherine Lohse[2], Matt Germino[3] and Kevin Feris. American Geophysical Union Fall Meeting. San Francisco, CA. December 5th-9th, 2011.

Lotic ecosystem response to chronic metal contamination assessed by the Resazurin-Resorufin Smart Tracer with data assimilation by the Markov chain Monte Carlo method Daniel Stanaway, Roy Haggerty, Shawn Benner, Alejandro Flores, Kevin Feris. American Geophysical Union Fall Meeting. San Francisco, CA. December 5th-9th, 2011.

ASSESSING EFFECTS OF CHRONIC METAL STRESS ON LOTIC MICROBIAL ECOSYSTEMS USING A NOVEL SMART TRACER Daniel Stanaway*, Roy Haggerty, Alejandro Flores, Shawn Benner, Kevin Feris. AWRA 2011 ANNUAL WATER RESOURCES CONFERENCE Albuquerque, New Mexico November 7-10, 2011

MARKOV CHAIN MONTE CARLO OPTIMIZATION OF THE RAZ RRU ADVECTION DISPERSION EQUATION TO DETERMINE MICROBIAL ECOSYSTEM RESPONSE TO CONTAMINATION. Daniel Stanaway, Roy Haggerty, Shawn Benner, Alejandro Flores, Kevin Feris,

Quantifying effects of chronic heavy metal contamination to river ecosystems using a novel metabolically reactive smart tracer. Daniel Stanaway and Kevin Feris. 2011 EPA STAR Fellow Conference. Washington D.C. September, 2011.

Optimization of a Novel Two-Stage Lignocellulose Saccharification Reactor Design. Brian Deis & Kevin Feris, American Society for Microbiology General Meeting. May 21st-24th, New Orleans.

Development of microbial transformation technologies and platforms for biofuels production from bench to pilot. Kevin Feris, Jon Van Gerpen, Tim Magnuson, Greg Bala, Melinda Hamilton. CAES professional exchange. Center for Advaned Energy Studies, Idaho Falls, ID. April 14th, 2011.

Bioenergy Research at Boise State University. Kevin Feris. CAES Idaho reserach panel Center for Advaned Energy Studies, Idaho Falls, ID. February 1st-3rd.

Experimental manipulation of precipitation regime affects soil microbial community structure and carbon storage in the semi-arid sagebrush steppe. Kevin Feris and Patrick Sorensen. EPSCOR tri-state meeting April 5th-8th, New Mexico.

Influence of precipitation regime on microbial extracellular enzyme activity in semi-arid ecosystems. Carrie Jilek, Kevin Feris, Patrick Sorensen. EPSCOR tri-state meeting April 5th-8th, New Mexico.

Cellulosic Ethanol Production in Idaho. Kevin Feris and Brian Deis. Boise State University Day at the capitol. Jan 24th, 2011.

Center for Advanced Energy Studies Bioenergy initiative External review. August 16th, 2011, Center for Advaned Energy Studies, Idaho Falls, ID.

"Bioenergy Research Capacity of Boise State University". Biofuel Panel. Idaho Research Symposium. Center for Advaned Energy Studies, Idaho Falls, ID. Feb 1st-2nd, 2011.

Optimization of a Novel Two-Stage Lignocellose Saccharification Reactor Design. B. Deis, K. Feris. General Meeting American Society for Microbiology. May 21st, 24th, 2011, New Orleans, LA.

Day at the capitol. "Cellulosic Ethanol Production in Idaho". Jan 24th, 2011.

Influence of Precipitation Regime on Microbial Decomposition Patterns in Semi-Arid Ecosystems. Carrie Jilek, David Huber, Keith Reinhardt, Marie-Anne deGraaff, Katherine Lohse, Matt Germino and Kevin Feris. American Geophysical Union Fall Meeting. December 6th-8th, 2011. San Francisco, CA.

Lotic ecosystem response to chronic metal contamination assessed by the resazurin-resorufin smart tracer with data assimilation by the Markov chain Monte Carlo method. Daniel Stanaway, Dr. Alejandro Flores, Dr. Roy Haggerty, Dr. Shawn Benner, Dr. Kevin Feris. American Geophysical Union Fall Meeting. December 6th-8th, 2011. San Francisco, CA.

Direct Quantification of Microbial Community Respiration along a Contamination Gradient using a novel Hydrologic "Smart" Tracer

Daniel Stanaway[1], Roy Haggerty[2], Shawn Benner[1], Alejandro Flores[1], Kevin Feris. American Geophysical Union Fall Meeting. December 13th-17th, 2010. San Francisco, CA.

Effect of Change in Precipitation on Soil Microbial Community Structure and Function in Semi-Arid Ecosystems. Patrick Sorensen, Matt Germino, and Kevin Feris. American Geophysical Union Fall Meeting. December 13th-17th, 2010. San Francisco, CA.

Sorensen P., Thompson D., Huttanus B., Lalor, S., Ingram L.,, Germino M., Feris K. Experimental Manipulation of Soil Moisture Regime Impacts Soil Microbial Community Abundance, Diversity, and Function in a Semi-Arid Sagebrush Steppe. NSF-EPSCoR Idaho Annual Meeting, Boise, ID.

Sorensen P., Thompson D., Huttanus B., Lalor, S., Ingram L.,, Germino M., Feris K. Experimental Manipulation of Soil Moisture Regime Impacts Soil Microbial Community Abundance, Diversity, and Function in a Semi-Arid Sagebrush Steppe. International Society for Microbial Ecology. Seattle, WA.

Sorensen P., Reinhardt K., Ingram L., Thompson D., Huttanus B., Germino M., Feris K. Experimental Manipulation of Precipitation Structures Microbial Communities in the Sagebrush Steppe. NSF-EPSCoR Annual Tri-State Consortium Meeting. Incline Village, NV.

Sorensen P., Janzen B., Reinhardt K., Ingram L., Bachman S., Thompson D., Huttanus B., Germino M., Feris K. (October 2009) Understanding soil-atmosphere carbon exchange through soil microbial and plant community dynamics; opportunities for predicting ecosystem response to global climate change. NSF-EPSCoR Annual National Meeting, Washington DC.

Sorensen P., Thompson D., Huttanus B., Ingram L.,, Germino M., Feris K. (August 2009) Experimental manipulation of precipitation regime and vegetation type alter microbial community structure and function at the Protective Cap Barrier Experiment. NSF-EPSCoR Idaho Annual Meeting, Moscow, ID.

"Sequence Analysis of Putative ATPas Divalent Metal Cation efflux pumps from a suite of novel metal tolerant isolates recovered from the Clark Fork River, MT" Kevin P. Feris, Steve Lalor, Sean M. Gibbons, James E. Gannon, and Philip Ramsey. American Society for Microbiology, General Meeting. May 17th-21st, 2009. Philadelphia, PA.

"Ecosystem processes and microbial community structure along a heavy metal contamination gradient in river sediment" Philip Ramsey, Sean Gibbons, **Kevin Feris**, and James Gannon 12th International Symposium on Microbial Ecology - August 17-22, 2008, Cairns, Australia.

"Effects of Long-Term Heavy Metal Stress on Hyporheic Microbial Community Structure and Ecosystem Function: How the Cost of Metal Tolerance Shapes Community

Composition". **Kevin P. Feris**, Mariona Nadal Ribelles, Philip Ramsey, and James Gannon. 12th International Symposium on Microbial Ecology - August 17-22, 2008, Cairns, Australia.

"Effects of long-term heavy metal stress on hyporheic microbial community structure of the Clark Fork River, MT" Mariona Nadal-Ribelles and **Kevin Feris**, Boise State University, Department of Biology Boise, ID 83725. Undergraduate Research Symposium, April 14th, 2008, Boise, ID.

"Riparian Ecosystem Consequences -a microbial perspective. or predicting and quantifying natural resource damage in chronically stressed ecosystems" J. Gannon, P.R. Ramsey, **K. Feris**, J. Moore, W. Woessner and M. Rillig Students: Chris Frazer, Bruce Wielinga, O.S. Moynahan. NIEHS sponsored international symposium on Mine-tailing. June 4-6 University of Arizona

"Antimicrobial Effects and Mechanisms of Toxicity of Metal Oxide Nanoparticles". Kevin Feris, Jason Bell, Madhu Kongara, Isaac Coombs, Hua Wang, Cory Hanley, Alex Punnoose, Denise Wingett. AAAS Regional Meeting Boise ID, June 17th-21st, 2007.

"Assessing Microbial Response to Nutrient Loading in Natural Stream Systems in the Dry Creek Experimental Watershed, Idaho". Hess, Pam; Nadal, Mariona; Feris, Kevin. AAAS Regional Meeting Boise ID, June 17th-21st, 2007.

"Development of a *Rhodopseudomonad* H_2 Producing Microbial System Driven by Agricultural Wastewater" Kevin Feris, Dana Moracco, Joni Barnes, Cathy Rae. AAAS Regional Meeting Boise ID, June 17th-21st, 2007.

"Selective toxicity of zinc oxide nanoparticles to gram-positive and gram-negative bacterial systems." K. Feris, K. M. Reddy, Jason Bell, Denise Wingett, and Alex Punnoose. ASM General Meeting, May 21-25th, 2007 Toronto CA.

"Evaluation of potential toxicity issues and nanomedicine based applications of ZnO nanoparticles". D.G. Wingett, **K. Feris**, C. Hanley, K. Reddy, H. Wang, and A. Punnoose. Boise State University, Departments of Biology and Physics, Boise, ID 83725. Keystone Symposium, in Biomedicine.

"Linking Impacts of Ethanol on Subsurface Microbial Ecology and Anaerobic Transformations of BTEX". Kevin Feris, *Boise State University, Boise, ID.* The 17th Annual AEHS Meeting & West Coast Conference on Soils, Sediments and Water March 19th - 22nd, 2007 Marriott Mission Valley, San Diego, California

Wee Seng Wong and **Kevin Feris**. "Detection and Characterization of the Microorganisms in a PCE Contaminated Groundwater Plume via Molecular Analyses." 5th Annual INBRE research conference. North Idaho College in Coeur d'Alene, Idaho (August 6 - 8).

Kevin P. Feris, Doug Mackay, Murray Einarson, Nick de Sieyes, Lisa Jacobsen, Mark Knoske, Larry Justice, Krassimira Hristova, and Kate M. Scow. "Impacts of Ethanol and BTX on Microbial Populations, Processes and Community Composition in a Sulfate-Reducing Contaminated Aquifer." Geological Society of America Annual Meeting, Salt Lake City, UT. October 16th-20th, 2005. Invited lecture in session on "Quantifying Controls on Microbial Reaction Rates in Subsurface Environments".

Kevin P. Feris, Doug Mackay, Murray Einarson, Nick de Sieyes, Lisa Jacobsen, Mark Knoske, Larry Justice, Krassimira Hristova, and Kate M. Scow. "Impact of a Controlled Ethanol Release on In Situ Biodegradation of BTX and MTBE and on Population Densities and Community Composition of Archaea and Bacteria". The Joint International Symposia for Subsurface Microbiology (ISSM 2005) and Environmental Biogeochemistry (ISEB XVII), Jackson Hole, WY, August 15-19, 2005.

Nick de Sieyes, Doug Mackay, Murray Einarson, MarkNoske, Larry Justice, Lisa Jacobson, **Kevin Feris**, and Kate Scow. "Degradation rates of benzene, toluene and oxylene in a normally sulfate-reducing aquifer: Impact of ethanol in a controlled field experiment". NGWA August 18, 2005, Costa Mesa, CA.

Kevin P. Feris, Doug Mackay, Murray Einarson, Nick de Sieyes, Lisa Jacobsen, Mark Knoske, Larry Justice, Krassimira Hristova, and Kate M. Scow. "Increased Archaeal Cell Densities and Methane Production in Response to a Controlled Field Release of Ethanol and Benzene, Toluene, and Xylene at Vandenberg Air Force Base, CA: Implications for Using ETOH as a Fuel Oxygenate." General Meeting American Society for Microbiology, Atlanta, Georgia, June 6th – 9th, 2005.

Kevin P. Feris, Doug Mackay, Murray Einarson, Nick de Sieyes, Lisa Jacobsen, Mark Noske, Larry Justice, Krassimira R. Hristova, and Kate M. Scow. "Presence and Abundance of Bacteria and Archaea During a Controlled Field Release of Ethanol and Benzene, Toluene, and Xylene at Vandenberg Air Force Base, California. **2005 NGWA Conference on MTBE and Perchlorate: Assessment, Remediation, and Public Policy**. May 26-27, 2005, San Francisco, CA.

Douglas Mackay, Murray Einarson, Nick de Sieyes, Mark Noske, Larry Justice, Lisa Jacobson, Isaac Wood, **Kevin Feris**, and Kate Scow. "In Situ Production and Degradation of TBA in a MTBE-Contaminated, Normally Sulfate-Reducing Aquifer Impacted by an Experimental Ethanol Release". **2005 NGWA Conference on MTBE and Perchlorate: Assessment, Remediation, and Public Policy**. May 26-27, 2005, San Francisco, CA.

Scow, K. M.; Hristova, K.; **Feris, K. P.** "Dynamics and Composition of Microbial Communities in Contaminated Groundwater". **3rd annual Microbial Observatories Principal Investigators Workshop**. Bozeman MT, September 12-14,2004.

Feris, K. P.; Wood, I. A.; Hristova, K.; Gebreyesus, B.; Mackay, D.; Scow, K. M.; "Rapid structural changes in, and reduced BTEX degradation rates by, aquifer microbial communities in response to simultaneous exposure to ETOH and BTEX: Implications for using ETOH as a fuel oxygenate." **10th Annual Symposium for the International Society for Microbial Ecology**. Cancun, Mexico, August 22 – 27, 2004.

Research Related Service
Journal Reviewer:

2007-current	Science of the Total Environment
2007-current	Hydrobiologia
2007-current	Frontiers in Ecology and the Environment
2006-current	Soil Science Society of America Journal
2006-current	Water Research
2006-current	Chemosphere
2006-current	Geomicrobiology
2003 – current	Applied and Environmental Microbiology
2003 – current	Environmental Science and Technology
2003 – current	Microbial Ecology
2003 – current	Environmental Microbiology
2003 – current	Biodegradation
2004 – current	FEMS Microbial Ecology
2005 – current	Journal of Environmental Management
2005 – current	Journal of Contaminant Hydrology

Research related service (Boise State and Broader Scientific Community):

2014-current	Department Chair: Biological Sciences Department, Boise State University
2011-2014	Chair EEB PhD Development Committee
2012-2014	Boise State Faculty Senator, Graduate College.
2011	Chair: College of Arts and Sciences Tenure and Promotion Committee.
2011	Committee member: Biomedical and Biomolecular Science searches for the Department of Biological Sciences Boise State University.
2010	Committee member: College of Arts and Sciences Tenure and Promotion Committee.
2010	Chair: Ecosystem Ecologist Search Committee for Department of Biological Sciences, Boise State University
2007-2008	Boise State University Focus the Nation 2008 steering committee member.
2007-2008	Director of Research Symposium for Focus the Nation event at Boise State University Jan 30-31st, 2008.
2007	NSF Panel member: NSF Bio and Hydrogen Panel Directorate for Engineering, Division of Chem., Bioeng., Environ., Transport Syst. May 29-May 31st, 2007.
2007	Proposal Reviewer for NSF Ecological Biology Program (proposal submission date 7-9-2007).
2007	Technical Session Chair 2007 Environmental Sensing Symposium. October 25-26, 2007 Boise State University, Boise, ID.

2007	Biological sensors Session Chair, 2007 Environmental Sensing Symposium. October 25-26, 2007 Boise State University, Boise, ID.
2007	Science Fair Judge: Riverstone School. Riverstone Invention Convention. February 14, 2007.
2006-2009	Board member Northwest Science Association.
2006	Member of College of Arts and Sciences Tenure and Review Committee
2006 - current	Member of BSU Biology Graduate Studies Committee
2005-2006	Member of BSU Biology Department Research committee
2006	Member of search committee for the Systematist search.
2005-	Member of Graduate student research grant review committee
2005 -	Member of Research Committee, Department of Biology, Boise State University
2002	Volunteer: Global Justice Action Summit
2001 – 2002	Biochemistry/Molecular-Microbiology Graduate student association representative to the campus wide Graduate Student Association, University of Montana,.
2000 -2001	Member of the Graduate Student Complaint Committee
1999	Science Fair Judge, The University of Montana Science Fair, April 12, 1999.

Curriculum Vitae
Jennifer Sorensen Forbey, Ph.D.

Department of Biological Sciences
Boise State University
1910 University Drive
Boise, ID 83725-1515
208-426-4426
jenniferforbey@boisestate.edu

PROFESSIONAL PREPARATION

INSTITUTION AND LOCATION	DEGREE	YEAR(s)	FIELD OF STUDY
Mesa State College, Grand Junction, CO	B.S.	1997	Biology
University of Utah, Salt Lake City, UT	Ph.D.	2003	Biology
Australian National Univ, Univ. Tasmania, AUS	NSF, PostDoc	2003-04	Biology
Pharmacokinetics and Toxicokinetics for the Industrial Scientist Training		2006	Pharmacokinetics
Pharmacokinetics for Pharmaceutical Scientists Course		2007	Pharmacokinetics

APPOINTMENTS

2014-Pres.	Associate Professor, Dept of Biological Sciences, Boise State University, Boise, ID
2008-2014	Assistant Professor, Dept of Biological Sciences, Boise State University, Boise, ID
2007-2009	Pharmacokinetic Consultant, Rosa Pharmaceuticals, INC
2007	Instructor, Pharmacokinetics and Pharmacodynamics, Dept of Pharmacology and Toxicology, University of Utah, SLC, UT
2007-2008	Research Assistant Professor, Dept Pharmaceutics and Pharmaceutical Chemistry, University of Utah, SLC, UT
2007	Instructor, Global Crises in Natural Resources, Dept of Biology, University of Utah, SLC, UT
2005-2007	Scientist I, Pharmacokineticist, NPS Pharmaceuticals, SLC, UT
2003-2007	National Science Foundation International Research Postdoctoral Fellow (Australia and New Zealand)
2004-2005	Assistant Professor, Oregon State University, Dept of Fisheries and Wildlife, Cascade Campus, Bend, OR
2002-2003	Graduate Research Fellow, University of Utah, SLC, UT
2001-2002	University Teaching Assistantship Fellow, University of Utah, SLC, UT
1999-2001	Dept of Biology Teaching Assistant, University of Utah, SLC, UT

PUBLICATIONS

Summary: 34 peer-reviewed publications in journals and 1 book chapter have been published since 2001. Plus 1 response article in Science, 1 book review, 1 news article and 4 other publications are in review or under revision for resubmission (J.S. Sorensen/Forbey authorship in bold, graduate student authorship indicated with *, undergraduate authorship indicated with **, international collaborators underlined)

Peer-reviewed research articles

38. Olsoy, P.J.*, T. Griggs, A. Ulappa, K. Gehlken, Lisa A. Shipley, Glenn E. Shewmaker, **J. S. Forbey**. *In Review* Journal of Arid Environments. Nutritional Analysis of Sagebrush by Near-infrared Reflectance Spectroscopy
37. Utz, J.*, L.A. Shipley, J. Rachlow, T.R. Johnson-Yellin, M.J. Camp*, **J.S. Forbey**. *In review* Wildlife Biology. Understanding tradeoffs between predation and food risks in a specialist mammalian herbivore.
36. Crowell, M.M.* , M.J. Camp*, L.A. Shipley, J.L. Rachlow, J.S. Forbey, and T.R. Johnson. *In review* Ecology and Evolution. Selection of Food Patches by Sympatric Herbivores in Response to Concealment and Distance from a Refuge.
35. Parikh, G.L.* **J.S. Forbey**, B. Robb**, R.O. Peterson, L.M. Vucetich, J.A. Vucetich. *In review* at Oikos. The influence of diet composition, plant defensive chemicals, and winter severity on the nutritional condition of a free-ranging, generalist herbivore.
34. Camp, M.J.*, L.A. Shipley, T.R. Johnson, M.M. Crowell*, J.S. Forbey, J.L. Rachlow. *In Press* Ecology. Modeling tradeoffs between the risk of starvation and toxicity: A framework for understanding habitat selection.
33. Kohl, K.D.*, E. Pitman**, B. Robb**, J.W. Connelly, M.D. Dearing, **J.S. Forbey**. 2015. Monoterpenes as inhibitors of digestive enzymes and counter-adaptations in a specialist avian herbivore. Journal of Comparative Physiological Biology-B. 185(4): 425-34.
32. Pu, X , L. Lam**, K. Gehlken**, A.C. Ulappa*, J.L. Rachlow, **J.S. Forbey**. 2015. Antioxidant capacity of Wyoming big sagebrush (*Artemisia tridentata ssp. wyomingensis*) varies spatially and is not related to the presence of a sagebrush dietary specialist. Western North American Naturalist. 75(1): 78-87.
31. Olsoy, P.J.*, **J.S. Forbey,** J.L. Rachlow, J.D. Nobler*, N.F. Glenn, L.A. Shipley. 2015. Fearscapes: mapping functional cover of prey with terrestrial LiDAR. BioScience. 65(1): 74-80.
30. McArthur, C., P.B. Banks, R. Boonstra, **J.S. Forbey**. 2014. The dilemma of foraging herbivores: dealing with food and fear. Oecologia.176(3):677-689.
29. Ulappa, A.C.*, R.G. Kelsey, G.G Frye*, J.L. Rachlow, L.A. Shipley, L. Bond, X. Pu, **J.S. Forbey**. 2014. Plant protein and secondary metabolites influence diet selection in a mammalian specialist herbivore. Journal of Mammalogy. 95(4): 834-842.
28. Frye, G.G.*, J.W. Connelly, D.D. Musil, C. Cardinal, L. Cross, **J.S. Forbey**. 2014. Do necklace-style radiotransmitters influence flushing behavior of greater sage-grouse? The Wildlife Society Bulletin. 38(2):433-438. The Idaho Department of Fish and Game, Idaho Governor's Office for Species Conservation, Bureau of Land Management
27. **Forbey, J.S.**, N.L. Wiggins, G.G. Frye*, J.W. Connelly. 2013. Hungry grouse in a warming world: Emerging risks from plant chemical defenses and climate change. Wildlife Biology. 19: 374-381.
26. Frye, G.G.*, J.W. Connelly, D.D. Musil, **J.S. Forbey**. 2013. Phytochemistry predicts habitat selection by an avian herbivore at multiple spatial scales. Ecology. 94(2): 308-314.
25. **Forbey, J.S.**, M.D. Dearing, E. Gross, C. Orians, E. Sotka and W.J. Foley. 2013. Vertebrate Herbivores in Terrestrial and Aquatic Systems: A Pharm-Ecological Perspective. Journal of Chemical Ecology. 39(4): 465-480.
24. Shipley, L.A., E.M. Davis, L.A. Felicetti, S. McLean, **J.S. Forbey**. 2012. Mechanisms for eliminating monoterpenes in sagebrush by specialist and generalist rabbits. J Chem Ecol. 38:1178-1189.
23. **Forbey J.S.,** X. Pu, D. Xu, K. Kielland, J.P. Bryant. 2011. Inhibition of succinate dehydrogenase activity as a mode of action for papyriferic acid in birch to deter snowshoe hares. J Chem Ecol. 37:1285-1293.
22. Simpson, S.J., Raubenheimer, D, Charleston, M., Clissold, F., **Working Group**[1]. 2010. Modeling nutritional interactions: from individuals to communities. Trends in Ecology and Evolution. 25(1): 53-60. Online 17 August. doi:10.1016/j.tree.2009.06.012

[1] The Working Group comprised of several contributors, including J.S. Forbey. However, TREE limits the number of authors to five.

21. **Forbey, J.S.**, A.L. Harvey, M.A. Huffman, F. Provenza, R. Sullivan, D. Tasdemir. 2009. Exploitation of secondary metabolites by animals: A response to homeostatic challenges. Integrative and Comparative Biology. 49(3):314-328.
20. **Forbey, JS** and WJ Foley. 2009 A pharmacological approach to understanding plant-herbivore interactions: an introduction to the Pharm-Ecology Symposium. Integrative and Comparative Biology. 49(3):267-273.
19. Sotka, E.E., **J.S. Forbey**, M.H. Horn, A.G.B. Poore, D. Raubenheimer and K.E. Whalen. 2009. The emerging role of pharmacology in understanding marine and freshwater consumer-prey interactions. Integrative and Comparative Biology. 49(3):291-313.
18. Shipley, L.A., B. Moore and **J.S. Forbey**. 2009. Revisiting the dietary niche: when is a mammalian herbivore a specialist? Integrative and Comparative Biology. 49(3):274-290.
17. Dearing, M.D., **J. S. Forbey**, J. D. McLister, L. Santos**. 2008. Ambient temperature influences diet selection and physiology of an herbivorous mammal, *Neotoma albigula*. Physiological Biochemical Zoology. 81(6): 891–897.
16. McLean, S., R.R. Boyle, S. Brandon, N.W. Davies and **J.S. Sorensen**. 2007. Pharmacokinetics of 1,8-cineole, a dietary toxin, in the brushtail possum (*Trichosurus vulpecula*): significance for feeding. Xenobiotica. 37(9):903-922.
15. **Sorensen, J.S**., K.C. Forbey, R. Tanquay and B. McLeod. 2007. Tissue distribution of cytochrome P450 3A (CYP3A) in brushtail possums (Trichosurus vulpecula) exposed to *Eucalyptus* terpenes. Comparative Biochemistry and Physiology C. Toxicology and Pharmacology. 145(2):194-201.
14. **Sorensen, J.S**. and M.D. Dearing. 2006. Efflux transporters as a novel herbivore counter mechanism to plant chemical defenses. Journal of Chemical Ecology. 32(6):1181-96.
13. **Sorensen, J.S.**, M. Skopec and M.D. Dearing. 2006. Application of pharmacological approaches to plant-mammal interactions. Journal of Chemical Ecology. 32(6):1229-46.
12. Marsh, K.J.*, I.R. Wallis, S. McLean, **J.S. Sorensen** and W.J. Foley. 2006. Conflicting demands on detoxification pathways influence how common brushtail possums choose their diets. Ecology. 87:2103-2112.
11. **Sorensen, J.S**., J. D. McLister and M.D. Dearing. 2005a. Plant secondary metabolites compromise the energy budgets of specialist and generalist mammalian herbivores. Ecology. 86: 125-139.
10. **Sorensen, J.S**., J.D. McLister and M.D. Dearing. 2005b. Novel plant secondary metabolites impact the performance of a specialist more than a generalist (*Neotoma* spp.). Ecology. 86: 140-154.
9. Dearing, M.D., J.D. McLister and **J.S. Sorensen**. 2005. Woodrat (*Neotoma)* herbivores maintain nitrogen balance on a low nitrogen, high phenolic forage, *Juniperus monosperma*. Journal of Comparative Physiology B: Biochemical, Systematic, and Environmental Physiology. 175(5): 349-355.
8. **Sorensen, J.S**., E. Heward**, and M.D. Dearing. 2005c. Plant secondary metabolites alter the feeding patterns of a mammalian herbivore (*Neotoma lepida*). Oecologia. 146:415-422.
7. McLister, J.D., **J.S. Sorensen** and M.D. Dearing. 2004. The effect of juniper (*Juniperus monosperma*) consumption on the cost of thermoregulation in the woodrats *Neotoma albigula* and *Neotoma stephensi* depends upon acclimation temperature. Physiological and Biochemical Zoology. 77(2): 305-312.
6. **Sorensen, J.S.**, C.A. Turnbull** and M.D. Dearing. 2004. A specialist herbivore (*Neotoma stephensi*) absorbs fewer plant toxins than a generalist (*Neotoma albigula*). Physiological and Biochemical Zoology. 77(1): 139-148.
5. Lamb, J. G., P. Chaterjie, P. Marick, **J. S. Sorensen**, S. Haley, and M. Denise Dearing. 2004. Liver biotransforming enzymes in woodrats *Neotoma stephensi* (Muridae).

Comparative Biochemistry and Physiology C. 138(2): 195-201.

4. **Sorensen, J.S.** and M.D. Dearing. 2004. Physiological limitations of dietary specialization in herbivorous woodrats (Neotoma spp.) *in* Animals and Environments: Proceedings of the Third International Congress of Comparative Physiology and Biochemistry ISC1275. Ed. S. Morris and A. Vosloo. Elsevier. Pp 313-320.
3. **Sorensen, J.S**. and M.D. Dearing. 2003. Elimination of plant toxins: an explanation for dietary specialization in mammalian herbivores. Oecologia. 134: 88-94.
2. Lamb, J.G., **J.S. Sorensen**, and M.D. Dearing. 2001. Comparison of detoxification enzyme mRNAs in woodrats (*Neotoma lepida*) and laboratory rats. Journal of Chemical Ecology. 27(4): 845-857.

Book Chapters

1. **Forbey, J.S.** and M.D. Hunter. 2012. The herbivore's prescription: A pharm-ecological perspective on host plant use by vertebrate and invertebrate herbivores. *In* The ecology of plant secondary metabolites: genes to global processes. Eds. GR Iason, M. Dicke and SE Hartley. Ecological Reviews. Cambridge University Press, Cambridge.

Other publications:

4. M.R. Fremgen. 2015. Diversity within a Species: Studying Sagebrush Morphotypes. Sage Notes 37 (1): 12-13. Idaho Native Plants Society. Available at: http://idahonativeplants.org/news/SageNotesMar2015.pdf.

3. Moore, B.D., W.J. Foley, **J.S. Forbey**, J.L. DeGabriel. 2013. Response letter to "Self-medication in animals," J. C. de Roode *et al*., Perspectives, 12 April, p. 150. Science. 340: 1041.

2. Forbey, JS. 2013. Evolutionary insight merges with toxicology, a review of Monosson, Emily. 2012. Evolution in a toxic world: how life responds to chemical threats. Ecology. 94(1): 257-264.

1. Forbey, JS, G.G. Frye, X. Pu and J.W. Connelly. 2011. Toxic Scat: A mechanism to prevent overdosing on plant chemicals by grouse. Grouse News 42:24-29.

FUNDING

Summary: My scholarly work at Boise State has received over $2.4 million total funding since 2008, with over $600,000 coming directly to Boise State from external federal and state agencies (National Science Foundation, Bureau of Land Management, Idaho Department of Fish and Game, Idaho Office of Species Conservation, Idaho Army National Guard) and the remainder supporting collaborative projects. Below are the sources and brief description of funding that is planned, pending, current and completed.

Pending support

NSF-DEB 1/15/16 - 1/14/21 8% effort
$1,398,943
Forbey (PI)
Title: The Influence of Plant Secondary Metabolites on the Stability of Ecological Communities

The overall objective of this research is to test the central hypothesis that adaptive browsing by vertebrate herbivores in response to PSMs can influence food chain dynamics relative to the influence of predation. The proposed research will scale up the effect of PSMs from individual herbivores to populations of free-ranging herbivores to the entire food chain.

Current support

US Fulbright Scholar to Sweden 2/14/16 - 6/14/16 30% effort
106,000 SEK ($12,150 USD)
Forbey (PI)
Title: Developing a Co-Evolutionary Directed Bioprospecting Program in Scandinavia
The proposed study will develop a co-evolutionary directed drug discovery program that enhances the ecosystem services of natural systems in Scandinavia. The first outcome is the discovery of natural products that are cytotoxic or enhance the bioavailability of other drugs. This will be accomplished by using the foraging behavior of herbivores as a natural screen to find bioactive plants. The second outcome is to increase the economic value of local ecosystems. This will be accomplished through an educational exchange program where training for international students will increase the scientific capacity to discover new drugs and conserve the chemical diversity in local systems.

NIH-INBRE 3 7/15/14 - 7/14/19 5% effort
$764,000 to College of Idaho
Forbey (Mentor for College of Idaho PI)
Co-evolutionary approach to discover natural products that enhance therapeutics.
Our objective is to take advantage of millions of years of co-evolution to discover compounds which can enhance the bioavailability of important therapeutics by altering the cellular signals controlling mechanisms of absorption, distribution, and metabolism (i.e. pharmacokinetics) of orally ingested therapeutics in humans.

NSF-DEB-1540085 7/01/15 - 6/30/16 5% effort
$7,800
Forbey (PI)
Title: Workshop to Expand the Use of Emerging Technology to Understand the Ecology of Avian Herbivores in a Changing Climate
The overall objective of the workshop is to show an international audience how to take advantage of advances in rapid biochemical assays, robotics and remote sensing to better understand, monitor and manage wildlife in a changing climate.

NSF-DEB- 1146194 6/12/12 - 6/12/16 10% effort
$291,000 of $980,000 total collaborative award
Forbey (PI)
Title: Collaborative Research: Modeling the Tradeoffs of Food-, Fear-, and Thermal-Scapes to Explain Habitat Use by Mammalian Herbivores
The main objective of this proposal is to elucidate the functional relationships between pygmy rabbits and interacting habitat features (nutrients in food, toxins in food, security cover, and thermal cover), to understand how individuals tradeoff resources, and to predict responses to habitat alterations. Integral to our research program is a novel educational model that trains graduate, undergraduate, and high school students who will conduct research collaboratively, participate in a tiered mentoring program, and engage with the community and regional biologists

Idaho Army National Guard 3/31/14 - 6/13/16 1% effort
$20,000
Forbey (PI)
Title: Piute Ground Squirrel Population and Behavior Study

The overall purpose of this project is to understand the spatial and temporal distribution of Piute ground squirrels (*Urocitellus mollis*) and how personality interacts with habitat types and use by this important prey species. This data will provide information on Piute ground squirrel (PGS) populations across the Orchard Combat Training Center (OCTC) for management of vegetation, prey and predators.

NSF-IOS-1258217 2/1/13-2/1/16 5% effort
$38,400 of $470,000 award
Forbey (PI of subcontract)
Title: Courtship negotiation in a life-history context: interaction between on- and off-lek tactics in sage-grouse
The goal of this proposal is to investigate courtship negotiation by exploring how condition, foraging efficiency and off-lek movements affect the dynamics of courtship haggling for both males and females.

Murdock (M.J.) Charitable Trust 2/26/15 - 2/26/17 5% effort
$15,000
Forbey (mentor to high school teacher Lockwood)
Title: Understanding the Role of Structural and Chemical Diversity in the Sagebrush Steppe
The overall objective of the research project is to discover and broaden the public and student perception of structural and chemical diversity and function in a local ecosystem in Idaho. We will rely on both field and laboratory research to test the hypotheses that 1) greater structural diversity of plants in habitats promotes greater habitat use by wildlife and that 2) chemical diversity of plants can be exploited for their anti-bacterial and insecticidal properties. These studies will contribute to better management of habitats and discovery of chemicals that can benefit humans

Idaho Office of Species Conservation and 12/21/10 - 8/30/16 5% effort
Idaho Department of Fish and Game
$178,325
Forbey (PI)
Title: Assessing the Dietary Quality of Sagebrush in Sage-Grouse Winter and Breeding Habitats
The overall purpose of this project is to identify the nutritional importance of different sagebrush species in the sage-grouse diet and determine how diet quality influences reproductive success ir sage-grouse at various sites in Idaho. The research will meet some of the population and habitat objectives outlined in the Idaho Sage-grouse Conservation Plan and will improve our understanding of sage-grouse distribution and population trends.

BLM-Challenge Cost Share LO9AC16253 02/01/10 - 9/30/15 5% effort
$82,500
Forbey (PI)
Title: Nutritional and chemical quality of winter diets selected by pygmy rabbits
The purpose of this project is to gain an understanding of how the chemical and nutritional quality of sagebrush influences the diet selection and potential habitat use of pygmy rabbits in the sagebrush steppe.

Wyoming Game and Fish Department 02/01/14 - 9/30/15 5% effort
$17,061
Forbey (Co-PI)
Title: *Effects of Mowing and Herbicide Treatments on the Nutritional Quality of Sagebrush in south-central, Wyoming*

The purpose of this project is to identify how management treatments such as mowing and herbicide influence the dietary quality of sagebrush as a food for wildlife.

Completed funding (selected projects):

Idaho NSF EPSCoR REU program 12/10 - 9/15 5% effort
$20,000
Internal competition – Forbey as mentor
for undergraduates
Title: Assessing the Quality of Sagebrush in Response to Climate Change

Idaho NSF EPSCoR Infrastructure 5/13 - 9/13 0% effort
$42,100
Internal compitition – Forbey as lead
Field research vehicles to expand the capacity for long-term monitoring of how climate and water influence natural ecosystems.

Idaho NIH INBRE 12/10 - 9/12 5% effort
$10,000
Internal competition – Forbey as mentor
for undergraduates
Title: Assessing the metabolic stability of natural products in animal microsomes

Boise State College of Arts and Sciences
Mini-Development Grant and Service 05/01/11 - 05/01/12 1% effort
Learning Program
$5,000
Forbey (PI)
Title: Student Educational Experience in Science (SEE Science) Program
The purpose of the Student Educational Experience in Science (SEE Science) Program is to provide opportunities for undergraduate students, graduate students and faculty at Boise State University who conduct research in local habitats to educate Idaho's children and public about the importance of these ecosystems. The first aim of the project is to train undergraduate and graduate students in the Department of Biological Sciences to share their scientific knowledge of local ecosystems with the general public. The second aim is to foster a working relationship between the public and the educators and students at Boise State.

BLM-CESU Award ID: LO9AC15385 06/01/09 - 06/01/11 10% effort
$13,940
Forbey (PI)
Title: Nutritional and chemical quality of winter diets selected by sage-grouse
This research will investigate both nutritional and chemical factors that drive selection of sagebrush for food by sage-grouse during the winter. The ultimate goal is to identify functional habitat use by sage-grouse and will provide land managers with insight based on nutritional ecology of sage-grouse that will compliment existing efforts to conserve and restore quality sagebrush habitat.

NSF Award ID: 0827239 9/15/08 - 8/31/2010 10% effort
$24,800 + $2565 supplement
Forbey (PI)

Symposium: PharmEcology Symposium: A Pharmacological Approach to Understanding Plant-Herbivore Interactions, to be held January 2-6, 2009 in Boston, MA.
This symposium provides an opportunity to define research at the interface of pharmacology and ecology, termed Pharm-Ecology. The new research areas will focus on: 1) mechanisms of absorption, distribution, metabolism and excretion (ADME) of plant secondary metabolites (PSMs) in herbivores; 2) mechanisms of action of PSMs in herbivores; and 3) genetic polymorphisms associated with these two components. The broader impacts of the symposium are to initiate international communication between leaders in ecology and pharmacology that will lead to novel funding opportunities, engage students to new research opportunities and promote diversity

PROFESSIONAL ACTIVITIES

***Presentations, conferences and workshops* – Summary: Since 2008, I have been invited to present 18 seminars or workshops. Of these, 4 were at international conferences and 6 were as an invited speaker in a symposium. I also organized, funded and hosted an international symposium and international workshop.**

2016 Invited Symposium Speaker, Annual symposium at the Department of Ecology, Swedish University of Agricultural Sciences, SLU, Uppsala, Sweden, February 2016.

2015 Invited Seminar Speaker, Grimsö Wildlife Research Station, Department of Ecology, Swedish University of Agricultural Sciences, SLU, Riddarhyttan, Sweden

2015 Invited Seminar Speaker, University of Eastern Finland, Department of Biology, Joensuu, Finland

2015 Invited Workshop Organizer: "Workshop to Expand the Use of Emerging Technology to Understand the Ecology of Avian Herbivores in a Changing Climate" at the International Grouse Symposium, Reykjavik, Iceland, Sept 3, 2015. Supported by NSF-DEB-1540085, JS Forbey, PI

2015 Invited Seminar Speaker, Department of Ecology and Evolutionary Biology, University of Tennessee, Oct 2014.

2014 Invited IGNITE Session Speaker, The Wildlife Society Conference: "The Herbivore's Prescription: A Tale of Wildlife-Directed Bioprospecting", Oct 2014.

2014 Invited Seminar Speaker, Department of Ecology and Evolutionary Biology, University of Tennessee, Oct 2014.

2014 Invited Symposium Speaker for Evolutionary Ecology Symposium: "Molecular mechanisms and ecological consequences of plant chemical defenses in vertebrate herbivores", International Society for Chemical Ecology Meeting, University of Illinois at Urbana-Champaign, July, 2014.

2014 Speaker: 29th Sage & Columbian Sharp-tailed Grouse Workshop: "Detecting palatable plants for sage-grouse in the sagebrush sea". Elko, NV, Jun 2014.

2014 Invited Seminar Speaker, Department of Evolution and Ecology, University of California - Davis, Jan 2014.

2013 Invited Symposium Speaker: Owyhee Research and Restoration Roundup. "Sage-grouse's eye view of habitat quality" Marsing, ID, 23 Oct, 2013.

2013 Invited Symposium Speaker: AAAS Symposium - Mechanisms of Tumor Progression & Cancer Therapeutics. "A co-evolutionary strategy to discovery novel anticancer drugs", Las Vegas, USA, 18 June 2013.

2013 Invited Symposium Speaker: Plant Herbivore Interactions Gordon Conference. "Scaling up dose-response curves: Translation between lab and landscape", Ventura, USA, 24-28 February 2013.

2013 Invited Conference Speaker for Great Basin Consortium Conference 2013: "A hungry sage-grouse's view on habitats and climate"

2011 Invited Seminar Speaker: Department of Biological Science, California State University Fullerton. "Nature's Chemical Arms Race: The defensive strategies of plants and herbivores"

2010 Invited Symposium Speaker: British Ecological Society Annual Symposium 2010: "The integrative role of plant secondary metabolites in ecological systems." University of Sussex, UK, 12 – 14 April, 2010. Invited by Dr. Glenn Iason (Macaulay Institute, Aberdeen, UK). "The herbivore's prescription: A pharmacological perspective on host plant use by herbivores"

2009 Conference Organizer: Society for Integrative and Comparative Physiology Symposium host: "PharmEcology: Integrating Ecological Systems and Pharmacology", Jan 3-7, 2009; http://www.sicb.org/meetings/2009/index.php3. Supported by NSF0827239, JS Forbey, PI

2008 Invited Seminar Speaker: Department of Natural Resource Sciences, Washington State University and Department of Fish & Wildlife Resources, University of Idaho, "Behavioral, physiological and biochemical offenses of mammalian herbivores against plant chemical defenses"

***Collaborators and other affiliations* – Summary: Since 2008, I have initiated collaborations with 10 new researchers from 8 different universities*. These new collaborations have resulted in published manuscripts, funded NSF grants (in 2011 and 2013) and an NIH grant (in 2014). I have also recruited an Australian Fulbright Scholar as a new collaborator.**

Collaborators: J. Beck* (U Wyoming), J. Bryant* (University of Alaska); C. Dadabay* (College of Idaho), M.D. Dearing (University of Utah); J. Connelly* (ID Dept. Fish and Game); W.J. Foley (Australian National University); M Horn (California State University, Fullerton); K. Keilland* (University of Alaska, Fairbanks); J.G. Lamb (University of Utah); S. McLean (University of Tasmania); G. Patricelli*, (Univ California Davis). A. Poore (University of New South Wales); J. Rachlow* (University of Idaho); L. Shipley* (Washington State University), J. Vucetich* (Michigan Tech University), D. Xu* (Idaho State University)

Graduate and Postdoctoral Advisors: Ph.D. Advisor: M.D. Dearing (University of Utah); Postdoc Advisors: W.J. Foley (Australian National University); S. McLean (University of Tasmania); B. McLeod (AgResearch Invermay)

Postdoctoral Scholars Sponsored at Boise State (2 since 2008): Dr. Xinzhu Pu from China: Aug 2010-Oct 2011, Dr. Natasha Wiggins (University of Tasmania) as an Australian Fulbright Scholar: Feb 2012-Aug 2013.

TEACHING

Summary: **Since 2008, I have developed and taught 9 different courses: 2 are part of the core curriculum*, 1 is a Disciplinary Lens (DL) introduction course, 1 is a Finishing Foundation (FF) course for seniors, 3 were graduate seminar courses. I have also provided 36 students with independent study opportunities to conduct research for 52 total credits.**

- BIOL 191*: General Biology I* (Disciplinary Lens Course)
- BIOL 192*: General Biology II*
- BIOL 297: Scientific Immersion – undergraduate research development
- ZOOL 409/509: Comparative Animal Physiology (Finishing Foundation Course)
- BIOL 496: Independent study (every semester, 22 total undergraduates)
- BIOL 497/597: Physiological Ecology
- BIOL 497/597: Plant-Herbivore Interactions

- BIOL 497/597, BIOL 498/598: Science and Society (previously Sagebrush Habitat Ecology)
- BIOL 598 - Graduate Seminar: Microbial Ecology
- BIOL 598: Graduate Seminar: Foraging Ecology
- BIOL 598: Graduate Seminar: Chemical Ecology

MENTORING

Summary: Since 2008, I have mentored and directly supervised 55 undergraduate students, 3 high school students and 7 K-12 teachers in my laboratory: 3 received funding from the NSF Idaho EPSCoR, 4 from the STEP program, 3 from the NSF LSAMP, 3 from NIH INBRE and one from the McNair Program. Of the 8 graduate students I have mentored, 6 have been supported from external funding for at least 1 semester and 5 received a student research grant for their research. I have graduated 5 graduate students, 2 are successfully pursuing PhDs and the others have full time positions in a Biology career. Since 2008, the graduate and undergraduate students in my lab collectively presented 56 research posters or presentations at regional or national meetings and received 6 awards for their presentations.

Supervising graduate students

Thesis Advisees (8 total since 2008, 5 have graduated):

Current major advisor (Chair):

Dan Melody, M.S. Biology, Teaching Assistantship funded by Department of Biological Sciences.

Zoe Tinkle, M.S. Biology, Research funded by Army National Guard, Teaching Assistantship funded by Department of Biological Sciences.

Jordan Nobler, M.S. Biology, Research Assistantship funded by NSF-DEB

Previous major advisor of graduated students:

Amy Ulappa, M.S. Biology awarded 2011, Research Assistantship funded by the Bureau of Land Management, Teaching Assistantship funded by Department of Biological Sciences and the NSF K-12 program. Currently PhD candidate at Washington State University

Jamie Utz, M.S. Raptor Biology awarded 2012, Research Assistantship funded by the Bureau of Land Management, Teaching Assistantship funded by Department of Biological Sciences. Currently employee for Idaho Department of Fish and Game.

Graham Frye, M.S. Biology awarded 2012, Research Assistantship funded by Idaho Department of Fish and Game. Currently PhD candidate at University of Alaska Fairbanks.

Jessie Sherburne, M.S. Raptor Biology, Teaching Assistantship funded by Department of Biological Sciences Raptor Program. Currently a full time lecturer in the Department of Biological Sciences at Boise State University.

Marcella Fremgen, M.S. Biology, Research Assistantship funded by Idaho Department of Fish and Game. Currently full time position with the Rocky Mountain Bird Observatory.

Current thesis committee member:

Juliette Rubin, M.S. Biology
Stephanie Coates, M.S. Biology
Peggy Martinez, M.S. Biology
Meghan Camp Ph.D. Biology, Washington State University

Previous thesis committee member of graduated students:

John O'keefe, M.S. Raptor Biology

Robert Miller, M.S. Raptor Biology
Heidi Ware, M.S. Biology
Xochi Campos, M.S. Biology
Matt Schmasow, M.S. Biology
Martha Brabec, M.S. Biology

SERVICE –

Professional Service in Discipline

Provided a student mentor program for undergraduates, graduates and postdocs at the Society for Integrative and Comparative Physiology Symposium: "PharmEcology: Integrating Ecological Systems and Pharmacology"

Grant Reviewer

NSF - International Collaborations in Organismal Biology Between US and Israeli Investigators (*ICOB*), ad hoc
NSF- Integrative Organismal Systems (OIS) full proposal panel, November 2013

Ad hoc Manuscript Reviewer

Ecology
Journal of Animal Behavior
Oecologia
Journal of Chemical Ecology
Journal of Veterinary Pharmacology and Therapeutics
Biochemical Systematics and Ecology
Journal of Experimental Zoology
Behavioral Ecology
Wildlife Biology

Membership to Professional Societies

Sigma Xi - The Scientific Research Society. My membership has allowed seven graduate and undergraduate students to submit grant application for support of their research to this society. Two have received funding.
The Idaho Chapter Wildlife Society. I have judged posters and presentations and am currently on the student research grant proposal review committee.
Society for Comparative and Integrative Biology. I have judged posters and presentations at their conferences and hosted a symposium at their conference.

Institutional Service

Departmental service:

Co-Chair Undergraduate Curriculum Reform Committee
Faculty search committee member for a Physiologist position for the Biomolecular PhD program in the Department of Biological Sciences.
Faculty search committee member for a Zoologist in the Department of Biological Sciences.
Committee member to develop the Workload Policy for our Department
Committee member for Graduate Student Admissions
Committee member for Research Development
Recruited 10 different national and international seminar speakers and provided opportunities for students, faculty and conservation agencies to meet and network with speakers
Developed a Science Honors Course (Scientific Immersion) that will help recruit and train undergraduates in research in our department:

Description of Science Honors Course: This is a competitive honors course for students interested in gaining skills to become a successful researcher in the biological sciences. The course focuses on experiential learning for students through research in ecology, physiology, evolution and organismal biology. The program requires that students complete five different scientific immersion modules:

- *Module A: Safety, library skills, time management (10 hrs)*
- *Module B: Writing skills (14 hours)*
- *Module C: Seminar speaking skills (8 hours)*
- *Module D: Laboratory and/or field training (25 hrs)*
- *Module E: Career Choices Electives (12 hrs): 1. Quantitative methods; 2. Conservation agencies; or 3. Teaching and learning*

College and University service:

Member of Institutional Animal Care and Use Committee
College of Arts and Sciences Tenure and Promotion review committee member
Faculty mentor, panel speaker and application reviewer for undergraduates involved in NSF STEP, NSF EPSCoR, NIH INBRE, NSF and LSAMP
Seminar on research opportunities for high school students at the 8th annual Capital Scholars program
Mentor for Idaho Science and Aerospace Scholars Mission to Mars: Biology and physiology of living on Mars

***Public or Community Service* - Summary: Since 2008, I have presented 10 public seminars to broaden the public's view on local wildlife issues.**

Science education and outreach: We developed IdahoWatch to: (1) educate teachers and their students about local research and conservation, (2) identify resources for teachers in the field that can be used for research projects in the classroom, (3) provide opportunities for students to experience how the scientific method is used to solve real-world conservation problems in the field, and (4) promote communication of science. http://theidahowatch.wix.com/idahowatch

Public seminars:

Sage-grouse state advisory committee (3)
BLM Boise District Resource Advisory Council (RAC)
Regional Sage-grouse Local Working Groups in Idaho (4)
Osher Lifelong Learning Institute at Boise State (2)

Media attention related to research

http://www.youtube.com/watch?v=_Nr5ezlfYM4

http://news.boisestate.edu/update/2013/06/13/researchers-to-use-small-unmanned-plane-to-test-wildlife-habitat-quality-in-remote-areas/

http://www.mtexpress.com/index2.php?ID=2005137389

http://www.foxnews.com/us/2013/06/16/scientists-hunt-for-rabbit-habitat-with-military-style-drones/

http://seattletimes.com/html/localnews/2021196039_apiddronehabitathunting.html

http://www.oregonlive.com/pacific-northwest-news/index.ssf/2013/06/drone_to_study_rabbit_habitat.html

http://www.idahostatejournal.com/news/local/article_c9355fda-d7e2-11e2-99b6-001a4bcf887a.html

http://www.columbian.com/news/2013/jun/18/drone-aircraft-to-study-rabbit-habitat/

http://www.saltlakecitysun.com/index.php/sid/215227163/scat/bcecd7f88c90b7a3

http://www.idahostatesman.com/news/local/environment/article41568135.html

http://www.ktvb.com/story/news/local/2015/06/19/drone-sagegrouse-pygmy-rabbits-forbey/28990919/

http://news.yahoo.com/scientists-fly-drones-map-sagebrush-wildfire-strategy-073642304.html

ERIC J. HAYDEN

Assistant Professor
Boise State University
Biological Sciences
1910 University Dr.
Boise, ID 83725
erichayden@boisestate.edu

EDUCATION

Postdoctoral Scholar, 2011-2013, Bioengineering, Stanford University, Stanford, CA.

Postdoctoral Scholar, 2008-2011, Institute of Evolutionary Biology, University of Zurich, Zurich, Switzerland.

Ph.D. Chemistry, 2008, Department of Biochemistry, Portland State University, Portland, OR
Dissertation: The original build-up of genetic information by RNA recombination

B.S. Chemistry, 2002, Linfield College, McMinnville, OR

RESEARCH INTERESTS

Ribozymes, Riboswitches, Directed Evolution, Systems Science of RNA populations, Synthetic Biology

PUBLICATIONS

First author

Hayden EJ, Bendixsen DP, Wagner A. (2015) Intramolecular phenotypic capacitance in a modular RNA molecule. *PNAS* 112, 12444–12449.

Hayden EJ, Bratulic S, Koenig I, Wagner A. (2014) The effects of stabilizing and directional selection on phenotypic and genotypic variation in a population of RNA enzymes. *J Mol Evol* 78:101–108. doi: 10.1007/s00239-013-9604-x.

Hayden EJ, Weikert C, Wagner A. (2012) Directional Selection Causes Decanalization in a Group I Ribozyme. *PLoS ONE* 7 e45351.

Hayden EJ, Wagner A (2012). Environmental change exposes beneficial epistatic interactions in a catalytic RNA. *Proceedings of the Royal Society B: Biological Sciences* 279(1742):3418-25.

Hayden EJ, Ferrada E, Wagner A (2011). Cryptic genetic variation promotes rapid evolutionary adaptation in an RNA enzyme. *Nature* 474: 92-95.

Hayden EJ, von Kiedrowski G, Lehman N (2008). Systems Chemistry on ribozyme self-construction: Evidence for autocatalysis in a recombination network. *Angewandte Chemie International Edition English* 47(44): 8424-8428.

Hayden EJ, Lehman N (2006). Self-assembly of a group I intron from inactive oligonucleotide fragments. *Chemistry & Biology* 13: 909-918.

Hayden EJ, Riley CA, Burton AS, Lehman N (2005). RNA-directed construction of structurally complex and active ligase ribozymes through recombination. *RNA* 11: 1678-1687.

Co-author

Vaidya N, Manapat M, Chen I, Xulvi-Brunet R, **Hayden EJ**, Lehman N (2012). Spontaneous network formation among cooperative RNA replicators. *Nature* 491: 72–77.

Draper WE, **Hayden EJ**, Lehman N (2008). Mechanisms of covalent self-assembly of the Azoarcus ribozyme from four fragment oligonucleotides. *Nucleic Acids Research* 36:520-531.

Zenisek SM, **Hayden EJ**, Lehman N (2007). Genetic exchange leading to self-assembling RNA species upon encapsulation in artificial protocells. *Artificial Life* 13: 279-289.

Invited commentary

Lehman N, **Hayden EJ** (2011). Template-directed RNA Polymerization: The Taming of the Milieu. *ChemBioChem* doi:10.1002/cbic.201100611

NEWS & VIEWS

Draghi JA & Plotkin JB. Molecular evolution: Hidden diversity sparks adaptation. *Nature* **474**, 45-46 (2011).

Seelig, B. An autocatalytic network for ribozyme self-construction. *Nat Chem Biol* **4**, 654-655 (2008).

Keim, B. Cryptic mutations could be evolution's hidden fuel. [online] Available: http://www.wired.com/wiredscience/2011/06/cryptic-variation/

AWARDS AND HONORS

Research Grant, National Science Foundation (Molecular and Cellular Biology) "An Empirical Examination of the Evolution of Innovation", 2014-2016.

Research Grant, Idaho INBRE "Exploration of Ribozyme landscapes", Summer 2014.

Outstanding Presentation, "Selecting for evolvable variants of a group I ribozyme", University of Zurich/ETH University Research Priority Program Systems Biology/Functional Genomics Retreat, 2010.

*Research Grant, "*Analysis of RNA evolution in vitro", University of Zurich and ETH Research Priority Program: Systems Biology/Functional Genomics, 2009-2012. This is a competitive intramural funding program between the ETH and University of Zurich.

Fellowship, NSF Central European Summer Research Institute (CESRI), 2007.

Outstanding Graduate Student Research, Gordon Research Conference: Origin of Life, 2008.

Graduate Student of the Year, Department of Chemistry Portland State University, 2007-2008 academic year.

PRESENTATIONS

"Intramolecular Phenotypic Capacitance in an RNA enzyme", oral presentation at The RiboClub Annual Meeting 2014, in conjunction with The Yale RNA Center, Magog, Quebec, Canada (2014).

"Cryptic variation promotes rapid adaptation in an RNA enzyme", oral presentation at the Swiss Institute of Bioinformatics annual meeting (2011).

"Selecting for evolvable variants of a group I ribozyme", poster presentation at the Systems Chemistry: Evolvability and Systems, ESF-COST High-level Research Conference, Balatonfüred, Hungary (2009).

"Autocatalysis in a self-organizing network of RNA", poster presentation at the Gordon Research Conference: Origins of Life, Ventura, CA (2008).

"Self-assembly and autocatalytic self-replication of a group I intron", oral presentation at the Volcano Conference: Bioorganic Chemistry, Pack Forrest, WA (2007).

"Self-assembly and autocatalytic self-replication of a group I intron", poster presentation at The Annual Meeting of the RNA Society, Seattle WA, (2006).

"Construction of structurally-complex ligase ribozymes through RNA-directed recombination", poster presentation at the Volcano Conference in Bioorganic Chemistry, Pack Forrest, WA (2005).

TEACHING

BMOL 601 Biomolecules I: DNA and RNA, Fall 2013-present
BIOL 570 Biotechnology and Genetic Engineering, Spring 2014
BMOL 613 Molecular Genetics, Spring 2015

ADDITIONAL ACTIVITIES

Exhibit Volunteer – Darwin Year Celebration, 2009, Zurich Hauptbahnhof. We built a physical phylogenetic tree of life, out of actual logs. Each node contained information about that branch on the tree (flowering plants, fungi, marsupials, etc.). I curated the Origin of Life node, comprised of a slide show and actual stromatolites, and explained it (English version) to people passing through the train station.

Journal Reviewer – Nature Reviews Genetics, Journal of Molecular Evolution, Biochemistry, PLoS Computational Biology, Molecular Biology and Evolution

Grant Review Panel – NASA Exobiology

CURRICULUM VITAE

JULIE A. HEATH, PH.D.

Department of Biological Sciences
Raptor Research Center
Boise State University
1910 University Dr.
Boise, ID 83725-1515
Phone: (208) 426-3208
e-mail: julieheath@boisestate.edu

EDUCATION

Ph.D. 2002 Wildlife Ecology and Conservation - University of Florida, Gainesville, FL
White Ibis (*Eudocimus albus*) reproductive physiology. P.C. Frederick (advisor)

M.S. 1996 Raptor Biology - Boise State University, Boise, ID
Effect of body condition on the adrenal stress response, and the role of corticosterone in American Kestrel nest departure and post-fledging dispersal. A.M. Dufty, Jr. (advisor)

B.S. 1993 Zoology - University of California, Davis, CA

APPOINTMENTS

2013-present Graduate Coordinator, Department of Biological Sciences, Boise State University, ID
2012-present Associate Professor, Department of Biological Sciences, Boise State University, ID
2007-2012 Assistant Professor, Department of Biological Sciences, Boise State University, ID
2003-2007 Assistant Professor, Department of Biology, Hofstra University, NY
2002-2003 Adjunct Professor, Saint Leo University, FL
1998-2002 Research Assistant**,** Department of Wildlife Ecology and Conservation, University of Florida, Gainesville, FL
2000-2001 Teaching Assistant, Department of Biological Sciences, University of Florida, FL

TEACHING

Boise State University

Biometry – graduate lecture
Conservation Biology – undergraduate & graduate lecture
Animal Behavior – undergraduate & graduate lecture and laboratory
Occupancy Modeling – graduate lecture
Applied Raptor Biology – graduate field course
Graduate Special Topics – Statistical programming in R, Data presentation in R, Communication and Science

Hofstra University

Human Anatomy and Physiology I & II – non-majors undergraduate lecture and laboratory
Ecology – undergraduate lecture
Ornithology – undergraduate & graduate lecture and laboratory
Human Biology – non-majors undergraduate laboratory
Ecology, Evolution and Behavior – undergraduate lecture and laboratory
Animal Migration – undergraduate & graduate lecture and laboratory
Graduate Special Topics – Experimental design and data analysis in SAS, Evolution of parental care

GRANTS AND AWARDS

Pending

Department of the Interior Idaho Bureau of Land Management Challenge Cost Share Grant ($68,872) PI. Adaptive management of wildfires: How effect are post-fire treatments at restoring wildlife communities in shrub-steppe ecosystems.

National Science Foundation ($849,000, Coupled Human and Natural Systems) PI. Loved to Death? Coupled relationships between outdoor recreation and wildlife on public lands.

Awarded

2015 **Department of the Interior** U.S. Fish and Wildlife Service ($60,000) PI. The ecology and conservation of golden eagles in the Northern Great Basin.

Osher Faculty Research Award ($5,000) PI. The use of stable isotopes in claws to distinguish between migratory and non-migratory American kestrels.

Department of the Interior U.S. Fish and Wildlife Service ($28,500) PI. The role of trichomoniasis and ectoparasites in golden eagle nesting ecology: prevalence, factors that affect infection risk, and population-level consequences.

2014 **Department of the Interior** U.S. Fish and Wildlife Service ($52,040) Co-PI. Golden eagle dietary responses in relation to habitat alteration and climate change in the Morley Nelson Snake River Birds of Prey National Conservation Area.

Department of the Interior Idaho Bureau of Land Management ($32,000) PI. Analysis and modeling of golden eagle diets in the Morley Nelson Snake River Birds of Prey National Conservation Area.

Boise State University College of Arts and Sciences travel grant ($400).

2012 **National Science Foundation** ($162,500, BIO-DEB-1145552, 2 REU supplements) PI. RUI: Climate change and birds: links among earlier nesting, migratory strategies, and warmer winters.

2011 **Department of the Interior** Idaho Bureau of Land Management Challenge Cost Share Grant ($58,054) PI. A collaborative, adaptive management approach to study the effects of off-highway vehicle trail closures on golden eagle territory occupancy, behavior, and nest survival.

Department of the Interior U.S. Geological Survey ($22,737) Co-PI. Graduate student support for current versus historical trends in habitat use by wintering raptors in the Morley Nelson Snake River Birds of Prey National Conservation Area.

Boise State University College of Arts and Sciences travel grant ($400).

Corporation for National and Community Service and Washington Campus Compact ($500) mini-grant for Service Learning in STEM disciplines

2010 **Department of the Interior** Idaho Bureau of Land Management Challenge Cost Share Grant ($51,389) PI: Wintering raptor habitat use in the Morley Nelson Snake River Birds of Prey National Conservation Area.

Boise State University College of Arts and Sciences travel grant ($400).

2009 **Idaho's Accomplished Under 40 Award** given by Idaho Business Review

2008 **Boise State University** College of Arts and Sciences travel grant ($400).

2007 **Department of Defense** United States Army Engineer Research and Development Center ($172,750) PI: How do coastal engineering and human disturbance affect the distribution of nesting snowy plovers in the Florida Panhandle?

Boise State University College of Arts and Sciences ($500) mini-development grant for BIOL 605: Applied Raptor Biology

2006 **New York State Biodiversity Research Institute** ($22,769) PI. Effects of predator exclosures and predator visits on piping plover incubation behavior and hatching success.
Hofstra University Faculty Research and Development Grant ($1,400)
2005 **Hofstra University** Faculty Research and Development Grant ($1,500)
2004 **Hofstra University** Presidential Research Award ($433).
Hofstra University Faculty Research and Development Grant ($1,100)
2002 **Florida Keys Audubon Society Graduate Scholarship** ($500)
2001 **University of Florida** Graduate Student Council Travel Award ($200)
Florida Institute of Food and Agricultural Sciences Travel Grant ($150)
1999 **University of Florida** Graduate Student Council Travel Award ($200)
1996 **International Symposium of Avian Endocrinology** Travel Award ($300)
1995 **Bergstrom Memorial Fund Research Grant** Student Research Award ($500)
Outstanding Teaching Assistant Department of Biology, Boise State University

Internal or External Sub-Awards Supporting Undergraduate Research

2014-2015 **National Science Foundation Research Experience for Undergraduate (REU) site award in Raptor Research** Mentor for 3 undergraduate researchers.
2013-2015 **National Science Foundation, Idaho EPSCoR MURI program** Mentor for 4 undergraduate researchers.
2010, 2011 **National Institute of Health Idaho INBRE Program** (P20 RR016454 and P20 GM103408). Mentor for 2 undergraduate researchers.
2009, 2012 **National Science Foundation, Idaho EPSCoR Research Experience for Undergraduates** Mentor for 2 undergraduate researchers.
2009-2015 **Boise State University Provost's Office** Mentor for 6 undergraduate work study researchers.

PUBLICATIONS

(*graduate student, +undergraduate student. Beginning in 2015, papers from the Heath lab list Heath as the last author, in years prior to 2015 Heath was listed as second author.)

Peer-reviewed papers

Harrison, J, M Kochert, B.P. Pauli and J.A. Heath. *In prep*. The use of trail cameras in studies of cliff-nesting raptors. *Journal of Raptor Research*.

Spaul, R.J.* and **J.A. Heath**. *In review*. Flight initiation responses of Golden Eagles (*Aquila chrysaetos*) to motorized and non-motorized recreation. *Journal of Field Ornithology.*

Pauli, B.P., Spaul, R.J.* and **J.A. Heath**. *In review*. Forecasting the effects of human disturbance on wildlife populations using an individual-based model: changes in wildlife tolerance are not enough to mitigate negative effects of increased recreation on wild lands. *Ecological Applications.*

Spaul, R.J.* and **J.A. Heath**. *In review*. Effects of non-motorized and motorized recreation on the breeding biology of golden eagles (*Aquila chrysaetos*) in shrub-steppe habitats. *Ecological Applications.*

Nolte, E.G.*, J. Bart, B.P. Pauli, G. Kaltenecker, and **J.A. Heath**. *In review*. Detectability of migrating raptors and its effect on bias and precision in trend estimates. *Avian Ecology and Conservation*

Pauli, B.P., E.R. Sun, Z.K. Tinkle, J.S. Forbey, K.E. Demps, and **J.A. Heath**. *In review*. Human habitat selection: Using tools from landscape ecology to predict human use of natural

landscapes. *Ecology and Society*.

Anderson*, A.M., S.J. Novak, J.F. Smith, K. Steenhof, and **J.A. Heath**. *In press*. Nesting phenology, mate choice, and genetic divergence within a partially migratory population of American kestrels. *Auk: Ornithological Advances*.

Sassani, E.C. [+], C. Sevy[+], E.H. Strasser*, A.M. Anderson*, and **J.A. Heath**. 2015. Plasma carotenoid concentrations of incubating American kestrels (*Falco sparverius*) show annual, seasonal, and individual variation and predict reproductive outcome. *Biological Journal of the Linnean Society*. DOI: 10.1111/bij.12653

McClure, C.J.W., A.C. Korte*, **J.A. Heath**, and J.R. Barber. 2015. Pavement and riparian forest shape the bird community along an urban river corridor. *Global Ecology and Conservation* 4:291-310. DOI::10.1016/j.gecco.2015.07.004

Paprocki, N.*, N. Glenn, E. Atkinson, K. Stirckler, C. Watson, and **J.A. Heath.** 2015. Changing habitat use associated with distributional shifts of wintering raptors. *Journal of Wildlife Management*. 79:402–412. DOI: 10.1002/jwmg.848

Miller, R.A., J.D. Carlisle, N. Paprocki, G.S. Kaltenecker, and **J.A. Heath**. 2015. Annual variation in autumn migration phenology and energetic condition at a stopover site in the western United States. Pp. 177–191 in E. M. Wood and J. L. Kellermann (editors), Phenological synchrony and bird migration: changing climate and seasonal resources in North America. *Studies in Avian Biology* (no. 47), CRC Press, Boca Raton, FL.

Paprocki, N.*, **J.A. Heath**, and S.J. Novak. 2014. Regional distribution shifts help explain local changes in wintering raptors: Implications for interpreting population trends. *PLoS One* e86814.

Strasser, E.H.* and **J.A. Heath**. 2013. Reproductive failure of a human-tolerant species, the American kestrel, is associated with stress and human disturbance. *Journal of Applied Ecology* 50:912-919.

Steenhof, K. and **J.A. Heath.** 2013. Local recruitment and natal dispersal distances in American kestrels. *The Condor* 115:584–592.

Webber, A.F.*, **J.A. Heath**, and R.A. Fischer. 2013. Human disturbance and stage-specific habitat requirements influence snowy plover site occupancy during the breeding season. *Ecology and Evolution* 3:853-863 doi:10.1002/ece3.511.

Heath, J.A., K. Steenhof, and M.A. Foster[+]. 2012. Shorter migration distances associated with warmer winter temperatures suggest a mechanism for advancing nesting phenology of American kestrels. *Journal of Avian Biology* 43:376-384.

Heath, J.A., E.H. Strasser[*], M.A. Foster[+], L. Bardo, and D.M. Bird. 2011. Challenges in creating an American kestrel body condition index based on size-adjusted mass. *Journal of Raptor Research* 45:324-334.

Strasser, E.H.* and **J.A. Heath**. 2011. Effects of developmental conditions on nestling American Kestrel (*Falco sparverius*) corticosterone concentrations. *General and Comparative Endocrinology* 173:164-170. doi:10.1016/j.ygcen.2011.05.010

Doherty, P.J.* and **J.A. Heath**. 2011. Factors affecting piping plover hatching success on Long Island, New York. *Journal of Wildlife Management* 75:109-115.

McIntyre, A.F.*, and **J.A. Heath**. 2011. Evaluating the effects of foraging habitat restoration on shorebird reproduction: the importance of performance criteria and comparative design. *Journal of Coastal Conservation* 15:151-157.

Leonard, D.L., Jr. and **J.A. Heath**. 2010. Foraging strategies are related to skull morphology and life history traits of Melanerpes woodpeckers. *Journal of Ornithology* 151:771-777.

McIntyre, A.F.*, **J.A. Heath**, and J. Jannsen. 2010. Trends in piping plover reproduction at Jones Beach State Park, NY, 1995-2007. *Northeastern Naturalist* 17:493-504.

Steenhof, K. and **J.A. Heath**. 2009. American kestrel reproduction: evidence for the selection hypothesis and the role of dispersal. *Ibis* 151:493-501.

Heath, J.A., and P.C. Frederick. 2006. White ibis integument color during the breeding season. *Journal of Field Ornithology* 77:141-150.

Frederick, P.C., **J.A. Heath**, R.E. Bennetts, and H. Hafner. 2006. Estimating nests not present at the time of breeding surveys: an important consideration in assessing nesting populations. *Journal of Field Ornithology* 77:212-219.

Heath, J.A., and P.C. Frederick. 2005. Relationships among mercury concentrations, hormones, and nesting effort of white ibises in the Florida Everglades. *Auk* 122:255-267.

Frederick, P.C., B. Hylton, **J.A. Heath**, and M.G. Spalding. 2004. A historical record of mercury contamination in southern Florida (USA) as inferred from avian feather tissue. *Environmental Toxicology and Chemistry* 23:1474–1478.

Lott, C.A., T.D. Meehan, and **J.A. Heath**. 2003. Estimating the latitudinal origins of migratory birds using hydrogen and sulfur isotopes in feathers: influence of marine prey base. *Oecologia* 134:505-510.

Heath, **J.A.**, P.C. Frederick, T. Edwards, and L.J. Guillette Jr. 2003. Reproductive physiology of free-living white ibises (*Eudocimus albus*) in the Florida Everglades. *General and Comparative Endocrinology* 133:118-131.

Frederick, P.C., B. Hylton, **J.A. Heath,** and M. Ruane. 2003. Accuracy and variation in estimates of large numbers of nesting birds by individual observers: a controlled simulation. *Journal of Field Ornithology* 74:281-287.

Heath, **J.A.**, and P.C. Frederick. 2003. Trapping white ibises with rocket nets and mist nets in the Everglades. *Journal of Field Ornithology* 74:187-192.

Epanchin, P.N., **J.A. Heath**, and P.C. Frederick. 2002. Effects of fires on foraging and breeding wading birds in the Everglades. *Wilson Bulletin* 114:139-141.

Heath, J.A., and A.M. Dufty Jr. 1998. Body condition and the adrenal stress response in captive American kestrel juveniles. *Physiological Zoology* 71:67-73.

Heath, J. 1997. Corticosterone levels during nest departure of juvenile American kestrels. *Condor* 99:806-811.

<u>Published data and models</u>

Heath, J.A. 2015. Data from: Plasma carotenoid concentrations of incubating American kestrels (*Falco sparverius*) show annual, seasonal, and individual variation and explain reproductive outcome. Dryad Digital Repository. doi:10.5061/dryad.98c7s

<u>Invited reviews and published abstracts</u>

Paprocki, N., E.G. Nolte, S.J. Novak, G. Kaltenecker, J.R. Bart, and **J.A. Heath**. 2014. How responses of raptors to climate change affects the reliability and interpretation of population trend estimates. *Northwestern Naturalist* 95:129-171.

Anderson, A.M.*, **J.A. Heath**, J. Smith, S. Novak, E. Stolen, and K. Stennhof. 2014. Assortative mating as a mechanism for advancing nesting phenology in American kestrels (*Falco sparverius*). *Northwestern Naturalist* 95:129-171.

Nolte, E.G.*, **J.A. Heath,** and G. Kaltenecker. 2011. Detectability of migrating raptors: project update. *Hawk Migration Studies*.

Heath, J.A. and E.G. Nolte*. 2009. Detectability of migrating raptors at Lucky Peak, Idaho. *Hawk Migration Studies* XXXIV:16-17.

Heath, J.A., P.C. Frederick, J.A. Kushlan and K.L. Bildstein. 2009. White Ibis (*Eudocimus albus*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology;

Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/009 doi:10.2173/bna.9

Heath, J.A. 2008. *Review of* "Raptors of Western North America and Raptors of Eastern North America" by B. Wheeler. *Journal of Field Ornithology*. 79:342-343.

PAPER AND POSTER PRESENTATIONS (*graduate student, + undergraduate student)

2015 Annual Meeting: Raptor Research Foundation. Sacramento, CA. Candidate for Anderson Award, Paper: Prevalence and risk factors for infection of *Trichomonas gallinae* in western golden eagle nestlings. Presented by (B. Dudek*)

Annual Meeting: Raptor Research Foundation. Sacramento, CA. Symposium Paper: The benefits of staying: how warming winters, migration strategies, and seasonal declines in fecundity drive earlier nesting in a partial migrant (with A.M. Anderson*, M.T. Henderson+, B.P. Pauli)

Annual Meeting: Raptor Research Foundation. Sacramento, CA. Paper: Golden eagle dietary responses to habitat alteration in the Morley Nelson Snake River Birds of Prey National Conservation Area, Idaho. Presented by: M.N. Kochert (with K. Steenhof)

Annual Meeting: Raptor Research Foundation. Sacramento, CA. Paper: Demography of the American kestrel lends insight into potential causes of population declines and suggests future research needs. Presented by: C.J.W. McClure (with J.L. Brown, K. Steenhof)

Annual Meeting: Raptor Research Foundation. Sacramento, CA. Symposium Paper: The implication of climate change on the diet of a key Arctic predator, the gyrfalcon. Presented by: B. Robinson* (with M. Bechard, D. Anderson)

Annual Meeting: Raptor Research Foundation. Sacramento, CA. Symposium Paper: Is earlier nesting by American kestrels (*Falco sparverius*) driven by changes in the timing of spring? Presented by S.H. Smith* (with C.J.W. McClure, K. Steenhof)

Annual Meeting: Raptor Research Foundation. Sacramento, CA. Candidate for Anderson Award, Paper: Recreation disturbance to golden eagles (*Aquila chrysaetos*): Biological consequences, behavioral mechanisms, and management implications. Presented by R. Spaul*

Annual Meeting: Raptor Research Foundation. Sacramento, CA. Poster: Evaluating the use of trail cameras to study diet, behavior, and productivity in cliff nesting golden eagles (*Aquila chrysaetos*). Presented by: J. Harrison (with M.N. Kochert)

Annual Meeting: Raptor Research Foundation. Sacramento, CA. Poster: The use of hydrogen stable isotopes in claws to distinguish between migratory and resident birds in a partial migrant population of American kestrels (*Falco sparverius*). Presented by: C.M. Hartmann+ (with S.L. Evans, M.J. Kohn)

Annual Meeting: Raptor Research Foundation. Sacramento, CA. Poster: Effects of hematophagous parasites on golden eagle nestling physiology and stress. Presented by M.T. Henderson+ (with B. Dudek)

Annual Meeting: Raptor Research Foundation. Sacramento, CA. Poster: Consequences of timing: How does synchronization between brood rearing and prey abundance affect American kestrel (*Falco sparverius*) reproduction? Presented by S.K. Rosebrook+ (with S.H. Smith*)

Annual Meeting: Raptor Research Foundation. Sacramento, CA. Poster: Human disturbance and golden eagle populations: Investigating the effects of recreation and eagle tolerance using individual-based models. Presented by R. Spaul* (with B.P. Pauli)

Boise State University's Summer Undergraduate Research Conference. Boise, ID. Poster: Consequences of timing: How does synchronization between brood rearing and prey availability affect American kestrel (*Falco sparverius*) reproduction? Presented by S.K. Rosebrook[+] (with S.H. Smith[*])

Boise State University's Summer Undergraduate Research Conference. Boise, ID. Poster: Stressed: Physiological effect of hematophagous parasites on Golden Eagle nestlings in the Snake River Canyon. Presented by M.T. Henderson[+] (with B. Dudek[*])

Boise State University's Summer Undergraduate Research Conference. Boise, ID. Poster: Distinguishing migratory and resident American kestrel (*Falco sparverius*) populations using hydrogen stable isotopes in claws. Presented by C.M. Hartmann[+] (with S.L. Evans, M.J. Kohn)

Annual meeting: American Ornithologists' Union, and Cooper Ornithological Society. Tulsa, OK. Paper: Demography of the American Kestrel lends insight into potential causes of population declines and suggests future research needs. Presented by C.J.W. McClure (with J.L. Brown, K. Steenhof).

Boise State University's Spring Undergraduate Research Conference. Boise, ID. Poster: Habitat features predict the distribution of recreational shooters in the Morley Nelson Snake River Birds of Prey National Conservation Area. Presented by E. R. Sun[+] (with B. P. Pauli, Z. Tinkle, R. Mukuna, D. Wolfe, J. S. Forbey)

Boise State University's Spring Undergraduate Research Conference. Boise, ID. Poster: Does personality affect the probability that Piute ground squirrels will be shot by recreational hunters? Presented by D. Wolfe[+] (with Z. Tinkle, B.P. Pauli, E.R. Sun, R. Mukuna, J.S. Forbey, B. Leavell)

Boise State University's Spring Undergraduate Research Conference. Boise, ID. Poster: Determining the density and fate of Piute ground squirrel carcasses in the Snake River Birds of Prey National Conservation Area. Presented by R. Mukuna[+] (with B.P. Pauli, Z.K. Tinkle, E.R. Sun, D. Wolfe, J.S. Forbey)

Distinguished Speaker. Idaho State University, Pocatello, ID. <u>Invited paper</u>: Avian survival and reproduction in human-dominated landscapes.

Emerging Researchers National (ERN) Conference in STEM. Washington DC. Poster: Differences in prey items within sagebrush and agricultural hunting territories of American kestrels. Presented by L. Kruger[+] (with S.H. Smith, M. Henderson).

2014 Semi-Annual meeting: The Idaho Bird Conservation Partnership. Boise, ID. Paper: Golden eagle research in Idaho's shrub-steppe. (with R. Spaul, M. Kochert, B.Pauli).

Annual meeting: The Wildlife Society. Pittsburgh, PA. Poster: Mitigating adverse effects of human disturbance on golden eagles (*Aquila chrysaetos*) using an individual-based modeling approach. Presented by L. D'Acunto (with R. Spaul, P. Zollner)

North American Ornithology Conference. Estes Park, CO. Poster: The effect of climate change on available resources for American kestrels (*Falco sparverius*) in southwestern Idaho. Presented by S.H. Smith[*] (with E.H. Urban)

North American Ornithology Conference. Estes Park, CO. Poster: Do resident American kestrels (*Falco sparverius*) maintain territories and pair-bonds year-round in southwestern Idaho? Presented by M. Henderson[+] (with A.M. Anderson, E.H. Urban)

North American Ornithology Conference. Estes Park, CO. Paper: Do carry-over effects on nest initiation and mate choice facilitate population response to climate change in a partial migrant, the American kestrel? Presented by A. Anderson* (with S.J. Novak, J. Smith, K. Steenhof)

North American Ornithology Conference. Estes Park, CO. Poster: The effects of off-highway recreation on the breeding ecology of a shrub-steppe raptor. Presented by R. Spaul*

North American Ornithology Conference. Estes Park, CO. Symposium Paper: Beyond migration banding: understanding factors affecting stopover success in autumn landbird migrants. Presented by J.Carlisle (with R.A. Miller, H.E. Ware, C. J.W. McClure, J.R. Barber, N. Paprocki, , G.S. Kaltenecker).

Annual meeting. Idaho NSF EPSCoR. Boise, ID. Poster: Provide, poison, or compete? How does recreational shooting of ground squirrels affect wildlife valued by bird watchers? Presented by B. Pauli (with Z. Tinkle*, J. Forbey).

Annual meeting. Idaho NSF EPSCoR. Boise, ID. Poster: Environmental impacts as perceived by different recreation groups. Presented by H. Brown+ and K. Araki+ (with R. Spaul*, M. Hubbard, K. Demps).

Undergraduate Research Conference. Boise State University, Boise, ID. Poster: Differences in prey items within sagebrush and agricultural hunting territories of American Kestrels. Presented by L. Kruger+ (with S.H. Smith, M. Henderson).

Undergraduate Research Conference. Boise State University, Boise, ID. Poster: Environmental impacts as perceived by different recreation groups. Presented by H. Brown+ and K. Araki+ (with R. Spaul*, M. Hubbard, K. Demps).

Undergraduate Research Conference. Boise State University, Boise, ID. Poster: Do resident American kestrels (*Falco sparverius*) maintain territories and pair-bonds year-round in southwestern Idaho? Presented by M. Henderson+ (with A.M. Anderson, E.H. Urban)

Annual meeting: Raptor Research Foundation. Corpus Cristi, TX. Symposium paper: Different patterns of nest survival in American Kestrels breeding in temperate and subtropical latitudes. Presented by J. Brown (with K. Steenhof).

National Science Foundation BIO-REU Principal Investigators Conference/Workshop, Arlington, VA. Poster: Hawks, Owls, Falcons, and Eagles: A new REU Site in Raptor Research. Presented by J. Belthoff (with J. Barber, J. Smith, M. Bechard, J. Carlisle, G. Kaltenecker, R. Miller, D. Anderson, C. McClure, R.Watson, R. Thorstrom, D. Perkins).

Symposium: Raptors of the Northwest. Pasco, WA. Invited Paper: How responses of raptors to climate change affects the reliability and interpretation of population trend estimates. Presented by N. Paprocki* (with E.G. Nolte*, S.J. Novak, G. Kalentecker, and J. Bart).

Symposium: Raptors of the Northwest. Pasco, WA. Poster: Assortative mating as a mechanism for advancing nesting phenology in American kestrels (*Falco sparverius*). Presented by A. Anderson* (with S.J. Novak, J. Smith. K. Steenhof, E. Stolen). Awarded Best Student Poster.

Semi-Annual meeting: The Idaho Bird Conservation Partnership. Boise, ID. Paper: Regional distribution shifts help explain local changes in wintering raptor abundance: Implications for interpreting population trends. Presented by N. Paprocki* (with S.J. Novak, and M. Kochert).

Annual meeting: The Wildlife Society Idaho Chapter. Boise, ID. Paper: The effects of off-highway recreation on the breeding behavior of a shrub-steppe raptor. Presented by R. Spaul*.

Annual meeting: The Wildlife Society Idaho Chapter. Boise, ID. Paper: Assortative mating as a mechanism for advancing nesting phenology in American kestrels (*Falco sparverius*). Presented by A. Anderson* (with S.J. Novak, J. Smith, K. Steenhof).

Annual meeting: The Wildlife Society Idaho Chapter. Boise, ID. Poster: The effect of climate change on available resources for American Kestrels (*Falco sparverius*) in southwestern Idaho: Is a predator driven mismatch occurring or will there be one in the future? Presented by S. Smith*.

2013 Annual meeting: Idaho NSF EPSCoR, McCall, ID. Invited Paper: Avian ecology and conservation in a time of global change.

Joint meeting: American Ornithologists' Union, and Cooper Ornithological Society, Chicago, IL. Paper: The effects of handling on the corticosterone stress response and fledging success in American Kestrel nestlings. Presented by E.L. Wonder*

Florida Panhandle Shorebird Working Group. Panama City, FL. Paper: Human disturbance and Snowy Plovers. Presented by A.F. Webber* (with R. Fischer)

Undergraduate Research Conference. Boise State University, Boise, ID. Poster: The impact of diet diversity and prey delivery rates on American Kestrel nestling survival in a drought year. Presented by A. Parrish+ (with E. Urban)

Undergraduate Research Conference. Boise State University, Boise, ID. Poster: Intra-annual patterns in rainfall, NDVI, and small mammal availability for southwestern Idaho. Presented by M.L. Courchane+ (with S. Smith*, T.L. Gleeson*)

Undergraduate Research Conference. Boise State University, Boise, ID. Poster: Heritability of tail coloration in male American kestrels. Presented by E. Tyrrell+ (with J. Braun+)

Undergraduate Research Conference. Boise State University, Boise, ID. Poster: Genetic variation of a local American kestrel population. Presented by J.T. Weeks+ (with A.M. Anderson*, J.F. Smith, S.J. Novak)

2012 North American Ornithology Conference. Vancouver, BC. Paper: Changes in American Kestrel migration and wintering are associated with warner winter temperatures in western North America. (with K. Steenhof and M. Foster+)

North American Ornithology Conference. Vancouver, BC. Paper: Raptors present, yet unobserved: detectability at a western migration watch-site and its effect on trend analysis. Presented by E. Nolte* (with G. Kaltenecker)

North American Ornithology Conference. Vancouver, BC. Invited Paper: Exploring climate impacts on migration timing and energetic condition of autumn migrant raptors and passerines in southwestern Idaho. Presented by J. Carlisle (with R. Miller*, N. Paprocki*, G. Kaltenecker)

North American Ornithology Conference. Vancouver, BC. Poster: Population response to climate change: does assortative mating facilitate earlier nesting? Presented by A.M. Anderson*

North American Ornithology Conference. Vancouver, BC. Poster: Regional management implications from a 20-year historical comparison of wintering raptors in southwest Idaho. Presented by N. Paprocki*

Undergraduate Research Conference. Boise State University, Boise, ID. Poster: Comparing the relative effects of year, seasonality, territory, and individual on American Kestrel carotenoid concentrations. Presented by E.C. Sassani+ (with A.M. Anderson*, T.L. Gleeson*)

Northwest Scientific Association. Boise, ID. Invited Paper: The use of Christmas Bird Counts and citizen science to monitor wintering raptor populations in Idaho and beyond. Presented by N. Paprocki*

The Wildlife Society Idaho Chapter. Boise, ID. Paper: What effect does detectability have on statistical power in analysis of raptor migration counts? Presented by N. Paprocki*.

2011 Raptor Research Foundation. Duluth, MN. Paper: What effect does detectability have on statistical power in analysis of raptor migration counts? Presented by E. G. Nolte* (with G. Kaltenecker)

Raptor Research Foundation. Duluth, MN. Poster: Detectability of migrating raptors. Presented by E.G. Nolte* (with G. Kaltenecker)

Raptor Research Foundation. Duluth, MN. Poster: How landscape and climate change affect occupancy of wintering raptors in the Morley Nelson Snake River Birds of Prey National Conservation Area. Presented by N.A Paprocki*

Raptor Research Foundation. Duluth, MN. Poster: Challenges in creating an American Kestrel body condition index based on size-adjusted mass. Presented by E.H. Strasser*

Graduate Research Symposium. Boise State University, Boise, ID. Poster: Detection of Wintering Raptors. Presented by N.A. Paprocki*

Idaho IDeA Network of Biomedical Research Excellence. Moscow, ID. Poster: Heat shock protein concentrations in migratory and resident American Kestrels. Presented by M.A. Foster[+]

2010 Raptor Research Foundation, Fort Collins, CO. Paper: Recruitment of local, second year American Kestrels into the breeding population: who comes back and why? (with K. Steenhof)

Idaho IDeA Network of Biomedical Research Excellence. Moscow, ID. Poster: Seasonal carotenoid variation in American Kestrels. Presented by C.H. Sevy[+]

Joint meeting: American Ornithologists' Union, Cooper Ornithological Society, and the Society of Canadian Ornithologists. San Diego, CA. Paper: Corticosterone and reproductive success in American Kestrels nesting along a human disturbance gradient. Presented by E.H. Strasser[*]

Joint meeting: American Ornithologists' Union, Cooper Ornithological Society, and the Society of Canadian Ornithologists. San Diego, CA. Paper: Quantifying detectability of migrating raptors: a practical double observer method. Presented by E.G. Nolte[*] (with G. Kaltenecker)

Joint meeting: American Ornithologists' Union, Cooper Ornithological Society, and the Society of Canadian Ornithologists. San Diego, CA. Paper: Snowy Plover (*Charadrius alexandrinus*) nesting habitat on the Florida Panhandle. Presented by A.F. Webber[*] (with R.A. Fischer)

Joint meeting: American Ornithologists' Union, Cooper Ornithological Society, and the Society of Canadian Ornithologists. San Diego, CA. Poster: The effects of investigator disturbance on American Kestrels: a study of incubation behavior and nest success. Presented by D.J. Owen.[*]

2009 Raptor Research Foundation. Pitlochry, Scotland. Paper: Demography of an American Kestrel population. Presented by K. Steenhof.

Western Field Ornithologists. Boise, ID. Paper: A proposed method to index size and body condition in American Kestrels. Presented by E.H. Strasser[*] (with L. Bardo, D. Bird)

Western Field Ornithologists. Boise, ID. Paper: The effects of investigator disturbance on American Kestrels: a study of incubation behavior and nest success. Presented by D.J. Owen[*]

Undergraduate Research Conference. Boise State University, Boise, ID. Poster: Heat-shock proteins as a tool for measuring stress in American kestrels (*Falco sparverius*) nesting along a human disturbance gradient. Presented by C. Hayes[+] (with E.H. Strasser*)

2008 Florida Panhandle Shorebird Working Group. Panama City, FL. Paper: Breeding habitat of

Snowy Plovers in the Florida Panhandle. Presented by A.F. Webber*

Raptor Research Foundation. Missoula, MT. Paper: Reproductive success in American kestrels: the roles of individual quality and human disturbance. Presented by E.H. Strasser*

Joint meeting: American Ornithologists' Union, Cooper Ornithological Society, and the Society of Canadian Ornithologists. Portland, OR. Paper: How does foraging habitat restoration affect Piping Plover reproduction? (with A.F. McIntyre*)

Joint meeting: American Ornithologists' Union, Cooper Ornithological Society, and the Society of Canadian Ornithologists, Portland, OR. Poster: American Kestrel reproduction: evidence for the selection hypothesis and the role of natal origin? Presented by K. Steenhof.

2007 American Ornithologists' Union, Laramie, WY. Paper: Factors affecting Piping Plover hatching success on Long Island, NY. Presented by P.J. Doherty*

2006 Atlantic Coast Piping Plover and Least Tern Working Group. National Conservation Training Center, WV. Poster: Proposal to study factors that affect Piping Plover nest abandonment. Presented by P.J. Doherty*

2005 Science Research Symposium. Hofstra University, Hempstead, NY. Paper: Why birds fly the coop.

2004 Science Research Symposium. Hofstra University, Hempstead, NY. Poster: Using stable isotope ratios in feathers to study bird movements.

2002 Joint meeting: Association of Field Ornithologists and Wilson's Ornithological Society. Fort Myers, FL. Paper: White Ibis integument color changes during the breeding season: hormonal correlates and use in breeding stage classification model. (with P.C. Frederick)

Wildlife Ecology and Conservation Department. University of Florida, Gainesville, FL. Paper: Reproductive physiology of White Ibises in the Florida Everglades. (with P.C. Frederick)

2001 Waterbird Society, Niagara Falls, Canada. Paper: Trapping White Ibises: evaluation of two techniques and factors that affect success. (with P.C. Frederick)

2000 7th International Symposium on Avian Endocrinology, Varanassi, India. Poster: Reproductive physiology of White Ibises (*Eudocimus albus*): towards conservation of a nomadic species. (with P.C. Frederick)

1998 Zoology Department, Gainesville, FL. Paper: Corticosterone and the biology of American Kestrels.

1997 Pacific Seabird Group. Monterey. CA. Poster: Twenty-five years of breeding success in Pelagic Cormorants at the OIMB colony, Oregon. Presented by J. Hodder

1996 6th International Symposium on Avian Endocrinology. Lake Louise, Canada. Poster: Relationship between body condition and adrenal stress response in captive American Kestrel juveniles.

1995 Raptor Research Foundation. Duluth, MN. Paper: Physiological correlates of nest departure in American Kestrels.

1994 Raptor Research Foundation. Flagstaff, AZ. Paper: Activity and corticosterone levels in food restricted post-fledging American Kestrels.

ACADEMIC AND SCHOLARSHIP SERVICE

2015-present Member: Human Environmental System Initiative at Boise State

2015-present Campus Security Authority (CSA)

2014-present Coordinator for PhD in Ecology, Evolution, and Behavior proposal for DBS.

2013-present Pre-tenure review panel for Dr. Kathryn Demps, Anthropology Dept.
2008- present Member: Society for Integrative and Comparative Biology, The Wildlife Society
2007- present Member: Raptor Research Foundation
2000- present Member: Association of Field Ornithologists, Cooper Ornithological Society.
2011-2015 Elected Board of Directors: Golden Eagle Audubon Society
2007- 2013 Committee Member: Department of Biological Science's Graduate Committee
2010- 2012 Mentor: INBRE fellows
2009- 2012 Alternate Committee Member: Boise State University's Institutional Animal Care and Use Committee
2009-2012 Elected Board of Directors: Northwest Scientific Association
2011-2012 Chair: Local Committee to host 2012 Northwest Science Association's annual meeting.
2009-2011 Member: Boise State University's Faculty Grievance Committee
2009-2010 Committee Member: Department of Biological Science's Faculty Search
2007-2008 Local Committee Co-Chair: Annual meeting of the Western Bird Banding Association.
2015 Member: Hamid Dashti Preliminary Exam Committee (Geosciences)
2015 Panelist: Careers in science, Purdue University, West Lafayette, IN.
2014 Reviewer: *NSF (ad-hoc), Journal of Raptor Research (2), Behavioral Ecology and Sociobiology*
2013 Co-Chair: Department of Biological Science's Transition Working Group
2013 Panel Reviewer: National Science Foundation, Biology Division
2013 Reviewer: *NSF (ad-hoc), Journal of Raptor Research, PLoS One, General and Comparative Endocrinology*
2012 Reviewer: *Waterbirds*, *Environmental Management, The Condor, NSF (ad-hoc)*
2011 Organizer: Boise State Graduate Student Research Symposium
2011 Reviewer: *Environmental Management*, *The Auk, Diversity and Distributions*
2010 Reviewer: State of Florida's Biological Status Review for White Ibises
2010 Reviewer: *Environmental Management*, *The Condor*, *Florida Field Naturalist*
2009 Reviewer: *Journal of Raptor Research, The Auk,*
2008 Reviewer: *Journal of Field Ornithology, Journal of Raptor Research, The Condor, The Auk, Waterbirds*
2007 Reviewer: *Journal of Field Ornithology*
2006 Reviewer: *Southeastern Naturalist, Biological Conservation, The Auk*
2006 Organizer: Poster session at Atlantic Coast Piping Plover and Least Tern Workshop, National Conservation Training Center, WV.
2005 Reviewer: *Herpetological Review*
2005 Reviewer: Port of Oakland's Biological Assessment of Maintenance Dredging on Least Terns.
2004 Panelist: Science and the Bush Administration: A Day of Dialogue, Hofstra University.
2004 Reviewer: *National Fish and Wildlife Foundation*
2003 Reviewer: *Journal of Avian Biology*
2002 Reviewer: *The Wilson Bulletin*
2001 Organizer: Wildlife Graduate Student Discussion Group, University of Florida, FL.
1998 Co-organized: Scientific Program at Annual Waterbird Society meeting, Miami, FL.
1996 Reviewer: *Journal of Raptor Research*

GRADUATE AND POST-DOSTORAL MENTORSHIP

Post-Doctoral Advisor

DR. BENJAMIN PAULI. Quantitative Ecologist. Projects: Individual-based models of global change ecology and birds of prey. CURRENT

Graduate Student Committee Chair

BENJAMIN DUDEK (MS Student) Project: Investigating prevalence and mechanisms that affect infection risk of two factors that influence golden eagle nestling mortality: *Trichomonas gallinae* and hematophagous ectoparasites. CURRENT

SHAWN SMITH (MS Student) Project: The effect of climate change on predator and prey synchrony: do changes in American kestrel nesting phenology create a mismatch with seasonal prey cycles in southwestern Idaho? CURRENT

ROBERT SPAUL (MS Student) Project: Recreation disturbance to a shrub-steppe raptor: behavioral mechanisms and management implications. GRADUATED 2015. Current position: Research Associate at Boise State University

ALEXANDRA ANDERSON (MS Student) Project: Population response to climate change: does assortative mating facilitate earlier nesting? GRADUATED 2014. Earned Boise State University's Distinguished Thesis Award. Current position: PhD student at Trent University.

NEIL PAPROCKI (MS Student) Project: Wintering raptors in the Morley Nelson Snake River Birds of Prey National Conservation Area. GRADUATED 2013. Current position: Conservation Biologist at Hawkwatch International.

ERIN WONDER (MS Student) Project: Handling stress and the development of the hypothalmic-pitutary-adrenal axis. GRADUATED 2013. Current position: Scientist at Jackson Laboratory

ERIC NOLTE (MS Student) Project: Detectability of migrating hawks at watchsites. GRADUATED 2012. Current position: Adjunct Instructor at Boise State University.

ALYSON WEBBER (MS Student) Project: Snowy plover breeding habitat selection in the Florida Panhandle. GRADUATED 2011. Current position: Research Technician at Auburn University.

ERIN STRASSER (MS Student) Project: The effects of human disturbance on American kestrel (*Falco sparverius*) corticosterone concentrations, body condition, and reproductive success. GRADUATED 2010. Current position: Biologist at Rocky Mountain Bird Observatory

PAUL DOHERTY (MS Student) *Hofstra University*. Project: Factors that affect piping plover parental care and hatching success. GRADUATED 2007. Current position: Vice President, GIS Market Development at Antris, University of Redlands.

ANNIE MCINTYRE (MS Student) *Hofstra University* Project: Does habitat restoration affect piping plover reproduction? GRADUATED 2007. Current position: Biologist for New York State Parks.

Graduate Student Committee member

MITCHELL LEVENHAGEN
ERIC FREY
ZOE TINKLE
TEMPE REGAN
BRYCE ROBINSON
MICHELLE JEFFERIES
HEIDI WARE (Graduated 2014)
JENNFIER CROSSMAN
PATRICK KOLAR (Graduated 2013)
JESSICA SHERBURNE (Graduated 2013)

DENNIS DAW (Graduated 2015)
MATTHEW SCHMASOW (Graduated 2014)
ALLISON KORTE (Graduated 2013)
ALEX URQUHART (Graduated 2013)
MICAH SCHOLAR (Graduated 2011)
AMY ULAPPA (Graduated 2011)
BETH MCGUIRE (Graduated 2007, *Hofstra University*)

UNDERGRADUATE STUDENT MENTORSHIP

SCHELBY ROSEBROOK (BS Student, Raptor Research REU) Project: Consequences of mismatch: how does changing nesting phenology affect American kestrel growth rates.
CHRISTINA HARTMANN (BS Student, NSF REU) Project: Using stable isotopes to determine migratory strategies of American kestrels.
HANNAH BROWN (BS Student, MURI program) Project: Recreationists' perspectives on wildlife and trail management.
KRISTIN ARAKI (BS Student, MURI program) Project: Recreationists' perspectives on wildlife and trail management.
LAUREN KRUGER (BS Student, Raptor Research REU) Project: Dietary studies of American kestrels.
MICHAEL HENDERSON (BS Student, MURI program and Raptor Research REU) Project: Do resident kestrels maintain year-round territories? *and* How do ectoparasites affect nestling golden eagle health?
ALIA PARRISH (BS Student, NSF REU) Project: Dietary studies of American kestrels.
MARGARET LISA COURCHANE (BS Student, MURI program) Project: Inter- and intra- annual variation in rainfall, growing seasons, and mammal abundance in SW Idaho.
EMMY TYRRELL (BS Student) Project: Heredity in tail plumage of male American kestrels.
ELIZABETH (BETH) SASSANI (BS Student, ID EPSCoR REU) Project: Comparing the relative effects of year, seasonality, territory, and individual on American kestrel carotenoid concentrations
JADE WEEKS (BS Student) Project: Genetic variation in a partial migrant, the American Kestrel
MARK FOSTER (BS Student, INBRE) Project: How does migration strategy affect heat shock proteins of American kestrels?
CHRISTEENA SEVY (BS Student, INBRE) Project: Seasonal variation in carotenoid levels in American kestrels.
TRINA PATEL (BS Student, ID EPSCoR REU) Project: Incubation behavior and mate quality in American Kestrels.
CHRISTINE HAYES (BS Student, Dan Montgomery Award) Project: Use of heat shock proteins in evaluating human disturbance to nesting birds.
KYLE MCCORMICK, JAMES EDGEMON, JONI CLAPSDALE, ABBY WATERS, JOSIE BRAUN, REBECCA WAGNER, AND LYNELLE PERRY-KOLSKY have completed internships in the Heath lab.

Hofstra University

ALINA WANG (BS Student) Project: Reevaluating the relationship between testosterone, social rank and badge size in male house sparrows.
BRUGISHA PATEL (BS Student) Project: Do nest site characteristics affect piping plover nesting success?
ASHLEY CLARK (BS Student) Project: Piping plover incubation behavior on Long Island, NY.
CHRISTINA GALLO (BS Student) Project: Do birds forage optimally?

POPULAR PRESS
The Arbiter, November 2015
Radio Boise, November 2015
PodKast, WildLens, September 2015
Idaho Science Journal, Idaho Public Television, May 2015
Golden Eagle Audubon Newsletter, January 2015
BBC Shared Planet, August 2014
KTVB News, February 2014
Boise State Radio, February 2014
Northwest (NW) NPR, May 2013
Hill and Dale show, June 2013
Science Friday, September 2012
Hofstra Horizons, May 2006

WORKSHOP ATTENDANCE
Agent based modeling 2013
Occupancy modeling 2009

Curriculum Vita

Peter Koetsier III

Department of Biological Sciences
Boise State University
1910 University Dr.
Boise, Idaho 83725-1515
Voice: (208) 426-3817
FAX: (208) 426-4267
E-mail: pkoet@boisestate.edu

Interests

Community/ecosystem ecology related to the structure & function of flowing waters

- Fish / Macroinvertebrate / Algal & Macrophyte Ecology
- Riparian Ecology
- Disturbance theory as it applies to stream recovery and restoration
  - ✓ Effects of wildfire on food webs
  - ✓ Community metabolism (primary production & respiration)
  - ✓ Invasive / endangered species
  - ✓ Urban stream ecology
- Predator-Prey relationships
- Macroinvertebrate drift & colonization dynamics
- Ecology of extreme aquatic environments (temporary streams, sink holes, vernal pools)

Education

Ph.D. 1993. Idaho State University, Pocatello, Idaho
Major: Aquatic Biology
Minor: Natural Resource Economics
Advisor: G. Wayne Minshall, Ph.D.

M.S. 1986. Louisiana State University, Baton Rouge, Louisiana
Major: Fisheries Management
Minor: Statistics
Advisor: C. Frederick Bryan, Ph.D.

B.S. 1982. Michigan State University, East Lansing, Michigan
Major: Fisheries Science
Minor: Zoology
Advisor: William Taylor, Ph.D.

A.A.S. 1979. Grand Rapids Community College, Grand Rapids, Michigan
Major: Sciences
Advisor: Anne Miller, Ph.D.

Professional Experience

- Chair, Dept Biological Sciences, Boise State Univ. 2011 - 2014
- Assoc. Chair, Dept Biological Sciences, Boise State Univ. 2009 - 2011
- Full Professor of Biology, Boise State Univ. 2009 to present
- Associate Professor of Biology, Boise State Univ., 2000 to 2008.
- Assistant Professor of Biology, Boise State Univ., 1995 - 2000.
- Ass't. Research Ecologist (Post-doctoral), Univ. Georgia, SREL, 1993 - 1995.
- Ph.D. candidate, Idaho State University, 1987 - 1993.
- Research Assistant, Idaho State Univ., 1986 - 1993.
- Macroinvertebrate Taxonomist, Idaho State Univ., 1986-1993.
- Teaching Assistant, Idaho State Univ., 1987-1990.
- Research Fellow, Louisiana State Univ., 1983-1986.
- Macroinvertebrate Taxonomist, Louisiana State Univ., 1983-1986.
- Research Associate, Louisiana Coop. Fish. Wildl. Res. Unit, USGS, 1983-1986.
- Biology Internship, Greenwood Nature Center, Avoca, MI, 1985.
- Aquaculture Research Assistant, Michigan St. Univ., 1982.
- Histology Research Assistant, Grand Rapids Jr. Coll., 1978-1979.

Teaching Experience

- **Boise State University**, Dept. of Biology, (1995 - present)

  Concepts of Biology (BIOL-100: lower division): organized and taught lecture and laboratories. This biology class was geared for non-majors and was a core requirement of the university [4 credits / 6-9 contact hrs per week].

  General Zoology (ZOOL-230: lower division): organized and taught lecture and laboratories. This was a rigorous 5-credit class and core requirement for the major in biology [5 credits / 7 – 11 contact hrs per week].

  General Ecology (BIOL-232: upper division): organized and taught lectures and laboratories. Developed lab manual. Core requirement for the major in biology [4 credits / 9- 12 contact hrs per week].

  Stream Ecology (BIOL-427/527: upper division/graduate): developed and organized this course (and lab) which studied the relationship abiotic and biotic components have on freshwater lotic communities and ecosystems [4 credits / 7 contact hrs per week].

  Aquatic Entomology (ZOOL-425/525: upper division/graduate): developed and organized this course (and lab). This course covers the taxonomy and ecology of the insects most commonly encountered in freshwater environments. Course emphasis is equally divided between identification/biology of individual taxa and aquatic insect ecology (including environmental pollution, and natural resource management) [4 credits / 6 contact hrs per week].

  Fisheries Biology (ZOOL-497/597: upper division/graduate): developed and taught lecture and laboratory. This course covers the ecology, biology, and management of economically important fish stocks [4 credits / 6 contact hrs per week].

Teaching Experience cont.

Advanced Topics in Aquatic Biology (BIOL-561: graduate level): topics varied each semester depending on student interest. Topics ranged from readings on tri-trophic interactions to learning methods for assessing water pollution levels in streams.
[2-3 credits / 3 contact hrs per week].

Biology Graduate Seminars (BIOL-598: graduate level): seminar course and core requirement for graduate degrees in the department. Taught periodically, with topics varied each time depending on student need/interest
[1 credit / 1-2 contact hrs per week].

- **Idaho State University**, Dept. of Biological Sciences, (1987-1990)

Introductory Zoology (lower division): taught lecture (25-30 students) one semester, and three laboratories over a 4 year period. Course introduced students to the fundamentals of zoology.

Man and His Environment (lower division): taught laboratories for 3 years. Course was for non-biology majors and emphasized genetics/bioethics, population/ reproduction, and ecology.

General Ecology (upper division): taught course laboratories (25 students) for 2 years. Course was an introduction to basic ecology theory.

Invertebrate Zoology (upper divsion): taught 2 laboratories for a two-year period. Sabbatical replacement (taught both lectures & labs) for 1 semester. Course emphasize the phylogeny, diversity, and comparative anatomy of major invertebrate phyla.

Undergraduate Students / Graduate Student Advising

Undergraduate Students

Harding, Rex	Undergraduate Intern
Filkins, Susan	Paid technician, independent study
Finke, Starla	Paid technician, independent study
Krause, Teresa	Paid technician, fellowship
McFall, Jeanne	Independent study (Univ. of Idaho)
Sandow, Cory	Paid technician, independent study
Taylor, Larry	Paid technician, independent study
Valdivia, Cindy	Paid technician, fellowship, independent study
White, Joshua	Paid technician, fellowship
Ziolkowski, Emanuel	Paid technician

Graduate Students

- *Major Advisor:*

Evans, Johnna	MS Biology	Salow, Tammy	MS Biology
Fonner, Amber	MS Biology	Tuckett, Quenton	MS Biology
Hostettler, Lauri	MS Biology	Urquhart, Alex	MS Biology
Lysne, Steve	MS Biology	Wood, Jeri	MS Biology
McCauley, Luana	MA Biology	Daw, Dennis	MS Biology
Restall, Christopher	MS Biology	Kirkendall, Sam	MS Biology

- *Advising committee member:*

Adams, Jason,	MS Biology
Bean, Barry	MS Biology
Bench, Molly	MS Biology
Billings, Stephine	MS Biology
Brill, Nicole	MS Biology - Univ. of Nevada
Eisenbarth, Stephie	MS Environ. Engineering
Engle, Janice	MS Biology
Flatter, Brian	MS-IDS Program
Hemingway, Angela	MS Biology
Hess, Pam	MS Biology
Howard, Amy	MS Biology
Krause, Teresa	MS Biology
Levin, Victoria	MS Biology
Lingo, Hallie	MS Biology
McVey, Kathlyn	MS Biology
Medick, Ryan	MS Biology
Newell-Van Bussum, Monica,	MS Geology
Rose, Sarah,	MS Biology
Stiefel, Carl	MS Biology
Stuber, Matthew	MS Biology
Stutzman, Matt	MA Biology
Triepke, Jack	MS Biology
White, Joshua	MS Biology

Grants Funded

2010

Fish and Wildlife Federation (grant: $15,000), Washington, DC. "Life history and environmental raits of the invasive Oriental Weatherfish in Idaho".

National Park Service (research contract: $15,000), Moscow, ID. "Cestone faunal/floral surveys at Craters of the Moon National Monument."

Idaho Department of Fish and Game (research contract: $10,000), Boise, ID. "Ecological impacts of the invasive Dojo Weatherfish in southwestern Idaho."

2005 Dan Montgomery Foundation (research grant: $8,000). "Fish diet and production in burned and unburned stream ecosystems of the Boise River basin".

2004 Dan Montgomery Foundation (research grant: $4,000). "Leaf pack decomposition in burned and unburned streams."

2003 US Dept. of Agriculture - National Research Initiative Competitive Grants Program (research grant: $100,000). "Effects of wildfire on trophic structure and food web dynamics in stream ecosystems."

Dan Montgomery Foundation (research grant: $5,000), Boise, ID. "Does the intermediate disturbance hypothesis apply to stream macroinvertebrate communities?"

2002 Idaho Department of Environmental Quality (research contract: $35,000), Boise, ID. "Development of biotic metrics to distinguish between prinstine and degraded rheocrene (springbrook) systems in southwest Idaho."

2001 US Bureau of Reclamation (research contract: $52,600), Boise, ID. "The effect of environmental factors on native Bull Trout (Salvelinus confluentus) migration patterns in Arrowrock Reservoir and in the upper Boise River."

2000 US Fish & Wildlife Service and US Bureau of Reclamation (research contract: $100,000). Ecological life history of two endangered Snake River gastropods.

1998 Faculty Research Grant, Boise State Univ. ($5,000). "Downstream effects of impoundments on aquatic insect and algal community dynamics."

1997 Idaho Department of Environmental Quality (research contract: $35,000), Boise, ID. Metrics development for algal bioassessment criteria in all eight ecoregions found in Idaho.

US Department of Justice, Natural Resource and Environment Division (research contract: $35,000), Washington, DC "Faunal build-up and community development in polluted and non-polluted streams."

Faculty Research Grant, Boise State Univ. ($5,000). "Organic decomposition as a measure of river ecosystem recovery."

1996 BSU Foundation Grant, Boise State Univ. ($5,000). Money to develop a seminar series titled "Innovative Research In Biology." Seminar series exposed student and community to speakers involved in novel or state-of-the-art biological research.

1992 Graduate Student Research Grant, Idaho State Univ. ($2,500). "The effects of fish and insect predation on macroinvertebrate community structure and periphyton biomass in an Idaho stream."

Environmental Protection Agency Environmental Educational Grant, Idaho State Univ. ($10,000) (co-principal investigator, R.S. Inouye). "Water quality measurements and its relation to riparian habitat use: module for high school use."

1991 Graduate Student Research Grant, Idaho State Univ. ($2,500). "Diel size-differential drift of three invertebrate species in the lower Mississippi River, Louisiana (USA)."

1990 Graduate Student Research Grant, Idaho State Univ. ($2,500). "Stream insect community structure: the effects of stream order on β- diversity."

Faculty Research Grant, Idaho State Univ. ($5,000) (co-principal investigator, G.W. Minshall). "The effects of two predator guilds on insect and algal structure in an Idaho stream."

1989 Graduate Student Research Grant, Idaho State Univ. ($2,500). "The effects of fish predation and algal biomass on insect community structure in an Idaho stream."

1988 Sigma Xi Grants-in-aid of research. ($1,000). "Effects of fish and insect predators on insect and diatom community structure in lotic systems."

1987 Graduate Student Research Grant, Idaho State Univ. ($2,500). "Predator-prey associations in freshwater streams."

Publications (peer-reviewed)

Koetsier, P., and L.M. McCauley. 2014. Density-dependent relationship between stream benthos and drift. *Western North American Naturalist:* submitted.

Tuckett, Q., and P. ***Koetsier***. 2014. The effects of wildfire and debris flows on stream ecosystem metabolism in central Idaho stream. *Freshwater Sciences*: submitted.

Urquhart, A. N., and P. ***Koetsier***. 2014. Diet of a cryptic but widespread invader, the oriental weatherfish (*Misgurnus anguillicaudatus*) in Idaho, USA. *Western North American Naturalist* 74: 92-98.

Urquhart, A. N., and P. ***Koetsier***. 2014. Low-temperature tolerance and critical thermal minimum of the invasive Oriental Weatherfish, *Misgurnus anguillicaudatus*, in Idaho, USA. *Transactions of the American Fisheries Society* 143: 68-76.

Koetsier, P., and A. N. Urquhart. 2012. Desiccation tolerance in a wild population of the invasive Oriental Weatherfish (Cobitidae: *Misgurnus anguillicaudatus*, Cantor) in Idaho, USA. *Transactions of the American Fisheries Society* 141: 365-369.

Urquhart, A. N., and P. ***Koetsier***. 2011. Pectoral fin morphology as a reliable field sexing characteristic in populations of the invasive Oriental Weatherfish (*Misgurunus anguillicaudatus*). Copeia 2011: 296-300.

Koetsier, P., T.R.B. Krause, and Q.M. Tuckett. 2010. Present effects of past wildfires on leaf litter breakdown in stream ecosystems. Western North American Naturalist 70 (2): 164-174.

Lysne, S., and P. ***Koetsier***. 2008. Comparison of desert Valvata snail growth at three densities of the invasive New Zealand Mudsnail. Western North American Naturalist 68:103-106.

Monnot, L., J.B. Dunham, T. Hoem, and P. ***Koetsier***. 2008. Influences of body size and environmental factors on autumn downstream migration of bull trout in the Boise River, Idaho. *North American Journal of Fisheries Management* 28:231-240.

Koetsier, P., Q. Tuckett, and J. White. 2007. Current effects of a past wildfire on stream fish diet. *Western North American Naturalist* 67 (3): 429-438.

Lysne, S., and P. ***Koetsier***. 2006. Experimental studies on habitat preference and tolerances of three species of snails from the Snake River of southern Idaho, USA. *American Malacological Bulletin* 21: 77-85.

Lysne, S., and P. ***Koetsier***. 2006. Growth rate and thermal tolerance of two endangered Snake River snails. *Western North American Naturalist* 66: 230-238.

Lysne, S., and P. ***Koetsier***. 2006. The life history of the Utah (desert) valvata, *Valvata utahensis*, in the Snake River, Idaho. *Journal of Freshwater Ecology* 21: 285-291.

Publications cont.

Koetsier, P. 2005. The effects of disturbance time interval on algal biomass in a small Idaho stream. *Northwest Science* 79: 211-217.

Koetsier, P. 2005. Response of a stream diatom community to top predator manipulations. *Aquatic Sciences* 67: 517-527.

Koetsier, P. 2002. Short-term benthic colonization dynamics in agricultural streams, recovering from slaughterhouse effluents. *Journal of the American Water Resources Association* 38 (5): 1409-1422.

Koetsier, P. and J V. McArthur. 2000. Organic matter retention by macrophyte beds in 2 southeastern, USA, low-gradient, headwater streams. *Journal of the North American Benthological Society* 19: 633-647.

Koetsier, P., J V. McArthur, and L.G. Leff. 1997. Spatial and temporal response of stream bacteria to sources of dissolved organic carbon in a blackwater stream. *Freshwater Biology* 37**:** 79-89.

Koetsier, P. and J V. McArthur. 1997. New concepts in stream ecology: an integrative approach. *Journal of the North American Benthological Society* 16: 303-304.

Koetsier, P. and C.F. Bryan. 1996. Is invertebrate drift a density-dependent mechanism of the benthos? *Journal of Freshwater Ecology* 11: 1-10.

Koetsier, P., C.T. Robinson, and G.W. Minshall. 1996. Benthos and macroinvertebrate drift in six streams differing in alkalinity. *Hydrobiologia* 317: 41-49.

Koetsier, P. and C.F. Bryan. 1995. Effects of abiotic factors on macroinvertebrate drift in the lower Mississippi River, Louisiana (USA). *American Midland Naturalist* 134: 63-74.

Koetsier, P. 1993. Direct and indirect effects of predator type on the structure and function of a lotic benthic community. Unpubl. Ph.D. Dissertation. Idaho State University, Pocatello, Idaho.

Koetsier, P. and C.F. Bryan. 1992. Diel, size-differential drift patterns of three macroinvertebrate species in the lower Mississippi River, Louisiana (USA).*Hydrobiologia* 228: 225-230.

Koetsier, P., P.D. Dey, G. Mladenka, and J.W. Check. 1990. Rejecting equilibrium theory: a cautionary note. *Bulletin of the Ecological Society of America* 71: 229-230.

Koetsier, P. 1989. The effects of fish predation and algal biomass on insect community structure in an Idaho stream. *Journal of Freshwater Ecology* 5: 187-196.

Koetsier, P. and C.F. Bryan. 1989. Winter and spring macroinvertebrate drift in an outpocketing of the lower Mississippi River, Louisiana (USA). *Hydrobiologia* 185: 205-209.

Reports and Presentations

2008 Koetsier, P. The effects of wildfire and fire-induced debris flows on stream food web and trophic structure: stable isotope analyses 14 years after the fires. 56th Annual Meeting of the North American Benthological Society. Salt Lake City, UT. May 26-30, 2008.

Koetsier, P. The effects of wildfire and fire-induced debris flows on stream food web and trophic structure: stable isotope analyses 14 years after the fires. 18th Annual Nonpoint Source Water Quality Monitoring Results Workshop. Boise, Idaho. January 3-5, 2008.

2007 Koetsier, P. Stream ecosystem recovery from wildfires: the role of riparian vegetation. 56th Annual Meeting of the American Water Resources Association. Albuquerque, New Mexico. November 12-15, 2007.

Sandown, J.S., and P. Koetsier. Differentiating impacted and least impacted springbrooks in southern Idaho. 88th Annual Meeting of the American Association for the Advancement of Science (Pacific Northwest Region). Boise, Idaho. June 17-20, 2007.

Sandown, J.S., and P. Koetsier. Using algae and bacteria to distinguish between impacted and least impacted springbrooks from southern Idaho. 17th Annual Nonpoint Source Water Quality Monitoring Results Workshop. Boise, Idaho. January 2-4, 2007.

Tuckett, Q., and P. Koetsier. Differential recovery of amphibians and fish to wildfire impacted stream ecosystems. 17th Annual Nonpoint Source Water Quality Monitoring Results Workshop. Boise, Idaho. January 2-4, 2007.

2006 Koetsier, P., and L. McCauley. Effect of scouring on scraper-algae interactions in a small Idaho stream. 16th Annual Nonpoint Source Water Quality Monitoring Results Workshop. Boise, Idaho. January 3-5, 2006.

McCauley, L., and P. Koetsier. Effect of periodic substate scouring on scraper-algae interactions in a small Idaho stream. Annual Meeting of the Northwest Science Association. Boise, ID. March 6-8, 2006.

Tuckett, Q., and P. Koetsier. Wildfire effects on stream esosystem properties following debris flows, 12 years post fire. Annual Meeting of the Northwest Science Association. Boise, ID. March 6-8, 2006.

White, J., Q. Tuckett, and P. Koetsier. Effects of the 1994 Rabbit Creek fire on stream fish diets: 11 years later. Annual Meeting of the Northwest Science Association. Boise, ID. March 6-8, 2006.

White, J., C. Valdivia, Q. Tuckett, and P. Koetsier. Effects of the 1994 Rabbit Creek fire on stream fish diets: 11 years later. Undergraduate Research and Scholarship Conference. Boise, ID. April 17, 2006.

Koetsier, P., Q. M. Tuckett, and J. White. Effects of wildfire on stream fish diet: 14 years after the fire. 54th Annual meeting of the North American Benthological Society. Anchorage, Alaska. June 4-9, 2006.

Tuckett, Q.M., and P. Koetsier. Wildfire effects on stream ecosystem properties following debris flows, 10 years post-fire. 54th Annual meeting of the North American Benthological Society. Anchorage, Alaska. June 4-9, 2006.

Sandow, J.L., and P. Koetsier. A pilot study for the development of bioassessment tools for desert springbrook ecosystems in southwestern Idaho. 54th Annual meeting of the North American Benthological Society. Anchorage, Alaska. June 4-9, 2006.

2005 Evans, J., and P. Koetsier. Development of biotic metics to distinguish between least impacted and impacted desert springbrooks in southwest Idaho. 15th Annual Nonpoint Source Water Quality Monitoring Results Workshop, Boise, Idaho. January 4-6, 2005.

Koetsier, P., and L. M. McCauley. Effect of periodic substrate scouring on scraper-algae interactions in a small Idaho stream. 53rd Annual Meeting of the North American Benthological Society. New Orleans, LA. May 23-27, 2005.

2004 Evans, J., and P. Koetsier. Development of biotic metics to distinguish between least impacted and impacted desert springbrooks in southwest Idaho. Annual meeting of the North American Benthological Society, Vancouver, British Columbia, Canada. June 7-11, 2004.

Koetsier, P. Potential effects of wildfire on benthic trophic dynamics in pristine streams of the Boise National Forest. USFS Boise National Forest Research Symposium. Boise, Idaho. May 20, 2004.

Hostettler, L, and P. Koetsier. Fall migration of juvenile Bull Trout in the north fork of the Boise River: the effects of impoundments . Annual meeting of the Northwest Region of the American Fisheries Society. Seattle, Washington. April 19-23, 2004.

Finke, S.D., & P. Koetsier. The effect of disturbance frequency on algal biomass in a small Idaho Stream. 1st Annual undergraduate research and professional practice conference. Boise, Idaho. April 19, 2004.

Hostettler, L, and P. Koetsier. Environmental influences on fall migration of juvenile Bull Trout in the north fork of the Boise River. Annual meeting of the Idaho chapter of the American Fisheries Society. McCall, Idaho. February 26-28, 2004.

2003 Hostettler, L., P. Koetsier, & J. B. Dunham. Environmental influences on fall migration of juvenile Bull Trout in the North Fork Boise River. 17th Annual meeting of the Idaho Chapter of the American Fisheries Society, Moscow, Idaho. February 2003.

Lysne, S., and P. Koetsier. The effects of temperature and flow on two endangered gastropod species in the Snake River, Idaho. 17th Annual meeting of the Idaho chapter of the American Fisheries Society, Moscow, Idaho. February 2003.

2002 Hostettler, L., and P. Koetsier. Radio transmitter implantation in juvenile Bull Trout. 27th Annual meeting of the Oregon Chapter of the American Fisheries Society, Oregon State University, Corvallis, Oregon. February 19-22, 2002.

Hostettler, L., and P. Koetsier. Radio transmitter implantation in juvenile Bull Trout. 75th Annual meeting of the Northwest Scientific Association, Boise State University, Boise, Idaho. March 27-30, 2002.

Lysne, S., and P. Koetsier. Experimental studies on the temperature tolerance of two gastropods endemic to the middle Snake River, Idaho USA. 16th Annual meeting of the Idaho chapter of the American Fisheries Society, Idaho Falls, Idaho. February 20-23, 2002.

Lysne, S., and P. Koetsier. Prelimminary studies of predation by crayfish on two endemic Snake River gastropods. 75th Annual meeting of the Northwest Scientific Association, Boise State University, Boise, Idaho. March 27-30, 2002.

Lysne, S. and P. Koetsier. Experimental studies on the substrate preference of two gastropods endemic to the middle Snake River, Idaho, USA. 36th annual meeting of the American Malacological Society, Charleston, SC. August 3-7, 2002.

1999 Koetsier, P. Development of an algal biotic index (ABI) for stream assessment in 3 ecoregions of southwest Idaho. North American Benthological Society (47th annual meeting), Duluth, Minnesota.

Koetsier, P. The direct and indirect effects of predator type on stream community structure and function in a small Idaho stream. South Dakota State University, Wildlife and Fisheries Department, Brookings, SD. (Invited presentation).

1998 Koetsier, P. The effects of Sparganium americanum beds on organic matter retention and storage in two southeastern, blackwater streams (South Carolina). North American Benthological Society (46th annual meeting), Prince Edward Island, Canada.

Koetsier, P. The effects of fish predation on aquatic insect and algal community structure in a small mountain stream. USFS Northcentral Experimental Research Station, Grand Rapids, Minnesota.

1997 Koetsier, P. Development of the Algal Biotic Index for 3 ecoregions in the state of Idaho. Under contract by the Division of Environmental Quality, Dept. of Health and Welfare, Idaho.

1996 Koetsier, P. The effects of Sparganium americanum beds on organic matter retention and storage in two southeastern, blackwater streams (South Carolina). North American Benthological Society (44th annual meeting), Kalispell, Montana.

Koetsier, P., and J V. McArthur. The effects of Sparganium americanum beds on organic matter retention and storage in two southeastern, blackwater streams (South Carolina). Ecological Society of America (81st annual meeting), Providence, Rhode Island.

1995 Koetsier, P. The effects of predator type on the structure of the benthic community in an Idaho stream. Boise State University, Boise, Idaho (invited presentation).

Koetsier, P. Comparisons of invertebrate assembly patterns in blackwater stream, river, and riverine floodplain habitats. North American Benthological Society (43rd annual meeting), Keystone, Colorado.

Koetsier, P., and J V. McArthur. Organized and hosted international symposium titled "*New concepts in stream ecology: an integrative approach*". University of Georgia's Savannah River Ecology Laboratory, Aiken, South Carolina, Oct. 16-19, 1995

1994 Koetsier, P. Macroinvertebrate benthic and drift patterns from six streams differing in chemical richness. North American Benthological Society (42nd annual meeting), Orlando, Florida.

1993 Koetsier, P. Indirect impacts of predators on periphyton community parameters in an Idaho stream. North American Benthological Society (41st annual meeting). Calgary, Alberta.

Koetsier, P. Direct and indirect effects of fish and stonefly predation on stream communities. Illinois Natural History Survey, Champaign, Illinois (invited presentation).

Koetsier, P. Trophic cascades initiated by fish and invertebrate predation in lotic ecosystems. University of Georgia, Savannah River Ecology Laboratory, Aiken, South Carolina (invited presentation).

1993 Koetsier, P. Fish and invertebrate predation and their effects on invertebrate and algal community structure. Maryland Dept. Natural Resources, Chesapeake Bay Research and Monitoring Division, Annapolis, Maryland (invited presentation).

1992 Koetsier, P. Effects of fire on wilderness stream ecosystems in the Frank Church-River of No Return Wilderness: report of 1991 studies (with GW Minshall, PD Dey, CT Robinson). Payette National Forest, Boise, Idaho.

Koetsier, P. The effects of fish and insect predation on the macroinvertebrate community and periphyton biomass in an Idaho stream. North American Benthological Society (40th annual meeting). Louisville, Kentucky.

1991 Koetsier, P. Diel size-differential drift of three invertebrates species in the lower Mississippi River, Louisiana (USA). North American Benthological Society (39th annual meeting), Santa Fe, New Mexico.

1989 Koetsier, P. Effects of fish predation and algal biomass on insect community structure in an Idaho stream. Ecological Society of America (1989 annual meeting), Snowbird, Utah.

1988 Koetsier, P. Invertebrate drift from predator-prey relationships in stream ecosystems. Dept. Biological Sciences-Ecolunch seminar. Idaho State University, Pocatello, Idaho.

1987 Koetsier, P. Direct and indirect effects of predators in lotic ecosystems: three-tiered effects. Dept. Biological Sciences seminar, Idaho State University, Pocatello, Idaho.

1986 Koetsier, P. Spring and summer invertebrate drift from a cove in the lower Mississippi River, Louisiana. Dept. Forest, Fisheries, and Wildlife. Louisiana State University. Baton Rouge, Louisiana.

Service / Administrative Experience

- **Non-University**

Aquatic Nuisance Species Taskforce (2007- present): Member of taskforce that serves as a technical advisory group to advise and consult with the Idaho Invasive Species Council, the governor, and state (ID Dept of Agiculture, Dept of Environmental Quality, ID Fish and Game) and federal (US Bureau Land Management, US Fish and Wildlife Service, etc.) agencies.

Board of Trustees member, Northwest Science Association (2003-2006): Member of the governing board of the NSA. Responsibilities including awarding research grants and annual meeting awards; reviewing qualifications and interviewing potential editors for the journal *Northwest Science* and replacement Board members; and reviewing association's finances and revising the Association's charter.

Associate Editor for the journal ***Northwest Science*** (2000 to 2005): Responsible for reviewing and sending manuscripts out for peer review. Coordinate of selection and acceptance of submitted manuscripts between peer-reviewers and the editor.

Snake River Snail Conservation and Restoration Team member (1999 to present): Committee with representatives from US Bureau of Reclamation, US Fish and Wildlife Service, Idaho Power Company, Idaho Dept. of Environmental Quality, and Idaho Fish and Game. The team is charged with developing and implementing a conservation plan and habitat restoration for 5 federally listed, endangered gastropods of the Snake River, Idaho.

Bull Trout Research Planning Team for the Boise River Basin member (1997 to 2007): Committee with representatives from US Bureau of Reclamation, US Fish and Wildlife Service, US Forest Service, US Geological Service, Idaho Fish & Game, and the Idaho Division of Environmental Quality charged with directing research efforts in the recovery of Bull Trout in the Boise River Basin.

Technical Advisor to Ada County Highway Department, Idaho (2003): Advised highway commission on aquatic ecosystem and life history as it pertained to potential insect vectors of West Nile Virus. I worked with engineers in the design of temporary overflow storm water retention ponds (Federal Way, Flying Wye projects).

Technical Advisor to Idaho's Department of Environmental Quality (1995 to present): One member of committee made up of representatives from private, state, and federal biologists. The committee's task is to design and critique the biomonitoring protocol for surface water designation and use in the state of Idaho.

Technical Advisor to Wastewater engineers of the cities of Nampa, Eagle, Meridian, Idaho (1997-2004): One member of a committee charged with the responsibility to design methods of wastewater treatment/elimination that complies with EPA regulations, yet are within the cost structure available to municipalities with populations under 40,000 people.

Headstart Science Education Advisor (Families, Children, and Friends, Region 10: 2001 to 2004): Worked with a team of elementary and special education professionals in developing, testing, and implementing science modules for Region 10 Headstart programs (3- to 5- year olds).

Service cont.

Member of the selection committee advising the US Forest Service Rocky Mountain Research Station in the hiring of a Research Fishery Biologist (1999). Reviewed application materials of the top 9 candidates for the position, and ranked the candidates based on academic and professional qualifications, commenting on the strengths and weakness of each candidate.

Research Manager (Univ. Georgia- Savannah River Ecology Lab., 1994-1995): Directed development of Integrative Management of Stream Ecosystems research program. Responsibilities included: supervising and directing undergraduate and graduate research; directing current and initiating new research studies; supervising technicians and instituting QA/QC procedures; soliciting funds from and supervising joint research projects with state and federal government agencies; and representing program at faculty meetings; co-editor of a symposium proceedings titled "*New concepts in stream ecology: an integrative approach*".

Peer-reviewer for manuscripts submitted to the following journals:

- American Midland Naturalist
- Aquatic Sciences
- BioInvasions Records
- Canadian Journal of Fisheries and Aquatic Sciences
- Environmental Entomology
- Freshwater Biology
- Fundamental and Applied Limnology
- Hydrobiologia
- Idaho Academy of Sciences
- Journal of the American Water Resources Association
- Journal of Fish Biology
- Journal of Freshwater Ecology
- Journal of the North American Benthological Society
- Northwest Science
- Southwest Naturalist
- Western North American Naturalist

Conducted workshops or presentations at:

- Nampa Christian Elementary School (3rd & 4th grades): "The Invertebrates"
- Cole Valley Christian Elementary School (5th grade): "The Invertebrates"
- Ponderosa Elementary School, Meridian (4th grade): "Insects"
- Trout Unlimited (Valley County chapter): "The Living Stream"
- Boise State University Anthropology Dept Workshop: Fish resources & habitats of the Mid-Snake River (1999-2001). "Stream invertebrates: the link between terrestrial ecosystems and fish communities."

- **University Related Service (Boise St. Univ.):**

Interim Chair, Dept. of Biological Sciences (Dept service, 2011-2014)

Associate Chair, Dept. of Biological Sciences (Dept service, 2009-2011)

Graduate Student Advisor/Committee Member (Dept service, 1995 to present): Major advisor of 12 MS graduate students, committee member for 20 MS/MA graduate students.

Service cont.

Biology Internship Coordinator (Dept. service, 2006 to present): Develops, promotes, and administers the internship program for the Biology Department (average: 13 interns/semester). Instructs potential interns and employers regarding legal policies; entrance requirements, intern – employer rights and responsibilities; evaluates bi-monthly intern reports and final intern products, assigns intern grades; and acts as liaison to the University internship program.

Biology Department Tenure & Promotion Committee (Dept. service, 2005 to present): Responsible for evaluating the teaching of adjunct and tenure-track faculty each semester; submits year-end evaluation & recommendations to the Chair regarding tenure-track faculty; and reviews packets of faculty members seeking tenure or promotion.

Biology Department Undergraduate Committee (Dept. service, 2006 to present): Member of a committee responsible for the managing the undergraduate curricula in the Biology Department. This includes the development of a new major, evaluating the teaching of adjunct faculty, UG advising, etc…

Biology Department Library Liaison (Dept. service, 1998 to present): Promotes and relays department needs/concerns regarding books, journal subscriptions, and acts as a conduit for information between University's Albertson Library and the Biology Department.

Biology Department Research Committee (Dept. service, 2004 to 2006): Member of a committee responsible for developing and promoting research opportunities in the Biology Department. This includes managing the department seminars, facilitating research collaborations, and seeking research opportunites.

Faculty Search Committees (Dept. service, 2000 thru 2006): Developed qualification list, advertisement, and selection of "short-list" candidates for 3 vacant faculty positions: Entomologist, Developmental Biologist, Raptor Biologist. Reviewed applicant's material, participated in phone and personal interviews, evaluated seminars and involved in candidate selection.

N.E.O.N. (National Ecological Observatory Network) & ***I.R.O.N.*** (Intermountain region observatory Network) participant (Dept. service, 2004-2006): Promoted the research strengths of Biology Department faculty and lobbied the National Science Foundation to include the northeastern Owyees in the IRON program. This would allow department faculty to have access to and take advantage of equipment, grants, and collaborations with other scientists on a national level.

Biology Proposed Ph.D. Program Committee member (Dept. service, 2000 to 2003): Committee charged with preliminary development of a Ph.D. in Biology program. Need, feasibility, current departmental strengths and weaknesses, community & state support, and program requirements were addressed.

Graduate Coordinator for the Biology Department (Dept. service, 1999 - 2000): responsible for the initial contact, correspondence, and acceptance/rejection of MS and MA graduate students in Biology. I chair the Graduate Oversight Committee which is responsible for allocation of departmental teaching assistantships, sets policy, and checks the annual progress of all graduate students in the department's program.

College of Arts and Sciences Tenure / Promotion Committee (Univ. service, 2004): Evaluated Teaching/Research/Service packets and advised the college dean regarding the award of tenure or promotion to COAS faculty.

Albertson Library Board member (Univ. service, 1999-2002): Committee addressed library concerns between the university, students and faculty; developed proposals for increasing library holdings (one-time and continuous purchases); and lobbied for library needs to the university's upper administration and to members of the State Board of Education.

University Graduate Council Chair (Univ. service, 1998 - 2000): university committee responsible for approval of new graduate programs, graduate curricula, and graduate faculty for Boise State University. Members are appointed by the Dean of Graduate Research.

Faculty Research Association Program (Univ. service, 2000 to 2001): One year sabbatical replacement for Dr. A. Dufty. Read and awarded research grants to University-sponsored grant program.

Institutional Animal Care and Use Committee (Univ. service, 2000 to 2001): One year sabbatical replacement for Dr. A. Dufty. Designed, developed and approved protocols for all university-wide research using animals.

- **University Related Service (other universities):**

Faculty Tenure Committee (Economics Dept., Idaho St. Univ., 1992): Out-of-department university member on the tenure hearing of Dr. Robert Tokle (Dept. of Economics, ISU). Responsibilities included review of candidate's academic record, peer-reviewed publications, teaching history, and community service; interviews with colleagues and former students; and meetings with Dean and Vice- president of Academic Affairs on tenure decision.

Research Coordinating Council (Biology Dept. representative, Idaho St. Univ., 1990-1992): Developed university policy regarding patent rights, research-derived royalties, freedom to publish under government contracts and response to academic fraud. Worked with representatives from all major university departments. Appointed by Dean of Graduate Studies and Research.

Faculty Search Committee (graduate representative, Idaho St. Univ., 1989): Developed qualification list and advertisement for plant ecologist position. Reviewed applicant's materials, participated in phone and personal interviews, evaluated seminars and involved in candidate selection.

Research & Field Supervisor (US Fish. & Wildl. Ser., Louisiana St. Univ., 1981-1983): Supervised 3 graduate students and 4 technicians. Maintained research timetable and schedule; responsible for writing of quarterly and annual reports to funding agencies; developed and conducted QA/QC laboratory procedures.

Professional Affiliations

- American Fisheries Society
- Ecological Society of America
- North American Benthological Society
- Northwest Science Association
- Sigma Xi, the scientific research society

CURRICULUM VITAE

Stephen J. Novak

PRESENT POSITION: Professor, Department of Biological Sciences
Boise State University
1910 University Dr.
Boise, ID 83725-1515
U.S.A.
Phone: (208) 426-3548
Fax: (208) 426-1040
Email: snovak@boisestate.edu

EDUCATION:

1985-1990	Washington State University, Pullman, WA 99164, Ph.D. Botany
1978-1981	University of Massachusetts, Amherst, MA 01003, M.S. Plant Pathology
1976-1978	Johnson State College, Johnson, VT 05656, B.S. Environmental Science

PROFESSIONAL EXPERIENCE:

2013 (Fall)	Professional Leave (Sabbatical), European Biological Control Laboratory, USDA-ARS, Montferrier-sur-Lez, France
2009-present	Professor, Department of Biological Sciences, Boise State University
2007 (Spring)	Professional Leave (Sabbatical), CSIRO European Laboratory, Montferrier-sur-Lez, France
2004 (Spring)	Visiting U.S. Professor, University Studies Abroad Consortium (USAC) Program, Universite de Pau, France
1999-2000	Professional Leave (Sabbatical), CSIRO European Laboratory, Montferrier-sur-Lez, France
1998-2009	Associate Professor, Department of Biology, Boise State University
1993-1998	Assistant Professor, Department of Biology, Boise State University
1993 (Summer)	Instructor, Department of Biology, Washington State University
1993 (Spring)	Instructor, Department of Botany, Washington State University
1990-1992	Post-doctoral Research Associate, Department of Botany, Washington State University
1985-1990	Graduate Teaching Assistant, Departments of Biology and Botany, Washington State University
1978 & 1980	Graduate Teaching Assistant, Department of Plant Pathology, University of Massachusetts

COURSES TAUGHT:

BIOL 100	Concepts of Biology
BIOL 191	General Biology I
BIOL 323	General Ecology

BIOL 343	Genetics Lecture
BIOL 400/500	Organic Evolution
BIOL 409/509	Molecular Ecology
BIOL 422/522	Conservation Biology
BOT 130	General Botany
BOT 424/524	Plant Community Ecology

TEACHING AWARDS AND RECOGNITION:

2008 Foundation Scholar Award for Teaching, Boise State University
2006 Finalist, College of Arts and Sciences Teaching Award, Boise State University
2004 Finalist, College of Arts and Sciences Teaching Award, Boise State University
2002 Finalist, College of Arts and Sciences Teaching Award, Boise State University

RESEARCH AWARDS AND GRANTS:

2015 Specific Cooperative Agreement, European Biological Control Laboratory, United States Department of Agriculture, Agriculture Research Services (ARS) and Boise State University, $85,640
2014 Specific Cooperative Agreement, European Biological Control Laboratory, United States Department of Agriculture, Agriculture Research Services (ARS) and Boise State University, $40,000
2014 United States Department of Agriculture, Agriculture Research Services (ARS) Area-wide Pest Management Program, $300,300 (with Rene Sforza and Massimo Cristofaro, $149,500 to Boise State University)
2012 Boise State University, College of Arts and Sciences, Faculty Travel Grant, $600
2011 BLM, Challenge Cost-share, CESU, $14, 625
2010 Boise State University, College of Arts and Sciences, Faculty Travel Grant, $600
2009 United States Department of Agriculture, Agriculture and Food Research Initiative, $199,704 (*Bromus* REEnet, Matthew Germino, Jeanne Chambers, and 25 others)
2009 LI-COR Environmental Education Foundation, $40,000 (with Marcelo Serpe, with mating funds of $41,000 provided by BSU)
2008 United States Department of Agriculture, Agriculture and Food Research Initiative, National Institute of Food and Agriculture, $99,929
2008 Boise State University, College of Arts and Sciences, Faculty Travel Grant, $600
2007 United States Department of Agriculture-Agricultural Research Services, European Biological Control Laboratory, $5000
2007 Commonwealth Scientific and Industrial Research Organization, Division of Entomology, Visiting Scientist Research Grant, $7500
2006 Boise State University, College of Arts and Sciences, Faculty Travel Grant, $600
2005 National Geographic Society, Committee for Research and Exploration (Collaborator with C. Lynn Kinter, Nancy Shaw, Ann Hild, George Markin, Mario Vigna, Ricardo Lopez, John Gaskin), $20,000

2005	State of Idaho, Military Division, Idaho Army National Guard (with Ian Robertson), $30,864
2004	Merck/American Association for the Advancement of Science (AAAS) Undergraduate Science Research Program (with Martin Schimpf, Julia Oxford, Marcelo Serpe, Susan Shadle, and Ken Cornell), $20,000
2004	University Studies Abroad Consortium (USAC) Program, $7000
2003	Merck/American Association for the Advancement of Science (AAAS) Undergraduate Science Research Program (with Martin Schimpf, Julia Oxford, Marcelo Serpe, Henry Charlier, and Robert Ellis), $20,000
2002	Idaho Department of Fish and Game, State Wildlife Grant Program (with James C. Munger), $22,300
2002	Boise State University, Faculty Research Program, $5000
2002	Merck/American Association for the Advancement of Science (AAAS) Undergraduate Science Research Program (with Martin Schimpf, Julia Oxford, Marcelo Serpe, Henry Charlier, and Robert Ellis), $20,000
2001	Boise State University, Faculty Research Program, $4994
2000	European Biological Control Laboratory, United States Department of Agriculture, Agricultural Research Services (with John L. Scott), $13,000
1999	United States Forest Service, Fortine Ranger District, Kootenai National Forest, Montana, $2000
1999	American Institute of Biological Sciences (AIBS), Travel Grant, $1200
1999	Boise State University, Faculty Research Program, $5000
1997	Research Corporation and the M.J. Murdock Charitable Trust, $14,000
1997	Boise State University, Faculty Research Program, $4990
1997	Boise State University, Faculty Travel Grant, $1400
1996	National Science Foundation-Idaho EPSCoR Program (with James R. Belthoff), $6000
1996	Boise State University, Faculty Research Program, $4958
1995	Boise State University Foundation (with James F. Smith), $5000
1995	Boise State University, Faculty Travel Grant, $466
1994	Boise State University, Faculty Research Program, $4500
1994	Boise State University, Faculty Travel Grant, $1031
1992	United States Forest Service, Kootenai National Forest, Libby, MT, $2500
1989	Washington State University, Graduate Student Travel Grant, $436
1988	Washington State University, Graduate Research Assistantship, $2000
1987-1989	Washington State University, Department of Botany, Hannah Aase Departmental Fellowship, $2000

PROFESSIONAL SOCIETIES:

Botanical Society of America
Ecological Society of America
Idaho Academy of Science
Society for Conservation Biology
Society for the Study of Evolution

PROFESSIONAL SERVICES:

Associate Editor: *Weed Research*, 2009 - present

Manuscript Reviewed For: *Evolution*, *Conservation Biology*, *American Midland Naturalist*, *American Journal of Botany*, *Molecular Ecology*, *New Phytologist*, *Plant Biology, Systematic Botany*, *Oecologia, Great Plains Research, Canadian Journal of Botany, Northwest Science*, *Applied Ecology*, *Journal of the Torrey Botanical Society*, *Biological Invasions, International Journal of Plant Sciences*, *Heredity, Weed Research, Proceedings of the National Academy of Science USA, Plant Ecology, Invasive Plant Science and Management, Diversity and Distributions, Australian Journal of Botany, Aquatic Botany, Trends in Ecology and Evolution (TREE), Evolutionary Ecology, Western North American Naturalist*, *Current Opinion in Environmental Sustainability*, *NeoBiota, Weed Science, Biology and Environment: Proceedings of the Royal Irish Academy, Frontiers in Ecology and the Environment, Ecology Letters, BioScience, Journal of Applied Ecology, Journal of Ecology*, *Journal of Arid Land, Journal of Arid Environments, PLOS ONE*, *Journal of the American Water Resources Association*

Proposal Reviewed For: United States National Science Foundation, Israel Science Foundation, United States Department of Agriculture, Utah State University--Biotechnology Center Grant Program, Utah State University--Community-University Research Initiative (CURI) Grant Program

Co-Organizer of a Conservation Biology Seminar Series at Boise State University (with James F. Smith), 1995-1996

Session Chair, Genetics Section, Botanical Society of America Annual Meeting: 1996, 1997 & 2001

Secretary-Treasurer/Vice-Chair/Program Organizer, Genetics Section, Botanical Society of America: 1997 - 2002

Chair, Genetics Section, Botanical Society of America: 2003 - 2005

Executive Council Member, Botanical Society of America: 2002, 2003 & 2005

Boise State University Trustee, Idaho Academy of Science: 2005 to 2010

Session Chair, Northwest Scientific Association Annual Meeting: 2006

Boise State University Technical Representative to the Great Basin Cooperative Ecosystem Study Unit, 2007

Faculty Advisor, Undergraduate Biology Club, 2007 - present

Treasurer, Idaho Academy of Science, 2010 – 2013

Panel Discussion Participant, Idaho Academy of Science Annual Symposium: 2011

Session Chair, Intermountain Native Plant Summit IV: 2011

Northern Rockies Invasive Plant Council Board: 2014 - present

UNIVERSITY AND COLLEGE SERVICES:

University Prior Learning Committee: 1995, 1996 & 1997

University Faculty Research Grant Program, Proposal Review Committee: 1995 & 1998

College of Arts and Sciences, Mini-Development Grant Selection Committee: 2001 - 2007

College of Arts and Sciences, Awards Committee: 2008

University Foundation Scholar Award for Teaching Committee: 2008-2009

MAJOR RESEARCH INTERESTS:

Biological and ecological consequences of the introduction of alien plants; Plant ecological genetics and evolutionary biology; Investigations of the factors that influence the level and structure of genetic variation: introduction events, founder effects, gene flow, and mating systems; Polyploid speciation: genetic and ecological consequences of polyploidy

INVITED SEMINARS/SYMPOSIA/PANEL DISCUSSIONS:

Nevada Weed Management Association Conference, 2015
Nevada Medusahead Symposium, 2015
College of Idaho, Department of Biology, 2014
Regional Botanist Special Lecture, Botany 2014 Meeting, Boise, ID, 2014
Washington State University, School of Biological Sciences, 2013
Washington State University, School of Biological Sciences, 2013
USDA-ARS, European Biological Control Laboratory, Montferrier-sur-Lez,

France, 2012

International Symposium on Invasive Plants and Global Change, Xinjiang Institute of Ecology and Geography, Urumqi, China, 2012
Brigham Young University, Department of Plant and Wildlife Sciences, 2012
Idaho Academy of Science Annual Meeting, College of Idaho, 2011
Chicago Map Society, Newberry Library, Chicago, IL, 2011
Idaho State University, Department of Biological Sciences, 2010
Boise State University, Center for Teaching and Learning, 2009
Boise State University, Department of Biological Sciences, 2009
Washington State University, School of Biological Science, 2009
Boise State University, Department of Biological Sciences, 2008
CSIRO European Laboratory, Montferrier-sur-Lez, France, 2007
USDA-ARS, European Biological Control Laboratory, Montferrier-sur-Lez, France, 2007
Idaho Rare Plant Conference, Invasive Species, Boise, ID, 2006
Invasive Plants in Native and Managed Systems: Linking Science and Management and 7th International Conference on Ecology and Management of Alien Plant Invasions (IPINAMS-EMAPi7) Meeting, Ft. Lauderdale, FL, 2003
Idaho Rare Plant Conference, Palouse Prairie: Past, Present and Future, Boise, 2002
Brigham Young University, Department of Botany and Range Science, 2001
Virginia Commonwealth University, Department of Biology, 2001
Owyhee-Bruneau Canyonlands Symposium, Boise, ID, 2000
Universite de Rennes I, Botanique: Biosystematique et Genetique des Population Vegetales, Rennes, France, 2000
Centre d'Ecologie Functionelle et Evolutive, Centre National de la Research Scientifique, Montpellier, France, 2000
CSIRO European Laboratory, Montferrier-sur-Lez, France, 2000
International Botanical Congress, St. Louis, MO, 1999
Ohio University, Department of Environmental and Plant Biology, 1997
Idaho Rare Plant Conference, Boise, ID, 1995
United States Forest Service Workshop, Boise, ID, 1995
University of Utah, Department of Biology, 1994
University of Arkansas, Department of Biology, 1994
Boise State University, Interdisciplinary Humanities Program, 1994
Idaho Native Plant Society, Boise, ID, 1994
Boise State University, Department of Biology, 1993
Herbicide Resistance Workshop, Western States, Weed Science Society of America, Elk River, ID 1992
Ecology, Management and Restoration of Intermountain Annual Rangelands Symposium, Boise, ID, 1992
Boise State University, Department of Biology, 1992
Utah State University, Department of Biology, 1991
University of Florida, Department of Botany, 1991
Weber State College, Department of Botany, 1990

PEER-REVIEWED PUBLICATIONS (* = Invited Paper):

Rohde, A.T., D.S. Pilliod, and S.J. Novak. 2015. Wildfire and post-fire restoration seeding alter insect communities in sagebrush habitats. *In Revision*.

Anderson, A.M., S.J. Novak, J.F. Smith, K. Steenhof, and J.A. Heath. 2015. Winter carry-over effects on nest initiation and mate choice in a partial migrant, the American kestrel (*Falco sparverius*): a climate change response? *The Auk: Ornithological Advances*, *In Press*.

Schulte, L.J., J.L. Clark, S.J. Novak, S.K. JeffriesM, and J.F. Smith. 2015. Speciation within *Columnea* Section *Angustiflorae* (Gesneriaceae): islands, hummingbirds and climate. *Molecular Phylogenetics and Evolution*, 84: 125-144.

Pawlak, A.R., R.N. Mack, Jeremiah W. Busch, and S.J. Novak. 2015. Invasion of *Bromus tectorum* (L.) into California and the American Southwest: rapid, multi-directional and genetically diverse. *Biological Invasions*, 17: 287- 306.

Tretter, E.D., E.M. Johnson, G.L. Benny, R.W. Lichtwardt, Y. Wang, P. Kandel, S.J. Novak, J.F. Smith, and M.M. White. 2014. An eight-gene molecular phylogeny of the Kickxellomycotina, including the first phylogenetic placement of Asellariales. *Mycologia*, 106: 912-935.

Wang, Y., E.D. Tretter, E.M. Johnson, P. Kandel, R.W. Lichtwardt, S.J. Novak, J.F. Smith, and M.M. White. 2014. Using a five-gene phylogeny to test morphology-based hypotheses of *Smittium* and allies, endosymbiotic gut fungi (Harpellales) associated with arthropods. *Molecular Phylogenetics and Evolution* 79: 23-41.

Schulte, L.J., J.L. Clark, S.J. Novak, M. T.-Y. Ooi, and J.F. Smith. 2014. Paraphyly of Section *Stygnanthe* (*Columnea,* Gesneriaceae), a New Section Inferred from ITS and Chloroplast DNA Data, and a Revision of the Species of Section *Angustiflorae. Systematic Botany* 39: 613-636.

Wilson, E.R., K.L. Smalling, T.J. Reilly, E. Gray, L. Bond, L. Steele, P. Kandel, A. Chamberlain, J. Gause, N. Reynolds, I. Robertson, S.J. Novak, K. Feris, and M.M. White. 2014. Assessing the potential effects of fungicides on nontarget gut fungi (Trichomyctees) and their associated larval black fly hosts. *American Water Resources Association* 50: 420-433.

Paprocki, N., J.A. Heath, and S.J. Novak. 2014. Regional distribution shifts help explain changes in wintering raptor abundance: inplications for interpreting population trends. *PLoS ONE* 9(1): e86814. doi:10.1371/journal.pone.0086814.

Gaskin, J.F., M. Schwarzlander, C.L. Kinter, J.F. Smith, and S.J. Novak. 2013. Propagule

pressure, population structure, and geographic origins of *Chondrilla juncea* (Asteraceae): an apomictic invader of three continents. *American Journal of Botany* 100: 1871-1882.

Lohr, K., E. Yensen, J.C. Munger, and S.J. Novak. 2013. Relationship between habitat characteristics and densities of southern Idaho ground squirrels. *Journal of Wildlife Management* 77: 983-993.

Clay, D.L., S.J. Novak, M.D. Serpe, D.C. Tank, and J.F. Smith. 2012. Homoploid hybrid speciation in a rare endemic *Castilleja* from Idaho (*Castilleja christii*, Orobanchaceae). *American Journal of Botany* 99: 1976-1990.

Huttanus, T.D., R.N. Mack, and S.J. Novak. 2011. Propagule pressure and introduction pathways of *Bromus tectorum* (cheatgrass; Poaceae) in the central United States. *International Journal of Plant Sciences* 172: 783-794.

Davis, M.C., S.J. Novak, and G. Hampikian. 2011. Mitochondrial DNA analysis of an immigrant Basque population: loss of diversity due to founder effects. *American Journal of Physical Anthropology* 144: 516-525.

Hardegree, S.P., C.A. Moffet, B.A. Roundy, T.A. Jones, S.J. Novak, P.E. Clark, F.B. Pierson, and G.N. Flerchinger. 2010. A comparison of cumulative-germination response of cheatgrass (*Bromus tectorum* L.) and five perennial bunchgrass species to simulated field-temperature regimes. *Environmental and Experimental Botany* 69: 320-327.

Xu, C-Y., M.H. Julien, M. Fatemi, C. Girod, R.D. Van Klinken, C.L. Gross, and S.J. Novak. 2010. Phenotypic divergence during the invasion of *Phyla canescens* in Australia and France: evidence for selection-driven evolution. *Ecology Letters* 13: 32-44.

Smith, J.F., A.J. Stillman, S.R. Larson, C.M. Culumber, I.C. Robertson, and S.J. Novak. 2009. Phylogenetic relationships among *Lepidium papilliferum* (L. Henderson) A. Nels. & J.F. Macbr., *L. montanum* Nutt., and *L. davisii* Rollins (Brassicaceae). *Journal of the Torrey Botanical Society* 136: 149-163.

Novak, S.J. and J.H. Rausch. 2009. Use of field surveys, distributional data and genetic analyses to monitor alien species: *Taeniatherum caput-medusae* as an example of the approach. *Neobiota* 8: 169-182.

Schachner, L.J., R.N. Mack, and S.J. Novak. 2008. *Bromus tectorum* (Poaceae) in mid-continent United States: population genetic analysis of an ongoing invasion. *American Journal of Botany* 95: 1584-1595.

Novak, S.J., and R. Sforza. 2008. Genetic analysis of native and introduced populations of *Taeniatherum caput-medusae* (Poaceae): implications for biological control. Pp. 422-428. *Proceedings of the XIIth International Symposium on Biological Control of Weeds*, CAB International, Wallingford, UK.

Anderson, K.E., S.J. Novak, and J.F. Smith. 2008. Populations composed entirely of hybrid colonies: bidirectional hybridization and polyandry in harvester ants. *Biological Journal of the Linnean Society* 95: 320-336.

Triepke, J.F., C.K. Brewer, D.M. Leavell, and S.J. Novak. 2008. Mapping of forest alliances and associations using fuzzy systems and nearest neighbor classifiers. *Remote Sensing of Environment* 112: 1037-1050.

*Novak, S.J. 2007. The role of evolution in the invasion process. *Proceedings of the National Academy of Sciences USA* 104: 3671-3672.

Valliant, M.T., R.N. Mack, and S.J. Novak. 2007. Introduction history and population genetics of the invasive grass *Bromus tectorum* (Poaceae) in Canada. *American Journal of Botany* 94: 1156-1169.

Novak, S.J. 2004. Genetic analysis of Downy Brome (*Bromus tectorum)* and Medusahead (*Taeniatherum caput-medusae*): management implications. *Weed Technology* 18: 1417-1421.

Anderson, D.L., D.A. Wiedenfeld, M.J. Bechard, and S.J. Novak. 2004. Avian Diversity in the Moskita Region of Honduras. *Ornitologia Neotropical* 15: 447-482.

*Sagers, C.L., S. Nigemann, and S.J. Novak. 2002. Ecological risk assessment for the release of transgenic rice in southeastern Arkansas. Pp. 94-105. *Proceedings: Ecological and Agronomic Consequences of Gene Flow from Transgenic Crops to Wild Relatives*, Ohio State University, Columbus, OH.

Bartlett, E., S.J. Novak, and R.N. Mack. 2002. Genetic variation in *Bromus tectorum* (Poaceae): differentiation in eastern United States. *American Journal of Botany* 89: 602-612.

*Novak, S.J., and R.N. Mack. 2001. Tracing plant introduction and spread: genetic evidence from *Bromus tectorum* (cheatgrass). *Bioscience* 51: 114-122.

Novak, S.J., and R.N. Mack. 2000. Clonal diversity within and among introduced populations of the apomictic vine *Bryonia alba* (Cucurbitaceae). *Canadian Journal of Botany* 78: 1469-1481.

Martin, E., and S.J. Novak. 1999. Composition and cover of epiphytic lichens on *Pseudotsuga menziesii* and *Populus tremuloides* in Southwestern Idaho. *Evansia* 16: 105-111.

Novak, S.J., and A.Y. Welfley. 1997. Genetic diversity in the introduced clonal grass *Poa bulbosa* (bulbous bluegrass). *Northwest Science* 71: 271-280.

Soltis, P.S., and S.J. Novak. 1997. Polyphyly of the tuberous Lomatiums: cpDNA evidence for morphological convergence. *Systematic Botany* 22: 99-112.

Soltis, P.S., G.M. Plunkett, S.J. Novak, and D.E. Soltis. 1995. Genetic variation in *Tragopogon* species: additional origins of the allotetraploids *T. mirus* and *T. miscellus* (Compositae). *American Journal of Botany* 82: 1329-1341.

Novak, S.J., and R.N. Mack. 1995. Allozyme diversity in the apomictic vine *Bryonia alba* (Cucurbitaceae): potential consequences of multiple introductions. *American Journal of Botany* 82: 1153-1162.

Novak, S.J. 1994. Quantitative variation within and among cheatgrass (*Bromus tectorum* L.) populations: the role of multiple introductions. Pp. 103-108. *Proceedings: Ecology and Management of Annual Rangelands*, Intermountain Research Station, General Technical Report INT-GTR-313.

*Pyke, D.A., and S.J. Novak. 1994. Cheatgrass (*Bromus tectorum* L.) demography – establishment attributes, recruitment, ecotypes, and genetic variability. Pp. 12-21. *Proceedings: Ecology and Management of Annual Rangelands*, Intermountain Research Station, General Technical Report INT-GTR-313.

Novak, S.J., R.N. Mack, and P.S. Soltis. 1993. Genetic variation in *Bromus tectorum* (Poaceae): introduction dynamics in North America. *Canadian Journal of Botany* 71: 1441-1448.

Novak, S.J., and R.N. Mack. 1993. Genetic variation in *Bromus tectorum* (Poaceae): a comparison between native and introduced populations. *Heredity* 71: 167-176.

*Novak, S.J., D.E. Soltis, and P.S. Soltis. 1991. Ownbey's Tragopogons: forty years later. *American Journal of Botany* 78: 1586-1600.

Novak, S.J., R.N. Mack, and D.E. Soltis. 1991. Genetic variation in *Bromus tectorum* (Poaceae): population differentiation in its North American range. *American Journal of Botany* 78: 1150-1161.

PEER-REVIEWED BOOK CHAPTERS:

Novak, S.J., and R.N. Mack. 2014. Mating system, introduction and genetic diversity of *Bromus tectorum* in North America, the most notorious product of evolution within *Bromus* section *Genea*. In: Exotic Brome grasses in arid and semi-arid ecosystems of the western United States: causes, consequences, and management implications, Springer, *In Press*.

Novak, S.J. 2011. Geographic Origins and Introduction Dynamics. Pp. 273-280. In: *Encyclopedia of Biological Invasions*, University of California Press, Berkeley, CA.

Novak, S.J., and R.N. Mack. 2005. Genetic bottlenecks in alien plant species: influence of

mating systems and introduction dynamics. Pp. 201-228. In: *Species Invasions*: *Insight into Ecology, Evolution and Biogeography*, Sinauer Associates, Sunderland, MA.

Soltis, P.S., D.E. Soltis, S.J. Novak, J.L. Schultz, and R.K. Kuzoff. 1995. Fossil DNA: its potential for biosystematics. Pp. 1-13. In: *Experimental and Molecular Approaches to Plant Biosystematics*, Missouri Botanical Garden, St. Louis, MO.

OTHER:

Pawlak, A.R., R.N. Mack, Jeremiah W. Busch, and S.J. Novak. 2015. Erratum to: Invasion of *Bromus tectorum* (L.) into California and the American Southwest: rapid, multi-directional and genetically diverse. *Biological Invasions*, 17:307.

Simberloff, D., and 140 Co-signatories. 2011. Non-natives: 141 scientist object. (Correspondence) *Nature* 475:36.

UNDERGRDUATE PUBLICATIONS:

Lefler, R.L., S.J. Novak, and Robert W. Ellis. 2003. Plant colonization and growth at an abandoned mine site in southwestern Idaho: influence of heavy metal contamination. *Proceedings of the National Conference on Undergraduate Research (NCUR)*, Pp. 1-8.

Hansen, K.T., S.J. Novak, and R.W. Ellis. 2003. Allozyme diversity in the invasive grass *Taeniatherum caput-medusae* (Poaceae): analysis of native range populations. *Proceedings of the National Conference on Undergraduate Research (NCUR)*, Pp. 1-6.

POPULAR PRESS:

*Novak, S.J. 1997. *Bryonia*: A potent medicinal cucurbit of temperate climes. *The Cucurbit Network News* 4: 1-3.

TECHNICAL REPORTS

Novak, S.J. 2015. Genetic analysis of medusahead (*Taeniatherum caput-medusae*) populations from Oregon and the native range. Final Report, Bureau of Land Management, Burns, Oregon.

Novak, S.J. 2013. Genetic analysis of medusahead (*Taeniatherum caput-medusae*) populations from Oregon, Yakima, WA, and the native range. Progress Report, Bureau of Land Management, Burns, Oregon.

Sforza, R., A. Lagopodi, S.J. Novak, and M. Cristofaro. 2013. Prospects for a biocontrol programme on medusahead. Progress Report, Bureau of Land Management, Burns, Oregon.

Novak, S.J. 2012. Analysis of native and introduced populations of an invasive plant:

management of medusahead (*Taeniatherum caput-medusae*) in western United States. Final Report, USDA, AFRI.

Serpe, M., and S.J. Novak. 2011. Development of procedures to break dormancy in *Lomatium dissectum* seeds. Pp. 37-43. In: Great Basin Native Plant Selection and Increase Project, 2010 Annual Report.

Novak, S.J. 2009. Analysis of native and introduced populations of an invasive plant: management of medusahead (*Taeniatherum caput-medusae*) in western United States. Annual Report, United States Department of Agriculture (USDA), Agriculture and Food Research Initiative (AFRI).

Kinter, C. Lynn, J. Gaskin, A. Hild, R. López, G. Markin, S.J. Novak, N. Shaw, M. Vigna, M. Schwarzländer, and J.F. Smith. 2007. Tracing global invasions of *Chondrilla juncea* L. (rush skeletonweed, yuyo esqueleto) to their Eurasian sources. Final Report, National Geographic Committee for Research and Exploration.

Robertson, I., S.J. Novak, H. Leavitt, and A. Stillman. 2005. L*epidium papilliferum*: analysis of pollination, herbivory, and genetic structure of populations. State of Idaho, Military Division, Idaho Army National Guard.

Robertson, I., S.J. Novak, H. Leavitt, and A. Stillman. 2004. Insect-mediated pollination of *Lepidium papilliferum*: 2004. State of Idaho, Military Division, Idaho Army National Guard.

Novak, S.J., and D.R. Marsh. 1999. Assessment of genetic variation in medusahead rye (*Taeniatherum caput-medusae*). Final Report, Partners in Science Program, M.J. Murdock Charitable Trust.

Munger, J.C., S.J. Novak, B.R. Barnett, and A.A. Ames. 1999. Impacts of Off-Highway Motorized Vehicle Trails on the Communities of the Owyhee Front. Cost-share Agreement Between the Bureau of Land Management and Boise State University.

Novak, S.J., and D.E. Soltis. 1992. Allozyme variation in Montana populations of the fern *Thelypteris phegopteris* (Polypodiaceae). USDA, Forest Service, Kootenai National Forest, Libby, MT.

PAPERS/POSTERS PRESENTED AT MEETINGS:

Novak, S.J., M. Cristofaro, D.Y. Maguire, and R.F.H. Sforza. 2015. The invasive grass ventenata (Ventenata dubia): a new threat for Nevada. Nevada Weed Management Association Conference, Sparks, NV

Novak, S.J., M.L. Peters, S.K. Skaar, J.F. Smith, M.D. Serpe, and R.F.H. Sforza. 2015. Medusahead (*Taeniatherum caput-medusae*) distribution and genetics: morphological and genetic differentiation among subspecies. Nevada Medusahead Sympoium, Sparks, NV

Maguire, D.Y., S.J. Novak, F.A. Brummer, M. Cristofaro, and R.F.H. Sforza. 2015. How historical information helps trace the invasion of a weed: a case study with ventenata. Western Society of Weed Science Meeting, Portland, OR

Brummer, F.A., S.J. Novak, M. Cristofaro, D.Y. Maguire, and R.F.H. Sforza. 2015. A comprehensive approach for control of the annual grass ventenata: an analysis of native and invasive populations. Western Society of Weed Science Meeting, Portland, OR

Novak, S.J., M. Cristofaro, F.A. Brummer, D.Y. Maguire, and R.F.H. Sforza. 2014. Assessing the potential of using biological control in the management of *Ventenata dubia*. W3185 Annual Meeting, Kauai, HI

Novak, S.J. 2014. The sagebrush-steppe sea: beautiful and imperiled ecosystems of the Intermountain West. Regional Botanist Special Lecture. Botany 2014 Meeting, Boise, ID

Prior, C., J.H. Rausch, R. Sforza, J.F. Smith, and S.J. Novak. 2014. Mating system analysis of medusahead (*Taeniatherum caput-medusae*): evidence for preadaptation during biological invasion. Botany 2014 Meeting, Boise, ID

Novak, S.J., C. Prior, J.H. Rausch, J.F. Smith, and R.F.H. Sforza. 2014. Mating system analysis of native and invasive populations of medusahead (*Taeniatherum caput-medusae*): evidence for preadaptation during biological invasion. 4th International Symposium on Environmental Weeds and Invasive Plants, Montpellier, France

Peters, M.L., S. Skaar, R. Sforza, J.F. Smith, M.D. Serpe, and S.J. Novak. 2014. Invasion of medusahead (*Taeniatherum caput-medusae*) in the western United States: geographic origins, multiple introductions and founder effects. 3rd Conference on Invasive Species in Natural Areas, Northern Rockies Invasive Plant Council, Airway Heights, WA

Peters, M.L., R. Sforza, J.F. Smith, M.D. Serpe, and S.J. Novak. 2014. Morphological and genetic differentiation among subspecies of medusahead (*Taeniatherum caput-medusae*): understanding taxonomic complexity in the native range. 3rd Conference on Invasive Species in Natural Areas, Northern Rockies Invasive Plant Council, Airway Heights, WA

Prior, C., J.H. Rausch, R. Sforza, J.F. Smith, and S.J. Novak. 2014. Mating system analysis of medusahead (*Taeniatherum caput-medusae*): evidence for preadaptation during biological invasion. 3rd Conference on Invasive Species in Natural Areas, Northern Rockies Invasive Plant Council, Airway Heights, WA

Peters, M.L., R. Sforza, J.F. Smith, M.D. Serpe, and S.J. Novak. 2013. Comparison of native and invasive populations of medusahead (*Taeniatherum caput-medusae*): geographic origins, multiple introductions and founder effects. W3185 Annual Meeting, Jackson, WY

Peters, M.L., R. Sforza, and S.J. Novak. 2012. Genetic diversity in native and invasive populations of *Taeniatherum caput-medusae* ssp. *asperum* (medusahead): geographic origins, multiple introductions and founder effects. Neobiota, 7th European Conference on Biological Invasions, Pontevedra, Spain

Xu, C-Y., M.C. Julien, M. Fatemi, C. Girod, R.D. Van Klinken, and S.J. Novak. 2012. Divergent phenotypic evolution during the invasion of *Phyla canescens* in France and Australia: the role of selection. Symposium: Rapid Evolution during Biological Invasions, University of Fribourg, Switzerland

Almquist, T.L., R.N. Mack, and S.J. Novak. 2012. Variation in freezing tolerance in *Bromus tectorum*: Comparison between Intermountain West and Great Plains populations. 97th Annual Ecological Society of America Meeting. Portland, OR

Kelly, L.J., R.N. Mack, and S.J. Novak. 2012. Genetic variation in *Bromus tectorum* (Poaceae) from the Mediterranean region: biogeographical history of native populations. 97th Annual Ecological Society of America Meeting. Portland, OR

Rohde, A., D. Pilliod, and S.J. Novak. 2012. Insect community responses to intra- and inter-annual variation in weather: implications for climate change in sagebrush steppe. AAAS Pacific Division Meeting, Boise, ID

Almquist, T.L., R.N. Mack, and S.J. Novak. 2012. Freezing tolerance variation among *Bromus tectorum* populations may increase invasion potential. School of Biological Sciences Graduate Student Research Symposium. Washington State University, Pullman, WA.

Novak, S.J. 2012. Biological invasions through preadaptation and post-immigration evolution: role of propagule pressure. International Symposium on Invasive Plants and Global Change, Urumqi, China

Peters, M.L., R. Sforza, and S.J. Novak. 2012. Comparison of native and invasive populations of *Taeniatherum caput-medusae*: geographic origins, multiple introductions and founder effects. 52nd Weed Science Society of America Meeting, Waikoloa, HI

Peters, M.L., R. Sforza, and S.J. Novak. 2012. Understanding taxonomic complexity in the native range: morphological and genetic differentiation among subspecies of *Taeniatherum caput-medusae*. 52nd Weed Science Society of America Meeting, Waikoloa, HI

Sforza, R., A. Lagopodi, S.J. Novak, and M. Cristofaro. 2012. Fighting medusahead: biocontrol as the last option before giving up? 52nd Weeds Science Society of America Meeting, Waikoloa, HI

Novak, S.J., E.H. Roalson, and R.N. Mack. 2011. Biogeography of the invasive grass *Bromus tectorum* in its native range: stochastic range expansion influences genetic diversity and genetic structure. 3rd International Symposium on Environmental Weeds and Invasive Plants, Monte Verita, Ascona, Switzerland

Peters, M.L., R. Sforza, and S.J. Novak. 2011. Genetic diversity of native and invasive populations of *Taeniatherum caput-medusae* (medusahead): evidence for multiple introductions, source populations and founder effects. 3th International Symposium on Environmental Weeds and Invasive Plants, Monte Verita, Ascona, Switzerland

Peters, M.L., R. Sforza, and S.J. Novak. 2011. Comparison of native and invasive populations of *Taeniatherum caput-medusae* (medusahead): evidence for multiple introductions, source populations and founder effects. 13th International Symposium on Biological Control of Weeds, Waikoloa, HI

Peters, M.L., R. Sforza, and S.J. Novak. 2011. Morphological and genetic differentiation among subspecies of *Taeniatherum caput-medusae*: disentangling taxonomic complexity in the native range. 13th International Symposium on Biological Control of Weeds, Waikoloa, HI

Gaskin, J.F., C.L. Kinter, M. Schwarzlaender, G.P. Markin, S.J. Novak and J.F. Smith. 2011. Origin and diversity of rush skeletonweed (*Chondrilla junccea*) from three continents. 13th International Symposium on Biological Control of Weeds, Waikoloa, HI

Meyer, S.E., K.R. Merill, S.J. Novak, E.A. Leger, and C.E. Coleman. 2011. Population genetic structure of *Bromus tectorum* and the invasion of novel habitats. 96th Annual Ecological Society of America Meeting, Austin, TX

Clay, D., M.Serpe, S. Novak, D. Tank, and J. Smith. 2011. Homoploid hybrid speciation in a rare *Castilleja* from Idaho. Botany 2011 Meeting, St. Louis, MO

Kelly, L.J., R.N. Mack, and S.J. Novak. 2011. Biogeographical history of native populations of *Bromus tectorum* (Poaceae) from the Mediterranean region. School of Biological Sciences Graduate Student Research Symposium. Washington State University, Pullman, WA.

Davis, M.C., S.J. Novak, and G. Hampikian. 2010. Ancient and recent demographic events influence mitochondrial DNA diversity in an immigrant Basque population. 60th American Society of Human Genetics Annual Meeting, Washington, D.C.

Novak, S.J., M. Peters, and R. Sforza. 2010. Comparison of native and invasive populations of medusahead (*Taeniatherum caput-medusae*): evidence for multiple introductions and

regional range expansion. 2nd Conference on Invasive Species in Natural Areas, Northern Rockies Invasive Plant Council, Coeur d'Alene, ID

Gaskin, J.F., M. Schwarzlaender, G.P. Markin, C.L. Kinter, J.F. Smith, and S.J. Novak. 2010. Distribution of invasive genotypes of rush skeletonweed in North America. 2nd Conference on Invasive Species in Natural Areas, Northern Rockies Invasive Plant Council, Coeur d'Alene, ID

Novak, S.J., E.H. Roalson, and R.N. Mack. 2010. Genetic structure without geographic structure: stochastic range expansion of *Bromus tectorum* in its native range influences genetic diversity of invasive populations. Neobiota, 6th European Conference on Biological Invasions, Copenhagen, Denmark

Novak, S.J. 2010. Allozyme diversity of native and invasive populations of cheatgrass (*Bromus tectorum*): evidence for multiple introductions and widespread range expansion in North America. *Bromus* REEnet Meeting, Salt Lake City, UT

Novak, S.J. and R. Sforza. 2010. Comparison of native and invasive populations of medusahead (*Taeniatherum caput-medusae*): insights into introduction dynamics across western landscapes. Weed Science Society of America and Society for Range Management Joint Annual Meeting (USDA Project Directors Meeting), Denver, CO

Sforza, R., S.J. Novak, and B.R. Blank. 2010. Invasion of medusahead: from ecology to biological control. Weed Science Society of America and Society for Range Management Joint Annual Meeting, Denver, CO

Novak, S.J., M. Peters, and R. Sforza. 2009. Allozyme diversity in native and invasive populations of medusahead (*Taeniatherum caput-medusae*). EMAPi 10 Meeting, Stellenbosch, South Africa

Novak, S.J. and J.H. Rausch. 2008. Use of plant surveys, distributional data, and genetic analyses to monitor invasive populations: *Taeniatherum caput-medusae* (Poaceae) as an example of the approach. Neobiota, 5th European Conference on Biological Invasions, Prague, Czech Republic

Novak, S.J., J.H. Rausch, and R. Sforza. 2008. Molecular and quantitative genetic diversity in *Taeniatherum caput-medusae* (Poaceae): evidence for multiple introductions with local range expansion. 5th International Weed Science Congress, Vancouver, Canada

Xu, C-Y., M.C. Julien, M. Fatemi, C. Girod, and S.J. Novak. 2008. Multiple introductions and post-immigration evolution in *Phyla canescens*: phenotypic differentiation under divergent selection pressures in invading populations with high genetic diversity. 5th International Weed Science Congress, Vancouver, Canada

Davis, M.C., J. Goswami, S.J. Novak, and G. Hampikian. 2008. Using DNA to characterize human migration patterns: the Basques of the American Northwest. Promega 19th International Symposium on Human Identification, Hollywood, CA

Davis, M.C., S.J. Novak, and G. Hampikian. 2008. The use of forensic DNA techniques in population studies: the Basques of the Northwest. Northwest Association of Forensic Scientist Annual Conference, Boise, ID

Alsup, S.E., M.N. Kochert, M.J. Bechard, and S.J. Novak. 2008. Productivity and habitat features of Swainson's Hawks (*Buteo swansonii*) nesting in suburban and agricultural environments in Southwest Idaho. Raptor Research Foundation Annual Meeting, Missoula, MT

Alsup, S.E., M.N. Kochert, M.J. Bechard, and S.J. Novak. 2008. Productivity and habitat features of Swainson's Hawks (*Buteo swansonii*) nesting in suburban and agricultural environments in Southwest Idaho. The Wildlife Society 15th Annual Conference, Miami, FL

Davis, M., J. Goswami, S.J. Novak, and G. Hampikian. 2007. STR variability in the immigrant Basque population of southwestern Idaho. Promega 18th International Symposium on Human Identification, Hollywood, CA

Smith, J.F., A.J. Stillman, S.R. Larson, C.M. Culumber, I.C. Robertson, and S.J. Novak. 2007. A phylogenetic analysis of *Lepidium papilliferum* and *L. davisii* (Brassicaceae) reveal the relations of these rare endemic species. Botany and Plant Biology Joint Congress, Chicago, IL

Stillman, A.J., I.C. Robertson, J.F. Smith, and S.J. Novak. 2007. Assessing allozyme diversity and polyploidy in the southwest Idaho endemic, *Lepidium papilliferum*. Botany and Plant Biology Joint Congress, Chicago, IL

Smith, J.F., A.J. Stillman, S.R. Larson, C.M. Culumber, I.C. Robertson, and S.J. Novak. 2007. A phylogenetic analysis of *Lepidium papilliferum* and *L. davisii* (Brassicaceae) reveal the relations of these rare endemic species. American Association for the Advancement of Science (AAAS) Northwest Regional Meeting, Boise, ID

Stillman, A.J., S.J. Novak, I.C. Robertson, and J.F. Smith. 2007. Population genetics of the rare polyploid, *Lepidium papilliferum* (Brassicaceae), a southwest Idaho endemic. American Association for the Advancement of Science (AAAS) Northwest Regional Meeting, Boise, ID

Novak, S.J. and R. Sforza. 2007. Genetic variation in native and introduced populations of *Taeniatherum caput-medusae* (Poaceae). XII International Symposium on Biological Control of Weeds. La Grande Motte, France

Novak, S.J., and R.N. Mack. 2006. Factors influencing genetic bottlenecks in invasive plants: mating systems and introduction dynamics. Symposium: An Evolutionary Perspective of Biological Invasions, University of Fribourg, Switzerland

Novak, S.J., and R.N. Mack. 2006. Multiple introductions matter: the entry and spread of *Bromus tectorum* (cheatgrass) into North America. Neobiota, 4th European Conference on Biological Invasions, Vienna, Austria

Stillman, A.J., I.C. Robertson, J.F. Smith, and S.J. Novak. 2006. Genetic diversity in *Lepidium papilliferum* (Brassicaceae), a southwest Idaho endemic. 79th Annual Northwest Scientific Association Meeting, Boise, ID

Novak, S.J., K.T. Hansen, M. Score, and R. Sforza. 2005. Genetic variation in *Taeniatherum caput-medusae* (Poaceae): analysis of native range populations. Botany 2005 Meeting, Austin, TX

Rausch, J.H., and S.J. Novak. 2005. Hierarchical analysis of quantitative genetic variation in *Taeniatherum caput-medusae*: life-history and morphometric trait variation among introduced populations. Botany 2005 Meeting, Austin, TX

Stillman, A.J., I. Robertson, J.F. Smith, and S.J. Novak. 2005. Allozyme diversity in *Lepidium papilliferum* (Brassicaceae), a southwest Idaho endemic. Botany 2005 Meeting, Austin, TX

Schachner, L.J., S.J. Novak, and R.N. Mack. 2005. Genetic variation in *Bromus tectorum*: differentiation among populations in the mid-continent United States. 90th Annual Ecological Society of America Meeting, Montreal, Canada

Valliant, M.T., R.N. Mack, and S.J. Novak. 2005. Genetic variation in *Bromus tectorum*: separate introductions into eastern and western Canada. 90th Annual Ecological Society of America Meeting Meeting, Montreal, Canada

Novak, S.J. 2003. Genetic analysis of *Bromus tectorum* and *Taeniatherum caput-medusae*: Insights into introduction and spread. IPINAMS-EMAPi 7 Joint Meeting, Ft. Lauderdale, FL

Novak, S.J., D.R. Marsh, L. Deines, and J.H. Rausch. 2003. Genetic variation in *Taeniatherum caput-medusae* (Poaceae): amount and distribution of variability. Botany 2003 Meeting, Mobile, AL

Rausch, J.H., J.F. Smith, and S.J. Novak. 2003. Genetic variation in the invasive grass *Taeniatherum caput-medusae* (Poaceae): random amplified polymorphic DNA (RAPD) analysis. Botany 2003 Meeting, Mobile, AL

Lefler, R.L., S.J. Novak, and R.W. Ellis. 2003. Influence of heavy metal contamination on plant colonization and growth at an abandoned mine site in southwestern Idaho. 45th Annual Idaho Academy of Science Meeting, Lewiston, ID

Hansen, K.T., S.J. Novak, and R.W. Ellis. 2003. Allozyme diversity in native range populations of the invasive grass *Taeniatherum caput-medusae* (Poaceae). 45th Annual Idaho Academy of Science Meeting, Lewiston, ID

Rausch, J.H., J.F. Smith, and S.J. Novak. 2003. Random amplified polymorphic DNA (RAPD) analysis of the invasive grass *Taeniatherum caput-medusae* (Poaceae). 45th Annual Idaho Academy of Science Meeting, Lewiston, ID

Lefler, R.L., S.J. Novak, and R.W. Ellis. 2003. Plant colonization and growth at an abandoned mine site in southwestern Idaho: influence of heavy metal contamination. 76th Annual Northwest Scientific Association Meeting, Forks, WA

Hansen, K.T., S.J. Novak, and R.W. Ellis. 2003. Allozyme diversity in the invasive grass *Taeniatherum caput-medusae* (Poaceae): analysis of native range populations. 76th Annual Northwest Scientific Association Meeting, Forks, WA

Rausch, J.H., J.F. Smith, and S.J. Novak. 2003. Random amplified polymorphic DNA (RAPD) analysis of *Taeniatherum caput-medusae* (Poaceae): level of variation and introduction dynamics. 76th Annual Northwest Scientific Association Meeting, Forks, WA

Lefler, R.L., S.J. Novak, and Robert W. Ellis. 2003. Plant colonization and growth at an abandoned mine site in southwestern Idaho. National Conference on Undergraduate Research (NCUR) Annual Meeting, Salt Lake City, UT

Hansen, K.T., S.J. Novak, S. Frederiksen, and R.W. Ellis. 2003. Allozyme diversity in the invasive grass *Taeniatherum caput-medusae* (Poaceae): analysis of native range populations. National Conference on Undergraduate Research (NCUR) Annual Meeting, Salt Lake City, UT

Lefler, R.L., S.J. Novak, and R.W. Ellis. 2003. Plant colonization and growth at an abandoned mine site in southwestern Idaho: influence of heavy metal contamination. American Association for the Advancement of Science (AAAS) Annual Meeting, Denver, CO

Novak, S.J., D.R. Marsh, L. Deines, and J.H. Rausch. 2002. Genetic variation in *Taeniatherum caput-medusae* (Poaceae): evidence for multiple introductions. Botany 2002 Meeting, Madison, WI

Rausch, J.H., S.J. Novak, and J.F. Smith. 2002. Genetic variation in *Taeniatherum caput-medusae* (Poaceae): analysis of mating system. Botany 2002 Meeting, Madison, WI

Moore, R.L., J.F. Smith, and S.J. Novak. 2002. Environmental heterogeneity and mode of recruitment in *Populus tremuloides* (Salicaceae). Botany 2002 Meeting, Madison, WI

Novak, S.J., D.R. Marsh, L. Deines, and J.H. Rausch. 2002. Allozyme diversity in the invasive grass *Taeniatherum caput-medusae* (Poaceae): evidence for multiple introductions. 44th Annual Idaho Academy of Science Meeting, Rexburg, ID

Novak, S.J., D.R. Marsh, L. Deines, and J.H. Rausch. 2002. Allozyme diversity in the invasive grass *Taeniatherum caput-medusae* (Poaceae): amount and distribution of variation. 44th Annual Idaho Academy of Science Meeting, Rexburg, ID

Rausch, J.H., S.J. Novak, and J.F. Smith. 2002. Allozyme diversity in the invasive grass *Taeniatherum caput-medusae* (Poaceae): analysis of mating system. 44th Annual Idaho Academy of Science Meeting, Rexburg, ID

Moore, R.L., J.F. Smith, and S.J. Novak. 2002. Clonal diversity and mode of recruitment in *Populus tremuloides* (Salicaceae). 44th Annual Idaho Academy of Science Meeting, Rexburg, ID

Novak, S.J., J.K. Scott, P.C. Quimby. 2002. Genetic variation in populations of *Lepidium latifolium* (Brassicaceeae) from southern France: insights into population dynamics. 44th Annual Idaho Academy of Science Meeting, Rexburg, ID

Novak, S.J., D.R. Marsh, L. Deines, and J.H. Rausch. 2002. Genetic variation in the invasive grass *Taeniatherum caput-medusae* (Poaceae): evidence for multiple introductions. 75th Annual Northwest Scientific Association Meeting, Boise, ID

Rausch, J.H., S.J. Novak, and J.F. Smith. 2002. Genetic variation in the invasive grass *Taeniatherum caput-medusae* (Poaceae): analysis of mating system. 75th Annual Northwest Scientific Association Meeting, Boise, ID

Moore, R.L., J.F. Smith, and S.J. Novak. 2002. Association of mode of recruitment with landscape variability in *Populus tremuloides* (Salicaceae). 75th Annual Northwest Scientific Association Meeting, Boise, ID

Novak, S.J., J.K. Scott, P.C. Quimby. 2002. Clonal diversity in populations of *Lepidium latifolium* (Brassicaceeae) from southern France. 75th Annual Northwest Scientific Association Meeting, Boise, ID

Novak, S.J., and A.Y. Welfley. 2002. Genetic variation within and among populations of the introduced plant *Poa bulbosa* (Poaceae). 75th Annual Northwest Scientific Association Meeting, Boise, ID

Novak, S.J., J.K. Scott, P.C. Quimby. 2001. Genetic diversity is low in naturalized populations of *Lepidium latifolium* (Brassicaceeae) from southern France. Botany 2001 Meeting, Albuquerque, NM

Novak, S.J., and A.Y. Welfley. 2001. Allozyme variation within and among populations of the introduced plant *Poa bulbosa* (Poaceae). Botany 2001 Meeting, Albuquerque, NM

Campbell, K.K., S.J. Novak, and S.P. Hardegree. 2000. *Bromus tectorum* seed germination characteristics: differentiation among populations. Joint Fall Meeting, Utah and Idaho Sections, Society for Range Management, Ogden, UT

Novak S.J., and R.N. Mack. 1999. Introduction of an alien plant into its naturalized ranges: *Bromus tectorum* (cheatgrass). XVI International Botanical Congress, St. Louis, MO

Campbell, K.K., S.P. Hardegree, and S.J. Novak. 1999. Seed germination characteristics of *Bromus tectorum*: differentiation among populations. 84th Annual ESA Meeting, Spokane, WA

Novak S.J., J.M. Ott, and L. Deines. 1999. Allozyme data support a progenitor-derivative relationship between *Allium simillimum* (Alliaceae) and *A. aaseae*. 41st Annual Idaho Academy of Science Meeting, Coeur D'Alene, ID

Campbell, K.K., S.P. Hardegree, and S.J. Novak. 1999. Comparison of seed germination characteristics of *Bromus tectorum*: genetic and environmental determinants. 41st Annual Idaho Academy of Science Meeting, Coeur D'Alene, ID

Marsh, D.R., and S.J. Novak. 1999. Evaluation of genetic variation in medusahead rye (*Taeniatherum caput-medusae*). 10th Annual Partners in Science Conference, Tucson, AZ

Campbell, K.K., S.P. Hardegree, and S.J. Novak. 1998. Germination rates of *Elymus elymoides* and *Bromus tectorum* at constant temperatures. 83rd Annual ESA Meeting, Baltimore, MD

Marsh, D.R., and S.J. Novak. 1998. Assessment of genetic variation in medusahead rye (*Taeniatherum caput-medusae*). 9th Annual Partners in Science Conference, Tucson, AZ

Novak, S.J., and J.M. Ott. 1997. Allozyme diversity in *Allium simillimum* (Alliaceae): evidence for a progenitor derivative relationship with *A. aaseae*. 48th Annual AIBS Meeting, Montreal, Canada

Welfley, A.Y., and S.J. Novak. 1997. Allelic variation in the introduced clonal grass *Poa bulbosa* (Poaceae). 39th Annual Idaho Academy of Science Meeting, Idaho Falls, ID

Ott, J.M., S.J. Novak, D.A. Murphey, and J.F. Smith. 1997. Assessment of genetic diversity in the narrow Idaho endemic *Allium aaseae* (Alliaceae) using enzyme electrophoresis and RAPD data. 39th Annual Idaho Academy of Science Meeting, Idaho Falls, ID

Novak, S.J., J.M. Ott, and D.A. Murphey. 1997. Genetic analysis of *Bromus tectorum* from eastern Washington and British Columbia: insights into colonization dynamics. 39th Annual Idaho Academy of Science Meeting, Idaho Falls, ID

Novak, S.J., D.A. Murphey, J. Ott, and J.F. Smith. 1996. Allozyme diversity in the narrow endemic *Allium aaseae* (Alliaceae): comparison with RAPD data. 47th Annual AIBS Meeting, Seattle, WA

James, K.M., S.J. Novak, and R.N. Mack. 1996. Genetic variation and colonization dynamics of *Bromus tectorum* (Poaceae): a global perspective. 47th Annual AIBS Meeting, Seattle, WA

Novak, S.J., and D.A. Murphey. 1996. Genetic variation and colonization dynamics of *Bromus tectorum* (Poaceae): an analysis of populations from Washington and British Columbia. 47th Annual AIBS Meeting, Seattle, WA

James, K.M., S.J. Novak, and R.N. Mack. 1996. Genetic analysis of *Bromus tectorum* from its introduced range: insights into colonization dynamics. 38th Annual Idaho Academy of Science Meeting, Moscow, ID

Novak, S.J., and G. Radamaker. 1995. Quantitative genetic variation within and among populations of the alien grass *Bromus tectorum* (Poaceae). 46th Annual AIBS Meeting, San Diego, CA

Soltis, P.S., S.J. Novak, T.M. Hardig, and D.E. Soltis. 1995. Phylogenetic relationships and rapid radiation in *Lomatium* (Apiaceae). 46th Annual AIBS Meeting, San Diego, CA

Novak, S.J., and R.N. Mack. 1994. Clonal diversity in the recently introduced vine *Bryonia alba* (Cucurbitaceae). 45th Annual AIBS Meeting, Knoxville, TN

Novak, S.J., and R.N. Mack. 1992. Genetic variation of *Bromus tectorum* in Europe: using electrophoresis to search for the source(s) of its introduced populations in North America. 43rd Annual AIBS Meeting, Honolulu, HI

Novak, S.J., and P.S. Soltis. 1992. Phylogenetic relationships among Tuberous *Lomatium* species: chloroplast DNA evidence. 43rd Annual AIBS Meeting, Honolulu, HI

Pyke, D.A., and S.J. Novak. 1992. Cheatgrass (*Bromus tectorum*) demography - establishment attributes, recruitment, ecotypes, and genetic variability. Ecology, Management and Restoration of Intermountain Annual Rangelands Symposium, Boise, ID

Novak, S.J. 1992. Quantitative genetics of *Bromus tectorum* in North America: the role of multiple introductions. Ecology, Management and Restoration of Intermountain Annual Rangelands Symposium, Boise, ID

Novak, S.J., and P.S. Soltis. 1991. Intraspecific cpDNA variation in four species of *Lomatium* (Umbelliferae). 42nd Annual AIBS Meeting, San Antonio, TX

Novak, S.J., D. E. Soltis, and P.S. Soltis. 1991. Geographical distribution and abundance of allotetraploid *Tragopogon* species: the history of range expansion. 42nd Annual AIBS Meeting, San Antonio, TX

Plunkett, G.M., S.J. Novak, P.S. Soltis, and D.E. Soltis. 1991. Molecular evidence of multiple origins in the allotetraploids *Tragopogon miscellus* and *T. mirus* (Asteraceae). 42nd Annual AIBS Meeting, San Antonio, TX

Novak, S.J., and R.N. Mack. 1990. Genetic variation and population differentiation in the recently introduced vine *Bryonia alba* L. 75th Annual ESA Meeting, Snowbird, UT

Novak, S.J., and R.N. Mack. 1989. Electrophoretic variation in native range populations of *Bromus tectorum* L. (cheatgrass): evidence for genetic bottlenecks following introduction. 40th Annual AIBS Meeting, Toronto, Canada

Novak, S.J., and R.N. Mack. 1989. Electrophoretic variability in Washington and British Columbia populations of cheatgrass: evidence for multiple introductions. 62nd Annual Meeting, Northwest Science Association, Richland, WA

Novak, S.J., and R.N. Mack. 1988. Genetic diversity in North American populations of the introduced grass *Bromus tectorum* L. 73rd Annual Ecological Society of America (ESA) Meeting, Davis, CA

Novak, S.J., S.J., and M.I. Cousens. 1985. Limitations to the persistence of *Dicranopteris flexuosa* in North America. 9th Annual Southeast Fern Conference, George Mason University, Fairfax, VA

Novak, S.J., and M.I. Cousens. 1985. *Dicranopteris flexuosa* (Schrad.) Underwood in north Florida: Investigations of a disjunct population. 36th Annual American Institute of Biological Sciences (AIBS) Meeting, Gainesville, FL

Dr. Ian Robertson
Department of Biological Sciences, Boise State University, 1910 University Drive, Boise, ID 83725
208-426-2394; iroberts@boisestate.edu

ACADEMIC POSITIONS

Professor
Department of Biological Sciences, Boise State University, Boise, ID 83725 (2012-present)

Associate Professor
Department of Biological Sciences, Boise State University, Boise, ID 83725 (2005-2011)

Assistant Professor
Department of Biological Sciences, Boise State University, Boise, ID 83725 (2000-2005)

POSTDOCTORAL POSITIONS

NSERC Postdoctoral Fellow
Department of Biology, University of Alberta, Edmonton, AB, Canada (1998-2000)

DEGREES

Ph.D. (Biology) – 1998, Simon Fraser University, Burnaby, BC, Canada
M.Sc. (Zoology) – 1992, University of Toronto, Mississauga, ON, Canada
B.Sc. (Honors Biology) – 1989, Carleton University, Ottawa, ON, Canada

PROFESSIONAL INVOLVEMENT

Professional Society Affiliations
Entomological Society of America (1996 to present)
Entomological Society of Canada (1993 to present)

Professional Activities (outside university)
2009 - Invited by USFWS to review and comment on new information and analyses about population processes in *Lepidium papilliferum*. Report submitted March 23, 2009.
2006 - Served as invited expert on scientific panel to discuss extinction risk to slickspot peppergrass, *Lepidium papilliferum*. Meeting was held in Boise, ID, May 1-3, 2006.
2003 - Served as invited expert on scientific panel to discuss extinction risk to slickspot peppergrass, *Lepidium papilliferum*. Meeting was held at the USFWS office in Portland OR, Nov 5-6, 2003.
2000 to present – reviewed 31 scientific manuscripts for peer-reviewed journals.
Journals (#): Annals of the Entomological Society of America (1), Australian Journal of Entomology (5), Behavioral Ecology & Sociobiology (2), Biological Conservation (1), Botany (1), Ecological Entomology (3), Environmental Entomology (5), Guyana Botanica (1), Journal of Ethology (2), Journal of the Idaho Academy of Sciences (2), Natural Areas Journal (1), Northeastern Entomologist (1), Oikos (1), Physiological Entomology (2), Proceedings of the Royal Society of London, B (2), Western North American Naturalist (1)

TEACHING EXPERIENCE (current rotation)

BIOL 192 – General Biology II
BIOL 426/526 – Insect Ecology
ZOOL 305/305G – Entomology
BIOL 496 – Independent Study
BIOL 598 – Graduate Seminar (topics include: pollination biology; evolution of flight; evolution of insect societies; insect mating systems; foraging ecology)

GRADUATE STUDENT THESES (as major advisor)

Jeffries, Michelle. Current MS Biology candidate studying the consequences of harvester ant foraging on the seed bank of slickspot peppergrass.

Brown, Jennifer. Current MS Biology candidate studying the consequences of harvester ant foraging on the seed bank of slickspot peppergrass.

Schmasow, Matthew. MS Biology 2015. "Diet selection by the Owyhee harvester ant (*Pogonomyrmex salinus*) in southwestern Idaho."

White, Joshua. MS Biology 2009. "Seed predation on slickspot peppergrass by the Owyhee harvester ant." Recipient of the 2009 "Distinguished Masters Thesis Award" at Boise State University.

Williams, Wyatt. MS Biology 2007. "Host selection in the Douglas-fir beetle following extended periods of flight: the effect of depleted fat reserves on pioneer behavior."

Billinge, Stephanie. MS Biology 2006. "Reproductive performance as a function of outcrossing distance in *Lepidium papilliferum* (Brassicaceae), a rare plant endemic to southwest Idaho."

Stillman, Amy. MS Biology 2006. "Population genetics and mating system of the rare polyploid, *Lepidium papilliferum* (Brassicaceae), a southwestern Idaho endemic."

Leavitt, Hollie. MS Biology 2006. "Pollination and florivory by insects visiting *Lepidium papilliferum* (Brassicaceae) flowers"

GRANT FUNDING (last 10 years)

Year	Project Title	Agency†	Amount
2015	Herbivory by harvester ants and rodents on slickspot peppergrass	USFWS	$25,050
2014	Continuation of a monitoring program for harvester ant colonies located within *Lepidium papilliferum* populations: Year 5	USFWS	$26,392
2014	Seed predation and pollination by insects visiting introduced slickspot peppergrass.	IDARNG	$24,929
2013	Continuation of a monitoring program for harvester ant colonies located within *Lepidium papilliferum* populations: Year 4	USFWS	$20,107
2013	Seed predation and pollination by insects visiting slickspot peppergrass	IDARNG	$24,000
2012	Continuation of a monitoring program for harvester ant colonies located within *Lepidium papilliferum* populations: Year 3	USFWS	$19,451
2012	Seed predation and pollination by insects visiting slickspot peppergrass	IDARNG	$20,983
2011	Continuation of a monitoring program for harvester ant colonies located within *Lepidium papilliferum* populations: Year 2	USFWS	$19,981
2011	Seed predation and pollination by insects visiting slickspot peppergrass	IDARNG	$18,094
2010	A monitoring program for harvester ant colonies located within *Lepidium papilliferum* populations	USFWS	$13,551
2010	Seed predation and pollination by insects visiting slickspot peppergrass	IDARNG	$17,995
2010	Assessing habitat suitability for the insects that pollinate *Lepidium papilliferum*	BLM	$14,566
2009	Seed predation and pollination by insects visiting slickspot peppergrass	IDARNG	$17,380
2008	Insect-mediated pollination and harvester ant seed predation in slickspot peppergrass	IDARNG	$17,530
2007	Insect-mediated pollination and seed predation in slickspot peppergrass: implications for population viability	IDARNG	$16,930
2006	Importance of insect-mediated pollination and outcrossing on the reproductive performance of slickspot peppergrass, *Lepidium papilliferum*	BLM	$12,082
2006	Insect-mediated pollination and herbivory of slickspot peppergrass	IDARNG	$14,496

† - BLM = Bureau of Land Management; IDARNG = Idaho Army National Guard; USFWS = United States Fish & Wildlife Service

SCIENTIFIC PRESENTATIONS (while at Boise State University)

Invited Speaker

Robertson, IC. "At home on the range: Loss of sagebrush may open new habitat for harvester ants, and imperil a threatened mustard endemic to southwest Idaho." American Academy for the Advancement of Science Meeting, Boise ID, June 25-27, 2012.

Robertson IC & JP White. "Seed predation by Owyhee harvester ants threatens the survival of slickspot peppergrass, a rare Idaho endemic". Intermountain Native Plant Summit 2009, Boise, ID, March 24-26, 2009

Robertson IC & JP White. "Harvester Ants: Implications for *Lepidium papilliferum*". Idaho Rare Plant Conference, Boise ID, Feb 10-12, 2009

Robertson IC. "Insect-mediated pollination in *Lepidium papilliferum*". BLM workshop on pollinators and conservation. Boise, ID, Feb 21, 2008.

Robertson IC, Ulappa AC & S Billinge. Insect-mediated pollination and spatial structuring in *Lepidium papilliferum* populations. Invited symposium presentation at the 88th Annual Meeting of the American Association for the Advancement of Science Pacific Division, Boise ID, June 17-21 2007.

Stillman A, Novak SJ, Robertson IC & JF Smith. Population genetics of a rare polyploidy, *Lepidium papilliferum* (Brassicaceae), a Southwest Idaho endemic. Invited symposium presentation at the 88th Annual Meeting of the American Association for the Advancement of Science Pacific Division, Boise ID, June 17-21 2007.

Smith JF, Stillman AJ, Larson SR, Culumber CM, Robertson IC & SJ Novak. A phylogenetic analysis of *Lepidium papilliferum* and *L. davisii* (Brassicaceae) reveals the relations of these rare endemic species. Invited symposium presentation at the 88th Annual Meeting of the American Association for the Advancement of Science Pacific Division, Boise ID, June 17-21 2007.

Robertson IC. "Visitation versus Pollination: Measuring the relative contributions of insects to the pollination of slickspot peppergrass". Idaho Rare Plant Conference, Boise, ID, Feb 2004

Selected Conference Presentations

Howell BD & IC Robertson. "Foraging behavior in *Pogonomyrmex salinus* when colonies overlap in their foraging ranges" McNair Scholars Research Conference, Baltimore MD, Sept 20, 2014

Howell BD & IC Robertson. "Understanding the foraging ranges of *Pogonomyrmex salinus* when neighboring colonies compete for resources." Boise State University Undergraduate Research Conference, Boise ID, April 21, 2014

Schmasow M & IC Robertson. "Diet selection by Owyhee harvester ants (*Pogonomyrmex salinus*) and its consequences for slickspot peppergrass (*Lepidium papilliferum*)." Northwest Science Annual Meeting, Boise ID, March 28-30, 2012.

White JP & IC Robertson. "Seed predation on slickspot peppergrass, *Lepidium papilliferum* (Brassicaceae), by the Owyhee harvester ant, *Pogonomyrmex salinus* (Hymenoptera: Formicidae)". Society for Integrative and Comparative Biology Annual Meeting, Boston MA, Jan 3-7, 2009

White JP & IC Robertson. "Seed predation on slickspot peppergrass, *Lepidium papilliferum*, (Brassicaceae), by the Owyhee harvester ant, *Pogonomyrmex salinus* (Hymenoptera: Formicidae). Entomological Society of Canada Annual Meeting, Ottawa, ON, Oct 19-22, 2008.

Williams WI & IC Robertson. "Using rotary flight mills to quantify fat use by Douglas-fir beetles, *Dendroctonus pseudotsugae.* 58th Annual Western Forest Insects Work Conference, Boise ID, March 5-9, 2007.

Stillman A, Robertson IC, Smith JF & SJ Novak. Assessing allozyme diversity and polyploidy in the rare southwestern Idaho endemic, Lepidium papilliferum. Botanical Society of America Annual Meeting, Chicago IL, July 7-11, 2007.

Billinge S & IC Robertson. Reproductive success as a function of outcrossing distance in *Lepidium papilliferum.* Northwest Science Annual Meeting, Boise ID, March 6-8 2006

Leavitt H & IC Robertson. Petal herbivory by chrysomelid beetles (*Phyllotreta sp.*) is detrimental to pollination and seed production in *Lepidium papilliferum* (Brassicaceae). Northwest Science Annual Meeting, Boise ID, March 6-8 2006

Stillman A, Robertson I, Smith JF, & SJ Novak. Allozyme diversity in *Lepidium papilliferum* (Brassicaceae), a southwest Idaho endemic. Northwest Science Annual Meeting, Boise ID, March 6-8 2006

Williams WI & IC Robertson. "Using rotary flight mills to quantify fat use by Douglas-fir beetles, *Dendroctonus pseudotsugae.* Northwest Science Annual Meeting, Boise ID, March 6-8 2006

Stillman A, Robertson I, Smith JF, & SJ Novak. Allozyme diversity in *Lepidium papilliferum* (Brassicaceae), a southwest Idaho endemic. Botanical Society of America Annual Meeting, Austin, TX, Aug 13-17, 2005

Williams WI & IC Robertson. "Emergence day and body condition correlate with amount of fat in Douglas-fir beetles (*Dendroctonus pseudotsugae*)" at the Entomological Society of Canada annual meeting in Canmore, AB, Nov 2-5, 2005 [

Leavitt H & IC Robertson. "Measuring the relative importance of insect visitors to the pollination of slickspot peppergrass, *Lepidium papilliferum*". Annual meeting of the Entomological Society of America, Cincinnati, OH, 26-29 October, 2003.

PUBLICATIONS (while at Boise State University)

Refereed Articles

Robertson IC, Robertson WG, & JP White. Habitat associations and colony dynamics of Owyhee harvester ants (Hymenoptera: Formicidae). (in preparation for Environmental Entomology)

Robertson IC & MS Schmasow. Searching for greener pastures: harvester ants extend their foraging range and modify diet in response to seed availability. (in preparation for Psyche)

Schmasow MS & **IC Robertson**. Selective foraging by Owyhee harvester ants in semiarid grassland: implications for a rare plant. (submitted to Oecologia, June 2015)

Howell BD, & **IC Robertson**. 2015. Reclaiming lost territory: the response of Owyhee harvester ants to forager intrusions by neighboring colonies. Journal of Insect Behavior, *in press*.

Wilson ER, Smalling KL, Reilly TJ, Gray E, Bond L, Steele L, Kandel P, Chamberlin A, Gause J, Reynolds N, **Robertson I**, Novak S, Feris K, & MM White. 2014. Assessing the potential effects of fungicides on nontarget gut fungi (Trichomycetes) and their associated larval blackfly hosts. Journal of the American Water Resources Association, 50(2): 420-433.

Robertson IC & H Leavitt. 2011. Relative contributions to seed production by floral visitors of slickspot peppergrass, *Lepidium papilliferum* (Brassicaceae). Arthropod-Plant Interactions, 5: 379-389. DOI1007/s11829-011-09142-7

White JP & **IC Robertson**. 2009. Intense seed predation by harvester ants on a rare mustard. Écoscience, 16(4): 508-513.

White JP & **IC Robertson**. 2009. An unusual life history strategy in *Lepidium papilliferum* (Brassicaceae), a rare mustard endemic to southwestern Idaho. Northwest Science, 83(3): 287-290.

Smith JF, Stillman AJ, Larson SR, Culumber CM, **Robertson IC**, & SJ Novak. 2009. Phylogenetic Relationships among *Lepidium papilliferum* (L. Henderson) A. Nels. & J. F. Macbr., *L. montanum* Nutt., and *L. davisii* Rollins (Brassicaceae). Journal of the Torrey Botanical Society, 136(2):149-163.

Billinge S & **IC Robertson**. 2008. Spatial structure and inbreeding depression in slickspot peppergrass, *Lepidium papilliferum* (Brassicaceae). Botany, 86: 1002-1008.

Williams WI & **IC Robertson**. 2008. Using automated flight mills to manipulate fat reserves in Douglas-fir Beetles, *Dendroctonus pseudotsugae* (Hopkins) (Coleoptera: Curculionidae). Environmental Entomology, 37: 850-856.

Leavitt H & **IC Robertson**. 2006. Petal herbivory by chrysomelid beetles (Phyllotreta sp.) is detrimental to pollination and seed production in *Lepidium papilliferum* (Brassicaceae). Ecological Entomology, 31: 657-660.

Robertson IC & D Klemash-Maguire. 2005. Crab spiders deter insect visitations to slickspot peppergrass flowers. Oikos, 109: 577-582.

Robertson IC & AC Ulappa. 2004. Distance between pollen donor and recipient influences fruiting success in slickspot peppergrass, *Lepidium papilliferum*. Canadian Journal of Botany, 82: 1705-1710.

Robertson IC. 2004. Importance of outcrossing for fruit production in slickspot peppergrass, *Lepidium papilliferum* L. (Brassicaceae). Western North American Naturalist, 64: 265-268.

Robertson IC & D. Klemash. 2003. Insect-mediated pollination in slickspot peppergrass, *Lepidium papilliferum* L. (Brassicaceae), and its implications for population viability. Western North American Naturalist, 63: 333-342.

Technical Reports

Robertson IC. 2014. Habitat associations and dynamics of Owyhee harvester ant colonies location within slickspot peppergrass populations. Unpublished report on file at: United States Fish and Wildlife Service. Idaho Fish and Wildlife Office, Boise, ID.

Robertson IC & J Crossman. 2013. Insect-mediated pollination and harvester ant seed predation in slickspot peppergrass: 2013 report. Unpublished report on file at: State of Idaho Military Division, Army National Guard, Boise, ID.

Robertson IC. 2013. Monitoring harvester ant colonies located within slickspot peppergrass habitat: 2013 update (year 4). Unpublished report on file at: United States Fish and Wildlife Service. Idaho Fish and Wildlife Office, Boise, ID.

Robertson IC & J Crossman. 2012. Insect-mediated pollination and harvester ant seed predation in slickspot peppergrass: 2012 report. Unpublished report on file at: State of Idaho Military Division, Army National Guard, Boise, ID.

Robertson IC. 2012. Monitoring harvester ant colonies located within slickspot peppergrass habitat: 2012 update (year 3). Unpublished report on file at: United States Fish and Wildlife Service. Idaho Fish and Wildlife Office, Boise, ID.

Robertson IC. 2011. Monitoring harvester ant colonies located within slickspot peppergrass habitat. Unpublished report on file at: United States Fish and Wildlife Service. Idaho Fish and Wildlife Office, Boise, ID.

Robertson IC & MS Schmasow. 2011. Insect-mediated pollination and harvester ant seed predation in slickspot peppergrass: 2011 report. Unpublished report on file at: State of Idaho Military Division, Army National Guard, Boise, ID.

Robertson IC. 2010. Assessing habitat suitability for the insects that pollinate *Lepidium papilliferum*. Unpublished report on file at: Bureau of Land Management, Boise, ID.

Robertson IC. 2010. Monitoring harvester ant colonies located within slickspot peppergrass habitat. Unpublished report on file at: United States Fish and Wildlife Service. Idaho Fish and Wildlife Office, Boise, ID.

Robertson IC & MS Schmasow. 2010. Insect-mediated pollination and harvester ant seed predation in slickspot peppergrass: 2010 report. Unpublished report on file at: State of Idaho Military Division, Army National Guard, Boise, ID.

Robertson IC & M Schmasow. 2009. Insect-mediated pollination and harvester ant seed predation in slickspot peppergrass: 2009 report. Unpublished report on file at: State of Idaho Military Division, Army National Guard, Boise, ID.

Robertson IC & JP White. 2008. Insect-mediated pollination and harvester ant seed predation in slickspot peppergrass: 2008 report. Unpublished report on file at: State of Idaho Military Division, Army National Guard, Boise, ID.

Robertson IC & JP White. 2007. Insect-mediated pollination and seed predation in slickspot peppergrass, *Lepidium papilliferum*. Unpublished report on file at: State of Idaho Military Division, Army National Guard, Boise, ID.

Robertson IC, Novak S, Leavitt H, Stillman A, & JP White. 2006. Analyses of seed predation, pollination, and population genetics in *Lepidium papilliferum*. Unpublished report on file at: State of Idaho Military Division, Army National Guard, Boise, ID.

Robertson IC, Leavitt H, & S Billinge. 2006. Importance of insect-mediated pollination and outcrossing on the reproductive performance of slickspot peppergrass, *Lepidium papilliferum*: Report for 2006. Unpublished report on file with Bureau of Land Management, Boise, ID.

Robertson IC, Novak S, Leavitt H, & A Stillman. 2005. *Lepidium papilliferum*: Analysis of pollination, herbivory, and genetic structure of populations. Unpublished report on file at: State of Idaho Military Division, Army National Guard, Boise, ID.

Robertson IC, Leavitt H, & S Billinge. 2005. Importance of insect-mediated pollination and outcrossing on the reproductive performance of slickspot peppergrass, *Lepidium papilliferum*. Unpublished report on file with Bureau of Land Management, Boise, ID.

Robertson IC, Novak S, Leavitt H, & A Stillman. 2004. Insect-mediated pollination of *Lepidium papilliferum*: 2004. Unpublished report on file at: State of Idaho Military Division, Army National Guard, Boise, ID.

Robertson IC, Leavitt H, & S Billinge. 2004. Insect-mediated pollination in slickspot peppergrass, and the impact of competition for pollinators on reproductive success. Unpublished report on file with Bureau of Land Management, Boise, ID.

Robertson IC. 2003. Insect-mediated pollination of *Lepidium papilliferum*: 2003. Unpublished report on file at: State of Idaho Military Division, Army National Guard, Boise, ID.

Robertson IC. 2003. Insect pollinator communities of slickspot peppergrass, *Lepidium papilliferum*: implications for population viability: 2003. Unpublished report on file with Bureau of Land Management, Boise, ID.

Robertson IC & L Hannon. 2003. Insect pollinator communities of slickspot peppergrass, *Lepidium papilliferum*: implications for population viability. Unpublished report on file with Bureau of Land Management, Boise, ID.

Robertson IC. 2002. Insect-mediated pollination of *Lepidium papilliferum*. Unpublished report on file at: State of Idaho Military Division, Army National Guard, Boise, ID.

Robertson IC. 2001. Insect-mediated pollination of slickspot peppergrass, *Lepidium papilliferum*: implications for population viability. Unpublished report on file with Bureau of Land Management, Boise, ID.

Biographical Sketch **MARCELO D. SERPE**

Department of Biological Sciences, Boise State University
1910 University Drive, Boise, ID 83725-1515
E-mail: MSerpe@boisestate.edu
Phone: (208) 426-3687

Present Position: Professor
Academic Degrees, Postdoctoral Work, and Previous Positions:
Associate Professor, Boise State University, 2002-2010
Assistant Professor, Boise State University, 1998-2002
Assistant Professor, Cayey University College, University of Puerto Rico, 1995-98
Postdoctoral research associate, Plant Cell Biochemistry, University of California, Riverside, 1991-95.
Ph.D., Plant Physiology, University of California, Davis, 1991.
M.S., Plant Science, California State University, Fresno, 1983.
Ingeniero Agronomo, Facultad de Agronomia, Universidad de Buenos Aires, 1981.

Teaching Experience:
General Biology (lecture and laboratory) (Boise State University)
Plant Physiology (lecture and laboratory) (Boise State University)
Plant Anatomy and Microtechnique (lecture and laboratory) (Boise State University)
Molecular and Cellular Biology of Plants (lecture and laboratory) (Boise State University)
Plants and Society (lecture and laboratory) (Boise State University)
Graduate Seminars in Control of Seed Germination and Plant Physiological Ecology (Boise State University)
General Botany (lecture and laboratory) (Cayey University College/Boise State University)
General Biology (lecture and laboratory) (Cayey University College)

Publications:

Zhuang W, **Serpe M**, Zhang Y (2015) The effect of lichen-dominated biological soil crusts on growth and physiological characteristics of three plant species in a temperate desert, northwestern China. Plant Biology Journal doi:10.1111/plb.12359
Carter KA*, Smith JF, White MM, **Serpe MD** (2014) Assessing the diversity of arbuscular mycorrhizal fungi in semiarid shrublands dominated by Artemisia tridentate ssp. wyomingensis. Mycorrhiza 24: 301-314
Shellie K, Cragin J*, **Serpe M** (2014) Performance of Alternative European Wine Grape Cultivars in Southwestern Idaho: Cold Hardiness, Berry Maturity, and Yield. HortTechnology 24: 138-147
Chao WS, **Serpe M**, Suttle JC, Jia Y (2013) Increase in ACC oxidase levels and activities during paradormancy release of leafy spurge (*Euphorbia esula*) buds. Planta 238: 205-215
Serpe MD, Roberts E**, Eldridge DJ, Rosentreter R (2013) *Bromus tectorum* litter alters photosynthetic characteristics of biological soil crusts from a semiarid shrubland. Soil Biology and Biochemistry 60:220-230
Clay DL, Novak SJ, **Serpe MD**, Tank DC, Smith JF (2012) Homoploid hybrid speciation in a rare endemic *Castilleja* from Idaho (*Castilleja christii*, Orobanchaceae). American Journal of Botany 99: 1976-1990
Zhou X, ZhangY, Ji X, Downing A, **Serpe M** (2011) Combined effects of nitrogen deposition and water stress on growth and physiological responses of two annual desert plants in northwestern China. Environmental and Experimental Botany 74:1-8
Chao WS, **Serpe MD** (2010) Changes in the expression of carbohydrate metabolism genes relating to three phases of bud dormancy in leafy spurge. Plant Molecular Biology 73: 227-239

Scholten M*, Donahue J**, Shaw NL, **Serpe MD** (2009) Environmental regulation of dormancy loss in *Lomatium dissectum* (Apiaceae) seeds. Annals of Botany 103: 1091-1101

Serpe MD, Zimmerman SJ**, Deines L*, Rosentreter R. (2008) Seed water status and root tip characteristics of two annual grasses on lichen-dominated biological soil crusts. Plant Soil 303: 191-205

Deines L*, Rosentreter R, Eldridge DJ, **Serpe MD** (2007) Germination and seedling establishment of two annual grasses on lichen-dominated biological soil crusts. Plant Soil 295: 23-35

Chao WS, **Serpe MD**, Jia Y, Shelver WL, Anderson JV, Umeda M (2007) Potential roles for autophosphorylation, kinase activity, and abundance of a CDK-activating kinase (Ee;CDKF;1) during growth in leafy spurge. Plant Molecular Biology 63: 365-379

Serpe MD, Orm JM*, Barkes TR**, Rosentreter R (2006) Germination and seed water status of four grasses on moss dominated biological soil crusts from arid lands Plant Ecology 185: 163-178

Chao WS, **Serpe MD**, Anderson JV, Gesch RW, Horvath DP (2006) Sugars, hormones, and environment affect the dormancy status in underground adventitious buds of leafy spurge (*Euphorbia esula*). Weed Science 54: 59-68

Serpe MD, Muir AJ**, Andème-Onzighi C, Driouich A (2004) Differential expression of callose and a β-1,4 galactan epitope in the laticiferous plant *Euphorbia heterophylla* L. International Journal of Plant Sciences 165: 571-585

Wicklow-Howard M, **Serpe MD**, Orm J**, Stokes J, Rosentreter R (2003) Effect of biological soil crusts on seed germination and seedling growth of *Bromus tectorum*. Proceedings of the VIIth International Rangelands Congress 1276-1278

Serpe MD, Muir AJ**, Driouich A (2002) Immunolocalization of β-D-glucans, pectins, and arabinogalactan-proteins during intrusive growth and elongation of nonarticulated laticifers in *Asclepias speciosa* Torr. Planta 215: 357-370

Serpe MD, Muir AJ**, Keidel AM** (2001) Localization of cell wall polysaccharides in non-articulated laticifers of *Asclepias speciosa*. Protoplasma 216: 215-226

Serpe MD, Matthews MA (2000) Turgor and cell wall yielding in dicot leaf growth in response to changes in relative humidity. Australian Journal of Plant Physiology 27: 1131-1140

Serpe MD, Nothnagel EA (1999) Arabinogalactan-proteins in the Multiple Domains of the Plant Cell Surface. Advances in Botanical Research 30: 207-289

Serpe MD, Nothnagel EA (1996) Heterogeneity of arabinogalactan-proteins on the plasma membrane of rose cells. Plant Physiology 112: 1261-1271

Serpe MD, Nothnagel EA (1996) Lipid lateral mobility in the plasma membrane of whole plant cells. Pflügers Archives-European Journal of Physiology. 43: 253-254

Serpe MD, Nothnagel EA (1995) Purification and biochemical characterization of arabinogalactan-proteins from the cell wall of rose cells. Plant Physiology 109: 1007-1016

Serpe MD, Nothnagel EA (1994) Effects of Yariv phenylglycosides on *Rosa* cell suspensions: Evidence for the involvement of arabinogalactan-proteins in cell proliferation. Planta 193: 542-550

Serpe MD, Matthews MA (1994) Growth, pressure, and wall stress in epidermal cells of *Begonia* leaves during development. International Journal of Plant Sciences 155: 291-301

Serpe MD, Matthews MA (1994) Changes in cell wall yielding and stored growth in *Begonia argenteo-guttata* L. leaves during the development of water deficits. Plant Cell Physiology 35: 619-626

Serpe MD, Matthews MA (1992) Rapid changes in cell wall yielding of elongating *Begonia argenteo-guttata* L. leaves in response to changes in plant water status. Plant Physiology 100: 1852-1857

Emershad RL, Ramming DW, **Serpe MD** (1989). In ovulo embryo development and plant formation from stenospermic genotypes of *Vitis vinifera*. American Journal of Botany 76: 397-402

Submitted manuscripts

Zhang Y, Aradottir AL, **Serpe MD**, Boeken B Interactions of biological soil crusts with vascular plants. Chapter for Book entitled: *Biological Soil Crusts: An Organizing Principle in Drylands* edited by Jayne Belnap

Davidson BE, Novak SJ, **Serpe MD** Consequences of pre-inoculation with native arbuscular mycorrhizae on root colonization and survival of *Artemisia tridentata* ssp. *wyomingensis* seedlings after transplanting

Technical reports during the last five years

Serpe MD, Davidson BE* Community structure of arbuscular mycorrhizal fungi colonizing Wyoming big sagebrush seedlings. In Great Basin Native Plant Project Annual Report 2014 (in press)

Serpe MD, Davidson BE* Pre-inoculation of Wyoming big sagebrush seedlings with native arbuscular mycorrhizae: effects on mycorrhizal colonization and seedling survival after transplanting. In Great Basin Native Plant Project Annual Report 2013 (pp. 61-67)

Serpe MD, Davidson BE* Pre-inoculation of Wyoming big sagebrush seedlings with native arbuscular mycorrhizae: Effects on mycorrhizal colonization and community composition after transplanting. In Great Basin Native Plant Project Annual Report 2012 (pp. 62-68)

Serpe M Diversity of Mycorrhizal Fungi Associated with *Artemisia tridentata* ssp. *wyomingensis.* In Great Basin Native Plant Selection and Increase Project Annual Report 2011 (pp. 50-57)

Serpe M Novak S Genetic variation among populations of *Lomatium dissectum*. In Great Basin Native Plant Selection and Increase Project Annual Report 2010 (pp. 37-42).

Serpe M Diversity of Mycorrhizal Fungi Associated with *Artemisia tridentata* ssp. *wyomingensis.* In Great Basin Native Plant Selection and Increase Project Annual Report 2010 (pp. 52-54)

Presentations during the last five years

Velasco J**, Smith JF, Serpe MD (2015) Drought Effects on Colonization of *Artemisia tridentata* seedlings by Arbuscular Mycorrhizal Fungi. Annual meeting of the Botanical Society of America

Davidson BE*, Smith JF, Serpe MD (2015) Community Structure of Arbuscular Mycorrhizal Fungi Colonizing *Artemisia tridentata* Seedlings Following Inoculation and Transplanting. Annual meeting of the Botanical Society of America

Serpe MD, Davidson BE* (2015) Improvement in colonization and seedling survival of Wyoming big sagebrush seedlings following inoculation with native arbuscular mycorrhizae. National Native Seed Conference

Davidson BE*, Serpe MD (2015) Community structure of arbuscular mycorrhizal fungi colonizing Wyoming big sagebrush seedlings transplanted to the Snake River Birds of Prey, NCA. Great Basin Consortium Conference

Serpe MD, Davidson BE* (2014) Inoculation of Wyoming big sagebrush seedlings with native arbuscular mycorrhizae: impacts on root colonization, mycorrhizal community composition, and seedling survival after transplanting. Society for Ecological Restoration Northwest-Great Basin regional conference

Cragin J*, Shellie K, Serpe MD (2014) Endodormancy release in grapevine buds: chilling requirements and changes in cold hardiness. Annual meeting of the Botanical Society of America

Davidson BE*, Smith JF, Serpe MD (2014) Inoculation of Artemisia tridentata ssp. wyomingensis with arbuscular mycorrhizae: impacts on colonization and mycorrhizal composition of roots after transplanting. Annual meeting of the Botanical Society of

America

Carter KA*, Serpe MD, Smith JF (2013) Assessing the diversity of mycorrhizal communities in sagebrush steppes of southwestern Idaho. Annual meeting of the Botanical Society of America

Roberts E**, Serpe M, Rosentreter R (2013) *Bromus tectorum* litter alters photosynthetic characteristics of biological soil crusts from sagebrush steppes. Annual Meeting of Northwest Science

Davidson BE*, Serpe MD (2013) Colonization of *Artermisia tridentata* ssp wyomingensis by native arbuscular mycorrhizae: persistence and consequence of inoculation. Great Basin Consortium Conference

Davidson B*, Serpe MD (2012) Improvement in colonization and seedling survival of Wyoming big sagebrush following inoculation with native arbuscular mycorrhizal fungi. Annual meeting of the Mycological Society of America

Cragin J*, Keller M, Serpe MD, Shellie K (2012) Fighting of the Cold: Effects of Temperature, Dormancy, and Deacclimation on Cold-Hardiness in Grapevines. Annual meeting of the American Society of Enology and Viticulture

Holten R**, Roberts E**, Serpe MD (2012) Survival of native arbuscular mycorrhizal inoculum following transplanting of Wyoming big sagebrush. National Conference of Undergraduate Research

Chao WS, Serpe M, Suttle JC, Jia Y (2011) Dynamics of ACC oxidase and ethylene during growth of leafy spurge buds. Annual meeting of the American Society of Plant Biologists

Carter K*, White M, Serpe M (2011) Identification of mycorrhizal species associated with *Artemisia tridentata* ssp. *wyomingensis* in southwestern Idaho. Annual meeting of the Mycological Society of America

Davidson D*, Cragin J**, Serpe M (2011) Seasonal changes in gas exchange and chlorophyll fluorescence parameters in *Artemisia tridentata* ssp. *wyomingensis.* Annual meeting of the Great Basin native plant selection and increase project

Osgood T**, Rosentreter R., Serpe MD (2010) Influence of Bromus tectorum litter on the photosynthetic capacity of a moss dominated biological soil crust. Annual Meeting of Northwest Science

Scholten M*, Zimmerman S**, Shaw N, Serpe MD (2010) Environmental regulation of dormancy loss in *Lomatium dissectum* seeds. National Native Seed Conference

Carter K*, Davidson B*, White M, Shaw N, Serpe M (2010) Identification of mycorrhizae associated with *Artermisia tridentata* ssp. *Wyomingensis* in Southwestern Idaho. National Native Seed Conference

*Graduate student in my lab, ** undergraduate student in my lab

<u>Grants during the last five years</u>:

USDA Forest Service ($39,923) Drought tolerance of big Wyoming sagebrush seedlings inoculated with arbuscular mycorrhizae (March 15-Jul 18) (PI: M.Serpe)

USDA Forest Service ($5,000) Analysis of arbuscular mycorrhizal taxa in seedlings of Wyoming big sagebrush following transplanting (Dec 13-Jul 16) (PI: M. Serpe)

Idaho State Department of Agriculture ($22,994) Preparing Idaho Viticulture for Future Extreme Temperature Events: Wine Grapes Need for and Tolerance to Cold (Feb 12-Dec 14) (PI: M.Serpe, CoPI J. Cragin)

USDA AFRI ($149,451) Functional diversity of native mycorrhizae during early development of Big Sagebrush: a step(pe) towards Restoring Sagebrush Ecosystems (Jan 10-Dec 13) (PI: M.

Serpe, Co-PI M. White)
USDA Forest Service ($9,400) Diversity of mycorrhizal species that colonize *Artemisia tridentata* in southwestern Idaho (Jan 10-May 13) (PI: M. Serpe)
Bureau of Land Management ($39,946): Influence of litter and a moss-dominated biological soil crust on *Bromus tectorum* establishment under natural environmental conditions (May 08-Oct 12) (PI: M. Serpe)

Pending grants:
USDA AFRI ($149,976) Developing deep roots: Improving establishment of *Artemisia tridentata* seedlings via associations with soil microorganisms (Jan 16-Dec 18) (PI: M. Serpe)
Bureau of Land Management ($15,945) Generation and multiplication of monospecific cultures of native arbuscular mycorrhizae (Jan 16-Sept 17) (PI: M. Serpe)

Graduate students in my lab during the last five years:
Keith A. Carter
Bill E. Davidson (graduated Spring 15)
Jacob Cragin (thesis submitted, expected completion Fall 15)
Craig Carpenter

Undergraduate Students working in my lab during the last five years:
Eric Roberts, Russell Holten, Ryan LaJoie, Rachael Barron, Rachael Bergey, Tyler Osgood, Jae Martini, Joel Velasco, Carly Prior, Brian Husler, Jacki Weber, Craig Carpenter, Jessica Andrews

Service during the last five years:
Professional:
-Reviewer for the following journals: Weed Research, Ecological Research, Rangeland Ecology and Management, Plant and Soil, Biodiversity and Conservation, PLOS ONE, Journal of Hydrology, Plant Species Biology, Arid Land Research and Management, Environmental Science and Technology, Agricultural Sciences, HortScience, Pedosphere
-Reviewer for the following agencies: USDA-AFRI (panelist in 2014 and 2105) , USGS, Idaho State Department of Agriculture, USDA-ARS
University:
-Biology representative on the Teacher Education Coordinating Council (2010 to 2012)
-Biological Sciences Undergraduate Committee (2010 to present)
-Biological Science Promotion and Tenure Committee (2010 to 2013)
-Programming of computers and supervision of equipment maintenance in the research greenhouse (2010 to present)
-College Curriculum Committee (2010 to present, chair since spring 2015)
-Biology representative to the IDo Teach program (Fall 2015)

Professional Societies:
American Society of Plant Biologists
Botanical Society of America
Society for Ecological Restoration

Curriculum vitae

James F. Smith
Department of Biological Sciences
1910 University Drive
Boise, ID, 83725-1515

Education

1982-1986	Cornell University, Division of Biological Sciences: B.A. cum laude biological sciences and distinction
1986-1991	University of Wisconsin-Madison, Botany Department: Ph.D. under Kenneth J. Sytsma, Dissertation Title: The Evolution and Systematics of Columnea (Gesneriaceae).

Professional Experience

2001-	Full Professor, Biology Department, Boise State University, Herbarium Director (SRP)
1997-2001	Associate Professor, Biology Department, Boise State University, Herbarium Director (SRP)
2000-2001	Harvard University Herbaria Associate.
1992-1997	Assistant Professor, Biology Department, Boise State University, Herbarium Director (SRP)
1991-1992	Post-Doctorate position with Drs. W. John Kress and Elizabeth A. Zimmer on cladistic relationships of the Zingiberales
1992	Instructor for Biolat Workshop on Biodiversity, Cuzco, Perú

Courses Taught

Plants and Society – An introductory level non-biology major's course teaching the principles of biology and botany through plants that are used by people in societies around the globe.

General Botany – An introductory level biology major's course aimed at teaching the basic principles of biology (ecology, evolution, genetics) and basics of botany.

Plant Systematics – An intermediate level biology major's course to teach the principles of modern systematics methods (DNA, phylogenetics) as well as a basic knowledge of plant family and genera identification.

Organic Evolution – An upper level biology major's course coving the basics of evolution and modern research in the field.

Plant Physiology – An upper level biology major's course teaching the principles of whole plant physiology, included a section on modern molecular methods.

Bioinformatics – An upper level and graduate biology major's course. I was responsible for teaching homology, alignment and phylogenetics.

Species and Speciation – A graduate level course covering original papers on species concepts and current original papers on aspects of speciation as a process.

Automated Sequencing – A graduate level practical course on using automated sequencing equipment for research.

Population Genetics – A graduate level course, co-taught with another faculty member on a need basis.

Molecular Ecology, Evolution, Phylogenetics and Phylogeography (MEEPP) – A weekly journal club discussion of recent papers related to molecular population and phylogenetic research, open to undergraduate and graduate students.

Grants Awarded

2015 Marjorie Moore Davidson Foundation (donation made to BSU Foundation $8000 for research)

2015 Bureau of Land Management ($10,000)

2014 Marjorie Moore Davidson Foundation (donation made to BSU Foundation $7000 for research, $20,000 for herbarium)

2013 Marjorie Moore Davidson Foundation (donation made to BSU Foundation $5000)

2013 US Fish and Wildlife Service: Taxonomic status of Packard's milkvetch in southewestern Idaho ($15, 657)

2012 Marjorie Moore Davidson Foundation (donation made to BSU Foundation $5000)

2012 BLM Boise District: Lichen Curation ($40,000)

2012 NSF grant DEB1110283: REU supplement ($7500)

2011 Marjorie Moore Davidson Foundation (donation made to BSU Foundation $5000)

2011 NSF grant DBI1052719: RUI: SWITCH: SouthWest Idaho: The Comprehensive Herbaria. An on-line database resource for botanical research and education, $365,815 (co-PI with Don Mansfield at College of Idaho.

2011	NSF grant DEB1110283: REU supplement ($7500)
2010	NSF grant DEB 1038069: Primarily Undergraduate Institutions: An important Resource for Systematics Research ($52,823)
2010	Marjorie Moore Davidson Foundation (donation made to BSU Foundation $5000)
2010	US Fish and Wildlife Service ($9000 – with Danielle Clay)
2009	NSF grant DEB0949270: Collaborative Research: REVSYS:RUI:A revision of the sectional classification of *Columnea* (Gesneriaceae) and the species of section *Ortholoma* (with the University of Alabama-Tuscaloosa $306,876 to BSU)
2009	Marjorie Moore Davidson Foundation (donation made to BSU Foundation $5000)
2008	Marjorie Moore Davidson Foundation (donation made to BSU Foundation $10,000)
	Chris Davidson and Sharon Christoph (donation made to BSU Department of Biological Sciences $5,000)
2007	Marjorie Moore Davidson Foundation (donation made to BSU Foundation $5,000)
2006	The DNA Safeguard Project: co-PI (Hampikian as PI: Department of Defense, $850,000)
2006	U. S. Fish and Wildlife Service ($5200)
2006	Marjorie Moore Davidson Foundation (donation made to BSU Foundation $10,000)
2005	U. S. Fish and Wildlife Service ($1800)
2004	NSF supplement for Research Education for Undergraduates ($6,000)
	Boise State University Faculty Research Grant ($5000)
2003	NSF supplement for Research Education for Undergraduates ($12,000)
2002	NSF supplement for Research Education for Undergraduates ($12,000)
2001	Boise State University Faculty Research Grant ($5000)
	NSF grant DEB-0107763 ($271, 492)

	BSU-EPSCoR travel grant ($1500)
	BSU-EPSCoR graduate student support to Lisa Hahn ($4000)
	BSU College of Arts and Sciences Mini-development Grant for "Systematics as an Active Science: Display for Passive Education" ($600)
2000	NSF ROA Grant ($24,930) with Dr. David Baum, Harvard University as P. I.
2000	Li-Cor automated sequencer ($30,000) A private donation from Dr. Chris Davidson.
2000	Boise State University Faculty Research Grant ($5000)
1999	Faculty Research Associates Fellowship ($4200)
1998	National Geographic Society ($11,000)
1998	Boise State University Faculty Research Grant ($5000)
1997	Boise State University Faculty Research Grant ($5000)
1996	NSF REU Supplement Grant ($5000)
1995	Boise State University Foundation ($5000) to fund a seminar series on Conservation Biology (with Dr. Steven Novak)
1995	Boise State University Faculty Research Associates Program ($3900)
1995	Boise State University Faculty Research Grant ($4841)
1994	NSF Research at Undergraduate Institutions Grant ($167, 304)
1994	BLM Challenge Cost Share Grant ($9,000)
1993	Idaho State Board of Education Grant ($26, 581)
1993	Faculty Research Grant, Boise State University ($5000, funding returned due to receipt of State Board Grant in the same year)
1993	American Gloxinia and Gesneriad Society ($1000)
1989	American Gloxinia and Gesneriad Society ($1000)
1988-1990	NSF Dissertation Improvement Grant under supervision of Dr. Kenneth J. Sytsma ($15,225)

1987	Jessie Smith Noyes Fund, Organization for Tropical Studies, Costa Rica ($206)
1987	Nave Foundation, University of Wisconsin-Madison ($500)
1987	O.N. and E.K. Allen grant, University of Wisconsin-Madison ($1000)
1987	Davis Fund, Department of Botany, University of Wisconsin-Madison ($678)

Honors and Awards

1998	Boise State University College of Arts and Sciences award for distinguished research in Math and Science
2005	2005 Top Ten Scholar Honored Faculty Member. In recognition for inspiring and mentoring Boise State students
2010-2012	Visiting Professorship for Senior International Scientists, Chinese Academy of Sciences
2014	Keynote speaker at Rainbow Graduation, Boise State University

Publications

Qiu, Z.-J., Y.-X. Lu, C._Q. Li, Y. Dong, J. F. Smith, and Y.-Z. Wang. 2015. Origin and evolution of *Petrocosmea* (Gesneriaceae) inferred from both DNA sequence and novel findings in morphology with a test of morphology-based hypotheses. *BMC Plant Biology* 15: 167.

Schulte, L. J., J. L. Clark, S. J. Novak, S. K,. Jeffries, and J. F. Smith. 2015. Speciation within *Columnea* section *Angustiflorae* (Gesneriaceae): Islands, pollinators and climate. submitted to *Molecular Phylogenetics and Evolution* 84: 125-144.

George, E. E., D. H. Mansfield, J. F. Smith, R. L. Hartman, S. L. Downie, and C. E. Hinchliff. 2014. Phylogenetic Analysis Reveals Multiple Cases of Morphological Parallelism and Taxonomic Polyphyly in *Lomatium* (Apiaceae). *Systematic Botany* 39: 662-675.

Schulte, L. J., J. L. Clark, S. J. Novak, M. T.-Y. Ooi, and J. F. Smith. 2014. Paraphyly of Section *Stygnanthe* (*Columnea*, Gesneriaceae), a New Section Inferred from ITS and Chloroplast DNA Data, and a Revision of the Species of Section Angustiflorae *Systematic Botany* 39: 613-636.

Bornstein, A. J., J. F. Smith and E. J. Tepe. 2014. Two new species of *Piper* from the Greater Antilles. *Systematic Botany* 39: 10-16.

Amaya-Marquez, M. and J. F. Smtih. 2013. *Columnea corralesii*, a new species of Gesneriaceae from Colombia. Rev. Acad. Colomb. Cienc. 37(144): 307-310.

J. F. Smith, M. Amaya-Marquez, O. H. Marin-Gomez, and J. L. Clark. 2013. Four new species of *Columnea* (Gesneriaceae) with primary distributions in Colombia. *Journal of the Botanical Research Institute of Texas*. 7: 667-679.

Carter, K. A., J. F. Smith, M. M. White, and M. D. Serpe. 2013. Assessing the diversity of arbuscular mycorrhizal fungi in semiarid shrublands dominated by *Artemisia tridentata* ssp. *wyomingensis*. *Mycorrhiza*

Smith, J. F., M. T. Ooi, L. Schulte, M. Amaya-Marquez, and J. L. Clark. 2013. Searching for monophyly in the subgeneric classification systems of *Columnea* (Gesneriaceae). *Selbyana* 31: 126-142.

Ning, Z.-L., J. Wang, J. F. Smith, and M. Kang. 2013. *Primulina qingyuanensis* sp. nov. (Gesneriaceae) from limestone areas in Guangdon, China. *Phytotaxa* 137: 48-52.

Gaskin, J. F., M. Schwarzländer, C. L. Kinter, J. F. Smith and S. J. Novak. 2013. Propagule pressure, genetic structure and geographic origins of *Chondrilla juncea* (Asteraceae): An invader on three continents. *American Journal of Botany* 100: 1871-1882.

J. F. Smith and J. L. Clark. 2013. Molecular phylogenetic analyses reveal undiscovered monospecific genera in Episcieae (Gesneriaceae). *Systematic Botany* 38: 451-463.

Ning, Z.-L., G.-F. Li, J. Wang, J. F. Smith, H. Rasolonjatove, and M. Kang. 2013. *Primulina huaijiensis* (Gesneriaceae) a new species from Guangdon, China. *Acta Botanica Fennici* 50: 119-122.

Clay, D. L., D. C. Tank, S. J. Novak, M. D. Serpe, and J. F. Smith. 2012. Homoploid hybrid speciation in a rare endemic *Castilleja* from Idaho (*Castilleja christii*, Orobanchaceae). *American Journal of Botany* 99: 1976-1990.

Amaya M., M. and J. F. Smith. 2012. *Columnea paraguensis* (Gesneriaceae) a remarkable and rare new species from Colombia. *Rev. Acad. Colomb. Cienc*. 36: 137-140

Clark, J. L., M. M. Funke, A. M. Duffy, and J. F. Smith. 2012. Phylogeny of a Neotropical clade in the Gesneriaceae: More tales of convergent evolution *International Journal of Plant Sciences.* 173: 894-916. Featured on cover.

Schubert, H. K., A. J. Bornstein, M. S. Taylor, and J. F. Smith. 2012. A Systematic Revision of the Genus *Manekia* (Piperaceae). *Systematic Botany* 37: 587-598. Featured on cover.

Carlson, K. M., D. H. Mansfield, and J. F. Smith. 2011. A new variety of *Lomatium ravenii* (Apiaceae) from the northern Great Basin and adjacent Owyhee region. *Aliso* 29(2):105-114.

Symmank, L., M.-S. Samain, J. F. Smith, G. Pino, A. Stoll, P. Goetghebur, C. Neinhuis, and S. Wanke. 2011. The extraordinary journey of *Peperomia* subgenus *Tildenia* (Piperaceae): insights into diversification and colonization patterns from its cradle in Peru to the Tans-Mexican volcanic belt. *Journal of Biogeography*. 38: 2337-2349.

Clark, J. L. and J. F. Smith. 2011. *Columnea pygmaea*, a new small-flowered species from Ecuador. *Journal of the Botanical Research Institute of Texas* 5: 87-95.

Carlson, K. M, D. H. Mansfield, and J. F. Smith. 2011. A New Species in the *Lomatium foeniculaceum* (Apiaceae) Clade Revealed Through Combined Morphometric and Phylogenetic Analyses. *Systematic Botany* 36: 495-507. Featured on cover.

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Wang, Y.-Z., R.-B. Mao, Y. Li, J.-M. Li, Y. Dong, Z.-Y. Li, and J. F. Smith. 2011. Phylogenetic reconstruction of *Chirita* and allies (Gesneriaceae) with taxonomic treatments. Journal of Systematics and Evolution.49: 50-64.

Smith, J. F., D. N. Perkins, C. Bjork, and G. Glenne. 2010. AFLP analyses reveal species boundaries within *Pyrrocoma* (Asteraceae). Madroño. 57: 95-105.

Smith, J. F. , A. J. Stillman, S. R. Larson. C. M. Culumber, I. C. Robertson , and S. J. Novak. 2009. Phylogenetic relationships among *Lepidium papilliferum* (L. Henderson) A. Nels & J. F. Macbr., *L. montanum* Nutt., and *L. davisii* Rollins (Brassicaceae). Journal of the Torrey Botanical Club 136: 149-163.

Xia, Z., Y.-Z. Wang, and J. F. Smith. 2009. Familial placement and relations of *Rehmannia* and *Triaenophora* (Scrophulariaceae s. l.) inferred from five gene regions. American Journal of Botany 96: 519-530.

Givnish, T. J., K. J. Milliam, A. Mast, T. B. Patterson, T. J. Theim, A. Hipp, J. M. Henss, J. F. Smith, K. Woods, and K. J. Sytsma. 2009. Origin, adaptive radiation, and diversification of the Hawaiian lobeliads (Asterales: Campanulaceae). Proceedings of the Royal Society of London Series B 276: 407-416.

Anderson, K. E., S. J. Novak, and J. F. Smith. 2008. Populations composed entirely of hybrid colonies: bidirectional hybridization and polyandry in harvester ants. Biological Journal of the Linnean Society 95: 320-326.

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Jaramillo, M. A., R. Callejas, C. Davidson, J. F. Smith, A. C. Stevens, and E. Tepe. 2008. A phylogeny of the tropical genus *Piper* (Piperaceae) using ITS and the chloroplast intron *psbJ-petA*. Systematic Botany 33: 647-660.

Smith, J. F., A. C. Stevens, E. J. Tepe, and C. Davidson. 2008. Placing the origin of two species-rich genera in the late Cretaceous with later species divergence in the Tertiary: A phylogenetic, biogeographic and molecular dating analysis. Plant Systematics and

Evolution 275: 9-30.

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Cronk, Q. C. B., M. Kiehn, W. L. Wagner, and J. F. Smith. 2005. Evolution of *Cyrtandra* (Gesneriaceae) in the Pacific Ocean: the origin of a supertramp clade American Journal of Botany 92: 1017-1024.

Smith, J. F., S. B. Draper, L. C. Hileman, and D. A. Baum. 2004. A phylogenetic analysis within tribes Gloxinieae and Gesnerieae (Gesneriaceae: Gesnerioideae). Systematic Botany 29: 947-958.

Smith, J. F., L. C. Hileman, M. P. Powell, and D. A. Baum. 2004. Evolution of G*CYC*, a Gesneriaceae homolog of *CYCLOIDEA*, within Gesnerioideae (Gesneriaceae). Molecular Phylogenetics and Evolution 31: 765-779.

Smith, J. F. and T. A. Bateman. 2002. Genetic differentiation of rare and common varieties of *Eriogonum shockleyi* (Polygonaceae) in Idaho using ISSR variability. Western North American Naturalist 62: 316-326.

Smith, J. F. 2001. The phylogenetic relationships of *Lembocarpus* and *Goyazia* (Gesneriaceae): based on *ndhF* sequences. Ann. Missouri Bot. Gard. 88: 135-143.

Smith, J. F. 2001. High Species Diversity in Fleshy-Fruited Tropical Understory Plants. The American Naturalist 157: 646-653.

Amaya M., M., L. E. Skog, C. E. Gonzalez and J. F. Smith. 2000. Una nueva especie de *Columnea* (Gesneriaceae) del Norte de los Andes Colombianos. Caldasia 22: 185-189

Smith, J. F. 2000. A phylogenetic analysis of tribes Beslerieae and Napeantheae (Gesneriaceae): parsimony and maximum-likelihood analyses of *ndhF* sequences. Systematic Botany 25: 71-80.

Smith, J. F. 2000. Phylogenetic signal common to three data sets: combining data which initially appear heterogeneous. Plant Systematics and Evolution 221: 179-198.

Smith, J. F. 2000. Phylogenetic resolution within the tribe Episcieae (Gesneriaceae): congruence of ITS and *ndhF* sequences from parsimony and maximum-likelihood analyses. Amer. J. Bot. 87: 883-897.

Smith, J. F. 1999. *Alloplectus martinianus*, a new species of Gesneriaceae from Ecuador. Novon 9: 419-421.

Smith, J. F., M. Kresge, M. Møller, and Q. C. Cronk. 1998. The African violets (*Saintpaulia*) are members of *Streptocarpus* subgenus *Streptocarpella* (Gesneriaceae): Combined evidence from chloroplast and nuclear ribosomal genes. Edinburgh Journal of Botany 55: 1-11.

Smith, J. F. and S. Atkinson. 1998. Phylogenetic analysis of the tribes Gloxinieae and Gesnerieae (Gesneriaceae): Data from *ndhF* Sequences. Selbyana 19: 122-131.

Smith, J. F. and C. L. Carroll. 1997. Phylogenetic relationships of the Episcieae (Gesneriaceae) based on *ndhF* sequences. Systematic Botany 22: 713-724.

Smith, J. F., J. C. Wolfram, K. D. Brown, C. L. Carroll, and D. S. Denton. 1997. Tribal relationships in the Gesneriaceae: Evidence from DNA sequences of the chloroplast gene *ndhF*. Annals of the Missouri Botanical Garden. 84: 50-66.

Smith, J. F., K. D. Brown, C. L. Carroll, and D. S. Denton. 1997. Familial Placement of *Cyrtandromoea, Titanotrichum*, and *Sanango*: Three Problematic Genera of the Lamiales. Taxon 40: 65-74.

Smith, J. F. 1996. Tribal relationships within the Gesneriaceae: a cladistic analysis of morphological data. Systematic Botany. 21: 497-514.

Smith, J. F., C. C. Burke, and W. L. Wagner. 1996. Interspecific Hybridization in Natural Populations of *Cyrtandra* (Gesneriaceae) on the Hawaiian Islands: Evidence from RAPD markers. Plant Systematics and Evolution 200: 61-77.

Smith, J. F., and T. Vuong Pham. 1996. Genetic diversity in natural populations of the rare Idaho endemic *Allium aaseae* and its relatedness and potential introgression with *Allium simillimum* using RAPD markers. American Journal of Botany 83: 717-726.

Smith, J. F., and J. J. Doyle. 1995. A Cladistic Analysis of chloroplast DNA restriction site variation and morphology for the genera of the Juglandaceae. Amer. J. Bot. 82: 1163-1172.

Smith, J. F., and K. J. Sytsma. 1994. Molecules and morphology: Congruence of data in *Columnea* (Gesneriaceae). Plant Systematics and Evolution. 193: 37-52.

Smith, J.F. 1994. Systematics of *Columnea* sections *Pentadenia* and *Stygnanthe* (Gesneriaceae). Systematic Botany Monographs Volume 44.

Smith, J. F., and K. J. Sytsma. 1994. Evolution in the Andean epiphytic genus *Columnea* (Gesneriaceae). Part I. Morphology. Syst. Bot. 19: 220-235.

Smith, J. F., and K. J. Sytsma. 1994. Evolution in the Andean epiphytic genus *Columnea* (Gesneriaceae). Part II. Chloroplast DNA restriction site variation. Syst. Bot. 19(2): 317-

336.

Givnish, T. J., K. J. Sytsma, J. F. Smith, and W. J. Hahn. 1994. Thorn-like prickles and heterophylly in *Cyanea*: Adaptations to extinct avian browsers on Hawai'i? Proc. Nat. Acad. Sci., USA. 91: 2810-2814.

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Duvall, M. R., M. T. Clegg, M. W. Chase, W. D. Clark, W. J. Kress, H. G. Hills, L. E. Eguiarte, **J. F. Smith**, B. S. Gaut, E. A. Zimmer, & G. H. Learn, Jr.1993. Phylogenetic hypotheses for the Monocotyledons constructed from *rbcL* sequence data. Ann. Missouri Bot. Gard. 80: 607-619.

Chase, M. W., D. E. Soltis, R. G. Olmstead, D. Morgan, D. H. Les, B. D. Mishler, M. R. Duvall, R. A. Price, H. G. Hills, Y.-L. Qiu, K. A. Kron, J. H. Rettig, E. Conti, J. D. Palmer, J. R. Manhart, K. J. Sytsma, H. J. Michaels, W. J. Kress, K. G. Karol, W. D. Clark, M. Hedren, B. S. Gaut, R. K. Jansen, K.-J. Kim, C. F. Wimpee, **J. F. Smith**, G. R. Furnier, S. H. Strauss, Q.-Y. Xiang, G. M. Plunkett, P. S. Soltis, S. Swenson, S. E. Williams, P. A. Gadek, C. J. Quinn, L. E. Eguiarte, E. Golenberg, G. H. Learn, Jr., S. W. Graham, S. C. H. Barrett, S. Dayanandan, & V. A. Albert. 1993. Phylogenetics of seed plants: an analysis of nucleotide sequences from the plastid gene *rbcL*. Ann. Missouri Bot. Gard. 80: 528-580.

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Givnish, T. J., K. J. Sytsma, J. F. Smith, and W. J. Hahn. 1995. Molecular evolution, adaptive radiation, and geographic speciation in *Cyanea* (Campanulaceae, Lobelioideae). pp. 288-337 In W. L. Wagner and V. A. Funk (eds.) *Hawaiian Biogeography: Evolution on a Hot Spot Archipelago*. Smithsonian Institution Press; Washington, DC.

Givnish, T. J., K. J. Sytsma, J. F. Smith, W. J. Hahn, D. H. Benzing, and E. M. Burkhardt. 1997. Molecular evolution and adaptive radiation in *Brocchinia* (Bromeliaceae: Pitcairnioideae) atop tepuis of the Guayana Shield. pp. 259-312. In: *Molecular Evolution and Adaptive Radiation*. T. J. Givnish and K. J. Sytsma (eds.), Cambridge University Press.

Publications In Popular Press

Smith, J. F. 1993. Molecular systematics and *Columnea*: Tracing evolutionary history. The Gloxinian.

Smith, J. F. 1995. Natural hybridization in Hawaiian Gesneriaceae. Gesneriad Journal.

Gesneriaceae pages for the Tree of Life:
http://phylogeny.arizona.edu/tree/eukaryotes/green_plants/embryophytes/angiosperms/eudicots/lamiids/gesneriaceae/gesneriaceae.html

Smith, J. F. 2003. Floral morphology and pollination biology in Gesneriaceae. The Gloxinian. 53: 20-27.

Pages on *Columnea* for The Gesneriad Reference Web. (http://gesneriads.ca/Articles/Smith%20-%20Columnea/Smith-Columnea_Genus_Overview.htm)

Smith, J. F. 2009. *Saintpaulia*. Gesneriads 59: 38-43.

Manuscripts In Press/Review

Salomo, K. J. F. Smith, M.-S. Samain, L. Bond, C. Davidson, J. Zimmers, T. S. Feild, C. Neinhuis, and S. Wanke. Improved ages of the earliest angiosperms using a comparative cross validation of fossils and extant lineages.

Manuscripts in Preparation

Perkins, D. N., M. Bechard, S. J. Novak and J. F. Smith. Population genetics of bald eagles (*Haliaeetus leucocephalus*) in southern Idaho: interactions of life history with reductions in population size. to be submitted to Conservation Genetics.

Smith, J. F., J. L. Clark, L. E. Skog, M. Amaya-Marquez. A revision of *Columnea* sections *Ortholoma* and *Bucinellina* (Gesneriaceae).

Ooi, M. T., J. L. Clark, and J. F. Smith. Species boundaries in the *Columnea strigosa* complex.

Stillman, A. J. I. C. Robertson, J. F. Smith, and S. J. Novak. Assessing allozyme diversity and polyploidy in the rare southwestern Idaho endemic, *Lepidium papilliferum*

Published Abstracts Of Papers Presented At Meetings

Smith, J. F., J. L. Clark, O. H. Marin-Gomez, and M. Amaya-Marquez. 2015. Species of hybrid origin in *Columnea* (Gesneriaceae). Presented at Botany 2015, Edmonton.

Tepe, E. J., A. J. Bornstein, M. Carvalho-Silva, P. M. Anary, M. A. Jaramillo, and J. F. Smith. 2015. Creating order out of chaos: A phylogeny of the *Radula* clade of *Piper*. Presented at Botany 2015, Edmonton.

Velasco, J., J. F. Smith, and M. D. Serpe. 2015. Drought effects on colonization of *Artemisia tridentata* seedlings by arbuscular mycorrhizal fungi. Poster presented at Botany 2015, Edmonton.

Davidson, B. E., J. F. Smith, and M. D. Serpe. 2015. Community structure of arbuscular mycorrhizal funi colonizing *Artemisia tridentata* seedlings following inoculation and transplanting. Poster presented at Botany 2015, Edmonton.

Zimmers, J., M. Mancuso, and J. F. Smith, 2014. Determining the taxonomic status of four varieties of *Astragalus cusickii* using molecular phylogenetic methods. Presented at Botany 2014, Boise.

Prior, C., J. Rausch, R. Sforza, J. F. Smith, and S. J. Novak. 2014. Mating system analysis of native and invasive populations of medusahead (*Taeniatherum caput-medusae*): Evidence for preadaptation during biological invasion. Presented at Botany 2014, Boise.

Davidson, B. E., J. F. Smith, and M. D. Serpe. 2014. Inoculation of *Artemisia tridentata* ssp. *wyomingensis* with arbuscular mycorrhizae: Impacts on colonization and mycorrhizal composition of roots after transplanting. Presented at Botany 2014, Boise.

Smith, J. F., L. Schulte, M. T.-Y. Ooi, S. Jeffries, C. Prior, M. Amaya-Marquez, and J. L. Clark. 2013. Reclassifying the subgeneric boundaries within *Columnea* (Gesneriaceae) to reflect evolutionary history. Presented at Botany 2013, New Orleans.

Carter, K., M. Serpe, and J. F. Smith. 2013. Assessing the diversity of mychorrhizal communities in sagebrush steppes of southwestern Idaho. Presented at Botany 2013 meetings, New Orleans.

Clark, J. L. and J. F. Smith. 2012. A Phylogeny of the Neotropical tribe Episcieae (Gesneriaceae): convergent evolution of reproductive and vegetative characters. Botany 2012, Columbus, Ohio.

DiNicola, A., D. E. Mansfield, and J. F. Smith. 2012. SWITCH (SouthWest Idaho: The Comprehensive Herbarium). Botany 2012, Columbus, Ohio.

Wanke, S., M.-S. Samain, J. Zimmers, C. Davidson, J. F. Smith, C. Neinhuis. 2011. Molecular evolutionary history of early branching angiosperms. Presentation in SYM080 – Basal angiosperms – multiple evolutionary dead ends of the trial and error trail to success? organized by J. F. Smith, S. Wanke, and M.-S. Samain. 18th International Botanical Congress, Melbourne, Australia.

Clay, D., J. F. Smith, S. J. Novak, and M. Serpe. 2011. Homoploid hybrid speciation in a rare endemic *Castilleja* from Idaho. Botany 2011, St. Louis, Missouri.

Schulte, L. J., M. T. Ooi, Shandra K. Jeffries, J. L. Clark, M. Amaya M., and J. F. Smith. 2011. Phylogeny and climatic and morphological adaptation in the angustata clade of *Columnea* (Gesneriaceae). Botany 2011, St. Louis, Missouri.

Jeffries, S. K., L. J. Schulte, J. L. Clark, M. Amaya M., and J. F. Smith. 2011. Using selected gene regions to find rapidly evolving DNA sequences of closely related species of the genus *Columnea.* Botany 2011, St. Louis, Missouri.

Ooi, M. T., J. L. Clark, M. Amaya M., and J. F. Smith. 2011. Distinguishing species with DNA sequencing in the *Columnea strigosa* comples. Botany 2011, St. Louis, Missouri.

Clay, D. C., D. Tank, M. Egger, and J. F. Smith. 2010. Exploring interspecific hybridization in a rare endemic species of paintbrush (*Castilleja christii* , Orobanchaceae) using molecular and morphological techniques. Botany 2010, Providence, Rhode Island.

Smith, J. F., J. L. Clark, and M. Amaya M. 2010. A preliminary new classification system for the species of *Columnea.* Botany 2010, Providence, Rhode Island. Also presented at the World Gesneriad Research Conference, October 2010, Sarasota, FL, and the 2010 Annual Convention of The Gesneriad Society, Vancouver, British Columbia, Canada.

Schubert, H. K., A. J. Bornstein, M. S. Taylor, and J. F. Smith. 2010. A Systematic Revision of the Genus *Manekia* (Piperaceae). Botany 2010, Providence, Rhode Island.

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Smith, J. F. , A. C. Stevens, E. J. Tepe, and C. Davidson. 2008. Placing the origin of two species-rich genera in the late Cretaceous with later species divergence in the Tertiary: A phylogenetic, biogeographic and molecular dating of *Piper* and *Peperomia* (Piperaceae).

Botany 2008, Vancouver, British Columbia, Canada. http://www.botanyconference.org/engine/search/index.php?func=detail&aid=46

Donahue, J., M. Scholten, N. Shaw, J. F. Smith, and M. Serpe. 2008. Differences in cold stratification requirements among populations of *Lomatium dissectum* seeds. Botany 2008, Vancouver, British Columbia, Canada. http://www.botanyconference.org/engine/search/index.php?func=detail&aid=403

Smith, J. F. , A. C. Stevens, and C. Davidson. 2008. Placing the origin of two species-rich genera in the late Cretaceous with later species divergence in the Tertiary: A phylogenetic, biogeographic and molecular dating of *Piper* and *Peperomia* (Piperaceae). Systematics 2008, Goettingen, Germany. http://www.systematics2008.com/index-Dateien/systematics2008_programme.htm

Stillman, A. J. I. C. Robertson, J. F. Smith, and S. J. Novak. Assessing allozyme diversity and polyploidy in the rare southwestern Idaho endemic, *Lepidium papilliferum* (Plant Biology and Botany 2007, Chicago, IL, p. 205).

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Smith, J. F., M. M. Funke, V. L. Woo, and P. J. Garnock-Jones. 2006 A molecular phylogenetic analysis of Coronanthereae (Gesneriaceae) reveals tow independent invasions of the Pacific. Botany 2006 meetings, Chico, CA. p. 257.

Givnish, T. J., K. J. Milliam, A. Mast, T. B. Patterson, T. J. Theim, A. Hipp, J. M. Henss, J. F. Smith, K. Woods, and K. J. Sytsma. 2006. Origin, adaptive radiation, and diversification of the Hawaiian lobeliads (Campanulaceae). Botany 2006 meetings, Chico, CA. p. 313.

Stillman, A., I. Robertson, J. F. Smith, and S. J. Novak. 2005. Allozyme diversity in *Lepidium papilliferum* (Brassicaceae), a southwest Idaho endemic. Botany 2005 meetings, Austin, TX, p. 72.

Smith, J. F., A. C. Stevens, C. Davidson. 2005. A phylogenetic analysis of Piperaceae focusing on its major geographic centers of diversification and placement of African species. Botany 2005 meetings, Austin, TX, p. 144.

Duffy, A. M., M. M. Funke, J. L. Clark, and J. F. Smith. 2004. A phylogenetic analysis of the genera of tribe Episcieae (Gesneriaceae) from multiple loci. Botany 2004 meetings, Snowbird, UT p. 113.

Stevens, A. C., A. Mollerup, W. S. Wong, C. Davidson, and J. F. Smith. 2004. Preliminary phylogenetic placement of African species of *Piper* (Piperaceae) using data from chloroplast DNA and low copy nuclear gene glyceraldehyde 3-phosphate dehydrogenase (G3pdh). Botany 2004 meetings, Snowbird, UT p. 145.

Draper, S. B., and J. F. Smith 2003. Maximum information and minimum sequencing: resolving phylogenetic relationships among closely related species of *Columnea* (Gesneriaceae) using multiple genes. Botany 2003 meetings, Mobile AL pp. 81-82 http://www.botany2003.org/Abstract%20Book.pdf

Funke, M. M., and J. F. Smith 2003. Phylogenetic relationships of tribe Coronanthereae (Gesneriaceae): evidence from multiple genes. Botany 2003 meetings, Mobile AL p. 83 http://www.botany2003.org/Abstract%20Book.pdf

Stevens, A. C., M. M. Funke, S. B. Draper, T. Zadorozhny, C. Davidson, A. Bornstein, and J. F. Smith. 2003. A preliminary phylogenetic analysis of Piperaceae using chloroplast and nuclear genes: utility of the low copy nuclear PEPC intron within sections *Enckea* and *Arctottonia* of *Piper*. Botany 2003 meetings, Mobile AL p. 100. http://www.botany2003.org/Abstract%20Book.pdf

Smith, James F. D. A. Baum, S. B. Draper, and L. C. Hileman. 2002. Floral evolution and phylogenetic analysis of tribes Gloxinieae and Gesnerieae (subfamily Gesnerioideae: Gesneriaceae) with an emphasis on G*CYC* (a Gesneriaceae *CYCLOIDEA* homolog). presented at Botany 2002 meetings in Madison, WI available at http://www.2002.botanyconference.org/cgi-bin/viewer02.pl.

Moore, R. L., J. F. Smith, and S. J. Novak. 2002. Association of mode of recruitment with landscape variability in *Populus tremuloides* (Salicaceae). presented at Botany 2002 meetings in Madison, WI available at http://www.2002.botanyconference.org/cgi-bin/viewer02.pl.

Rausch, J. H., S. J. Novak, and J. F. Smith. 2002. Genetic variation in the invasive grass *Taeniatherum caput-meduase* (Poaceae): analysis of mating system. presented at Botany 2002 meetings in Madison, WI available at http://www.2002.botanyconference.org/cgi-bin/viewer02.pl.

Smith, James F., David A. Baum, and Lena Hileman. 2001. Evolution and phylogenetic analysis of G*CYC* (a Gesneriaceae *CYCLOIDEA* homolog) in subfamily Gesnerioideae (Gesneriaceae). presented at Botany 2001 meetings in Albuquerque, NM. abstract available at http://www.botany2001.org/section12/abstracts/17.shtml

Smith, James F. and Terry A. Bateman. 2000. Genetic differentiation of rare and common varieties of *Eriogonum shockleyi* (Polygonaceae) in Idaho using ISSR variability. Amer. J. Bot. 87 (6): 158.

Smith, J. F., Q. C. B. Cronk, M. Kiehn, and W. L. Wagner. 1999. Adaptive radiation and phylogeny of Pacific *Cyrtandra* (Gesneriaceae) based on molecular and morphological data. XVI International Botanical Congress, St. Louis, USA.

Smith, J. F. 1998. Phylogenetic resolution within the tribe Episcieae (Gesneriaceae): ITS and ndhF sequences. Amer. J. Bot. 85 (6): 156-157. (AIBS: Baltimore)

Cronk, Q. C. B., J. F. Smith, and M. Kiehn. 1998. Preliminary Phylogenetic analysis of Cyrtandra (Gesneriaceae) based on ITS sequence data. Fourth International Flora

Malesiana Symposium, Kuala Lumpur, Malaysia.

Smith, J. F. and S. Atkinson. 1997. Phylogenetic analysis of the tribes Gloxinieae and Gesnerieae (Gesneriaceae): data from ndhF sequences. Amer. J. Bot. 84 (6): 232. (AIBS: Montreal)

Novak, S. J., D. A. Murphey, J. M. Ott, and J. F. Smith. 1996. Allozyme diversity in the narrow endemic Allium aaseae (Alliaceae): comparisons with RAPD data. Amer. J. Bot. 83: 182-183. (AIBS: Seattle)

Smith, J. F., K. D. Brown, C. L. Carroll, and D. S. Denton. 1996. Tribal relationships within the Gesneriaceae: an assessment of three data sets. Amer. J. Bot. 83: 192. (AIBS: Seattle)

Smith, J. F., and J. C. Wolfram. 1995. Morphological and molecular cladistic relationships in the Gesneriaceae: Comparison and congruence. Amer. J. Bot. 82: 162. (AIBS: San Diego)

Smith, J. F., C. C. Burke, and W. L. Wagner. 1995. Interspecific hybridization in natural populations of Cyrtandra (Gesneriaceae) on the Hawaiian islands: evidence from RAPD markers. American Journal of Botany 82: 162. (AIBS: San Diego)

Smith, J. F., and J. J. Doyle. 1994. Cladistic analysis of morphology and chloroplast DNA restriction site data within the Juglandaceae. Amer. J. Bot. 81: 186. (AIBS: Knoxville)

Smith, J. F. 1993. Cladistic analysis of rbcL sequences and chloroplast DNA inverted repeat restriction site data from the Zingiberales. Amer. J. Bot. 80: 176. (AIBS: Ames)

Sytsma, K. J., W. J. Hahn, J. F. Smith, and W. L. Wagner. 1993. Characterization and phylogenetic utility of a large inversion in the chloroplast genome of some species in Oenothera (Onagraceae). Amer. J. Bot. 80: 79. (AIBS: Ames)

Givnish, T. J., K. J. Sytsma, J. F. Smith, and W. J. Hahn. 1992. Molecular evolution, phylogeny, and geography in the Pitcairnoideae (Bromeliaceae). Amer. J. Bot. 79: 145. (AIBS: Honolulu)

Givnish, T. J., K. J. Sytsma, J. F. Smith, and W. J. Hahn. 1992. Molecular evolution, adaptive radiation and geographic speciation in the endemic Hawaiian lobeliad genus Cyanea. Amer. J. Bot. 79: 127. (AIBS: Honolulu)

Smith, J. F., and K. J. Sytsma. 1991. Molecular and morphological variation indicates recent and rapid speciation in Columnea sect. Stygnanthe (Gesneriaceae). Amer. J. Bot. 78: 217. (AIBS: San Antonio)

Sytsma, K. J., J. F. Smith, and L. D. Gottlieb. 1991. Re-examination of catastrophic speciation in Clarkia (Onagraceae). Amer. J. Bot. 78:221-222. (AIBS: San Antonio)

Sytsma, K. J., J. F. Smith, and P. C. Hoch. 1991. A chloroplast DNA analysis of tribal and generic relationships within Onagraceae. Amer. J. Bot. 78: 222.(AIBS: San Antonio)

Sytsma, K. J., J. F. Smith, and L. D. Gottlieb. 1991. Preliminary evidence for a mosaic chloroplast genome in an allotetraploid species of Clarkia (Onagraceae). Amer. J. Bot.

78: 100-101. (AIBS: San Antonio)

Smith, J. F., and K. J. Sytsma. 1990. Morphological and molecular evolution in Columnea (Gesneriaceae). Amer. J. Bot. 77: 155. (AIBS: Richmond)

Givnish, T. J., K. J. Sytsma, ad J. F. Smith. 1990. Adaptive radiation, plant-animal interactions, and molecular evolution in the bromeliad genus Brocchinia. Amer. J. Bot. 77: 174-175.

Givnish, T. J., K. J. Sytsma, ad J. F. Smith. 1990. A re-examination of phylogenetic relationships among bromeliad subfamilies using cpDNA restriction site variation. Amer. J. Bot. 77: 133. (AIBS: Richmond)

Sytsma, K. J., J. F. Smith, and P. Berry. 1989. Biogeography and evolution of morphology, breeding systems, and flavonoids in the Old World Fuchsia sect. Skinnera: evidence from chloroplast DNA. Amer. J. Bot. 76: 274. (AIBS: Toronto)

Spooner, D. M., K. J. Sytsma, J. F. Smith, J. Staub, and L. Kneer. 1988. A reexamination of diploid hybrid speciation in Solanum sect. Petota. Amer. J. Bot. 75: 208. (AIBS: Davis)

Smith, J. F., and J. J. Doyle. 1986. Chloroplast DNA variation and evolution in the Juglandaceae. Amer. J. Bot. 73: 730. (AIBS: Amherst)

Graduate Students:

Kirk A. Anderson: M. S. 2002, Interspecific hybridization in the seed-harvester ant *Pogonomyrmex* (Hymenoptera: Formicidae).

Danielle Clay M. S. 2011: Diploid hybrid speciation in the rare endemic *Castilleja christii*

Lars Symmank Ph. D. 2011. Phylogenetics and evolution of *Peperomia* section *Tildenia* (Piperaceae). Technische-Universitat Dresden.

Rubing Mao M. S. 2011. A preliminary study on the phylogenetic relationshoips of *Briggsia* and related genera (Gesneriaceae). Institute of Botany, Chinese Academy of Sciences.

Wei Lai Ph.D. 2011. Systematics research on the tribe Ruteae (Rutaceae) and its related taxa. Institute of Botany, Chinese Academy of Sciences.

Zhi-Jing Qiu Ph.D. 2011. Molecular phylogeny of *Petrocosmea* (Gesneriaceae) and evo-devo study of zygomorphic flower in *Petrocosmea*. Institute of Botany, Chinese Academy of Sciences.

Andrew Nadeau M. S. 2012: Population genetics of bald eagles in the Pacific Northwest.

Lacie Schulte M. S. 2012: Phylogenetics of a clade within *Columnea*.

Rylene Moore (current): Variation in clonal and sexual reproduction in aspen.

Jay Zimmers (current): Species and subspecies boundaries in *Astragalus cusickii* (Fabaceae).

Michele Laskowski (current): Parasites in raptors.

Karsten Salomo (Ph. D. student Technische Universität Dresden, Germany, current, co-supervisor). Using fossils to calibrate molecular clocks: a statistical measure of efficient and effective sampling using the basal angiosperms.

Professional Service

2013-	Editor-in-Chief for *Systematic Botany* (journal of the American Society of Plant Taxonomists)
2008-2012	Managing Editor for *Systematic Botany* (journal of the American Society of Plant Taxonomists)
2011	Panelist for National Science Foundation Doctoral Dissertation Improvement Grants review
2000-2008	Associate Editor for *Systematic Botany* (journal of the American Society of Plant Taxonomists)
2003	Panelist for National Science Foundation Doctoral Dissertation Improvement Grants review
2002	Panelist for National Science Foundation Doctoral Dissertation Improvement Grants review
1998	Panelist for National Science Foundation Post-Doctoral Grants review

Merlin M. White
Boise State University

Department of Biological Sciences
1910 University Drive
210, Science Building
Boise, Idaho
83725-1515

Ph: (208) 426-4638
FAX: (208) 426-1040
e-mail: MerlinWhite@boisestate.edu

EDUCATION, PROFESSIONAL PREPARATION

Saint Mary's University	Biology (Honors)	B.Sc.	1991
Dalhousie University	Science - Biology	B.Ed.	1995
Dalhousie University	Biology	M.Sc.	1997
University of Kansas	Botany (Mycology)	Ph.D.	2002

PROFESSIONAL EXPERIENCE / APPOINTMENTS

Associate Professor, Boise State University	**Aug. 22, 2012 – Present**
Assistant Professor, Boise State University	**Dec. 31, 2006 – Aug. 21, 2012**
Adjunct Research Associate, U. of Kansas, Dept Ecol & Evol. Biology	**Jan. 3, 2007– Present**
Research Associate & PI, U. of Kansas, Dept Ecol & Evol. Biology	**April 2004 – Dec. 2006**
Fellow (post doctoral researcher), U. of Kansas	**June 2002 – Mar. 2004**

PRIOR APPOINTMENTS

University of Kansas, Dept. Ecology & Evolutionary Biology, Lawrence, Kansas, USA

Graduate Research Assistant	May, 1997 – May 2002
Graduate Teaching Assistant	January - May, 1998
Graduate Research Assistant	August, 1996 - January, 1997

Dalhousie University, Department of Biology, Halifax, Nova Scotia, Canada

Graduate Fellowship	May 1995 - August 1996
High School Teaching Experience	6 weeks, Spring, 1995
Junior High School Teaching Experience	2 weeks, Fall, 1994
Graduate Fellowship	May, 1994 - September, 1994
Graduate Teaching Assistant	September, 1993 - May, 1994
Research Assistant	May, 1991 - August, 1993

Saint Mary's University, Department of Biology, Halifax, Nova Scotia, Canada

Laboratory Demonstrator	1988-1991
Summer Research Positions	1988-1991

THESES COMPLETED

Ph.D. Taxonomic and molecular systematic studies of the Harpellales (Trichomycetes) toward understanding the diversity, evolution and dispersal of gut fungi. Degree awarded May, 2002.

M.Sc. Assessment of copepod development in relation to genome size and 18S rDNA copy number. Degree awarded May, 1997.

B.Sc. (Honors). A study of the infection of *Salvelinus fontinalis* eggs by *Saprolegnia diclina*. Degree awarded May, 1991.

Graduate Level TEACHING EXPERIENCE at Boise State University

(Some Co-listed as Undergraduate/Graduate Level courses)

BOT 330/330G. Mycology Lecture & Laboratory,

Fall Semesters 2007—2012, 2014; 19/1 enrolled 2007; 13 in 2008, 15/4 (2009); 21/1 (2010); 17/3 (2011); 21/0 in 2012 and 18/0 in 2014.

BIOL 497/597. Adv Topics – Symbiosis (= 2 credits) in Spr. 2009 (8/3 enrolled), (= 3 credits) in Spr. 2011 (11/6) and Spr. 2013 (20/3).

BIOL 497/597. Adv Topics – Advanced Mycology (= 2 credits) in Spr. 2012; 2014 (11/3; 6/0 enrolled).

BIOL 498/598. Graduate Seminar "Rivers & Microbes: the microbial ecology of anthropogenically influenced fluvial systems" – team taught with Dr. K. Feris (Fall 2008, 2/3 enrolled), team taught with Drs. Feris and Forbey (Spr. 2009, 0/4 enrolled).

BIOL 593-019. Thesis Research (ongoing enrollment)

BIOL 696. Directed Research (Graduate Level), Fall 2008 (1 enrolled)

GRANTS AND AWARDS

National Science Foundation Biological Research Collections Award from DBI-1052719
Project Title: RUI: SWITCH: Southwest Idaho: The Comprehensive Herbaria. An on-line database resource for botanical research and education.
D. Mansfield (PI, College of Idaho),
James Smith, Barbara Ertter, **MM White (Co-PIs, Boise State University)**
Requested and Funded amount: $365,815 with $88,571 subaward to Boise State
Duration/Dates: 3 years; 7-15-2011 till 7-14-2014

National Science Foundation Revisionary Syntheses in Systematics Award DEB-0918182
Project Title: Collaborative Research: REVSYS: RUI: Phylogenetic and Revisionary Systematics of early-diverging, ecologically unique clades of fungi, Harpellales and Asellariales.
MM White (PI) at Boise State University
Requested: $469,374, Funded: $410,000
Duration/Dates: 3 years, 9-1-2009 till 8-31-2012.
Note: This award to Boise State University is linked to another NSF Award to RW Lichtwardt at University of Kansas. There are separate projects and efforts at each institution, and with separate budgets, but we will work collaboratively to achieve the overarching goals of our collaboration(s).

USDA Agriculture and Food Research Initiative (AFRI) Competitive Grants Program Award Project Title:
Functional biodiversity of native mycorrhizae during early development of Big Sagebrush: A Step(pe) towards restoring sagebrush ecosystems.
M Serpe (BSU) (PI), **MM White (Co-PI)**
Requested and Funded Amount: $149,451
Duration/Dates: 2 years, 1-1-2010 till 12-31-2011.

National Science Foundation Biotic Surveys & Inventories Award DEB-0344722
Project Title: Biodiversity of cryptic fungal symbionts, Harpellales, living within the guts of aquatic insects in North America.
MM White (PI) and RW Lichtwardt (Co-PI) at University of Kansas.
Requested: $487,536.00, July 10, 2003; Funded: $400,000.00 (for three years)

Duration/Dates: 3 years, 1-29-2004 till 1-28-2007.
PUBLICATIONS (in refereed journals)

(Noting: At various sections below, for publications or manuscripts, Boise State University **undergraduates (*) or graduates ($^{\phi}$) are so designated, as my mentorees; I encourage my students to publish and lead-author their research whenever possible and appropriate**)

2014. $^{\phi}$Wilson ER, Smalling KL Reilly TJ, Gray E, Bond L, Steele L, *Kandel P, *Chamberlin A, *****Gause J, *****Reynolds N, Robertson I, Novak S, Feris K, **White MM**. Assessing the potential effects of fungicides on nontarget Gut Fungi (Trichomycetes) and their associated larval black fly hosts. *Journal of the American Water Resources Association (JAWRA)* **50:420-433.**

2014. $^{\phi}$Carter KA, Smith JF, **White MM**, Serpe MD. Assessing the diversity of arbuscular mycorrhizal fungi in semiarid shrublands dominated by *Artemesia tridentata* ssp. *wyomingensis*. *Mycorrhiza* **24:301-314**

2013. $^{\phi}$Tretter ED, *Johnson EM, $^{\phi}$Wang Y, *Kandel P, **White MM**. Examining new phylogenetic markers to uncover the evolutionary history of early-diverging fungi: comparing MCM7, TSR1, and rRNA genes for single- and multi-gene analyses of the Kickxellomycotina. *Persoonia* **30:106-125**.

2013. $^{\phi}$Wang Y, $^{\phi}$Tretter E, Lichtwardt RW, **White MM.** Overview of 75 years *Smittium* research, establishing a new genus for *Smittium culisetae* and prospects for future revisions of the "Smittium" clade. *Mycologia* **105: 90-111.**

2012. **White MM**, Strongman DB. New species of *Smittium* and *Stachylina* and other trichomycetes in larval Diptera from streams in Nova Scotia, Canada. *Botany* **90: 1204-1219**.

2012. **White MM**, Strongman DB. New species of *Spartiella* and *Legeriosimilis* from mayflies and other arthropod-associated trichomycetes from Nova Scotia, Canada. *Botany* **90: 1195-1203.**

2012. Schoch, CL. et al. (with over 100 authors for the Fungal Barcoding Consortium and including $^{\phi}$Tretter E, $^{\phi}$Wang Y, *Johnson E, and **White MM**). The internal transcribed spacer (ITS) as a universal DNA barcode marker for fungi. *Proceedings of the National Academy of Sciences of the United States of America* (PNAS) **109: 6241-6246.**

2012. *Kandel P, **White MM.** A new species of *Ephemerellomyces* from North America highlights its morphological plasticity and possible intergeneric similarities with other Harpellales. *Fungal Biology* **116: 171-184**.

2012. *Oman SJ, **White MM.** Extended studies of *Baltomyces styrax* in Idaho and expanded distribution of this isopod gut fungus in the USA. *Mycologia* **104: 313-320.**

2012. $^{\phi}$Bench ME, **White, MM.** New species and first records of trichomycetes from immature aquatic insects in Idaho. *Mycologia* **104: 295-312.**

2011. Lichtwardt RW, **White MM.** Typification of *Smittium*, an important genus in the taxonomy of Harpellales. *Mycologia* **103**: 918-920**.**

2011. Lichtwardt RW, Williams MC, **White MM.** *Klastostachys*, a new genus of Harpellales in Chironomidae larvae. *Mycologia* **103**: 915-917.

2011. Valle LG, **White MM**, Cafaro MJ. Dipteran-associated Harpellales from lowland and submontane tropical rain forests of Veracruz (Mexico). *Mycologia* **103**: 656-673.

2011. Strongman DB, **White MM**. *Trifoliellum bioblitzii*, a new genus of trichomycete from mayfly nymphs in Nova Scotia, Canada. *Mycologia* **103**: 219-225.

2009. Hapsari MP, **White MM**, Chukeatirote E, Hyde KD. Seasonality of *Harpella melusinae* Leger and Duboscq (Harpellales) in black fly larvae in Northern Thailand. *Cryptogamie Mycologie* **30**: 191-198.

2009. Hapsari MP, **White MM**, Hyde KD. Freshwater trichomycetes from northern Thailand. *Cryptogamie Mycologie* **30:** 405-425.

2008. Strongman DB, **White MM**. Trichomycetes from lentic and lotic aquatic habitats in Ontario, Canada. *Botany* **86**: 1449-1466.

2008. Valle LG, **White MM**, Cafaro MJ. Harpellales in the digestive tracts of Ephemeroptera and Plecoptera nymphs from Veracruz, Mexico. *Mycologia* **100**: 149-162.

2007. A higher-level phylogenetic classification of the *Fungi*. Hibbett DS, Binder M, Bischoff JF, Blackwell M, Cannon PF, Eriksson O, Huhndorf S, James T, Kirk PM, Lücking R, Lumbsch T, Lutzoni F, Matheny PB, Mclaughlin DJ, Powell MJ, Redhead S, Schoch CL, Spatafora JW, Stalpers JA, Vilgalys R, Aime MC, Aptroot A, Bauer R, Begerow D, Benny GL, Castlebury LA, Crous PW, Dai Y-C, Gams W, Geiser DM, Griffith GW, Gueidan C, Hawksworth DL, Hestmark G, Hosaka K, Humber RA, Hyde K, Kõljalg U, Kurtzman CP, Larsson K-H, Lichtwardt R, Longcore J, Miądlikowska J, Miller A, Moncalvo J-M, Mozley-Standridge S, Oberwinkler F, Parmasto E, Reeb V, Rogers JD, Roux C, Ryvarden L, Sampaio JP, Schuessler A, Sugiyama J, Thorn RG, Tibell L, Untereiner WA, Walker C, Wang Z, Weir A, Weiss M, **White MM**, Winka K, Yao Y-J, Zhang N. Last 20 authors are listed alphabetically. *Mycological Research* **122**: 509-547.

2006. **White MM,** James T, O'Donnell K, Cafaro MJ, Tanabe Y, Sugiyama J. Phylogeny of the Zygomycota based on nuclear ribosomal sequence data. *Mycologia* **98**: 872-884.

2006. **White MM**, Colbo MH, Lichtwardt RW. Confirmation and identification of parasitic stages of obligate endobionts (Harpellales) in blackflies (Simuliidae) by means of rRNA sequence data. *Mycological Research* **110**: 1070-1079.

2006. **White MM.** Evolutionary implications of a rRNA based phylogeny of the Harpellales. *Mycological Research* **110**: 1011-1024.

2006. Strongman DB, **White MM**. New species of *Lancisporomyces*, *Orphella*, and *Paramoebidium*, endosymbionts of stonefly nymphs from streams in Nova Scotia, Canada. *Canadian Journal of Botany* **84(6):** 1417-1495.

2006. **White MM**, Siri A, Lichtwardt RW. Fungal insect symbionts (Trichomycetes) in the Great Smoky Mountains National Park and vicinity. *Mycologia* **98**: 333-352.

2006. James TY, Kauff F, Schoch CL, Matheny PB, Hofstetter V, Cox C, Celio G, Gueidan C, Fraker E, Miadlikowska J, Lumbsch HT, Rauhut A, Reeb V, Arnold EA, Amtoft A, Stajich JE, Hosaka K, Sung G-H, Johnson D, O'Rourke B, Crockett M, Binder M, Curtis JM, Slot JC, Wang Z, Wilson AW, Schüßler A, Longcore JE, O'Donnell K, Mozley-Standridge S, Porter D, Letcher PM, Powell MJ, Taylor JW, **White MM**, Griffith GW, Davies DR, Humber RA, Morton J, Sugiyama J, Rossman AY, Rogers JD, Pfister DH, Hewitt D, Hansen K, Hambleton S, Shoemaker RA, Kohlmeyer J, Volkmann-Kohlmeyer B, Spotts RA, Serdani M, Crous PW, Hughes KW, Matsuura K, Langer E, Langer G, Untereiner WA, Lücking R, Büdel B, Geiser DM, Aptroot A, Diederich P, Schmitt I, Schultz M, Yahr R, Hibbett DS, Lutzoni F, McLaughlin D,

Spatafora J, Vilgalys R. Reconstructing the early evolution of the fungi using a six gene phylogeny. *Nature* **443**: 818-822.

2004. **White MM,** Lichtwardt RW. Fungal symbionts (Harpellales) in Norwegian aquatic insect larvae. *Mycologia* **96:** 891-910.

2004. Suh S-O, **White MM**, Nguyen NH, Blackwell M. The status and characterization of *Enteroramus dimorphus*: a xylose-fermenting yeast attached to the gut of beetles. *Mycologia* **96:** 756-760.

Manuscripts in press, accepted or under review:

2014. ϕTretter ED, *Johnson EM, Benny GL, Lichtwardt RW, ϕWang Y, *Kandel P, Novak SJ, Smith JF, **White MM**. An eight-gene molecular phylogeny of the Kickxellomycotina, including the first phylogenetic placement of Asellariales. *Mycologia* 2014 Jun 2. pii: 13-253. [Epub ahead of print] PMID: 24891422

2014. ϕWang Y, ϕTretter ED, *Johnson EM, *Kandel P, Lichtwardt RW, Novak SJ, Smith JF, White MM. Using a five-gene phylogeny to test morphology-based hypotheses of *Smittium* and allies, endosymbiotic gut fungi (Harpellales) associated with arthropods. *MPE* 2014 Jun 14; 79C:23-41. doi:10.1016/j.ympev.2014.05.008. [Epub ahead of print] PMID: 24933275.

Other works:

2013. Lichtwardt RW and MM White. Living in Harmony. Published in the June issue with the cover title "Planet In Flux", this article is an interview-style format of responses from both M.M. White and collaborator R.W. Lichtwardt showcasing the REVSYS project and offering thoughts, comments and opinions of their research on this symbiotic system. *International Innovation:* Pages 102-104. Also available on the web http://www.research-europe.com/magazine/REGIONAL/NA13/index.html

PRESENTATIONS AT NATIONAL AND §INTERNATIONAL MEETINGS (* are undergraduates)

2014. **White MM**. Recent advances in and current opportunities for gut fungi research with reflections on the Trichomycetes. Presented June 10, 2014 at the Mycological Society of America (MSA) Meeting, East Lansing, Michigan. Oral presentation, by White.

2013. Reynolds N, Tretter E, Heeney D, Kandel P, Gause J, Cafaro MJ, **White MM.** Resolving relationships at the animal-fungal divergence: toward a multigene phylogeny of the protist trichomycete orders Eccrinales and Amoebidiales. Presented August 1, 2013 at the the International Congress of Protistology XIV, Vancouver, British Columbia. Poster presentation by Reynolds.

2012. Wang Y, Tretter ED, Johnson EM, Kandel P, Lichtwardt RW, **White MM**. Ribosomal RNA gene-based and multi-gene phylogenies of *Smittium* (Harpellales) and allies-toward unraveling relationships among early-diverging fungi. Presented **July 17,** 2012 at the Mycological Society of America (MSA) Meeting, New Haven, Connecticut. Oral presentation, by Wang.

2012. Tretter ED, Johnson EM, Wang Y, Kandel P, **White MM**. Utilizing new genes (MCM7 and TSR1) for the phylogenetic analysis of early-diverging fungi. Presented July 17, 2012 at the Mycological Society of America (MSA) Meeting, New Haven, Connecticut. Oral presentation, by Tretter.

2012. *Johnson EM, Tretter ED, *Kandel P, **White MM**. Molecular-based phylogenetic placement of the Asellariales, an enigmatic order of arthropod gut endosymbionts. Presented Jul 17, 2012 at the Mycological Society of America (MSA) Meeting, New Haven, Connecticut. Oral presentation, by Johnson.

2012. *Reynolds NK, Wilson ER, *Kandel P, Laramie M, Pilliod D, **White MM**. Extending knowledge of Trichomycetes by fixing on preserved immature aquatic insects in Idaho. Presented Jul 16, 2012 at the Mycological Society of America (MSA) Meeting, New Haven, Connecticut. Poster presentation, by Reynolds.

2012. *Gause JW, **White MM**. Entangled and nearly deceived in a web of gut fungi: two intermingled, dimorphic *Smittium* species from Idaho. Presented Jul 16, 2012 at the Mycological Society of America (MSA) Meeting, New Haven, Connecticut. Poster presentation, by Gause.

2012. Wang Y, Tretter ED, Johnson EM, Kandel P, Lichtwardt RW, White MM. Testing monophyly and phylogenetic relationships of *Smittium* (Harpellales) using a five-gene molecular phylogenetic analysis 93rd Annual Meeting of the AAAS, Pacific Division Boise Idaho June 24-27, 2012 , Oral Presentation, by Yan Wang. Note: Yan Wang won 1st prize for the talk in the Ecology, Organismal Biology and Environmental Sciences section and was also awarded the Geraldine K. Lindsay Award for its contributions to the Natural Sciences.

2012. Wilson ER, Smalling KL, Reilly TJ, Gray EW, Gause JW, **White MM**. Using microcosms to infer fungicide impact on black fly associated gut fungi. American Water Resources Association (AWRA) Summer Specialty Conference, Contaminants of Emerging Concern II, June 25-27, Denver, Colorado. Invited Poster Presentation. Note: Emma Wilson won *1st prize for her Poster*!
http://awramedia.org/mainblog/2012/08/13/2012-awra-summer-conference-student-presenter-winners/

2012. Wilson ER, Smalling KL, Reilly TJ, Steele L, Kandel P, Chamberlin AB, **White MM**. Field studies of the effects of fungicides on non-target gut fungi and pesticide accumulation in their black fly hosts. American Water Resources Association (AWRA) Summer Specialty Conference, Contaminants of Emerging Concern II, June 25-27, Denver, Colorado. Invited Oral Presentation. Note: Emma Wilson won *1st prize for her Talk*!

2012. Wilson ER, Smalling KL, Reilly TJ, Steele L, Kandel P, Chamberlin, AB, Gause JW, **White MM**. From field to fridge: first glimpses of fungicide-exposed gut fungi. March 28-31 at the 83rd Annual Meeting of the Northwest Scientific Association, in Boise, Idaho. Poster Presentation, by Wilson. Note: Emma Wilson received *2nd prize for the poster*.

2012. Wilson ER, Smalling KL, Reilly TJ, Steele L, Kandel P, Chamberlin AB, Gause JW, **White MM**. Non-target effects of fungicides on black fly associated gut fungi and accumulation of pesticides in larval tissue. 10th Annual Meeting North American Black Fly Association (NABFA) Archbold Biological Field Station, Lake Placid, Florida. Feb 8-10. Oral Presentation, by Wilson.

2012. Reynolds NK, Wilson ER, Kandel P, Laramie M and **White MM**. Expanded surveys and new species of black fly gut fungi in Southern Idaho. 10th Annual Meeting North American Black Fly Association (NABFA) Archbold Biological Field Station, Lake Placid, Florida. Feb 8-10. Oral Presentation, by Reynolds.

§2011. **White MM**, Tretter ED, Wang Y, *Johnson EM, Guardia Valle L, Strongman D, Kurihara Y, Degawa Y. Phylogeny and systematics of trichomycetes and early-diverging fungi. Presented Sept 9, 2011 at the International Union of Microbiological Societies (IUMS) 2011 Congress at the Sapporo Convention Center (Sapporo, Japan). Oral presentation by **White MM (in English)**.

Symposium Title: Recent research progress on early diverging fungi - their evolution, systematics, and diversity. ***My Role:*** Convener and Speaker. This symposium on Early-Diverging fungi was **co-organized with Satoshi Sekimoto.** We will discuss recent progress on early-diverging fungal research, including evolution, systematics, ecology, and genetics. *Our goal* was for speakers from multiple countries and continents. **I represented the USA** and Sekimoto, Canada. Another speaker is from Germany and two others from Asia.

2011. Wang Y, Tretter ED, Lichtwardt RW, **White MM.** Teasing apart the polyphyletic "Smittium" clade of Gut Fungi (Harpellales): merging multi-gene molecular and morphological margins. Presented August 2, 2011 at the Mycological Society of America (MSA) Meeting, Fairbanks, Alaska. Oral presentation, by Wang.

2011. Tretter, ED, *Johnson, EM, Wang, Y, Strongman D, Guardia Valle, L, **White MM.** An Expanded Phylogeny of the Trichomycete Fungi. Presented August 2, 2011 at the Mycological Society of America (MSA) Meeting, Fairbanks, Alaska. Oral presentation, by Tretter.

2011. Wilson ER, Smalling KL, Reilly TJ, *Steele L, *Kandel P, *Chamberlin AB, **White MM.** Beyond gut feelings: how are trichomycetes affected by fungicides in aquatic systems? Presented August 3, 2011 at the Mycological Society of America (MSA) Meeting, Fairbanks, Alaska. Oral presentation, by Wilson.

2011. Carter K, Serpe M, **White MM.** Identification of mycorrhizal species associated with *Artemisia tridentata* ssp. *wyomingensis* in Southwestern Idaho. Presented August 3, 2011 at the Mycological Society of America (MSA) Meeting, Fairbanks, Alaska. Poster presentation, by White.

2011. Carter K, **White MM**, Serpe M. Molecular identification of mycorrhizal fungi in seedlings of *Artemisia tridentata* ssp. wyomingensis from southern Idaho. Seminar for
USDA Managed Ecosystems Project Director's Meeting Washington, D.C. Delivered by Marcelo Serpe.

2010. Tretter ED, Strongman DB, Guardia Valle L, **White MM.** A preliminary multigene phylogeny of the clade *Orphella*. Presented June 28, 2010 at the Mycological Society of America (MSA) Meeting, Lexington, Kentucky. Poster presentation, by Tretter.

2010. Wang Y, Tretter ED, **White MM.** Toward a multi-gene phylogeny of the "Smittium" clade of gut fungi. Presented June 28, 2010 at the Mycological Society of America (MSA) Meeting, Lexington, Kentucky. Poster presentation, by Wang.

2010. Wilson ER, Steele L, Reilly T, Smalling K, *Oman S, **White MM.** Potential utility of trichomycetes as bioindicators of fungicide-impacted waterways. Presented June 30, 2010 at the Mycological Society of America (MSA) Meeting, Lexington, Kentucky. Poster presentation, by Wilson.

2010. Carter K, Davidson B, **White MM**, Shaw N, Serpe M. Identification of mycorrhizae associated with *Artemisia tridentata* spp *wyomingensis* in Southwestern Idaho. Presented May 17-21, 2010 at the National Native Seed Conference on Native Plant Materials Development, Production & Use in Habitat Restoration. Poster presentation, by Shaw.

2010. Reilly TJ, Smalling KL, **White MM**, Orlando JL, Kuivila KM, Battaglin WA, Meyer MT, Sandstrom MW. Design and Implementation of a study to determine the occurrence and fate of fungicides in aquatic systems. Presented at the NWQMC meeting in Denver. Poster presentation, by Reilly.

2009. **White MM**. Trichomycetes - habitat, isolation and culture. Invited symposium presentation for Symposium entitled "Teaching with basal fungal lineages; chaired by Dr. Martha Powell, U. of Alabama. Approximate 30 min. oral presentation July 29, 2009 at the Mycological Society of America (MSA) Meeting, Snowbird, Utah.

2009. Bench ME, **White MM**. New species and first records of trichomycetes from immature aquatic insects in Idaho. Presented July 27, 2009 at the Mycological Society of America (MSA) Meeting, Snowbird, Utah. Poster presentation, by White.

2009. *Oman SJ, **White MM**. *Baltomyces*, a rare and unusual gut fungus newly discovered in Idaho isopods: 1st report since the original genus description. Presented July 28, 2009 at the Mycological Society of America (MSA) Meeting, Snowbird, Utah. Poster presentation, by Oman.

2008. Bench ME, **White MM**. Biodiversity and seasonality of gut fungi associated with arthropods in Cottonwood Creek, Boise, Idaho. Presented November 19, 2008 at the Entomological Society of America Meeting, Reno-Sparks Convention Center, Reno, Nevada. Poster presentation, by Bench.

2008. Bench ME, **White MM**. Biodiversity and seasonality of gut fungi in an ephemeral aquatic system and urban setting. Presented August 11, 2008 at the Mycological Society of America (MSA) Meeting, Penn State University, State College, Pennsylvania. Poster presentation, by White.

2007. **White MM**, Siri A, Ferrington LC, Strongman DB. New records of *Austrosmittium* in North and South America. Presented August 6-9, 2007 at the MSA meeting, Louisiana State University, Baton Rouge, Louisiana. Poster presentation.

§2006. **White MM**, Lichtwardt RW. Trichomycetes: major taxonomic revisions based on molecular phylogenies. Invited oral presentation delivered (by Lichtwardt) August 21, 2006 at IMC8 (8th International Mycological Congress), Cairns, Australia as part of the Symposium entitled: Phylogenetic biology of fungal and fungal-like phyla [chairs: Rytas Vilgalys (Duke University) and Joseph W. Spatafora (Oregon State University)].

2005**. White MM**, Lichtwardt RW. Phylogeny of insect-associated gut fungi with emphasis on the Harpellales. Presented August 4, 2005 at the MSA meeting, Hilo, Hawaii. Oral Paper.

2004. **White MM.** Reflections of Trichomycetology by a PEET trainee. Invited Commentary (15 mins.) presented July 20, 2004 at the MSA meeting, Asheville, North Carolina.

GRADUATE PRESENTATIONS WITHIN INSTITUTIONS (* are undergraduates)

2011. Wang Y. Multigene testing of the phylogenetic stability of *Smittium*. Oral presentation at the BSU First Annual Graduate Student Research Symposium, Boise, Idaho. March 18, 2011. **(White, MM, Advisor)**

2011. Wilson E. Exploring the implications of fungicides for non-target aquatic fungi. Oral presentation at the BSU First Annual Graduate Student Research Symposium, Boise, Idaho. March 18, 2011. **(White, MM, Advisor)**

2011. Tretter E. Specialized primers for the amplification of unknown fungal sequences from mixed

genomics. Poster presented at the BSU First Annual Graduate Student Research Symposium, Boise, Idaho. March 18, 2011. **(White, MM, Advisor)**

2011. Carter K, Identification of Mycorrhizal Species Associated with *Artemisia tridentata* spp. *wyomingensis* in Southwestern Idaho. Poster presented at the BSU First Annual Graduate Student Research Symposium, Boise, Idaho. March 18, 2011. **(White, MM, Co-Advisor)**

2011. Wilson E, Smalling KL, Reilly TJ, *Steele L, *Kandel P, *Chamberlin A, *Oman S, **White MM.** Assessing the effects of fungicides on non-target aquatic fungi in Southern Idaho. Presented at the 21st Annual Water Quality Workshop: Monitoring, Assessment, and Management, Boise, Idaho February 9, 2011.

RESEARCH RELATED SERVICE

2012. **Jan. 12, 2012 Served on a USDA (NP 303 Panel 4) Panel with review of Systematics Proposals. Conducted via phone conference with other reviewers from across the country.**

2011. **Co-organized and conducted a workshop with Dr. Satoshi Sekimoto** Sept 9, 2011 at the International Union of Microbiological Societies (IUMS) 2011 Congress at the Sapporo Convention Center (Sapporo, Japan). **Symposium Title:** Recent research progress on early diverging fungi - their evolution, systematics, and diversity. ***My Role:*** Convener and Speaker. This symposium on Early-Diverging fungi discussed recent progress on early-diverging fungal research, including evolution, systematics, ecology, and genetics. *Our goal* was for speakers from multiple countries and continents. **I represented the USA** and Sekimoto, Canada. Another speaker was from Germany and two others from Asia.

2007-2011, 2014. Participated in annual Mycological **Forays** (mostly macrofungi), with Mycological Society of America members.

2004-2014. Worked with trichomycetologists from other countries on collaborative projects, particularly biodiversity and description of new taxa, **and training students** (see Thailand paper). Others have used **online videos tutorials** at my laboratory webpage.

2009. Participated, as an invited speaker, in a symposium entitled "**Teaching with basal fungal lineages"** (Chaired by Dr. Martha Powell, U. of Alabama) at the Mycological Society of America (MSA) Meeting, Snowbird, Utah. The goal was to demonstrate and explain how understudied fungal groups could be used in the classes etc. of the participants. I also discussed how to utilize the gut fungi and how, as endosymbionts, they could be used from a number of possible angles in teaching various courses.

2009. Participated in the 2nd annual **Bioblitz**, Halifax, Nova Scotia, June 5-6, 2009. **Opportunity to engage children and general public** on gut fungi and aquatic insects. Web Link: www.smu.ca/bioblitz/home.html

2007, 2008. **Member of judging team for student posters and/or oral presentations** at the annual Mycological Society of America meetings.

2005. **Workshop**/Symposium on Phylogenetic Studies of Trichomycetes [with RW Lichtwardt (USA) & Hiroki Sato (Japan)] at the Mycological Society of America (MSA) meeting, Hilo, Hawaii.

1997-present. Periodically, have introduced **undergraduate laboratory classes and grade school children to field collection of invertebrates from freshwater aquatic streams, emphasizing their internal symbionts and overall ecological role.** Example at: www.urbanecologycenter.org/newsletter/2008/novdec.pdf (see page 4) and the a summary of the 2nd annual Bioblitz, Halifax, Nova Scotia (June 5-6, 2009) at www.smu.ca/bioblitz/home.html

Graduate Students (all are within the M.Sc. Biology Program)

Current:Nicole Reynolds (Fall 2012 – present)

Additionally, Keith Carter (Fall 2009 – present),
listed as his **Co-Advisor**, but with Dr. M. Serpe as the clear lead**.**

Completed:
Molly Bench, M.Sc. (Aug 2007– Spring 2009)
Yan Wang, M.Sc. (Fall 2009 – Spring 2012)
Emma Wilson (Spring 2010 – Spring 2013)
Eric Tretter (Spring 2010 – Spring 2013)

MS Theses:

Wilson, Emma R., "Evaluating the Effects of Fungicides and other Pesticides on Non-Target Gut Fungi and their Aquatic Insect Hosts" (2013). *Boise State University Theses and Dissertations.* http://scholarworks.boisestate.edu/td/596

Tretter, Eric Dennis, "A Multi-Gene Molecular Systematic Study of the Kickxellomycotina, Including the Examination of Two New Genes (MCM7 and TSR1) for Phylogenetic Inference" (2013). *Boise State University Theses and Dissertations.* http://scholarworks.boisestate.edu/td/591

Wang, Yan, "Ribosomal RNA Gene-Based and Multigene Phylogenies of Smittium (Harpellales) and Allies—Toward Unraveling Relationships Among Early-Diverging Fungi" (2012). *Boise State University Theses and Dissertations.* http://scholarworks.boisestate.edu/td/340

Bench, Molly Elizabeth, "New Species and Expanded Geographic Ranges of Gut Fungi and their Symbiotic Relationship with Insect Hosts" (2009). *Boise State University Theses and Dissertations.* http://scholarworks.boisestate.edu/td/41

PROFESSIONAL AFFILIATIONS AND SOCIETAL MEMBERSHIPS

Asociación Latinoamericana de Micología
Ecological Society of America
International Symbiosis Society
Kaw Valley Mycological Society
Mycological Society of America
North American Benthological Society
North American Mycological Association
Sigma Xi
Southern Idaho Mycological Association
Xerces Society

COLLABORATORS AND OTHER AFFILIATIONS

Collaborators (abbreviated list):

Gerald Benny	Dept. of Plant Pathology, University of Florida, Gainesville, Florida.
Matías Cafaro	Dept. of Biology, University of Puerto Rico, Mayaguez, Puerto Rico.
Leonard C. Ferrington, Jr.	Dept. of Entomology, University of Minnesota, St. Paul, Minnesota.
Tim James	Dept. of Ecology & Evol. Biol., U. of Michigan, Ann Arbor, Michigan.
Robert Lichtwardt	Dept. Ecol. & Evol. Biol., University of Kansas, Lawrence, Kansas.
J.K. Misra	Sri J.N.P.G. College, Lucknow, India.
Kerry O'Donnell	NCAUR, USDA, Peoria, Illinois.
Doug Strongman	Dept. of Biology, Saint Mary's University, Halifax, Nova Scotia, Canada.
Junta Sugiyama	Tokyo Office, TechnoSurago Co., Ltd. Chiyoda-ku, Japan.
Y. Tanabe	Laboratory of Intellectual Fundamentals for Environmental Studies, Japan.
Laia Guardia Valle	Facultat de Ciencies, UAB, Barcelona, Spain.

Graduate advisors:
Ian A. McLaren (M.Sc.) Dept. of Biology, Dalhousie University, Halifax, NS, Canada.
Robert W. Lichtwardt (Ph.D.) Dept. Ecol. and Evol. Biol., U. Kansas, Lawrence, Kansas.
Robert W. Lichtwardt (Postdoctoral advisor) Dept. Ecol. and Evol. Biol., U. Kansas, Lawrence, Kansas.

EXAMPLES OF SERVICE

A. Professional service

a. Professional committees and organizational involvement

i. Member of the Mycological Society of America (MSA) Graduate Awards Committee. Reviewed 12 applications and came to mutual decision on awards (via email) with other committee members. Spring 2007.

ii. Judge (with other MSA society members) for student poster awards at the annual Mycological Society of America Meeting. Discussed posters with students and met with committee members to render decision and presentation of Award. Summer 2007 & 2008, Mycological Society of America Meeting.

b. Editorial services

i. As **Associate Editor for *Mycologia***, I completed paperwork, correspondence and improvements for numerous manuscripts *from 2007–2012.*

ii. Have been a **peer reviewer** for the following journals (with # of reviews /year).

1. Evolutionary Bioinformatics (1/2007)
2. Fungal Diversity (1/2008)
3. Journal of Invertebrate Pathology (1/2009)
4. Mycologia (2/2007; 1/2008)
5. Mycological Research (1/2008)
6. Mycotaxon (1/2010)

c. Proposal review

i. I have completed as many as one or two reviews of NSF proposals each year

d. Collections Based Contributions

i. Deposited several pure slant cultures of fungi from the Fall 2007 Mycology class to the USDA collection in Peoria, IL. Cultures were sent March 10, 2008 to Dr. Stephen Peterson who was to accession them in the collection, which has few isolates from Idaho. These resources are available for teaching/research purposes.

B. Institutional service

a. Committees

i. Member of BSU Biology Research Committee (2007-present). Tasks have included everything from advancing research in our department to design and printing of the 1st Departmental Newsletter (see below also).

ii. Member of Faculty Search Committee (2010) for Ecosystems Ecologist Position.
iii. Member Dept. Biol. Sci. Tenure and Promotion committee, Spr 2014-present.

b. University-related projects
   i. Organized and led a 1-day Fungal Foray (field trip) for Mycology students (BOT 330 & BOT 330G) each fall from 2007-2012 and 2014; sites have included Grimes Creek, Herrick Reservoir or Sage Hen Reservoir, ID.

c. Assigned institutional responsibilities
   i. Advised numerous students each year (2007-2014)
   ii. Participated in the Commencement Ceremonies.

d. Other service activities that benefit the University
   i. Serve on Advisory Board for Canadian Studies; 1st meeting was October 28, 2010.
   ii. Have written many letters of reference for former/current students at BSU.
   iii. Also nominated two students for a Wallace Kay writing competition, Jan 2010.

C. Community Service

a. Led a **local foray** (in Veterans Park, Boise) for Myxomycetes with world expert Dr. Harold Keller, June 13, 2010. Accompanied by some of my graduate and undergraduate students. Later published a brief article summarizing the event in *Inoculum*, the Newsletter of the Mycological Society of America. Online: http://msafungi.org/wp-content/uploads/Inoculum/61(4).pdf (see p. 31)
b. Attended 2nd annual BIOBLITZ, June 5-6, 2009 in Halifax, Nova Scotia. Used fungal taxonomic expertise, especially identifying gut fungi from larval aquatic insects. Interacted with general public, great outreach opportunity. Ultimately, we also prepared a paper on a new fungal species we discovered there.
c. Met with Teacher from Montpelier, ID, and her (~12) students to answer Evolutionary Biology questions in advance of their "Academic Decathalon Event" in Boise, ID. I answered a series of questions from them (was truly impressed by them really) and assured them that they were ready for the competition! I did try to provide some explanation on a couple more complex concepts, but it was a most impressive sense that I was left with, regarding the potential of these young scholars. March 12, 2009.
d. I created an instructional DVD called "How to Collect and Dissect Gut Fungi" Version 1 that was demonstrated and distributed at the Mycological Society of America (MSA) Meeting in August 2007. Several copies of the DVD were given to

mycologists for peer review and for use in their Mycology courses/workshops with positive feedback received. These were since placed online at my laboratory homepage. (see supplement to this section.)

e. Volunteer at Idaho Native Plants Society Annual Sale, Boise ID, April 21, 2007.
f. Mushroom/Fungi related questions taken from the public (in Idaho). A few examples since 2007.
    i. By phone: Mushroom IDs and advice (a stinkhorn).
    ii. Returned call to Meridian, ID vet, gave advice on possible fungal poisoning of a dogs/pets.
    iii. By Phone: Advised a Kuna vet on the wet season and how it may be impacting mushroom occurrences in the area, especially with pets consuming them. June 19, 2008.
    iv. Answered query by Caldwell, ID resident on strange aquatic organisms – id's as Nostoc and symbiotic midge and sent him original paper from 1960's. (by email) Sept. 17, 2008.
    v. In person: Sat with concerned local Boise resident who brought in a variety of dried wild mushrooms found in son's bedroom. (1.5 hours) Oct. 7, 2008.

JODI BRANDT
Human Environment Systems Initiative
College of Innovation and Design
Boise State University
Boise, Idaho 83725
Email: jodibrandt@boisestate.edu; Tel: (208) 426-2935; Office: ERB 2159

Education

2012	**Ph.D.** University of Wisconsin, Forest and Wildlife Ecology Thesis: Landscape change and biodiversity conservation in the Chinese Himalayans
2004	**M.S.** University of Maryland, Ecology and Environmental Science Thesis: Landscape change and water resources in the Bolivian Andes
1996	**B.A.** Yale University, Geology & Geophysics, Earth, Environment and Resources Thesis: Land use impacts on water quantity/quality in the Susquehanna Basin

Appointments and Professional Training

2015	**Assistant Professor,** Boise State University, Human Environment Systems
2014	**Postdoctoral Research Fellow**, Dartmouth College, Hanover NH
2013	**Postdoctoral Research Fellow,** University of Michigan, Ann Arbor, MI
2007 - 2012	**NSF IGERT Trainee**
2005 - 2006	**Fulbright Fellow,** Bolivia, South America
2000 - 2002	**US Peace Corps Volunteer,** Guatemala, Central America
1996 - 2000	**Hydrogeologist,** Waterborne Environmental, Inc., Leesburg, VA

Grants and Awards

Pending	**NASA New Investigator Program**. "Ecotourism Impacts in the Himalaya" (PI) ($320,000)
Pending	**NASA SERVIR Applied Science Team**. "Forest change, policies, and ecosystem services in the Himalaya" (PI) ($480,000)
Pending	**NASA Land-Cover Land Use Change Program**. "Land use, market integration, and sustainable development in the Eastern Himalaya (PI) ($580,000)
Pending	**Michigan Invasive Species Program** "Innovative Control of Frogbit in the northern Great Lakes" (Co-PI) ($320,000)
2015	**NASA-MSU Professional Enhancement Award**. (PI) ($800)
2015	**Dartmouth Neukom CompX.** "Developing novel computational approaches in support of indigenous-led Earth Stewardship of Great Lakes coastal wetlands" (PI) ($25,000)
2014 - 2015	**U.S. Fish and Wildlife Service** (in collaboration with Sault Chippewa Tribe). "Bulrush restoration in culturally-important wetlands" ($100,000) (Co-PI)
2010 - 2012	**NSF Doctoral Dissertation Enhancement Program** (DDEP) grant. "Tibetan culture and bird conservation in southwest China" ($15,000) (PI)

2009 - 2012 **NASA Earth and Space Science Graduate Fellowship**. "Landscape change and impacts on biodiversity in southwest China" ($90,000) (PI)

2010 - 2012 **NSF-IGERT Collaboration Grant** with Ellen Bartee, Linguist. "Birds of Shangrila". Connections between culture and nature in Tibetan China. ($5000) (PI)

2010 - 2011 **NSF-IGERT Collaboration Grant** with Michelle Haynes, Ethnobotanist. "Alpine change impacts on ecosystem services in the Chinese Himalaya" ($3000) (PI)

2010 - 2011 **NSF-IGERT Collaboration Grant** with Teri Allendorf, Human Ecologist. "Local Governance of Tibetan Sacred forests" ($5000) (Co-PI)

2007 - 2009 **NSF IGERT Fellowship**. "Interdisciplinary Trainee for the UW China-IGERT, Biodiversity Conservation in SW China" ($80,000)

2007 - 2008 **NSF-IGERT Data Grant**, with Jamon Van den Hoek, Geographer. "Building a Landsat database for the UW-IGERT program" ($8000) (PI)

2003 - 2004 **TNC – Bolivia Country Program,** Field Research Grant, Land cover change and water resources in the arid Bolivian Andes ($7000) (PI)

2002 - 2003 **University of Maryland Appalachian Lab Fellowship** "Landscape change and water resources in the Bolivian Andes" ($40,000) (PI)

Publications

Peer-reviewed

Brandt, JS, Nolte, C, and Agrawal, A. (in review). Deforestation and timber production in Congo after implementation of sustainable forest management. *Land Use Policy*

Brandt, JS, Butsic, VB, Schwab, B, Kuemmerle, T, and Radeloff, VC. (2014). Relative effectiveness of a logging ban, protected areas, and sacred areas to protect old-growth forests in southwest China. *Biological Conservation*

Haynes, M., Kung, K., **Brandt, J.,** Yongping, Y., Waller, D. (2014) Accelerated climate change and its potential impact on Yak herding livelihoods in the eastern Tibetan plateau. *Climatic Change* 1-14.

Brandt, J.S., Nolte, C., Steinberg, J., Agrawal, A. (2014) Foreign capital, forest change and regulatory compliance in Congo Basin forests. *Environmental Research Letters* 9, 044007.

Wood, E., **Brandt, J**., Pidgeon, A., Radeloff, V. (2014) Habitat–occupancy associations and tree-species use patterns by breeding birds in community-managed Tibetan sacred forests. *Biodiversity and Conservation*, 1-20.

Allendorf, T.D., **Brandt, J.S.,** Yang, J.M., (2014) Local perceptions of Tibetan village sacred forests in northwest Yunnan. *Biological Conservation* 169, 303-310.

Brandt, J.S., M.A. Haynes, T. Kuemmerle, Fang Zhendong, D. Waller, and V. Radeloff (2013) Regime shift on the roof of the world: Alpine meadows convert to shrublands in the southern Himalayas. *Biological Conservation* 158:116-127.

Brandt, J.S., Han L., Fang Z, Wood E.M. and V. Radeloff (2013) Sacred forests are keystone structures for bird conservation in southwest China's Himalayans. *Biological Conservation* 166(0):34-42.

Brandt, J. S., T. Kuemmerle, H. Li, G. Ren, J. Zhu, and V. C. Radeloff (2012) Using Landsat imagery to map forest change in southwest China in response to the national logging ban and ecotourism development. *Remote Sensing of Environment* 121:358-369

Brandt J.S. and Townsend P.A. (2006) Land cover conversion, regeneration, and degradation in the high-elevation Bolivian Andes. *Landscape Ecology* 21: 607-623

Book

Brandt, JS, and E. Bartee. (2012). "The Birds of Shangrila". Yunnan Minorities Publishing. 266 pp.
Interactive pdf: https://www.researchgate.net/publication/263271811_Birds_of_Shangrila
Website: http://birdsofshangrila.forest.wisc.edu/

Technical Reports

Brandt, J.S., 2009: "Mapping Wild Rice in culturally-important lakes in Northern Wisconsin". Final Report for Circle of Flight project with the Lac Courte Oreilles Ojibwa Community College

Klein, D., **Brandt J,** Cook C., Graham, R., Postle, J., Rheineck, B. 2008. Agricultural Chemicals in Wisconsin Groundwater. Wisconsin DATCP ARM Publication 180.

Brandt, J.S. 2006. "Evaluation of the Biological Health of the Rivers of the Central Valley of Tarija, Bolivia" (in Spanish, for TNC-Bolivia Country Program).

Presentations

Invited

International Association of Landscape Ecology (IALE), Portland, Oregon, July 2015
- Avoiding imminent regime shifts in the northern Great Lakes

Dartmouth Environmental Studies Program Departmental Seminar, February 2014
- Land systems change and socio-ecological trajectories: The Good, the Bad, and the Unexpected.

Dartmouth Ecology and Evolutionary Biology Seminar, January 2014
- Consequences of land systems change in a biodiversity hotspot

University of Michigan, Postdoctoral Fellow Job Talk, August 2012, Ann Arbor, MI
- Coupled socioecological systems in southwest China

Boston University, Postdoctoral Fellow Job Talk, August 2012, Boston, MA
- Land use systems in forest and alpine zones of the Himalayan mountains

University of Missouri, Postdoctoral Fellow Job Talk, August 2012, Columbia, MO
- Threatened bird conservation in a rapidly changing Tibetan landscape

NASA 2011 Carbon Cycle and Ecosystems (CC&E) Joint Science Workshop, October 3-7, 2011
- Land systems change in southwest China's Himalayas

NASA 2011 Land Cover Land Use Change (LCLUC) Annual Team Meeting, March 28-30 2011
- Ecotourism accelerates logging in old-growth forests in southwest China

Contributed

Natural Capital Annual Meeting, March 2014, Stanford University
- An Ecosystem Services framework for tribal stewardship of Great Lakes coastal ecosystems

American Ornithological Union (AOU), August 2013, Chicago, IL
- Sacred forests and bird conservation in the Himalaya.

International Congress for Conservation Biology (ICCB), 2011, Auckland, New Zealand
- Old-growth forest conservation in southwest China

Association for Nepal and Himalayan Studies (ANHS) Conference, 2011, St. Paul, MN

- Sacred sites are refugia for Himalayan forest birds.

US-International Association of Landscape Ecology (IALE), Madison, Wisconsin, April 2008

- Land cover conversion, regeneration, and degradation in the Bolivian Andes.

Peer Reviewer

Ecosphere, Remote Sensing of Environment, Environmental Research Letters, Biological Conservation, Regional Environmental Change, Remote Sensing, Biodiversity and Conservation

Field Experience

2014	Lake Superior coastal wetlands, Upper Peninsula of Michigan (6 weeks)
2013	Tropical forests, Southeastern Cameroon, Central Africa (1 month)
2008 - 2011	Himalayan Forest and Alpine systems, Northwest Yunnan Province, China (1.5 years)
2005	Andean streams and rivers, Fulbright fellowship, Tarija, Bolivia (1 year)
2003	Andean arid rangelands and croplands, M.S. Research, Tarija, Bolivia (2 months)
2000 - 2002	Guatemalan highlands (US Peace Corps) (2 years)
1996 - 2000	Agricultural areas throughout the US (frequent trips)
1995	Susquehanna River tributaries, Pennsylvania Appalachians (summer field tech for USGS)

Media and outreach

2014 ScienceDaily, 12 November 2014. "China's old-growth forests vanishing despite government policies." <www.sciencedaily.com/releases/2014/11/141112132113.htm>.

2014 Environmental Research Web (interview and media coverage about deforestation in Congo)

2013 China Dialogue Net (interview and media coverage about alpine change in Himalaya)

2013 Conservation Magazine.org (media coverage about Himalayan birds in sacred forests)

2012 Birds of Shangrila Book and Website

2006 “Tarija, Today” Local Daytime Talk Show (invited guest, in Spanish)

Skills

Software skills: ArcGIS, ERDAS Imagine, ENVI, ImageSVM, eCognition, R, SAS, S-Plus – Statistical analysis packages**,** Primer, PC-Ord, CART, EstimateS, DISTANCE, BASINS, HSPF, Clue-S

Languages: English – native tongue, Spanish – fluent, Mandarin – operational

Teaching Experience and Training

2015 **Co-instructor,** Bay Mills-Chippewa Community College, Bay Mills, MI
Encountering Wetlands: Plants and People in Lake Superior Coastal Zones

2014 **Faculty Mentor,** Dartmouth Women in Science Program
Studying Human-Environment Interactions using GIS and Remote Sensing

2014 **Guest Lecturer**, Dartmouth College
Env St 80 Science and Policy of Rapid Environmental Change

2013 **Teacher Training**: University of Michigan
Postdoctoral Short-Course: Innovative Undergraduate Science Teaching,

2013 **Guest Lecturer**, Eastern Michigan University
Geography 110 World Regions

2011 **Guest Lecturer**, University of Wisconsin-Madison
Env St 401 Introduction to Environmental Remote Sensing

2003 - 2004 **Teaching Assistant**, University of Maryland
MEES 661 Landscape Ecology

2003 - 2004 **Teaching Assistant**, University of Maryland
MEES 508 Land Margins Interactions

2000 - 2002 **Environmental Educator**, US Peace Corps, Guatemala

2000 **Teacher Training**: U.S. Peace Corps, Guatemala
Informal and Active Learning Techniques for Environmental Education in Communities

Advising

Braden Elliot, PhD student (American), Dartmouth College
Dissertation Topic: Human-environment linkages in tribal lands of the Pacific Coast Range

GyeongEun Yi, undergraduate (South Korean), Dartmouth College
Research project: Biodiversity conservation and conflict resolution in the Korean DMZ

Chelsea Suydam, undergraduate student (Native American), Dartmouth College
Responsibilities: GIS analysis of islands and shorelines in the St. Mary's River, Michigan

Michael Perles, undergraduate student (American), University of Michigan
Undergraduate Thesis Topic: Forestry violations and deforestation in Republic of Congo

Zhenyue Duan & Yi Wang, MS Students (Chinese), University of Michigan
Research topic: Forests, land tenure and poverty: a GIS analysis

Naparat Suttidate, PhD Student (Thai), University of Wisconsin
Dissertation topic: Protected areas and land cover change in Thailand.

Song Wen Yu, MS Student (Chinese), Southwest Forestry Institute, Yunnan, China
Research topic: Landscape analysis of purple mud-hen in Dali Wetlands

Kong-xi Kang, Field Assistant (Chinese), Yunnan, China
Responsibilities: Translation and Field Guide for field trips in Tibetan hinterlands

Maria Bolivar Romero, Field Assistant (Bolivian), Tarija, Bolivia
Responsibilities: Field and lab work associated with water resources research.

Synergistic Activities

I participate in the National Socio-Environmental Synthesis Center (SESYNC) Venture project: "Synthesizing social-ecological systems change using cultural evolution theory". The 4-year project holds annual interdisciplinary workshops with the overarching goal of increasing knowledge about sustainable systems. As a quantitative environmental scientist with experience working with remote sensing data and biological data, my role is to ensure that the ecological aspects of the research are strong, and to contribute insights on how to integrate social and ecological data.

At the University of Michigan, I was a post-doctoral research fellow for an NSF Coupled-Human and Natural Systems (CNH) grant investigating governance and forest outcomes in the Congo. I co-organized our capstone conference, held in Paris, France, which aggregated 50+ scholars from Europe, the US and Africa active in studying sustainability in tropical forests in Central Africa.

With colleagues, I wrote *"The Birds of Shangrila",* a 266-page, tri-lingual ecological and cultural guide to the birds of my PhD study area. The book was developed and published in collaboration with a Tibetan linguist, a Chinese medicine doctor, and a vocational school teacher. Three thousand copies were printed and sold out within months. In addition, I procured additional funding to produce an interactive pdf, an e-book, and a website for even broader dissemination.

During my PhD, I was a member of the NSF IGERT (*Integrative Graduate Education and Research Traineeship)* program at the University of Wisconsin. IGERT is the National Science Foundation's flagship interdisciplinary training program. I participated in IGERT throughout my PhD, including attending and leading interdisciplinary seminars and retreats, and co-developing research proposals.

During my Fulbright fellowship, in collaboration with local NGO *PROMETA*, I developed a biologically-based stream monitoring system, which is still in use. The "rankings" derived from this monitoring system stimulated press and interest about the water resource in the city and surrounding villages, and we were invited to several events, including the local daily talk show, to discuss the monitoring system and the health of local watersheds.

Neil Henderson Carter

phone: 208-426-2958
e-mail: neilcarter@boisestate.edu
website: http://hes.boisestate.edu/who-we-are/faculty/neil-carter/
personal website: www.neilhcarter.com

Assistant Professor
Human-Environment Systems Research Center
College of Innovation and Design
Boise State University
1295 University Dr.
Boise, ID, 83725

RESEARCH INTERESTS

- wildlife ecology and conservation, wildlife management and policy, landscape ecology, human dimensions of wildlife conservation, complexity of coupled human and natural systems, and sustainability science

PROFESSIONAL PREPARATION

National Socio-Environmental Synthesis Center, Annapolis, MD
Postdoctoral Fellow (advisor: Dr. Simon Levin at Princeton University) **2013 –2015**
Complexity of improving human well-being and conserving biodiversity

Michigan State Univ., Lansing, MI
Ph.D. from Department of Fisheries and Wildlife (advisor: Dr. Jianguo Liu) **2013**
Dissertation: "Coupled Human and Natural System Approach to Tiger Conservation in Chitwan National Park, Nepal and Beyond"

Univ. of Michigan, Ann Arbor, MI
M.S. in Terrestrial Ecology from School of Natural Resources and Environment (advisor: Dr. Daniel Brown) **2007**
Thesis: "Predicting the Ecological and Social Suitability of Black Bear Habitat in Michigan's Lower Peninsula"

Univ. of California San Diego, San Diego, CA
B.S. in Ecology, Behavior, and Evolution **2003**

Peking Univ., Beijing, China
Undergraduate junior year travel abroad **2002**
Full time student for 13 months studying Chinese language, history, and culture

JOURNAL ARTICLES (PEER-REVIEWED)

- Carter, N.H., J.V. López-Bao, J.T. Bruskotter, M. Gore, G. Chapron, A. Johnson, M. Shrestha, J. Frank, O. Ohrens, and A. Treves. 2015. Social-ecological systems and wildlife poaching. Submitted.
- Bruskotter, J.T., G.R. Karns, K. Ard, C. Wolf, J. Vucetich, S.D. Gehrt, N.H. Carter, and W.J. Ripple. 2015. Modernization, human risk and the conservation of the world's largest carnivores. In review.
- Inskip, C., N.H. Carter, S.J. Riley, Z. Fahad, T. Roberts, and D. MacMillan. 2015. Towards human-carnivore coexistence: understanding tolerance for tigers in Bangladesh. In review.
- Carter, N.H., J.D.C. Linnell, M. Gore, A. Dickman, J. Baird Callicott, V. Athreya, and N. Lescureux. 2015. Realizing coexistence between people and large carnivores in shared landscapes. In review.
- Carter, N.H., S. Levin, A. Barlow, and V. Grimm. 2015. Modeling tiger population and territory dynamics using an agent-based approach. Ecological Modelling 312: 347-362.

- Carter, N.H., M. Jasny, B. Gurung, and J. Liu. 2015. Impacts of people and tigers on leopard spatiotemporal activity patterns in a global biodiversity hotspot. Global Ecology and Conservation. http://dx.doi.org/10.1016/j.gecco.2014.11.013
- Carter, N.H., A. Viña, V. Hull, W. McConnell, W. Axinn, D. Ghimire, and J. Liu. 2014. Coupled human and natural systems approach to wildlife research and conservation. Ecology and Society 19(3):43.
- Carter, N.H., S.J. Riley, A. Shortridge, B. Shrestha, and J. Liu. 2014. Spatial assessment of attitudes toward tigers in Nepal. AMBIO 43: 125-137. (March cover issue)
- Carter, N.H., B. Gurung, A. Viña, H. Campa III, J. Liu, and J. Karki. 2013. Assessing spatiotemporal changes in tiger habitat across different land management regimes. Ecosphere 4:art124.
- Carter, N.H., B. Shrestha, J. Karki, N. Pradhan, and J. Liu. 2013. Reply to Goswami et al., Karanth et al., and Harihar et al.: Fine-scale interactions between tigers and people. PNAS. doi:10.1073/pnas.1217414110.
- Carter, N.H., B. Shrestha, J. Karki, N. Pradhan, and J. Liu. 2012. Coexistence between wildlife and humans at fine spatial scales. PNAS 109: 15360-15365. (Highlight in Nature 489:181 and recommended by Faculty of 1000).
- Carter, N.H., S.J. Riley, J. Liu. 2012. Utility of a psychological framework for carnivore conservation. Oryx 46: 525-535.
- Carter, N.H., Brown, D.G., Etter, D.R., and L.G. Visser. 2010. American black bear habitat selection in northern Lower Peninsula, Michigan, USA, using discrete-choice modeling. URSUS 21: 57-71.

OTHER PUBLICATIONS AND REPORTS

- Carter, N.H. 2012. Small Numbers – Large Impacts: Conserving Tigers in Nepal. Box 13.1, page 178 in Human Dimensions of Wildlife Management. Decker, D. J., Riley, S. J., & Siemer, W. F. (Eds.). Johns Hopkins Univ. Press.
- Carter, N.H. 2012. Coupled human and natural systems approach to tiger conservation in Chitwan National Park, Nepal and beyond. Final report for NASA Earth and Space Science Fellowship Program project No. NNX09AO34H.
- Carter, N.H., J. Liu. 2012. Coupled human and natural systems approach to tiger conservation in Chitwan National Park, Nepal and beyond. Final report for USFWS Rhinoceros and Tiger Conservation Fund project No. F10AP00320.
- Carter, N.H. 2011. Tiger Tales: Evaluating wildlife acceptance capacity in Nepal. MSU Fisheries and Wildlife SPOTLIGHT. Issue 7. Pages 17 – 19.

CONFERENCE PRESENTATIONS AND POSTERS

- Carter, N.H. 2015. Realizing coexistence between people and large carnivores in shared landscapes (poster). International Congress on Conservation Biology (Montpellier, France).
- Carter, N.H. 2014. The keys to coexistence: realizing the potential for integrating large carnivores into multi-use landscapes. North American Congress for Conservation Biology (Missoula, MT, USA).
- Carter, N.H., A. Viña, H. Campa III, and J. Karki. 2013. Effects of different land management regimes on wildlife habitat: the case of tigers in Nepal (poster). International Association of Landscape Ecology annual meeting (Austin, TX, USA).
- Carter, N.H., B. Shrestha, J. Karki, N. Pradhan, and J. Liu. 2012. Adaptation of tigers in space and time to high human densities in Nepal: implications for conservation across the tiger's range. The Wildlife Society annual meeting (Portland, OR, USA).
- Carter, N.H., A. Shortridge, S.J. Riley, and B. Shrestha, J. Liu. 2012. Evaluating the spatial distribution of local intolerance to tigers. Pathways to Success: Integrating Human Dimensions into Fisheries and Wildlife Management (Breckenridge, CO, USA).
- Carter, N.H., A. Shortridge, S.J. Riley, and B. Shrestha. 2012. Evaluating the spatial distribution of attitudes, beliefs, and perceptions towards tigers: implications for conservation in human-dominated regions. Association for Nepal and Himalayan Studies (Kalamazoo, MI, USA).

- Carter, N.H., A. Shortridge, S.J. Riley. 2012. Using geospatial models to map local attitudes, beliefs, and perceptions towards a conflict-prone predator. American Association for Geographers (New York, NY, USA).
- Carter, N.H., J. Liu, and H. Campa. 2011. Impacts of community-based natural resource management on large vertebrate habitat with implications on landscape scale conservation in Nepal. International Congress for Conservation Biology (Auckland, New Zealand).
- Carter, N.H. 2011. Acceptance capacity for tigers in Nepal: Implications for conservation of predators in human-dominated landscapes. Association for Nepal and Himalayan Studies (St. Paul, MN, USA).
- Carter, N.H., J. Liu, S.J. Riley, H. Campa, and A. Shortridge.2011. Integrating natural and human dimensions to advance tiger conservation. Ecological Society of America (Austin, TX, USA).
- Carter, N.H., A. Viña, J. Liu, D. Dangol, B. Shrestha. 2011. Impacts of decentralized natural resource management on wildlife habitat around a protected area in Nepal. International Symposium on Society and Resource Management (Madison, WI, USA).
- Carter, N.H., J. Liu, S.J. Riley, H. Campa, and A. Shortridge. 2011. Coupled human and natural systems approach to tiger conservation (poster). American Association for the Advancement of Science Annual Meeting (Washington, DC, USA).
- Carter, N.H., S.J. Riley, and J. Liu. 2010. Local Acceptance Capacity towards Tigers. Midwest Fish and Wildlife Conference (Minneapolis, MN, USA).
- Carter, N.H., A. Viña, J. Liu, D. Dangol, and B. Shrestha. 2010. Evaluating the Impacts of Community Forests on Vegetation at Chitwan National Park, Nepal. Global Land Project Open Science Meeting (Tempe, AZ, USA).
- Carter, N.H., S.J. Riley, and J. Liu. 2010. Evaluating and Modeling Local Acceptance Capacity towards Tigers in Chitwan National Park, Nepal. Pathways to Success: Integrating Human Dimensions into Fisheries and Wildlife Management (Estes Park, CO, USA).
- Carter, N.H. 2010. Coupled Human and Natural System Approach to Tiger Conservation in Chitwan National Park, Nepal and Beyond. Annual meeting on the status of endangered species in Nepal (Kathmandu, Nepal).
- Carter, N.H., Brown, D.G., Etter, D.R., and L.G. Visser. 2009. Predicting Black Bear Habitat Suitability in Michigan's Lower Peninsula. American Association of Geographers (Las Vegas, NV, USA).
- Carter, N.H., Brown, D.G., Etter, D.R., and L.G. Visser. 2008. Predicting the Ecological Suitability of Black Bear Habitat in Michigan's Lower Peninsula. Midwest Fish and Wildlife Conference (Columbus, OH, USA).

ORGANIZED SYMPOSIUMS AND INVITED PRESENTATIONS

- Carter, N.H. 2015. Approaching carnivore poaching with a global framework. USC Conference on Conservation, Computation, and Criminology (Washington, DC, USA).
- Carter, N.H. 2014. Understanding human-tiger conflict. World Wildlife Fund human-tiger conflict working group meeting in Chitwan, Nepal.
- Carter, N.H. and M. Lute (co-organizers). 2014. Symposium: "Human-Carnivore Coexistence? Integrating Science, Ethics, and Practice to Address a Major Conservation Challenge" for North American Congress on Conservation Biology (Missoula, MT, USA).
- Carter, N.H. 2014. Synthesizing social and environmental data and theories to advance tiger conservation. Helmholtz Centre for Environmental Research – UFZ (Leipzig, Germany).
- Carter, N.H. 2013. Integrating social and ecological sciences for coexistence. Carnivore Coexistence Lab, Nelson Institute for Environmental Studies, Univ. of Wisconsin (Madison, WI, USA).
- Carter, N.H. 2012. Bridging human and natural sciences to advance tiger conservation in Nepal and beyond. Wildlife Conservation Society headquarters (Bronx, NY, USA).

TEACHING EXPERIENCE

National Socio-Environmental Synthesis Center, Annapolis, MD, USA
Co-teacher – "Teaching Socio-Environmental Synthesis with Case Studies" **2014**

Discussed use of quantitative complex models to teach students about socio-environmental systems with a group of advanced graduate students, postdocs, and professors. Developed hands-on exercise and agent-based model along with lecture materials.

Fisheries and Wildlife, Michigan State Univ., East Lansing, USA
Guest Lecturer – "FW 434, Human Dimensions of Fisheries and Wildlife Management" **2011, 2012**
Discussed the application of human dimensions research in Nepal

Institute for Social and Environmental Research, Chitwan, Nepal
Lecturer – "Introduction to Geographic Information Systems" **2010**
Developed and taught 2-day training course to staff from wildlife conservation agencies and local Univ. students in environmental science.

School of Natural Resources, Univ. of Michigan, Ann Arbor, USA
Graduate Student Instructor – "Biology 390, Evolution" **2006**
Organized and led weekly discussions on lecture topics, held office hours, and administered grades.

School of Natural Resources, Univ. of Michigan, Ann Arbor, USA
Graduate Student Instructor – "NRE 531, Principles of Geographic Information Systems" **2006**
Organized and led weekly laboratory sessions, held office hours, and administered grades.

TRAINING AND CERTIFICATIONS

- 2011 – 2012. Awarded one of 20 competitive positions in Emerging Wildlife Conservation Leaders (EWCL) training and mentoring initiative.

  EWCL provides intense training in conservation campaign development. My EWCL team and I developed a lion conservation and awareness campaign in Northern Kenya called LION WATCH.
- 2008. Chemical immobilization of wildlife from Safe Capture International, Cleveland, OH
- 2008. Chemical immobilization of big cats from Henry Doorly Zoo, Omaha, NE
- 2005. Received GIS certification from San Diego Mesa Community College, San Diego, CA

MENTORSHIP

- Alex Killion – Starting PhD with me in January 2016
- Micah Jasny – Undergraduate at College of William and Mary. Mentored from May – August 2013
- Randall Malcolm – Undergraduate at Michigan State Univ. Mentored from May – Sept. 2010

JOURNAL AND BOOK CHAPTER REVIEWS

- Regional Environmental Change, Journal of Mammalogy, Conservation Biology, Biological Conservation, Conservation and Society, Landscape Ecology, Biodiversity and Conservation, Ecology and Society, Conservation Letters, Journal of Wildlife Management, Human Dimensions of Wildlife, Oryx, Ecosphere, Canadian Journal of Zoology, URSUS, Land, Michigan Journal of Sustainability, Serengeti IV: Sustaining biodiversity in a coupled human-natural system (Book)

AWARDS, FELLOWSHIPS, AND GRANTS

- SESYNC Venture ($100,000): PI on "New tools to predict and prevent human-wildlife conflicts" **2014 – 2016**
- The Biodiversity Foundation: Small Grants for Science and Conservation ($6,942): Co-PI on "Building the foundations for conservation action: **2014**

assessing human-tiger conflict research and management needs in the Terai, Nepal".

- NASA-MSU Professional Enhancement Award ($600). Award provides travel support to the 2013 US-IALE annual meeting and networking opportunities. **2013**
- Travel support ($1,600) to International Congress for Conservation Biology from Michigan State Univ. **2011**
- CHANS-Net: International Network of Research on Coupled Human and Natural Systems fellowship. Fellowship included travel support to 2011 AAAS annual meeting ($1,000) and networking opportunities. **2011**
- 2010 Global Land Project (GLP) travel support from GLP (funding through NSF and NASA) **2010**
- U.S. Fish and Wildlife Service, Rhinoceros and Tiger Conservation Fund Grant – 2 year duration ($42,859) **2010 – 2012**
- NASA Earth and Space Science Graduate Fellowship – 3 year duration ($150,000) **2009 – 2012**
- Michigan State Univ. Pre-dissertation Travel Award ($3,000) **2008**
- Michigan State Univ. Distinguished Fellowship – 2 year duration ($100,000) **2007 – 2008**
- School of Natural Resources and Environment faculty elected Howard M. Wight Memorial Award for the Outstanding Wildlife Graduate Student **2007**
- Michigan Department of Natural Resources and Environment Research Grant ($10,000) **2007**
- Joseph G. Schotthoefer Memorial Student Award from Safari Club International ($1,000) **2006**
- Univ. of Michigan Rackham Graduate School Discretionary Fund ($1,500) **2006**

RELEVANT EMPLOYMENT

World Bank, Sustainable Development Department, Washington, DC
Consultant **2014**
I assisted in a research project examining the bioeconomic potential of the Ruaha-Rungwa region in Tanzania. My research entailed the development and coupling of models pertaining to African lion-prey dynamics and household economics and land-use decisions.

Environmental Spatial Analysis Lab, Univ. of Michigan, Ann Arbor, MI
Geographic Information Systems Research Assistant **2005**
I assisted in a project, financed by NASA, which analyzed the feedback between human settlement and land-cover/land-use change around the Poyang Lake region in China. I also worked on a project that examined the relationship between obesity and landscape characteristics at 5 major cities.

City of San Diego Information Technology Department, San Diego, CA
Geographic Information Systems Intern **2004 - 2005**
My duties included developing and maintaining geographic databases, testing software, map production for various departments using ESRI's ArcGIS desktop software, coordinating application development with City Departments, and business meeting support.

Center for Biological Diversity, San Diego, CA
Researcher **2004**
I assisted project staff in research of conservation status of endangered species, project compliance with conservation laws and other duties. I helped write and publish two petitions to put local butterflies on the Endangered Species List.

RELATED ACTIVITIES

- 2007. Volunteered with Montana Cooperative Wildlife Research Unit to track and record the presence of wolves and wolf rendezvous sites in Idaho.
- 2006. Volunteered with United States National Park Service in the Upper Peninsula, Michigan, capturing black bears to obtain bear population information in the region.

PROFESSIONAL AFFILIATIONS AND MEMBERSHIPS (PAST AND PRESENT)

- American Association for the Advancement of Science, Society for Conservation Biology, Association of American Geographers, Ecological Society of America, The Wildlife Society, International Association for Society and Natural Resources ,and Coupled Human and Natural Systems Network (CHANS-Net.org)

OUTREACH AND MEDIA

- 2014. Presentation at Café Scientifique (49 West Coffee Shop) on "Integrating science, ethics, and practice to advance carnivore conservation in a human-dominated world".
- 2013. Research highlighted in Yale e360
- 2013. Presentation at Annapolis High School on "Tigers and Biodiversity Conservation"
- 2013. SESYNC Blog: Protecting Predators, Protecting People
- 2013. Research highlighted in Conservation Magazine
- 2012. Discussed research in interviews with Science Update and Voice of America.
- 2012. Research highlighted in BBC, New York Times, Discovery Channel, AAAS, Scientific American, NSF, Nature and Science magazines, Conservation Magazine, and as comic called Night Growl.
- 2011. Spartan Saga. "Understanding the human-nature dance".
- 2011. MSUToday show (No 26). "Living with Tigers".

Samantha Heidi Blatt

Boise State University
Department of Anthropology
1910 University Drive
Boise, Idaho 83725
Tel: (208) 573-2721
Email: samanthablatt@boisestate.edu
Skype ID: Samantha.H.Blatt

Education

The Ohio State University, Columbus, OH
2013 Ph.D. Anthropology
Dissertation Title: *From the Mouths of Babes: Using Incremental Enamel Microstructures to Evaluate the Applicability of the Moorrees Method of Dental Formation to the Estimation of Age of Prehistoric Native American Children*

The Ohio State University, Columbus, OH
2007 M.A. Anthropology
Thesis Title: *Biocultural Implications of Human Dental Calculus from Two Late Prehistoric Ohio Populations*

Rutgers, The State University of New Jersey, New Brunswick, NJ
2004 B.S. Evolutionary Anthropology, Highest Honors
Thesis Title: *Prehistoric Cannibalism in the Cook Islands: Burning Modification of Human Skeletal Remains from Ana Manuku (MAN-84), Mangaia*

Research Interests

Bioarchaeology, Osteology, Biocultural Adaptations, Growth and Development, Stature and Body Mass, Health and Diet, Dental Anthropology, Human Variation, Paleopathology, Paleoepidemiology, Forensic Anthropology, Scanning Electron Microscopy, Eastern Woodland Amerindians

Professional Appointments

2013-present	Visiting Assistant Professor, Department of Anthropology, Boise State University
2007-2012	Graduate Teaching Associate/Instructor of Record, Department of Anthropology, The Ohio State University
2012	Adjunct Instructor, Department of Sociology/Anthropology, Ohio Wesleyan University
2007-2009	Teaching Assistant, PAST Foundation, Forensics in the Classroom
2006	Intern, Department of Archaeology, Cleveland Museum of Natural History
2005-2008	Research Associate, Department of Anthropology, The Ohio State University
2003	National Science Foundation Research Experience for Undergraduates Participant (NSF-REU), Körös Regional Archaeological Project, Hungary
2002-2004	Research Assistant, Department of Geological Sciences, Rutgers University

Grants and Awards

2015 PI for grant Dan Montgomery Research Grant awarded to Kathy Petersen for MA thesis ($3500)
2015 PI for grant Dan Montgomery Research Grant awarded to Emily Moes for MA thesis ($400)
2014 Student Poster Award for Melissa Kidd, 2nd place, Western Bioarchaeology Group conference ($50)
2013 Human Behavior and Evolution Society support for Northwest Ecological and Evolutionary Human Behavior Symposium ($1795)
2013 Wenner-Gren Foundation for Anthropological Research, Engaged Anthropology Grant ($4100) *Toward a Collaborative Indigenous Bioarchaeology: Engaging Communities in the Relevance, Shared Knowledge, and Interpretation of Prehistoric North America*

2013 HBES Conference Support Award for NWHEEB2 Symposium at Boise State University ($1661)
2013 Histology micrograph selected for Buehler Microstructure 2014 Calendar ($200)
2012 Preparing Future Faculty Fellow ($300)
2011 Wenner-Gren Foundation for Anthropological Research, Dissertation Fieldwork Grant, Gr. 8390 ($17,243)
2011 Edward J. Ray Travel Award for Scholarship and Service, Council of Graduate Students, The Ohio State University ($750)
2011 Larsen Research and Travel Grant, Department of Anthropology, The Ohio State University ($1000)
2010 Alumni Grant for Graduate Research and Scholarship, The Ohio State University ($2000)
2009 Grant-In-Aid-of-Research, Sigma Xi, The Ohio State University Chapter ($500)
2008 Edward F. Hayes Graduate Research Forum, The Ohio State University- 3rd place poster ($75)
2006 Archaeology Institute of America Intern, Department of Archaeology, Cleveland Museum of Natural History, Danbury site excavations, OH (fees, room and board, + $2400 stipend)
2003 National Science Foundation, REU-Sites Grant, Körös Regional Archaeological Project, Vesztó site excavations, Hungary (travel, fees, room and board, + $1800 stipend)
2003 Bigel Endowment, Department of Anthropology, Rutgers University ($500)
2003 Henry Rutgers Research Grant, Rutgers College, Rutgers, The State University of New Jersey ($750)
2003 Rutgers College Travel Grant, Rutgers College, Rutgers, The State University of New Jersey ($350)

Teaching Experience

2013-present **Visiting Assistant Professor, Boise State University, Department of Anthropology**

- ANTH 101- Biological Anthropology
- ANTH 101L- Biological Anthropology Lab
- ANTH 325- Human Variation
- ANTH 330- Osteology
- ANTH 444- Forensic Anthropology
- ANTH 401- Human Evolution and Peloanthropology
- ANTH 496- Independent Study/ Internship
  - STEM Promotion and Public Outreach Development
  - Paleopathology
  - Osteological Curation
- ANTH 502- Human Evolutionary History and Development (Graduate)
- ANTH 580- Selected Topics in Anthropology- Bioarchaeology (Graduate)
- ANTH 593- Thesis Research (Graduate)
- ANTH 596- Paleopathology (Graduate)
- ANTH 686- Masters Preliminary Exam (Graduate)

2012 **Adjunct Professor, Ohio Wesleyan University, Department of Sociology and Anthropology**

- SOAN 111- Cultural Anthropology

2007-2012 **Graduate Teaching Associate (Instructor of Record), The Ohio State University, Department of Anthropology**

- ANTH 200 and 2200 (with lab)- Introduction to Physical Anthropology
- ANTH 201- World Prehistory: An Anthropological Perspective
- ANTH 202- Peoples and Cultures: An Introduction to Cultural Anthropology
- ANTH 597.01- Cultural Conflict in Developing Nations
- ANTH 597.02- Women, Culture, and Development
- ANTH 603.01- Human Osteology
- ANTH 686- Forensic Anthropology Field School

Publications in Referred Journals

2015 **Blatt, S.H.** To swaddle, or not to swaddle: paleoepidemiology of developmental dysplasia of the hip and the swaddling dilemma among the indigenous populations of North America. *American Journal of Human Biology* 27(1): 116-128.
(Impact Factor- 1.928; ISI Ranking in Anthropology- 11/81; ISI Ranking in Biology- 25/83)

2015 Nolan, K.C., Sciulli, P.W., **Blatt, S.H.**, Thompson, C.K. A Late Woodland Red Ochre burial cache from Madison County, Ohio. *North American Archaeologist* 36(3): 197-236.

2013 Robbins-Schug, G., Gupta, S., Cowgill, P., Sciulli, P., and **Blatt, S.H.** Panel regression formulas for stature and body mass estimation in immature human skeletons. *Journal of Archaeological Science*, 40(7): 3076-3086.
(5-Year Impact Factor - 2.245)

2011 **Blatt, S.H.**, Redmond, B.G., Cassman, V. and Sciulli, P.W. Dirty teeth and ancient trade: evidence of cotton fibers in human dental calculus from Late Woodland, Ohio. *International Journal of Osteoarchaeology* 21(6): 669-678.
(Impact Factor- 1.085; ISI Ranking in Anthropology- 29/83)

2010 Robbins, G., Sciulli, P.W., **Blatt, S.H**. Estimating body mass in subadult human skeletons. *American Journal of Physical Anthropology* 143:146-150.
(Impact Factor- 2.481; ISI Ranking in Anthropology- 7/83)

2009 Sciulli, P.W., **Blatt, S.H.**, Tatarek, N.E. Analysis of skeletal remains from the Old Town (33HS02) site, a Late Archaic cemetery in Harrison County, Ohio. *Pennsylvania Archaeologist* 79(2): 33-41.

2008 Sciulli, P.W. and **Blatt, S.H**. Evaluation of juvenile stature and body mass prediction. *American Journal of Physical Anthropology* 136:378-393.
(Impact Factor- 2.481; ISI Ranking in Anthropology- 7/83)

2004 Ashley, G.M., Matima Mworia, J., Muasya, A.M., Owen, R.B., Driese, S.G., Hover, V.C., Renaut, R.W., Goman, M.F., Mathai, S., and **Blatt, S.H**. Sedimentation and evolution of a freshwater wetland in a semi-arid environment, Loboi Swamp, Kenya, East Africa. *Sedimentology* 51(6):1301-1321.
(Impact Factor- 2.611; ISI Ranking in Geology- 6/47)

Publications in Edited Volumes

2012 da Gloria, P, **Blatt, SH**, and Kyle-McIlvaine, B. 2012. "Laboratory Exercise 10: Evolution of Bipedalism," In Stewart MC, Sadvari JW, editors. Anthropology 2200: Introduction to physical anthropology Laboratory course packet. Columbus, OH: McGraw-Hill.

2012 **Blatt, SH**, da Gloria, P, and Kyle-McIlvaine, B. 2012. "Laboratory Exercise 11: Introducing the Proto- and Early Hominids," In Stewart MC, Sadvari JW, editors. Anthropology 2200: Introduction to physical anthropology Laboratory course packet. Columbus, OH: McGraw-Hill.

2012 Kyle-McIlvaine, B, **Blatt, SH**, and da Gloria, P. 2012. "Laboratory Exercise 12: The Genus *Homo*," In Stewart MC, Sadvari JW, editors. Anthropology 2200: Introduction to physical anthropology Laboratory course packet. Columbus, OH: McGraw-Hill.

Work Under Consideration or In Preparation

In Review **Blatt, S.H.** Paleo-otology: childhood cholesteatoma, otitis media, and intracranial complications. Submitted to *Journal of Laryngology and Otology*.

In Review **Blatt, S.H.** Who Cares?: applying a bioarchaeology of care model to a 15th case of osteochondroma. Submitted to *International Journal of Paleopathology*.

In Review **Blatt, S.H**. and Casado, A. Let's talk about sex: principal component analysis of sexually dimorphic traits in the human pelvis. Submitted to *International Journal of Forensic Science*.

In Prep. **Blatt, S.H.** Crown formation times and developmental sequences in archaeological children from Ohio. To be submitted to the *American Journal of Physical Anthropology*.

In Prep. **Blatt, S.H.** From the mouths of babes: Is the Moorrees method applicable to prehistoric Native American children? To be submitted to *American Journal of Physical Anthropology*.

Abstracts for Posters and Presentations at Conferences

Submitted **Blatt, S.H.**, Moes, E., and Petersen, K. Heavy-handed: Can handedness be detected from bilateral degeneration of the medial end of the clavicle? American Association of Physical Anthropologists 2016.

Submitted Bradbury, C., **Blatt, S.H.**, and Yu, P. Classroom optional: Service learning and community engagement in anthropology. American Association of Physical Anthropologists 2016.

2015 Watkins, J. Alanko, G.A., **Blatt, S.H.**, Bradbury, C.A., Kohn, M.J., Lytle, M., Lacrois, D., Taylor, J., Dudgeon, J., Hazard, R.E., O;Leary-Lepsen, E., Butt, D. P. A transdiscoplinary approach to determining the provenience of a distorted, Pre-Columbian skull recovered in rural Idaho. College of Engineering Poster Presentations, Paper 5.

2015 **Blatt., S.H**. From the mouths of babes: is Moorrees the method appropriate for age estimation of Prehistoric Native American Children. *American Journal of Physical Anthropology*: 88

2014 Kidd, M., Rogers, A., Inglerhirti, N. Jumonville, B., and **Blatt, S.H**. In from the cold: Western Bioarchaeology Group. Las Vegas, NV. (2nd place for Student Poster Award)

2013 Kidd, M., Rogers, A., Inglerhirti, N. Jumonville, B., and **Blatt, S.H.** In from the cold: A case study of human remains demonstrating the importance of context. Undergraduate Research Forum, Boise State University.

2013 **Blatt, S.H.** The Right Method in the Right Context: Is the Application of a European-Derived Dental Formation Reference Appropriate for Age Estimation of Prehistoric Native American Children? Western Bioarchaeology Group. Berkeley, CA.

2013 **Blatt, S.H.** An unusual case of a solitary osteochondroma on the mandibular symphysis. Submitted to *American Journal of Physical Anthropology* (S56):83.

2012 **Blatt, S.H.** Epidemiology of developmental dysplasia of the hip in Amerindians: Cases from the Late Prehistoric Buffalo Site, West Virginia. *American Journal of Physical Anthropology*. 147 (S54):101.

2011 **Blatt, S.H.** and Casado, A.M. 2011. Let's talk about sex: principal components analysis of sexually dimorphic traits in the human pelvis. *American Journal of Physical Anthropology* 141 (S52):91-92.

2010 **Blatt, S.H.** and Sciulli, P.W. 2010. Deformed or not deformed, that is the question: quantifying artificial cranial deformation. *American Journal of Physical Anthropology* 141 (S50):69.

2009 G.J. Jakubowska and **Blatt, S.H.** 2009. Growth and estimated skeletal height of Mochica juveniles, Peru (A.D. 900- 1750). *American Journal of Physical Anthropology* 138 (S48): 157.

2008 **Blatt, S.H.** 2008. Biocultural implications from scanning electron microscopy of prehistoric human dental calculus, *American Journal of Physical Anthropology* 135 (S46):70. Columbus, Oh.

2008 **Blatt, S.H.** 2008. Biocultural implications from scanning electron microscopy of prehistoric human dental calculus. Edward F. Hayes Graduate Research Forum, The Ohio State University.

2006 **Blatt, S.H.** 2006. Internship report: excavations at the Danbury Site (33OT16), Ohio: a bioarchaeological perspective. Archaeological Institute of America, Cleveland Archaeological Society, CMNH. (Presentation).

2004 **Blatt, S.H.** 2004. Functional hypotheses of eastern European copper age enclosures, Vèsztö -20, Hungary. Society for American Archaeology Annual Meetings, Montréal, CA.

2003 Ashley, G.M., Matima Mworia, J., Muasya, A.M., Owen, R.B., Driese, S.G., Hover, V.C., Renaut, R.W., Goman, M.F., Mathai, S., and **Blatt, S.H.** 2003. Hydrology, biology, and sedimentology of a freshwater wetland in a semi-arid environment, Loboi Swamp, Kenya. XVI INQUA Congress, Reno, Nevada, The Geological Society of America.

Technical Reports (Forensic and Archaeological)

2015 **Blatt, S.H.** N15-45468. Nampa PD and Ada County Coroner, ID (human infant remains)

2015 **Blatt, S.H.** F82615. Caldwell PD, ID (faunal remains)

2015 **Blatt, S.H.**, Moes, E., Taylor, K., Petersen, K. F101608: Walters Ferry. SHPO, ID.

2015 **Blatt, S.H.**, Moes, E., Schrier, M., Taylor, K. 10MO85: Rexberg Man. SHPO, ID.

2015 **Blatt, S.H.** C14-19707: Human Remains Report. Canyon County Sherriff, ID.

2014 **Blatt, S.H.** F101015. Ada County, ID. (faunal remains)

2014 **Blatt, S.H.** C14-19707. Canyon County Sheriff, ID. (human remains-archaeological)

2014 **Blatt, S.H.** F112413: Red Skull. SHPO,ID. (human remains- archaeological)
2014 **Blatt, S.H.** 10IH82: Human Remains Report. SHPO, ID.
2012 **Blatt, S.H.** and Kidd, M. F120611a and F120611b: "Blue Suitcase Man". ID (human remains-archaeological)
2008 Sciulli P.W and **Blatt, S.H.** The Danbury Site 2007: Human Skeletal Remains Inventory. CMNH.
2007 Sciulli, P.W. and **Blatt, S.H.** The Danbury Site 2006: Human Skeletal Remains Inventory. CMNH.
2007 Sciulli, P.W. and **Blatt, S.H.** Lakeview Heights Human Skeletal Remains.
2006 **Blatt, S.H.** The Danbury site 2006: Internship Report. AIA, CMNH, Nov. 2006.
2006 **Blatt, S.H.** Late Prehistoric Mortuary Practices at the Norma Grantham Site, Ohio. CMNH.
2004 **Blatt, S.H.** Baffling Palisades: Functions of Eastern European Calcolithic Enclosures. Koros Regional Archaeological Project, Vesztó, Hungary.

Forensic Search and Recovery

2011 Windsor, Ashtabula County, OH- homicide/ missing persons case, warrant excavation and survey (July 19-21) (CPD Case Number: 11186518CPD)
2010 Westerville, Franklin County, OH- homicide/ missing persons case, warrant excavation and survey (May-November) (NCIC Number: M-946495830)
2009 Lawrence County Sheriff, OH. Bone identification (no number- 5/15/09)
2007 Marion County Coroner, OH (no number-9/28/07), Bone identification
2006 Franklin County Coroner, OH (06-14120) Bone identification
2005 Marion County Coroner, OH (no number- 12/9/05) Bone identification

Field Experience

In prep Mississippi historic family cemetery
2015- present Cholera Cemetery Survey, Franklin County, Ohio
2008- present Peters site, Ohio (Late Archaic), The Ohio State University
2008-2012 Forensic Anthropology Case Team (FACT), The Ohio State University
2006-2008 Danbury Site (33OT16), Ohio (Late Archaic-Late Prehistoric), Cleveland Museum of Natural History
2004-2005 Western New York Archaeological Survey, SUNY at Buffalo
2003 Körös Regional Archaeological Project, Vesztó, Hungary (Chalcolithic)
1994 Maresha, Israel, Archaeological Institute of America

Laboratory and Collections Experience

2013-present Wet Lab Supervisor and PI (Chemical Hygiene Officer), Department of Anthropology, Boise State University
2008- 2012 Laboratory Manager/Chemical Hygiene Officer, Osteology Lab of Dr. P.W. Sciulli, Dept. of Anthropology, The Ohio State University
2012 Grave Creek Mound Archaeological Complex and Delf Norona Museum, Moundesville, WV
2009 SunWatch Indian Village and Archaeological Park and Boonshoft Museum, Dayton, OH
2011 Campus Microscopy and Imaging Facility, The Ohio State University
2010 SHC Dental Cast Collection, The Ohio State University
2010, 2015 Hamann-Todd Human Skeletal Collection, Cleveland Museum of Natural History
2005-2008 Research Assistant, Osteology Lab of Dr. P.W. Sciulli, Dept. of Anthropology, Ohio State University
2006 Microscopy and Chemical Analysis Research Center, Dept. of Geology, The Ohio State University
2006 Intern, Department of Archaeology, Cleveland Museum of Natural History
2004 Zooarchaeology Lab of Dr. R.B. Blumenschein, Dept. of Anthropology, Rutgers University

2004	Osteology Lab of Dr. S.C. Anton, Dept. of Anthropology, New York University
2002-2003	Research Assistant, Quaternary Studies Lab of Dr. G.M. Ashley, Dept. of Geological Sciences, Rutgers University

Community Outreach and Civic Engagement

2016	Lecturer, "Bones, Stones, and Genomes: Current Insights into Human Origins," Osher Lifelong Learning Institute
2015	Senior Project Mentor, Nyssa High School, Oregon (Selene Ortega)
2014-2015	E-girlsWorkshop (for 7th-11th grade girls interested in science), Boise State University
2015	STEM Day (Anthropology teaching demonstrations for the general public), Boise State University
2013-2014	"Zombies, Vampires, and Werewolves: Anthropology of the Undead," presented to the Anthropology Club, Boise State University
2013	Forensic Archaeology Training Workshop (for law enforcement), Boise State University
2013	Wenner-Gren Foundation for Anthropological Research, Engaged Anthropology Grant, *Toward a Collaborative Indigenous Bioarchaeology: Engaging Communities in the Relevance, Shared Knowledge, and Interpretation of Prehistoric North America*
2013	Organizing committee, Idaho Archaeology and Historic Preservation Month (for May, 2014)
2013	Invited speaker, Science Café, Discovery Center of Idaho
2008-2011	Ohio Archaeology Month- COSI museum display and public demonstration
2008, 2011	"Girls Explore…Archaeology!" workshop coordinator and speaker
2009	Volunteer, Museum of Classical Archaeology, Department of History, The Ohio State University.
2007-2009	PAST Foundation "Forensics in the Classroom"
2006	Invited lecturer for the American Institute of Archaeology, Cleveland Chapter

Media Coverage

2015 Tuck, K. Mining Data from the Mouths of Babes. Boise State News.

2013 Chan, K. *Anthropomotron 1.5*. Mobile application for iOS, Android, or web browser which gathers and simplifies calculations to estimate the stature and body mass of an individual based on input of measurements. (www.keithcchan.com/anthropomotron/).

2012 Meyers, K. Bone Don't Lie: The Unknown Benefits of Dental Plaque. (http://bonesdontlie.wordpress.com/2012/01/11/the-unknown-benefits-of-dental-plaque/).

2010 Lepper, BT. Archaeology: Materials Dispute Woodland Decline. *The Columbus Dispatch* (Sunday Science Section, October 24, 2010, p. G10). (http://www.dispatch.com/content/stories/science/2010/10/24/materials-dispute-woodland-decline.html).

2007 Ohlson, K. A Picture of Ancient Life and Death. *American Archaeology: A quarterly publication of the Archaeological Conservancy*, Winter, 11 (4): 28-33.

Department and University Service

2014-present	Undergraduate and Graduate Advisor for biological anthropology
2013-present	Field and Lab Consultant, Ada County Coroner's Office, Boise, Idaho (cases throughout Idaho and western Montana)
2013-present	Consultant, State Historic Preservation Office, Idaho State Historical Society
2013-2014	Organizing Committee, Northwest Evolution, Ecology, and Human Behavior Symposium (NWEEHB), Boise State University
2013-present	Consultant, Center for Applied Archaeological Science (CAAS), Department of Anthropology, Boise State University
2013-present	Wet Lab Supervisor and PI (Chemical Hygiene Officer), Department of Anthropology, Boise State University

2013-2014	Graduate Committee for qualifying exams
2010-2012	Founder and Chair, Undergraduate Anthropology Mentorship Program, The Ohio State University
2011-2012	Undergraduate Anthropology Club Representative, Graduate Student Anthropology Association (GSAA), The Ohio State University
2010-2011	Judge and volunteer, Richard J. and Martha D. Denman Undergraduate Research Forum, The Ohio State University
2008-2012	Forensic Anthropology Cold Case Team (FACCT), The Ohio State University
2008	Volunteer, American Association of Physical Anthropologists Annual Meeting, Columbus, Ohio

Professional Development

2013-present	Certified Training in EHS Laboratory and Research Safety and SOP, Office of Environmental Health and Safety, Boise State University
2011-2012	Preparing Future Faculty, Fellow
2012	Certified Training in Veterans On Campus: Issues and Services, University Center for the Advancement of Teaching and Counseling and Consultation Services, The Ohio State University
2011	Certified Training in EHS Laboratory and Research Safety and SOP, Office of Environmental Health and Safety, The Ohio State University
2010	Certified Training in Identifying and Assisting At-Risk Students, University Center for the Advancement of Teaching and Counseling and Consultation Services, The Ohio State University

Mentoring and Thesis Advising

2014-present	MA thesis advisor/chair, Emily Moes and Kathy Petersen
2015	MA thesis committee member, Shawn Roberts
2010-2012	Founder and Chair, Undergraduate Anthropology Mentorship Program, The Ohio State University

Referee for Manuscript Review

2010-present	International Journal of Osteoarchaeology
2007-present	Journal of Archaeological Science
2007-present	Wadsworth Cengage Learning

Professional Affiliations

2008-present	Sigma Xi (National and OSU Chapter)
2008-present	Paleopathology Association
2005-present	American Association of Physical Anthropologists
2011-present	International Association for Paleodontology

References

Paul W. Sciulli, Ph.D.
Professor Emeritus
Department of Anthropology
The Ohio State University
4020 Smith Laboratory
174 West 19th Avenue
Columbus, OH 43210
Tel: (614) 292-1984
Fax: (614) 292-4155

Email: sciulli.1@osu.edu
Affiliation: Advisor and committee chair

Clark S. Larsen, Ph.D.
Distinguished Professor, Chair
Department of Anthropology
The Ohio State University
4034 Smith Laboratory
174 W. 18th Ave.
Columbus, OH 43210
Tel: (614) 292-4149
Fax: (614) 292-4155
Email: larsen.53@osu.edu
Affiliation: Committee member

Debbie Guatelli-Steinberg, Ph.D.
Associate Professor
Department of Anthropology
The Ohio State University
4006 Smith Laboratory
174 W. 18th Ave.
Columbus, OH 43210
Tel: (614) 292-9768
Fax: (614) 292-4155
Email: guatelli-steinbe.1@osu.edu
Affiliation: Committee member

Gwen Robbins-Schug, Ph.D.
Associate Professor
Department of Anthropology
Appalachian State University
401 Sanford Hall
Boone, NC 28608
Tel: 828-262-7505
Email: Robbinsgm@appstate.edu
Affiliation: Co-author/researcher

Brian G. Redmond, Ph.D
Museum Director of Science, Curator and Head of Archaeology
Cleveland Museum of Natural History
1 Wade Oval Drive
University Circle
Cleveland, OH 44106-1767
Tel: (216) 231-4600, ext. 3301
Email: bredmond@cmnh.org
Affiliation: CMNH collections and field supervisor

ASSISTANT PROFESSOR
DEPARTMENT OF ANTHROPOLOGY, BOISE STATE UNIVERSITY
TEL 208 4264690 EMAIL KATHRYNDEMPS@BOISESTATE.EDU

KATHRYN DEMPS

EDUCATION

UNIVERSITY OF CALIFORNIA, DAVIS
PhD, Anthropology 2012
MA, Anthropology 2006

UNIVERSITY OF CALIFORNIA, LOS ANGELES
BSc, Anthropology 2005

AREAS OF EXPERTISE

Behavioral and evolutionary ecology, cultural evolution, local ecological knowledge, small-scale societies

PUBLICATIONS

Pauli, B., Sun, E., Tinkle, Z., Forbey, J., **Demps, K.**, Heath, J. (*submitted*) Human habitat selection: Using tools from landscape ecology to predict human use of natural landscapes. Ecology and Society.

Reyes-Garcia, V., Gallois, S., **Demps, K.** (*in press)* A multi-stage learning model for cultural transmission: Evidence from three indigenous societies. In Terashima, H., Hewlett, B. (eds.), *Social Learning and Innovation in contemporary Hunter-Gatherers: Evolutionary and Ethnographic Perspectives*. Springer.

Richerson, P., Baldini, R., Bell, A, **Demps, K.**, Frost, K., Hillis, V., Mathew, S., Naar, N., Newton, E., Ross, C., Smaldino, P., Waring, T., Zimmerman, M. (*in press*) Cultural group selection plays an essential role in explaining human cooperation: A sketch of the evidence. *Behavior and Brain Sciences*.

Zorondo-Rodríguez, F., Grau-Satorras, M., Jenukalla, M. G., **Demps, K.**, Gómez-Baggethun, E., García, C., Reyes-García, V. (*in press*) The role of natural and economic capital on subjective well-being: Empirical evidence from a small-scale society in Kodagu (Karnataka), India. *Social Indicators Research*.

Hooper, P., **Demps, K.,** Gerkey, D., Gurven, M., Kaplan, H. (2015) Skills, division of labor and economies of scale among foragers: Participation and productivity of Amazonian hunters and South Indian honey collectors. Philosophical Transactions B.

Demps, K., Dougherty, J., Zorondo-Rodriguez, F., Reyes-Garcia, V., Garcia, C. (*2015*) Schooling and local ecological knowledge: How students trade-off multifaceted educations. *Culture, Agriculture, Food and Environment.*

Demps, K., Richerson, P. (2014) Group Selection. In: Discoveries in Modern Science: Exploration, Invention, and Technology. Cengage Learning, Michigan.

Demps, K., Klemetti, S. (2014) Ephemeral Work Group Formation of Jenu Kuruba Honey Collectors and Late 19th Century Colorado Silver Prospectors. *Behavior,* 151: 1413-1432.

Zorondo-Rodriguez, F., Gomez, E., **Demps, K.**, Ariza-Montobbio, Garcia, C., Reyes-Garcia, V. (2014) What defines quality of life? The gap between public policies and locally defined indicators among residents of Kodagu, Karnataka (India). *Social Indicators Research*, 115 (1): 441-456.

Kightley, E.P., V. Reyes-García, K. **Demps**, R.V. Magtanong, V. Ramenzoni, G. Thampy, J.R. Stepp. (2013) An empirical comparison of knowledge and skill in the context of traditional ecological knowledge. *Journal of Ethnobiology and Ethnomedicine*, 9: 71.

Demps, K., Zorondo, F., Garcia, C., Reyes-Garcia, V. (2012) Social learning across the lifecycle: Cultural knowledge acquisition for honey collection among the Jenu Kuruba, India. *Evolution and Human Behavior*, 33(5): 460-470.

Demps, K., Zorondo, F., Garcia, C., Reyes-Garcia, V. (2012) The selective persistence of local ecological knowledge: Honey collecting with the Jenu Kuruba. *Human Ecology*, 40(3): 427-434.

Macura, B., Garcia, C., **Demps, K.**, Zorondo, F., Reyes-Garcia, V. (2011). Local Community Attitudes toward Forests Outside Protected Areas in India. Impact of Legal Awareness, Trust, and Participation. *Ecology and Society,* 16 (3):10.

Reyes-García, V., Kightley, E., Ruiz-Mallén, I., Fuentes-Pelaez, N., **Demps, K**; Huanca,T., Martinez- Rodríguez, M. R. (2010) Schooling and local environmental knowledge: Do they complement or substitute each other? International Journal of Educational Development. 30: 305-313**.**

MANUSCRIPTS IN PREPARATION

Demps, K., Winterhalder, B. (*in prep*) Behavioral Ecology, Missing Markets and the Evolutionary Influences on Barter and Trade in Non-Separable Household Economies

ORAL PRESENTATIONS

Demps, K., Winterhalder, B. (2014) Central Place Marketing and Resource Extraction. Small-scale societies and environmental transformations: Co-evololutionary dynamics. Barcelona, Spain.

Demps, K. (2014) Cultural transmission, life history, and local ecological knowledge in South India. Arizona State University Adaptation, Behavior, Culture, and Society lecture series. **Invited**

Demps, K., Winterhalder, B. (2014) Central Place Marketing: Models of household production for consumption and exchange. Human Behavior and Evolution Society, Natal, Brazil.

Demps, K., Glover Klemetti, S. (2014) Optimal foraging and ephemeral group formation in humans. Universided Federal Rio Grande do Norte, Natal, Brazil. **Invited**

Demps, K., Glover Klemetti, S. (2013) Optimal foraging and ephemeral group formation of Jenu Kuruba honey collectors and late 19th C. Colorado silver prospectors. American Anthropological Association, Chicago.

Demps, K. (2012) The ecology of behavioral transmission: Learning to collect wild honey in South India. Colloquium for Dartmouth Dept. of Anthropology, Asian and Middle-Eastern Studies Program and the Dickey Center for National Understanding. **Invited**

Demps, K. (2012) Dynamics of Social Learning: Socialization into a honey-collecting tribe and the ecology of cultural knowledge transmission. UC Davis Dept. of Anthropology Spring Colloquium.

Demps, K., Zorondo, F., Garcia, C., Reyes-Garcia, V. (2011) The selective resilience of local ecological knowledge: Honey collecting with the Jenu Kuruba. Human Behavior and Evolution Society, France.

Demps, K., Reyes-Garcia, V. (2010) The selection of social learning strategies: differential knowledge acquisition for honey hunting in south India. American Anthropological Association, New Orleans.

Demps, K., Reyes-Garcia, V., Zorondo, F., Garcia, C. (2010) Social Learning across the lifecycle: Honey Hunting with the Jenu Kuruba. Human Behavior and Evolution Society, Eugene, OR.

Demps, K., Reyes-Garcia, V., Zorondo, F., Garcia, C. (2010) Social Learning across the lifecycle: Honey Hunting with the Jenu Kuruba. California Workshop on Evolutionary Perspectives of Human Behavior, San Luis Obispo, California.

Demps, K., Reyes-Garcia, V., Garcia, C. (2009) Factors affecting the loss of traditional knowledge for the Jenu Kuruba, a forest-dwelling tribe in Kodagu, south India. International Union of Anthropological and Ethnological Sciences, Kunming, China.

Demps, K. (2009) Transmission of Ecological Knowledge in the Western Ghats. Colloquium for the French Institute of Pondicherry, Pondicherry, India.

Demps, K. (2007) Dynamics of parent-child cultural transmission. Society for Human Ecology, Brazil

Demps, K., Fessler, D., Snyder, J. (2004). Exploring the origins of sex differences in disgust sensitivity: A test of the male signaling hypothesis. Human Behavior and Evolution Society, Berlin, Germany.

POSTER PRESENTATIONS

Demps, K., Glover Klemetti, S. (2015) Optimal foraging and ephemeral group formation of two societies on the boundary of theory. American Association of Physical Anthropologists, St. Louis, MO.

Demps, K., Glover Klemetti, S. (2014) Optimal foraging and ephemeral group formation of Jenu Kuruba honey collectors and late 19th C. Colorado silver prospectors. Northwest Evolution, Ecology, and Human Behavior Symposium. Boise, Idaho.

Demps, K., Winterhalder, B. (2013) A central place model of marketing behavior. Northwest Evolution, Ecology, and Human Behavior Symposium. Boise, Idaho.

Demps, K., Dougherty, J., Zorondo-Rodriguez, F., Garcia, C., Reyes-Garcia, V. (2012) Does time in the classroom take away from learning about the forest? A study examining the connections between schooling and traditional ecological knowledge. California Workshop on Evolutionary Perspectives of Human Behavior, San Luis Obispo, California.

Burns, G., Cook, S., Demps, K., Eerkens, J., Bartelink, E. (2012) Isotopic evidence for changing residence patterns through the middle to late holocene in Central California. Society for California Archaeology, San Diego, California.

Demps, K. (2007) Dynamics of parent-child cultural transmission. Human Behavior and Evolution Society, Williamsburg, Virginia.

STUDENT POSTER PRESENTATIONS

Letourneau, D., Demps, K., Brown, H., Spaul, R., Heath, J., Hubbard, M. (2015) Characterizing recreationists in the Owyhees. Great Basin Consortium & NWEEHB, Boise.

Johnson, J., Demps, K., Dahal, K. (2015) Constraining the Landscape: Using demographic change to anticipate future development needs and predict water usage along the Ada County and Canyon County border. Great Basin Consortium, Boise.

Araki, K., Brown, H., Spaul, R., Hubbard, M., Demps, K., Heath, J. (2015) Environmental impacts as percieved by different recreation groups. Great Basin Consortium, Boise.

Ramirez, E., Haskell, N., Demps, K. (2014) Law abiding angles of the Treasure Valley? Managing Idaho's Landscapes for Ecosystem Services (MILES) annual meeting, Boise.

Haskell, N., Ramirez, E., Demps, K. (2014) Beliefs and behaviors of Treasure Valley angles: Love of fishing more important than time and travel costs. Managing Idaho's Landscapes for Ecosystem Services (MILES) annual meeting, Boise.

RESEARCH PROJECTS

Managing Idaho's Wildlands For Multiple Resource Streams: Understanding Interactions Between Wildlife And Recreationists PRESENT

Examining interactions between recreationists and golden eagle populations in the Owyhees using models of human decision-making. Data will be incorporated into an agent-based model containing data on golden eagles and humans.

Theoretical & Agent-Based Modeling 2010 - PRESENT

Theoretical models examining resource extraction and participation in local markets based on central place foraging theory. Agent-based models examining the evolution of social learning in a dual- inheritance system.

Dissertation Research 2009

Social learning among honey collectors in south India. One year of quantitative and qualitative data collection among an indigenous Scheduled Tribe population examining transmission and evolution of culture, focusing on local ecological knowledge.

NSF Field Training In Methods Of Data Collection In Cultural Anthropology 2008 Quantitative and qualitative anthropological methods course in project design, data collection, and analysis; 5-weeks in the Bolivian Amazon with the Tsimane.

Pilot Study 2007

Patterns of religious conversion to Mormonism and social networks among the Chamorro and Carolinians on Saipan, Micronesia. Five weeks of preliminary field research to understand how social connections fuel conversion patterns.

TEACHING EXPERIENCE

ASSISTANT PROFESSOR, BOISE STATE UNIVERSITY 2012-PRESENT

Courses taught: Research Design in Anthropology
Adaptation and Human Behavior
Environmental Anthropology
Introduction to Cultural Anthropology
Quantitative Field Methods
Introduction to Physical Anthropology
Evolution of the Human Life Cycle

ADJUNCT ASSISTANT PROFESSOR, COSUMNES RIVER COLLEGE 2011

Courses taught: Introduction to Physical Anthropology
Physical Anthropology Laboratory

ASSOCIATE INSTRUCTOR, UC DAVIS 2010-2011

Courses taught: Behavior and Evolutionary Biology of the Human Lifecycle
Kinship and Social Organization
Evolution of Human Nature

GRADUATE STUDENTS

Mark Biel - MA, Spring 2015
Eric Frey - Spring 2016
Michelle Kinney - Spring 2016

MURI STUDENTS (MILES UNDERGRADUATE RESEARCH AND INTERNSHIPS PROGRAM)

Jadie King, Summer 2015
Denell Letourneau, Spring 2015
Nychele Haskell, Summer 2014
Erika Ramirez, Summer 2014

ACADEMIC SERVICE

Organizer - Northwest Evolution, Ecology, and Human Behavior Symposium, Boise, ID (2012 - present)
Faculty advisor - Boise State Sustainability Club
Reviewer - Evolution and Human Behavior, Human Ecology, Current Anthropology, Journal of Ethnobiology and Ethnomedicine, PLOS One, Journal of Society and Natural Resources, Ecology and Society, Economic Botany, Field Methods, Decision and Risk Management (NSF)
Chaired Session - Behavior, ecology, and cognition: the multiple avenues of adaptation. American Anthropological Association, New Orleans (2010)
Chaired Session – Temporal and Spatial Cross-scale Approaches in Human Ecology: Implications for Resource Use. Society for Human Ecology, Rio de Janeiro, Brazil (2007)
GuestLectures: Environmental Anthropology, Introduction to Evolutionary Psychology, Ethnographic Methods, Introduction to Cultural Evolution, Research Methods for Quantitative Anthropology
Lead Organizer - Inaugural 3UC California Workshop on Evolutionary Perspectives of Human Behavior (2007)

PROFESSIONAL MEMBERSHIPS

American Anthropological Association (EAS)
Human Behavior and Evolution Society

CHRISTOPHER L. HILL
Boise State University
307 Riverfront Hall, 1910 University Drive, 83725-1110
chill2@boisestate.edu, 208-426-2625

EDUCATION

1992 Ph.D., Anthropology (Archaeology Program), Institute for the Study of Earth and Man, Southern Methodist University, Dallas, Texas. Dissertation: *Archaeological and Pleistocene Geology of Acheulian and Middle Paleolithic Sites in the Bir Tarfawi Region of the Southern Egyptian Sahara*. Chair: Fred Wendorf.

1989 M.A., Anthropology (Archaeology Program), Institute for the Study of Earth and Man, Southern Methodist University, Dallas, Texas.

1982 B.A., Interdisciplinary Studies: Geology, Archaeology and Anthropology, University of Minnesota, Duluth, Minnesota. Senior Thesis: *Paleoecology of the Cloquet River Basin: Geomorphology and Environmental Change in Northeastern Minnesota*. Advisor: George Rapp.

EMPLOYMENT/POSITIONS

Boise State University
- 2013-2015 *Full Professor with Tenure*
- 2012-2015 *Associate Dean*, Graduate College
- 2007-2012 *Coordinator/Director*, Environmental Studies Program
- 2007-2012 *Associate Professor with Tenure*
- 2002-2007 *Assistant Professor*

Combined Prehistoric Expedition Field School, Egypt
- 2000 *Senior Faculty Archaeologist and Geomorphologist*

Montana State University
- 1997-2002 *Director*, Ice Age Research Program
- 1995-2002 *Adjunct Assistant Professor of Geology*, Department of Earth Sciences
- 1994-2002 *Associate Curator of Geology and Biology,* Museum of the Rockies

Tulane University
- 1993 *Visiting Assistant Professor*, Tulane University (Winter/Spring).

Southern Methodist University
- 1992-1993 *Fellow*, Institute for the Study of Earth and Man
- 1986 *Teaching Assistant,* Anthropology Department
- 1982-1992 *Graduate Research Assistant,* Wendorf Laboratory and Radiocarbon Laboratory

Archaeological Research Services
- 1980 *Field Assistant*, Superior National Forest, Minnesota.

University of Wisconsin
- 1980 *Participant with Stipend*, Student Originated Studies-National Science Foundation Grant.

Archaeometry Laboratory and Environmental Geology-Geochemistry-Ecology Working Group, University of Minnesota.
- 1992-1994 *Research Associate*
- 1982-1992 *Research Fellow*
- 1977-1982 *Lab Attendant-Lab Technician-Senior Lab Technician*

RESEARCH SPECIALIZATIONS

Topics: Interdisciplinary Environmental Science, Paleontology and Geoarchaeology, Stratigraphy, Geomorphology, Geochemistry, Geochronology, Paleoenvironments, Historical Ecology, Conservation Paleoecology.

Field Experience: North America (Great Lakes, Great Plains, Rocky Mountains, Snake River-Columbia Basin, Great Basin), North Africa and the Middle East (Egypt, Israel, Turkey), Northern Europe (Norway), and Central Asia (Siberia).

INTERNAL UNIVERSITY FUNDING (GRANTS)

2011-2012 Research Fellow, College of Social Science and Public Affairs, Boise State University, *Environmental Variability and Landscape Dynamics in Saharan North Africa and the Northern Rocky Mountains*.

2010 Center for Teaching and Learning Travel Award, Boise State University, travel to Teaching Climate Change from the Geologic Record Workshop, University of Wyoming, Laramie.

2007 Faculty Research Award, College of Social Science and Public Affairs, Boise State University, *Interdisciplinary Applications of Isotope Geochemistry: Dating Climate Change and Paleobiotic Evolution*.

2007 Faculty Research Award, College of Social Science and Public Affairs, Boise State University, *Climate Change and Hominid Evolution*.

2006 Funds to Support Professional Travel, College of Social Science and Public Affairs, Boise State University, Developing International Geoarchaeology – Second Conference.

2005 Faculty Research Award, College of Social Science and Public Affairs, Boise State University, *Global Climate Change and Landscape Evolution*.

of the Western Snake River Plain.

2003 Faculty Research Award, College of Social Science and Public Affairs, Boise State University, *Quaternary Stratigraphy and Landscape Evolution in the Upper Missouri Basin, North America*.

2002 Faculty Service to Profession Award, College of Social Science and Public Affairs, Boise State University, funded travel to chair professional meeting.

1999 International Research and Program Development Fund, Montana State University, *Prehistory of the Nile Valley and Saharan Desert of Egypt*.

1987 Analytical Facilities Directorate**,** Institute for the Study of Earth and Man, Southern Methodist University, *Stable Isotope Analysis of North African Pleistocene Deposits*.

1986 Institute for the Study of Earth and Man, Southern Methodist University, *Pleistocene Paleoenvironments Associated with Middle Paleolithic Sites at Bir Tarfawi: Stable Isotope and Sedimentological Studies*.

1985 Graduate Student Assembly, Southern Methodist University, *Archaeological Geology and Quaternary Paleoenvironments in the Eastern Sahara Desert, Southern Egypt*.

EXTERNAL FUNDING (GRANTS, PI or Co-PI)

2015 National Science Foundation, *Graduate Research Fellowship Program (GRFP)* (Principal Investigator).

2012 Bureau of Land Management, National Landscape Conservation System, *Bruneau River Capacity Analysis* (Co-principal Investigator; Lowe, S., Principal Investigator).

2006 National Science Foundation, research in Siberia (Russia), Award No. ARC-06319700 (Co-principal Investigator; Ziker, J., Principal Investigator).

1998 National Science Foundation, symposium and exhibit planning on Cenozoic geoecology, Award No. DRL-9801327 (Co-principal Investigator, Lead Scientist; Sawyer, B., Principle Investigator).

1996-2002 Kokopelli Research Fund, *Ice Age Research Program* (*Director*).

1995 National Science Foundation, MONTS-Experimental Program to Stimulate Competitive Research, *Ice Age Paleoenvironments, Paleoclimates of the Northern Rocky Mountains: Pleistocene Stratigraphy and Geochronology of Blacktail Cave and the Centennial Valley, Montana*.

1993 Minnesota Department of Natural Resources, *Identification of Geomorphic Features as a Predictive Model for Archaeological Sites* (Co-recipient with Phillips, B.).

1987 Sigma Xi, the Scientific Research Society, *Archaeological Geology of Middle Paleolithic Sites in Southwest Egypt*.

HONORS, SCHOLARSHIPS

2010 Provost's Excellence in Advising Award, Boise State University.

2008 Elected Fellow, Geological Society of America.

2006 Promoted to Full Member, Sigma Xi, the Scientific Research Society.

2004 Annual Faculty Award: Research, Teaching, and Service, College of Social Science and Public Affairs, Boise State University.

1991 Claude C. Albritton, Jr. Award (accomplishment in interdisciplinary research), Institute for the Study of Earth and Man, Southern Methodist University.

1989 Elected Associate Member, Sigma Xi, the Scientific Research Society.

1989 Weber Graduate Fellowship, Southern Methodist University.

1986 Scholarship, Institute for the Study of Earth and Man, Southern Methodist University.

1982-1985 Scholarships, Southern Methodist University.

1980 Elected Member, Phi Alpha Theta, History Honor Society.

BOOKS

2006 *Geoarchaeology: The Earth Science Approach to Archaeological Interpretation.* Second Edition. Yale University Press, New Haven (co-author with Rapp, G.). (5)

2005 *The Merrell Locality (24BE1659) and Centennial Valley, Southwest Montana: Pleistocene Geology, Paleontology, and Prehistoric Archaeology.* Bureau of Land Management Cultural Resource Series No. 4, Billings, Montana (first editor with Davis, L.B.). (4)

2001 *Mesozoic and Cenozoic Vertebrate Paleontology in the Western Plains and Rocky Mountains*. Occasional Paper No. 3, Museum of the Rockies, Bozeman (editor). (3)

1998 *Geoarchaeology: The Earth Science Approach to Archaeological Interpretation*. Yale University Press, New Haven (co-author with Rapp, G.) (three printings). (2)

1995 *The Paleo-Indian of Southern St. Louis County, Minnesota: The Reservoir Lakes Complex*. Interdisciplinary Archaeological Studies University of Minnesota Monograph Series, Number 4. Kendall/Hunt Publishing Company (co-author with Harrison, C., Redepenning, E., Aschenbrenner, S., Rapp, G., Jr., Huber, J., and Muholland, S.). (1)

CHAPTERS IN BOOKS, ENCYCLOPDEIA ENTRIES

Accepted "Glacial Settings," *Encyclopedia of Geoarchaeology*. Springer, Heidelberg (invited). (34)

Accepted "History of Geoarchaeology," *Encyclopedia of Geoarchaeology*. Springer, Heidelberg (invited). (33)

Accepted "Eastern Sahara: Combined Prehistoric Expedition," *Encyclopedia of Geoarchaeology*. Springer, Heidelberg (invited). (32)

2014 "Rivers: Environmental Archaeology," *Encyclopedia of Global Archaeology*. Springer, Heidelberg, pp. 6,343-6,351 (invited). (31)

2014 "Geoarchaeology," *Encyclopedia of Global Archaeology*. Springer, Heidelberg, pp. 3,008-3,017 (first author with Rapp, G.) (invited). (30)

2011 "Alluvial Stratigraphy and Geoarchaeology in the Big Fork River Valley, Minnesota: Human Response to Late Holocene Environmental Change," in L. Wilson (ed.), *Human Interaction with the Geosphere: The Geoarchaeological Perspective*, Geological Society of London Special Publication Volume 352, pp. 109-124 (first author with Rapp, G., and Jing, Z.). (29)

2008 "Late Glacial Environments and Paleoecology at Blackwater Draw, Near Clovis, New Mexico, U.S.A.," in *Man-Millennia-Environment,* Sulgostowaska, Z., and Tomaszewski, A., eds., Institute of Archaeology and Ethnology, Polish Academy of Sciences, Warsawa, Poland, pp. 79-86 (first author with Wendorf, F., Sears, P.B. and Papazian, E.) (invited). (28)

2007 "Surficial Processes and Pleistocene Archaeology: Context, Landscape Evolution and Climate Change," in *Reconstructing Human-Landscape Interactions,* Wilson, L., Dickinson, P., and Jeandron, J., eds., Cambridge Scholars Publishing, Newcastle, pp. 6-36. (27)

2006 "Geologic Framework and Glaciation of the Eastern Area," in *Handbook of North American Indians*, Ubelaker, D.H., ed., Smithsonian Institution, Washington D.C., pp. 47-60 (invited). (26)

2006 "Geologic Framework and Glaciation of the Central Area," in *Handbook of North American Indians*, Ubelaker, D.H., ed., Smithsonian Institution, Washington D.C., pp. 67-80 (invited). (25)

2006 "Geologic Framework and Glaciation of the Western Area," in *Handbook of North American Indians*, Ubelaker, D.H., ed., Smithsonian Institution, Washington D.C., pp. 81-98 (invited). (24)

2006 "Late Tertiary to Quaternary Geology and Landscape Evolution along the Western Snake River Plain, Southwestern Idaho," in *A Report of Archaeological Excavations at 10-CN-6, Middle Snake River, Idaho,* Boise State University, Monographs in Archaeology No. 3, pp. 120-139. (23)

2005 "Geochronology of Merrell Locality Strata and Regional Paleoenvironmental Contexts," in *The Merrell Locality (24BE1659) and Centennial Valley, Southwest Montana: Pleistocene Geology, Paleontology, and Prehistoric Archaeology,* Hill, C.L. and Davis, L.B., eds., Bureau of Land Management Cultural Resource Series No. 4, pp. 71-77. (22)

2005 "Spatial Distribution of Pleistocene and Holocene Faunal Remains, South Block Excavations," in *The Merrell Locality (24BE1659) and Centennial Valley, Southwest Montana: Pleistocene Geology, Paleontology, and Prehistoric Archaeology,* Hill, C.L. and Davis, L.B., eds., Bureau of Land Management Cultural Resource Series No. 4, pp. 23-37. (21)

2005 "Geology of Centennial Valley and Stratigraphy of Pleistocene Fossil-Bearing Sediments," in *The Merrell Locality (24BE1659) and Centennial Valley, Southwest Montana: Pleistocene Geology, Paleontology, and Prehistoric Archaeology,* Hill, C.L. and Davis, L.B., eds., Bureau of Land Management Cultural Resource Series No. 4, pp. 39-63. (20)

2005 "Prehistoric Archaeology: The Merrell Site Artifact Inventory," in *The Merrell Locality (24BE1659) and Centennial Valley, Southwest Montana: Pleistocene Geology, Paleontology, and Prehistoric Archaeology,* Hill, C.L. and Davis, L.B., eds., Bureau of Land Management Cultural Resource Series No. 4, pp. 103-105 (first author with Herbort, D.P.). (19)

2005 "Geoarchaeology," in *Handbook of Archaeological Methods*, Maschner, H. and Chippindale, C., eds., Altamira Press, Lanham, pp. 1002-1033 (invited). (18)

2004 "Deglaciation History and Geomorphological Character of the Region Between the Agassiz and Superior Basins, Associated with the 'Interlakes Composite' of Minnesota and Ontario," in *The Late Paleo-Indian Great Lakes, Geological and Archaeological Investigations of Late Pleistocene and Early Holocene Environments*, Jackson, L. and Hinshelwood, A., eds., Mercury Series Archaeology Paper 165, Canadian Museum of Civilization, pp. 275-301 (co-author with Phillips, B.A.M.). (17)

2001 "Pleistocene Mammals of Montana and Their Geologic Context," in *Mesozoic and Cenozoic Vertebrate Paleontology in the Western Plains and Rocky Mountains*. Guidebook for the Field Trips, Society of Vertebrate Paleontology, 61st Annual Meeting. Occasional Paper No. 3, Museum of the Rockies, Bozeman, pp. 127-143. (16)

2001 "Late Pliocene and Pleistocene Geology and Paleontology in the Three Rivers Basin, Montana," in *Mesozoic and Cenozoic Vertebrate Paleontology in the Western Plains and Rocky Mountains*. Guidebook for the Field Trips, Society of Vertebrate Paleontology, 61st Annual Meeting. Occasional Paper No. 3, Museum of the Rockies, Bozeman, pp. 113-125. (15)

2001 "Introduction: Cenozoic Mammals, Southwest Montana," in *Mesozoic and Cenozoic Vertebrate Paleontology in the Western Plains and Rocky Mountains*. Guidebook for the Field Trips, Society of Vertebrate

with Nichols, R. and Tabrum, A.R.). (14)

1995 "Geologic Context of Paleo-Indian Occurrences," in *The Paleo-Indian of Southern St. Louis County, Minnesota: The Reservoir Lakes Complex* by Harrison, C., Redepenning, E., Hill, C., Aschenbrenner, S., Rapp, G., Jr., Huber, J., and Muholland, S., Kendall/Hunt Publishing Company, pp. 89-100. (13)

1995 "Site Descriptions," in *The Paleo-Indian of Southern St. Louis County, Minnesota: The Reservoir Lakes Complex* by Harrison, C., Redepenning, E., Hill, C.L., Aschenbrenner, S., Rapp, G., Jr., Huber, J., and Muholland, S., Kendall/Hunt Publishing Company, pp.101-124 (co-author with Harrison, C. and Redepenning, E.). (12)

1994 "A Chronology for the Middle and Late Pleistocene Wet Episodes in the Eastern Sahara," in *Late Quaternary Chronology and Paleoclimates of the Eastern Mediterranean*, Bar-Yosef, O. and Kra, R., eds., pp. 147-168 (co-author with Wendorf, F., Schild, R., Close, A.E., Schwarcz, H.P., Miller, G.H., Grun, R., Bluszcz, A., Stokes, S., Morawski, L., Huxtable, J., and McKinney, C.). (11)

1993 "Sedimentology of Pleistocene Deposits Associated with Middle Paleolithic Sites in Bir Tarfawi and Bir Sahara East," in *Egypt During the Last Interglacial*, by Wendorf, F., Schild, R., Close, A.E., and Associates. Plenum Press, New York and London, pp. 66-105. (10)

1993 "E-86-3: An Assemblage in Hydromorphic and Basin-Edge Sands of the Lower Lake," in *Egypt During the Last Interglacial*, by Wendorf, F., Schild, R., Close, A.E., and Associates. Plenum Press, New York and London, pp. 412-423. (9)

1993 "E-86-4: Artifacts in Marsh-Related Sands of the Lower Lake (Grey Phase 3)," in *Egypt During the Last Interglacial*, by Wendorf, F., Schild, R., Close, A.E., and Associates. Plenum Press, New York and London, pp. 424-442. (8)

1993 "E-87-2: A Site in Lake-Margin Deposits of the Green Phase (Grey Phase 3)," in *Egypt During the Last Interglacial*, by Wendorf, F., Schild, R., Close, A.E., and Associates. Plenum Press, New York and London, pp. 443-458. (7)

1993 "E-87-3: A Small Dry-Season Occupation in the Onset of the Green Phase," in *Egypt During the Last Interglacial*, by F. Wendorf, R. Schild, A.E. Close, and Associates. Plenum Press, New York and London, pp. 459-470. (6)

1989 "Petrography of Quaternary Sediments of Upper Egypt," in *Prehistory of Wadi Kubbaniya, Volume 2, Stratigraphy, Paleoeconomy, and Environment*, Close, A.E., ed., SMU Press, Dallas, pp. 101-113. (5)

1989 "Site Geology," in *Excavations at Tel Michal, Israel*, Herzog, Z., Rapp, G., and Negbi, O. eds., University of Minnesota Press, Minneapolis, pp. 209-218 (co-author with Gifford, J. and Rapp, G., Jr.). (4)

1989 "Report on Site E-84-1, A Multicomponent Paleolithic Site at Wadi Kubbaniya, Egypt," in *Prehistory of Wadi Kubbaniya, Volume 3, Late Paleolithic Archaeology*, Close, A.E., ed. SMU Press, Dallas, pp. 365-374 (first author with Wendorf, F. and Schild, R.). (3)

1989 "Report on Site E-84-2, A Ballanan-Silsilian Site at the Mouth of Wadi Kubbaniya," in *Prehistory of Wadi Kubbaniya, Volume 3, Late Paleolithic Archaeology*, Close, A.E., ed., SMU Press, Dallas, pp. 679-696 (co-author with Wendorf, F.). (2)

1986 "Description of Some Upper Pleistocene Sediments from Wadi Kubbaniya, Egypt," in *Prehistory of Wadi Kubbaniya, Volume 1, The Wadi Kubbaniya Skeleton*, Close A.E., ed., SMU Press, Dallas, pp. 75-80 (first author with Schild, R.). (1)

PEER REVIEWED/REFEREED ARTICLES

2011 "The Third Lake Cache, St. Louis County, Minnesota," *Current Research in the Pleistocene, v. 28, pp. 65-7 (co-*author with Muholland, S., and Muholland, S.). (34)

2009 "Geology of Mammoth (*Mammuthus*) Fossils on the Western Snake River Plain, Idaho," *Current Research in the Pleistocene, v. 26, pp. 195-198*. (33)

2009 "Stratigraphy and Sedimentology at Bir Sahara, Egypt: Environments, Climate Change and the Middle Paleolithic," *Catena: An Interdisciplinary Journal of Soil Science-Hydrology-Geomorphology Focusing on Geoecology and Landscape Evolution, 78, pp. 250-259*. (32)

2008 "Paleohistological Study of Pleistocene Mammoth (*Mammuthus*) Bone," *Current Research in the Pleistocene, v. 25, pp. 189-191* (co-author with Streeter, M. and Prall, S.). (31)

2008 "Variability in a Pleistocene Climate Sequence from Bir Tarfawi, Egypt," *Proceedings of the 50th Annual Meeting of the Idaho Academy of Sciences*, pp. 1-11 (co-author with Bradbury, C). *(*30)

2007 "Stratigraphy and Quaternary Landscape Evolution in the Vicinity of the Marias River, North Central Montana," *Current Research in the Pleistocene*, v. 24, pp. 48-50. (29)

2007 "Geoarchaeology and Late Glacial Landscapes in the Western Lake Superior Region, Central North America," *Geoarchaeology: An International Journal,* v. 22, n. 1, pp. 17-49. (28)

2006 "Stratigraphic and Geochronologic Contexts of Mammoth (*Mammuthus*) and other Pleistocene Fauna, Upper Missouri Basin (Northern Great Plains and Rocky Mountains), U.S.A.," *Quaternary International,* v. 142-143, pp. 87-106. (27)

Yellowstone Ecosystem, Centennial Valley, Southwestern Montana," *Current Research in the Pleistocene,* v. 23, pp. 185-187. (26)

2005 "Fossil Ground Sloths, *Megalonyx* and *Paramylodon* (Mammalia: Xenartha), from the Doeden Local Fauna (Illinoian/Sangamonian?) Eastern Montana." *Current Research in the Pleistocene,* v. 22, pp. 83-85 (co-author with Wilson, M.C. and McDonald, H.G.). (25)

2004 "Middle Wisconsinan (Pre-Last Glacial Maximum Interstadial) Mammoths in the Northern Plains, Western Interior North America," *Current Research in the Pleistocene*, v. 21, pp. 95-97. (24)

2004 "A Younger Dryas Pollen Spectrum from Blacktail Cave, Lewis and Clark County, Montana," *Current Research in the Pleistocene*, v. 20, pp. 85-87 (co-author with Huber, J.). (23)

2003 "Pleistocene Stratigraphy, Geomorphology, and Geochronology within the Lower Yellowstone Basin, Montana, U.S.A.," *Current Research in the Pleistocene*, v. 20, pp. 121-123. (22)

2003 "Paleoecological Inferences Based on Pollen and Stable Isotopes for Mammoth Bearing Deposits of the Oahe Formation (Aggie Brown Member), Eastern Montana," *Current Research in the Pleistocene*, v. 20, pp. 95-97 (co-author with Huber, J.). (21)

2002 "Identification of Immunoreactive Material in Mammoth Fossils," *Journal of Molecular Evolution*, v. 55, pp. 696-705 (co-author with Schweitzer, M.H., Asara, J.M., Lane, W.S., and Pincus, S.H.). (20)

2002 "Glacial Lake Great Falls and the Late-Wisconsin-Episode Laurentide Ice Margin," *Current Research in the Pleistocene*, v. 19, pp. 119-121 (first author with Feathers, J.K.). (19)

2002 "Fossil *Arctodus* from the Doeden Local Fauna (Illinoian/Sangamonian?), Eastern Montana," *Current Research in the Pleistocene*, v. 19, pp. 116-118 (co-author with Wilson, M.). (18)

2002 "Pollen and Algae from Late-Wisconsin Glacial Lake Great Falls Sediments, Holter Lake, Montana," *Current Research in the Pleistocene*, v. 19, pp. 93-95 (co-author with Huber, J.K.). (17)

2002 "Radiocarbon Dates for Paleoindian Components (Folsom, Scottsbluff) at the MacHaffie Site, West-Central Montana Rockies," *Current Research in the Pleistocene*, v. 19, pp. 18-20 (co-author with Davis, L.B. and Fisher, J.W., Jr.). (16)

2001 "Middle and Late Wisconsin (Late Pleistocene) Paleoenvironmental Records from the Rocky Mountains: Lithostratigraphy and Geochronology of Blacktail Cave, Montana, U.S.A.," *Current Research in the Pleistocene*, v. 18, pp. 121-123. (15)

2001 "Geologic Contexts of the Acheulian (Middle Pleistocene) in the Eastern Sahara," *Geoarchaeology: An International Journal*, v. 16, n. 1, pp. 65-94. (14)

2000 "Pleistocene Lakes along the Southwest Margin of the Laurentide Ice Sheet," *Current Research in the Pleistocene*, v. 17, pp. 145-147. (13)

2000 "The Doeden Local Fauna (Illinoian/Sangamonian?), Eastern Montana," *Current Research in the Pleistocene*, v. 17, pp. 140-142 (co-author with Wilson, M.). (12)

1999 "Radiocarbon Geochronology of Strata Containing *Mammuthus* (Mammoth), Red Rock River, Montana," *Current Research in the Pleistocene*, v. 16, pp. 118-120. (11)

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1993 "Archaeological and Pleistocene Geology of Acheulian and Middle Paleolithic Sites in the Bir Tarfawi Region of the Southern Egyptian Sahara," *Dissertation Abstracts International*, v. 54, n. 2. (6)
1992 "An Analysis of Temperature Variation During the Late Holocene," *American Quaternary Association Abstracts*, University of California, Davis, p. 43 (co-author with Hietala, H.J.). (5)
1991 "Paleoclimatic Dynamics in the Eastern Sahara (North Africa) Based on Late Quaternary Sediments Containing Acheulian and Middle Paleolithic Artifacts," *Geological Society of America Abstracts with Programs*, v. 23, n. 5, p. 356 (first author with Wendorf, F.). (4)
1986 "Late Quaternary Lithostratigraphy and Geochronology of the Mustang Springs Archaeological Site," *Geological Society of America Abstracts with Programs*, v. 18, p. 637 (first author with Meltzer, D.J.). (3)
1985 "Coastal Change at Tel Michal, Israel," *Geological Society of America Abstracts with Programs*, v. 17, p. 694 (co-author with Rapp, G., Jr. and Gifford, J.). (2)
1985 "Final Pleistocene and Holocene Pollen Stratigraphic Sequence from the Cloquet River Area, St. Louis County, Northeastern Minnesota," *Geological Society of America Abstracts with Programs*, v. 17, p. 610 (first author with Rapp, G., Jr. and Huber, J.). (1)

COURSES TAUGHT

Boise State University
- *Introduction to Environmental Studies* (undergraduate)
- *Quaternary Paleontology* (undergraduate)
- *Introduction to World Prehistory* (undergraduate)
- *Environmental Anthropology* (undergraduate)
- *Quantitative Methods/Statistical Methods* (graduate)
- *Quaternary Vertebrate Paleontology* (undergraduate)
- *Human Evolution and Paleoanthropology* (undergraduate)
- *Human Paleoecology* (undergraduate)
- *African Prehistory* (undergraduate)
- *European Prehistory* (undergraduate)
- *Geoarchaeology* (undergraduate)
- *Geoarchaeology and Paleoecology* (undergraduate/graduate)
- *Quaternary Paleoenvironments* (undergraduate/graduate)
- *North American Paleoenvironments* (graduate)
- *Ice Age Mammals of North America* (undergraduate/graduate)
- *Mammoths and the Great Ice Age* (undergraduate/graduate)
- *Field Methods in Archaeology* (undergraduate)
- *Old World Prehistory* (undergraduate)
- *Prehistory of Egypt* (undergraduate/graduate)
- *Mesoamerican Archaeology* (undergraduate)
- *Archaeology of North America* (undergraduate)
- *Prehistory of North America* (undergraduate)
- *Senior Practicum-Portfolio* (undergraduate)
- *Environmental Studies Senior Project I and II* (undergraduate)
- *Introduction to Archaeology* (undergraduate)

Montana State University
- *Quaternary Environments* (graduate)
- *Paleobiology* (graduate)

Tulane University
- *Human Origins* (undergraduate)
- *Prehistory of North America* (undergraduate/graduate)

Combined Prehistoric Expedition (directed by Wendorf, F.)
- *Techniques in Saharan Archaeology* (archaeological field school, Nabta, Egypt)

Teaching Assistantships, Southern Methodist University
- *Geochronologic Methods: Archaeomagnetic Dating* (taught by Eighmy, J., SMU at Taos)
- *Geochronologic Methods: Radiocarbon and Thermoluminescence* (taught by Haynes, C.V., Jr., SMU at Taos)
- *Archaeology Field School* (taught by Crown, P., SMU at Taos)

PROFESSIONAL ASSOCIATIONS AND AFFILIATIONS, SERVICE

Fellow, *Geological Society of America (GSA), joined 1984*
- Divisions
  - Archaeological Geology
  - Environmental and Engineering Geology
  - Quaternary Geology and Geomorphology
- Archaeological Geology Division Service
  - Chair, 2001-2002
  - First vice chair, 2000-2001
  - Second vice chair, 1999-2000
  - Management board, 1999-2003, 2011-2015
  - Division section liaison, 2007-2015
  - Secretary-treasurer, 2011-2015
  - Richard Hay Award selection committee, 2013
- Joint Technical Program Representative, 2002/3-2003/4
- Pardee Review Panel, 2004

Member*, American Quaternary Association (AMQUA*)
- Executive Committee, Board of Directors, Treasurer (2014-2015)

Member*, Society for American Archaeology (SAA), since 1982*
- Co-organizer (chair), Geoarchaeology Interest Group (GIG), 2003-2005
- Committee member, Douglas C. Kellogg Fund for Geoarchaeological Research, 2003-2006
- Chair, Douglas C. Kellogg Fund for Geoarchaeological Research, 2005-2008
- Organizer and chair, 2003 Fryxell Symposium

Registered Professional Archaeologist (RPA)

Lifetime Member, *Society for Archaeological Science (SAS)*

Member*, Ecological Society of America (ESA)*
- Sections: Paleoecology, Biogeosciences, Natural History

Member*, Society of Vertebrate Paleontology (SVP)*
- 2001 Host Committee national meeting; Co-leader of 2001 Cenozoic field conference

Member, Geochemical Society

Member, International Association of Geochemistry

Member, Paleoanthropology Society

Past Global Changes (PAGES)

Geoarchaeology Working Group, International Association of Geomorphologists

OTHER SELECTED PROFESSIONAL OR COMMUNITY SERVICE

Host Committee, *American Society for Environmental History* 2008 annual meeting

Trustee, Kokopelli Archaeological Research Fund (1998-2002)

Member, Scientific Committee, Mountain Resources and their Response to Global Change,
- Mountain Research Initiative, 2012 Conference, Ankara University, Turkey (2012)

Member, external review team, Department of Earth and Environmental Systems, Indiana State University (2013)

Board of Directors, Mores Creek Water District, Boise County, Idaho
- Member (2006-2009), Secretary-treasurer (2007-2008), Chair (2008-2009)

EDITORIAL BOARD/EDITORIAL ADVISORY BOARD

Scientific American Discovering Archaeology (1999-2001)

Idaho Archaeologist (2003-2014)

Geology

PEER REVIEWER/REFEREE

Geoarchaeology
Radiocarbon
Quaternary International
Archaeometry
Archaeological and Anthropological Sciences
Journal of Archaeological Method and Theory
Geomorphology
Quaternary Science Reviews
Canadian Journal of Earth Sciences
Journal of Paleolimnology
Environmental Engineering and Management Journal
Idaho Archaeologist
Research Council of Canada
National Science Foundation (Reviewer and Panelist)
European Science Foundation

EXTERNAL INSTITUTES/WORKSHOPS

Participant, Summer Workshop and New Deans Institute, Council of Graduate Schools, Portland, Oregon (12-16 July, 2014).
Presenter, Long-Term Biodiversity and Landscape Evolution: Conservation Paleoecology, Contemporary Issues in Environmental Science, Workshop for High School Environmental Studies Teachers, Boise State University (25 May, 2013)
Presenter, Environmental Change: Climate and Human Activity, Osher Lifelong Learning Institute, Boise State University (10 and 17 September, 2013)
Presenter, Environments, Evolution and Extinction, Osher Lifelong Learning Institute, Boise State University (9 September, 2012)
Participant, Summer Workshop and New Deans Institute, Council of Graduate Schools, Boston, Massachusetts (7-11 July, 2012).
Participant and Team Leader, Science Education for New Civic Engagements and Responsibilities (SENCER) 2011 Institute, National Center for Science and Civic Engagement, Butler University, Indianapolis, Indiana (21-25 July, 2011).
Participant, Teaching Climate Change from the Geologic Record, University of Wyoming (10-12 August, 2010).
Presenter and Participant, Teaching Paleontology in the 21st Century, Cornell University and the Paleontological Research Institute (30 July-6 August, 2009).
Participant, Weather, Sea Level Rise and Climate Change Workshop, College of Exploration (3-23 November, 2008).
Presenter, Long-Term Ecology: Lewis and Clark Expedition and Natural History, Osher Lifelong Learning Institute, Boise State University (9 September, 2008).
Participant, Science Education for New Civic Engagements and Responsibilities (SENCER) 2008 Institute, National Center for Science and Civic Engagement, Santa Clara University (8-11 August, 2008).
Participant, Teaching Climate Change with Ice Core Data (Teaching Climate Change: Lessons from the Past), Pennsylvania State University (2-3 June, 2008).
Participant, Earth Science Literacy Initiative Workshop, College of Exploration (12-23 May, 2008).
Presenter and Participant, Egypt-U.S. Workshop on Anthropology, Cairo, Egypt 2008 (25-28 August, 2003).

SELECTED BOISE STATE UNIVERSITY INSTITUTES, CONFERENCES OR WORKSHOPS

Panelist, Idaho Conference on Graduate Education (31 July, 2014).
Participant, (Successfully!) Teaching Our Middle Eastern Student Population (31 January, 2014).
Participant, Visualizing Data through the Creation of Infographics Workshop (8 November, 2013).
Panelist, Summer Mobile Learning Institute (23 May, 2013).
Presenter, Pacific Northwest LSAMP Conference (1 March, 2013).
Key Note Panelist, B Mobile Day (26 September, 2012).
Presenter, Summer Institute, Teaching and Learning in a Mobile Environment (21-25 May, 2012).
Participant, STEM Service Learning: How Service-Learning Can Address NSF Broader Impacts (9 February, 2012).
Participant, Assessment Think Tank for Foundational Studies (22 February, 2012).
Participant, Digital Resources for Enhancing Instruction and Engaging Students (12 February, 2012).
Participant, Great Ideas for Teaching and Learning Symposium - Mobile Learning Table Topics: Drop in Event (10 January, 2012).
Participant, Great Ideas for Teaching and Learning Symposium Concurrent Session 2: Going Mobile: What's different About Teaching and Learning with Mobile Devices? (10 January, 2012).
Participant, An Introduction to Team Based Learning (19 December, 2011).
Participant, STEM Service Learning: Cultivating Public Partners for Outreach Projects (17 December, 2011).
Participant, Service-Learning in Large Classes (5 October, 2011).
Participant, Introduction to Service-Learning (8 September, 2011).
Participant, Disciplinary Lens Course Design Institute (May 7, 2011).
Participant, Great Ideas for Teaching and Learning Symposium: Food for Thought Presentation (10 January, 2011).
Participant, Foundations Program Implementation Retreat (1 January, 2011).
Participant, Level 4: Grade Center in Blackboard 9 (7 July, 2010).
Participant, Level 3: Assessments in Blackboard 9 (6 July, 2010).
Participant, Service-Learning and Sustainability (17 March, 2010).

MUSEUM EXHIBITS, MONTANA STATE UNIVERSITY

Science Advisor, "Landforms/Lifeforms"
Curator, "Mammoths and the Great Ice Age"
Chief Scientist for Planning, "Mammals and Mountains"

SELECTED PUBLIC PRESENTATIONS, PANELS AND POSTERS

2015 "The Great Ice Age Extinction Experiment," *Climate and Society* Plenary Lecture, Boise State University (October 12)
2014 "How Fossils Changed the World*," The Idea of Nature,* Boise State University (October 9).
2013 "Evidence for Pre-Clovis Human Activity Associated with a Mammoth in Late Pleistocene Eastern Montana," Santa Fe, New Mexico (second author with L.B. Davis and K. Krasinski) (October 17).
2013 "Long Term Evolution of Ecosystems: Climate, Human Activity, and Environmental Change," *Northwest Evolution, Ecology, and Human Behavior Symposium*, Boise State University (April 20).
2012 "Ice Age Co-Stars: Horses, Camels, and Cheetahs*," Science Friday, National Public Radio* (September 28).
2012 "The Darwinian Revolution: The Nature of Science and the Science of Nature*," Interdisciplinary Explorations: The Idea of Nature,* Boise State University (April 26).
2011 "Environmental Change in the Rocky Mountains of North America: Landscape Evolution and Historical Ecology," *People and Nature in Mountains: Changing Land Use and Landscape Dynamics,* Museum of Natural History and Archaeology, Norwegian University of Science and Technology, Trondheim, Norway (September 21).
2010 "Quaternary Faunal Environments and Biogeography," *On the Cutting Edge Workshop, Teaching Climate Change from the Geologic Record,* University of Wyoming, Laramie (August 12).
2010 "Climate and Paleobotany—200,000 Years of Environmental Change Using Pollen Analysis," *On the Cutting Edge Workshop, Teaching Climate Change from the Geologic Record,* University of Wyoming, Laramie (August 12).
2008 "Extinctions and Environmental Response to Global Warming in Western North America," *Focus the Nation Research Symposium: The Science Behind Climate Change,* Boise State University, Boise, Idaho (January 30).
2008 "Landscape Change in North Africa and the Middle East: Past Climates and Human Adaptations," *Focus the Nation Research Symposium: The Science Behind Climate Change,* Boise State University, Boise, Idaho (January 30)
2008 "Global Change in Siberia: Past and Present Human-Caribou/Reindeer Interaction," *Focus the Nation Research Symposium: The Science Behind Climate Change,* Boise State University, Boise, Idaho (co-author with Ziker, J.) (January 30).
2007 "Global Climate Change: The Science, the Impact, and the Effort to Educate—from an Anthropological Perspective," Earth Week at Boise State University, Boise, Idaho (April 26).
2005 "The Great Ice Age: Prehistoric Archaeology and Environments," 17th Annual Idaho Archaeology and Historic Preservation Month (May 4).
2002 "Mammoths," Dialogue for Kids, Idaho Public Television (Nov. 18).
2003 "Prehistoric Life and the Great ice Age in Western North America," 15th Annual Idaho Archaeology and Historic Preservation Month (May 1).
1998 "Prehistoric Life in the Great Ice Age: Blacktail Cave and Other Discoveries," Stone Age Fair, Loveland, Colorado (September 26).
1997 "Late Cenozoic Paleobiology, Geoecology, and Environmental Change," West Texas A&M University, Canyon, Texas.
1996 "Glacial Dynamics, Proglacial Lakes and Geoecology along the Southern Margin of the Laurentide Ice Sheet," *Second Annual Conference of Ecology and Evolution*, Montana State University, Bozeman, Montana.
1996 "Ice Age Environments of the American Mammoth Steppe," Institute for the Study of Earth and Man, Southern Methodist University, Dallas, Texas (April 25).
1992 "Ice Age Lakes of the Sahara," Geology Seminar, University of Minnesota, Duluth, Minnesota (December 17).

SELECTED UNIVERSITY SERVICE AND ASSOCIATIONS AT BOISE STATE UNIVERSITY

Co-Chair, Graduate Student Research Symposium Committee, 2014
Member, Fellowship Selection Committee, Student Research Initiative Program, 2012-2015
Member, Advisory Committee, Student Research Initiative Program, 2012-2015
Chair, Distinguished Thesis Committee, 2012-2015
Team Member, Extend Mobile Learning Initiative; Project Lead, mProgram, 2012-2013
Faculty Advisor, Fall Mobile Learning Symposium Planning Committee, 2012
Science Friday Planning Committee, 2012
Advisor, Graduate Residential Studies Program Club, 2012-2015
Interdisciplinary Studies Program Committee, 2012-2015
Faculty Senate, Spring 2012
M-Learning Scholar (Mobile Learning Scholar), 2011-2012
Service Learning Courses, 2011-2012
Curriculum Committee, College of Social Science and Public Affairs (Environmental Studies/Anthropology), 2010-2012
Environment and Society Research Cluster, Arts and Humanities Institute, 2010-2014
Faculty Liaison, Concurrent Enrollment Program, 2010-2012
Graduate Faculty Representative, Ph.D. and Master's Committees, 2010, 2012-15

Co-Coordinator, Geoarchaeology Major, 2007-2012
Organizing and Planning Committee, Focus the Nation, 2007-2008
Promotion and Tenure Committee, College of Social Science and Public Affairs, 2005-2006, 2007-2008, 2009-2010
Associate Coordinator, Center for Applied Archaeological Science, 2006-2013
Dean Search Committee, College of Social Science and Public Affairs, 2006-2007
Research-Service-Teaching Awards Committee, College of Social Science and Public Affairs, 2006
Internship Coordinator, Environmental Studies Program, 2005-2012
Student Union Board of Governors, 2004-2006
Faculty Sponsor, Undergraduate Research and Professional Practice Conference, 2004, 2006, 2008, 2009, 2011
Faculty Affiliate/Advisor, Environmental Studies Program Committee (Interdisciplinary Degree), 2003-2015
Advisor, Archaeological Students Association, 2002-2012
Canadian Studies Advisory Board, 2002-2012
Dean Evaluation Committee, College of Social Science and Public Affairs, 2005
Environmental Science and Public Policy Research Institute, 2004-2005
Research Awards Committee, College of Social Science and Public Affairs, 2004, 2005
Teaching Awards Committee, College of Social Science and Public Affairs, 2003-2004
Graduate Faculty (Interdisciplinary Studies and Anthropology Master's, Geoscience Ph.D Supervisory Committees, Member or Chair

MARK G. PLEW — CURRICULUM VITAE

OFFICE:

Department of Anthropology
Boise State University
208-426-3444
Fax: (208) 426-4329
Email: mplew@boisestate.edu

HOME:

3389 Crosspoint Avenue
Boise, Idaho 83706
(208) 384-0479

EDUCATION:

1985 Ph.D., Indiana University, Degree in Anthropology with Archaeological emphasis and minors in Geography (Don C. Bennett) and Museology. Dissertation: "A Prehistoric Settlement Pattern for the Owyhee Uplands, Idaho." Wesley R. Hurt, Chair

1974 M.A., Indiana University, Archaeology. Master's Thesis: "The Fremont Culture: A Re-Evaluation." Wesley R. Hurt, Advisor

1972 B.A., Indiana University, Bloomington Indiana, Major in Anthropology, minor in Latin American Studies. James H. Kellar, Advisor

PROFESSIONAL DEVELOPMENT:

2007-present	Director, Archaeological Field School Program, Denis Williams School of Archaeology, University of Guyana
2006-present	Graduate Coordinator, Department of Anthropology, Boise State University
2002-present	Research Affiliate, Iwokrama, International Centre for Rainforest Conservation and Development
2002-2012	Chair, Department of Anthropology, Boise State University
1995-present	Director, Center for Applied Archaeological Science (CAAS), Boise State University
1994-present	Professor, Department of Anthropology, Boise State University
1996-present	Co-Director, Desert Studies Institute, Boise State University
1997-present	Member, Science Advisory Board, Walter Roth Museum of Anthropology, Ministry of Culture, Republic of Guyana
1987-present	Research Affiliate, Amerindian Research Unit, University of Guyana
1982-present	Research Associate, College of Southern Idaho Coordinator, Anthropological Research Facility (now Center for Applied Archaeological Science)
2002-2006	Director, Canadian Studies Program, Boise State University
1996-2000	Associate Chair, Department of Anthropology, Boise State University
1992-1996	Associate Professor of Anthropology
1990	Founding Chair, Department of Anthropology, Boise State University
1987	Associate Professor, Department of Sociology, Anthropology and CJA, Boise State University
1986	Assistant Professor, Department of Sociology, Anthropology and Criminal Justice Administration, Boise State University

1985-1988	Vale District Archaeologist Consultancy, Bureau of Land Management, Vale, Oregon. Developed Cultural Resource Management Program for one of the largest BLM districts in the west. Assisted with Governor's Oregon Trail Protection Plan. Community outreach in Oregon and Idaho
1984-1985	Visiting Professor, Department of Sociology, Anthropology and Criminal Justice Administration, Boise State University
1982	Instructor in anthropology, Department of Sociology and Anthropology, Idaho
1981	Lecturer in anthropology, Idaho State University.
1980-1983	Special Lecturer in anthropology, Department of Sociology, Anthropology and Criminal Justice Administration, Boise State University
1977-1982	Research archaeologist, Idaho State Historical Society. Assisted the Idaho State Coordinator and field representative for various CRM activities. Researcher and writer with community service responsibilities
1977-1985	Partner/President, Idaho Archeological Consultants, Cultural Resource Management firm operating in Idaho, Wyoming, Nevada and Oregon. The firm performed work for a wide range of clients including federal, state and private companies such as the Idaho Power Company. In 1980 Idaho's largest private archaeological cultural resource firm.
1977-1979	Instructor in anthropology, Department of Societal and Urban Studies, Boise State University
1974	Instructor, general anthropology and museum methods, Indiana University Museum
1975-1976	Graduate Research Assistantship in archeology, Indiana University, Indiana University Museum

AREAS OF SPECIAL INTEREST:

Archaeology of Western North America, particularly the Great Basin and northern Southwest
South American archaeology, Northern Amazonia, Northeastern Brazil, Guyana
Theoretical and methodological interests include: Hunter-Gatherers, human ecology, ethnobiology, optimality theory, diversity/organizational studies, lithic and ceramic analysis

COURSES TAUGHT:

General Anthropology, History of Anthropology, Mesoamerican Archaeology, African Prehistory, North American Archeology, Geoarchaeology, Old World Prehistory, Museum Methods, Cultural Anthropology, Hunters and Gatherers, North American Indians, Physical Anthropology, Human Variation, Human Evolution, Idaho Archaeology, South American Archaeology, Introductory Archaeology, Indians of South America, Archaeological Field School, South American Culture History, History and Theory in Anthropology (graduate), Hunter-Gatherer Ethno-archaeology (graduate), Advanced Archaeological Field Methods (graduate)

LANGUAGES/TOOL SKILLS:

French/reading
Portuguese/Spanish reading
German reading, speaking
Computer Science and Statistical Applications

PROFESSIONAL SOCIETIES:

Member, Society for American Archaeology
Member, Plains Conference
Member, Idaho Archaeological Society, Lifetime member
Member, Idaho Advisory Council of Professional Archaeologists
Member, American Association for the Advancement of Science
Elected Member, New York Academy of Science, 1980
Member, Idaho Academy of Science

LINGUISTIC FIELD EXPERIENCE:

1974 Southern Paiute, Mexican Hat, Utah (under the supervision of C.F. Voegelin)
1974 Shawnee, Bloomington, Indiana (under the supervision of C.F. Voegelin)

ETHNOGRAPHIC EXPERIENCE:

1995 Wapishana, Rupununi Savannahs, Guyana, study of native fishing strategies
1993 Macushi Informants, Cyril Potter College of Education, Guyana
1987 Pitjandjara Informants, South Australia, (under supervision of Norman Tindale)

HONORS, AWARDS and RECOGNITIONS:

2011 Finalist, University Distinguished Professorship
2005 Honored Professor, Phi Kappa Phi
2004 Honored Professor, Alumni Top Ten Scholars
2003 Honored Professor, Phi Kappa Phi
2001 University Foundation Scholar, Research, Boise State University
2000 Finalist, University Foundation Scholar Award, Research, Boise State University
2000 Elected, Phi Kappa Phi
1999 Honored Professor, Phi Kappa Phi
1999 Finalist, University Foundation Scholar Award, Research, Boise State University
1997 Honored Faculty Member, Honors Program
1997 Nominated for University Foundation Scholar Award, Research, Boise State University
1997 Nominated for University Foundation Scholar Award, Service, Boise State University
1997 Honored as Nominee for Outstanding Advisor to an Academic Club, Associated Students of Boise State University
1997 Honored Faculty Member, Top Ten Scholars Awards, Boise State University Alumni Association
1996 Nominated for University Foundation Scholar Award-Research
1996 Honored as Coach for a Game, Boise State University Athletic Department
1995 Honored Faculty Member, Honors Program
1994 Honored Faculty Member, Honors Program
1993 Finalist, Associate Vice President for Academic Affairs, Boise State University
1988 Listed as one of 20 experts in the United States in use-wear analysis, International Directory of Use-wear Analysts, Germany
1977 Academic Scholarship, Indiana University Graduate School
1976 Fellowship, Indiana University Graduate School
1974 Fellowship in Linguistics and Archaeology, Indiana University Graduate School Fellowship
1974 Assistantship in Archaeology, Museum of Northern Arizona

1974 Grant-in-Aid for Doctoral Research, Indiana University Advanced Studies and Research Program

SELECTED CONSULTANCIES: FEDERAL, STATE, PRIVATE and ACADEMIC:

Federal (1975-present)

U.S. Bureau of Land Management, Vale District, OR
U.S. Bureau of Land Management, ID:
Boise District
Shoshone District
Idaho Falls District
State Office
U.S. Bureau of Land Management, Wyoming State Office
U.S. Army Corps of Engineers
U.S. Forest Service: Idaho, Utah, Oregon, Indiana
Boise National Forest
Payette National Forest
National Park Service
Craters of the Moon National Monument
Farmers Home Administration
U.S. Air Force, Clearfield, Utah
U.S. Air Force, Mountain Home, ID
Bureau of Indian Affairs
U.S. Fish and Wildlife
Federal Highway Administration
Ogden Regional Office
Oregon Regional Office
Wayne-Hoosier National Forest

State and Local Consultancies

Three Island Crossing State Park
Massacre Rocks State Park
Nez Perce State Park
J-U-B Engineering, Boise, Twin Falls, ID
Mutual Energy Company, Sacramento, California
CH2M Hill, Boise and Corvallis Offices: Idaho and Oregon
Idaho Power Company
Consulting Associates Inc., Boise, ID
AGI Construction, Boise, ID
Idaho Army National Guard
Church of Jesus Christ of Latter Day Saints
Small Business Center, BSU
Idaho State Historical Society Ralston and Associates, Boise, ID Horseshoe Bend Hydroelectric Co. Idaho
Department of Law Enforcement Idaho Forensics Laboratory
Idaho Department of Fish and Game
Idaho Department of Corrections
Lincoln County Sheriff's Department
Boise County Sheriff's Department
Office of the U.S. Attorney for Idaho
Division of Highways
Lombard-Conrad Architects
Malad State Park
Celebration Park

Public/Private Sector and International Consultancies

Association for the Humanities of Idaho
Educational Television, Channels 4, 20
Bingham Engineering, Salt Lake City, UT
Envirosafe, Inc.
Henningson, Durham and Richardson, Santa Barbara, CA
Myers Engineering, Boise, ID
Utah Power and Light, Salt Lake City
Wildish Construction, Portland, OR
Bonneville Power, Seattle, WA
Guysuco, Inc., Georgetown, Guyana
Shoshone-Paiute Tribes
BSR Architects
Fallon Paiute Tribes
Professional Analysts, Portland, OR
General Electric, Seattle
Powers Engineering, Inc.
Turning Point, Nampa
Simplot Company
Micron Technology, Inc.
Kinross Mining Company
Ecologistics, Inc., Ontario, Canada
Professional Services Industries
Ziontz, Chestnut, Varell, Berley and Slonim Attorneys at Law, Seattle
ENVIRON International Corporation

Academic Consultancies

College of Southern Idaho
University of Idaho
Idaho State University
Washington State University
Utah State University
Treasure Valley Community College
Indiana University
University of California, Davis
University of New Mexico
Museum of Northern Arizona
South Australian Museum
University of Guyana
Universidad Federal de Bahia
University of Colorado, Colorado Springs
Walter Roth Museum of Anthropology

UNIVERSITY, COLLEGE AND DEPARTMENT SERVICE:

2015 Member, COAS, Faculty Awards Committee
2015 Member, SSPA P and T Committee
2013 Chair, Department P and T Committees
2012 Member, SSPA Promotion and Tenure Committee
2012 Member, Department Faculty Search Committee
2012 Member, Department P and T Committee
2011 Member, SSPA Associate Dean Search Committee
2010 Chair, SSPA Distinguished Professor SSPA sub-Committee
2009 Member, Adjunct Faculty Committee
2009 Member, International Programs Advisory Committee
2008 Member, Basque Studies Committee
2007 Member, Deans Search Committee
2007 Member, SSPA Charting the Course Committee
2007 Member, Senate Grievance Committee
2006 Member, Internationalization Task Force, sub-chair
2006 Member, Internationalization Advisory Committee
2005 Member, President's Water Initiative Project
2005 Member, International Programs Advisory Committee
2005 Member, Civic Engagement Committee
2004 Chair, Deans Evaluation Committee
2004 Member, SSPA Awards Committee
2004 Member, American Democracy (Civic Engagement) Project Steering Committee
2004 Member, Internationalization Committee
2004 Member, SSPA PT Task Force Committee
2003 Member, Associate Dean Search Committee, SSPA
2003 Member, Promotion and Tenure Task Force
2003 Chair, University Foundations Scholars Selection Committee, Research
2003 Member, International Business Advisory Committee
2000 Boise State University Representative, Wings and Roots Tribal Consultation Program, Idaho Army National Guard, United States Air Force
2000 Member, Undergraduate Research Initiative Advisory Board
2000 Member, Promotion and Tenure Committee, SSPA
2000 Member, Deans Evaluation Committee
2000 Member, Deans Search Committee, SSPA
1998 Faculty Representative, Alumni Affairs Strategic Planning Committee
1998 Boise State University Representative, Wings and Roots Tribal Consultation Program, Bureau of Land Management
1997 Faculty Sponsor, Athletic Department Mentoring Program
1997 Faculty Representative, Alumni Affairs Strategic Planning Committee
1997 Athletic Hall of Fame Selection Committee

1997 Co-Director, Desert Studies Institute (summer studies program)
1996 Member, SSPA Annual Report Committee
1996 Member, Project Access Advisory Committee, College of Social Science and Faculty Senate Representative
1996 Senator, Faculty Senate, Graduate School
1996 Member, Graduate Council
1995 Member, Graduate Faculty
1994 Chair, College Tenure and Promotion Committee
1994 Member, Cultural Diversity Committee
1994 Member, Multi-Ethnic Committee
1994 Member, Human Rights Committee with responsibility of Martin Luther King Week
1994 Member, Editorial Board, *Idaho Issues*, College of Social Science and Public Affairs
1993 Acting Senator, Faculty Senate, College of Social Sciences and Public Affairs
1993 Member, President's Strategic Planning Committee
1993 Chair, Faculty Senate Faculty Development Committee
1993 Academic Orientation, Football Program
1993 Editor, *Anthropology Newsletter*
1993 Member, Dean's Search Committee
1992 Academic Orientation, Football Program
1992 Member, Faculty Senate Faculty Development Committee
1992 Member, SSPA, Technology Committee
1991 Chair, College Tenure and Promotion Committee
1991 Faculty Representative, CSSPA, Discover BSU Day
1991 Member, Frank Church Conference Planning Committee (Public Affairs)
1991 Academic Orientation, Football Program
1991 Member, CSSPA, Consulting/Training Activities Committee
1990 Faculty Representative, SSPA, Discover BSU Day
1990 Member, College Tenure and Promotion Committee
1990 Member, Faculty Salary and Promotion Committee
1990 Member, Dean's Evaluation Committee
1990 Liaison, Idaho State University, Cooperative Anthropology Program
1990 Founding Chair, Department of Anthropology
1990 Co-Chair, Native American Policy Committee
1998 College Representative, College of Social Science and Public Affairs, Faculty Research Advisory Committee, 1988-92
1988 Member, Internship Committee
1988 Faculty Luncheon Speaker
1988 Coordinator, Anthropology, Department of Anthropology, Sociology and Criminal JA
1988 Lecturer/Participant, Hemingway Scholars Program
1988 Lecturer/Participant, Honors Program
1987 Member, Hemingway Editorial Advisory Board, Western Studies Publications
1987 Editor, *Cultural Resource Reports*
1987 Special Activities Chair, WASA Conference
1987 Editor, *Anthro BSU*
1986 Member, SSPA, Publication Committee
1985 Member, Indian Arts Committee
1985 Editor, *Idaho Archaeologist*
1985 Member, College Tenure and Promotion Committee
1985 Member, Speakers Bureau
1984 Coordinator, Anthropology, Department of Anthropology, Sociology and CJA
1984 Member, Hemingway Western Studies Committee
1985 Academic Advisor, Anthropology Club, 1985-89, 1996-2012

PROFESSIONAL SERVICES ACTIVITIES:

Member, Idaho Advisory Council of Professional Archaeologists
Research Associate, Herrett Museum, College of Southern Idaho
Research Associate, Amerindian Research Unit, University of Guyana
Member, Science Advisory Board, Walter Roth Museum, Ministry of Culture, Guyana
Member, Board of Directors, Idaho Archaeological Society
Boise State University Representative, Idaho Archaeological Survey Advisory Board
Member, Advisory Council of the Washington Archaeological Research Center
Boise State University Representative, BLM Wings and Roots Consultation
Boise State University Representative, Idaho Army and Air National Guard and U.S. Air Force, MHAFB Wings and Roots Program
Representative, Pacific Northwest Canadian Studies Consortium Executive Committee
Founder and Chair, Idaho Archaeology Working Group
Affiliate, Iwokrama, International Centre for Rainforest Conservation and Development
Affiliate, Walter Roth Museum of Anthropology
Affiliate, Amerindian Research Unit, Faculty of Social Sciences, University Guyana

EDITIORSHIPS:

Editor, *Idaho Archaeologist*
Editor, *Cultural Resource Reports*, Boise State University
Editor, *Cultural Resource Reports*, Center for Applied Archaeological Science
Co-editor, *Archaeology and Anthropology,* Journal of the Walter Roth Museum of Anthropology
Managing Editor, *Occasional Papers and Monographs in Cultural Anthropology and Linguistics*
Editorial Board, *Monographs in Archaeology*

REVIEWERSHIPS:

Reviewer, *American Antiquity, American Anthropologist, Plains Anthropologist*, and *Journal of Field Archaeology, Journal of Archaeological Science*
Reviewer, *Journal of the American West*
Reviewer, Kendall-Hunt Reviewer, Wadsworth
Publishing Reviewer/Essayist, Mayfield
Publishing Company Reviewer, Wenner Gren
Foundation
Reviewer, National Science Foundation

SERVICE AS AN EXPERT WITNESS

2003- Expert Witness, Indian Child Well Fare Cases, Idaho Department of Health and 2001
2001 Expert Witness, Spirit Cave Mummy Repatriation Case, NAGPRA Board Harvard Law School, on behalf of the Fallon Paiute Tribe
1992 Expert Witness, Stoddard Property Case, Idaho State Supreme Court
1993 Expert Witness, Ted Bundy Idaho Investigation Case
1982 Expert Witness, Charbeneau Murder Trail

COMMUNITY SERVICE:

Idaho Conservation League
High Desert Committee
Sierra Club
Association of Retarded Citizens
Easter Seal/Goodwill
Goodwill Industries
Vista Neighborhood Redevelopment Agency
Boise Paint-the-Town (BSU Co-Organizer 4 years)
The Nature Conservancy

SUMMARY OF FIELD RESEARCH:

2015 PI, Test Excavations at 10-EL-215, Boise State University Field School
2015 PI, Duck Valley Road Project, Shoshone-Paiute Tribe
2015 PI, DAGIR Survey, Idaho Army National Guard
2014 PI, Excavations at 10-EL-1367
2013 PI, Excavations at 10-EL-215
2012 PI, Archaeological Excavations at 10-EL-215
2011 PI, Monitoring of the Sayler Creek Training Range, Tallons, Inc.
2011 PI, Excavations of the Siriki Shell Mound, Northeastern Guyana
2010 PI, Survey of Bara Bara Shanale, MCYS
2010 PI, CRMP Project, Idaho Army National Guard
2010 PI, Boise National Forest Tests
2008 PI, 106 Criteria Project, Idaho Army National Guard
2007 PI, Test Excavations at 10-CN-5
2007 PI, M3 Eagle Project, M3 Company
2007 PI, M3 Eagle Project
2007 PI, Kabakaburi Project, University of Guyana
2007 PI, Danskin Landing, Forest Service
2007 PI, Cow Hollow Project, Oregon BLM
2007 PI, Cow Hollow Park Project, BLM
2007 PI, Cow Creek Project, BLM
2006 PI, Kuna Waster Water Project, Keller Associates
2006 PI, Cascade Wastewater Project, Keller Associates
2006 PI, Black Creek Development Project, Materials Surveying and Testing
2006 PI, Test Excavations at 10-CN-6, Canyon County Parks and Recreation
2006 PI, Services Contract, Idaho Army National Guard
2006 PI, Red Ridge Project, Secesh Engineering
2006 PI, Osprey Ridge Development Project, Materials Surveying and Testing
2006 PI, Nicholson Land Exchange, Bureau of Land Management
2006 PI, KV38 Power Line Extension—Duck Valley, Armstrong Engineering
2006 PI, Cow Creek Project, Oregon Bureau of Land Management, Vale
2006 PI, Blackhawk South Development Project, Secech Engineering
2006 PI, Sperry Wind Power Project, Carol Sperry
2006 PI, Nicholson Land Exchange Addendum, BLM

2006 PI, Duck Valley Airport Extension Project
2005 PI, Sinker Creek Road Project, Canyon County
2005 PI, Simco Road Project, Synthetic Energy, Inc.
2005 PI, Falcon Crest Survey, Materials Testing and Inspection
2005 PI, Cascade Water Project, City of Cascade
2005 PI, Blackhawk Survey Project, McCall, Idaho, Secesh Engineering, Inc.
2005 PI, Archaeological Test Excavations at 10-VY-7, McCall, Idaho
2005 PI, Donnelly Wastewater Treatment Facility, Keller Associates, Meridian
2005 PI, Test Excavations at the North Fork Rockshelter, Vale District BLM
2005 PI, Site Monitoring, Saylor Creek, MHAFB
2004 PI, Excavations at Little Owl Cave, Malheur County, Oregon, BLM
2004 PI, Grandview to Duck Valley Powerline Survey, Powers Engineering
2004 PI, EUA Site Monitoring, Saylor Creek Range, Prewitt and Associates (USAF)
2004 PI, Cascade Common Land Owners Boatdock Expansion, Common Land Owners
2003 PI, Jug-Mountain 2-5 Phase Survey, Secesh Engineering
2003 PI, Eagle-Pitcher Diatom Mine Survey, Southeast Oregon
2003 PI, Excavations at 10-CN-6
2003 PI, Camas Creek Archaeological Survey, Tallons Inc.
2003 PI, Bull Creek Rockshelter Evaluation, Southeastern Oregon, BLM
2003 PI, Antelope Overhang Project, Southeastern Oregon, BLM
2003 PI, OTA Engineering Training Area Project, IDARNG
2003 PI, Archaeological Survey of Aishalton Rock Sites, Guyana
2003 PI, OTA Screening Project, IDARNG
2003 PI, OTA Range 22 Assembly Project, IDARNG
2003 PI, Excavations at 10-CN-6
2002 PI, Excavations at 10-EL-216, Idaho Power Company
2002 PI, PSI Tower Projects
2002 PI, OTA Surveys, IDANG
2002 PI, Wallin Farms Project, Marsing
2002 PI, Survey and Excavations on the Essequibo River, Guyana
2002 PI, Testing of site 10-EL-438, Idaho Power Company
2002 PI, Archaeological Survey of Toka North Rupununi, Guyana
2002 PI, Survey of the Iwokrama Mountains, Guyana
2002 PI, Greenleaf Water Project, City of Greenleaf
2001 PI, Excavations at 10-CN-6, Southwest Idaho
2001 PI, Rain Gauge Project, OTA, IANG
2001 PI, Archaeological Survey of the Shulinab Area, South Rupununi
2001 PI, Collections Processing, Idaho Transportation Department
2000 PI, Test Excavations at 10-EL-1577, King Hill, Idaho
2000 PI, Tadpole Lake Experimental Fairy Shrimp Harvest Project
2000 PI, Smut Fence Project, Idaho Army National Guard
2000 PI, Simplot Right-of-Way Project, Simplot Company
2000 PI, Simco Land Exchange, LDS Church and BLM
2000 PI, Shiriri Mountain Project, Guyana, Walter Roth Museum
2000 PI, Kuna Communications Project, Professional Services Industries
2000 PI, Glenns Ferry Communications Tower Project, PSI, Inc.
2000 PI, Envirosafe Land Exchange Survey, Envirosafe
2000 PI, BSU West Expansion, BSU Small Business Center
2000 PI, Simplot Water Line Projects, Simplot Company
2000 PI, Parole Visitors Center Project, Lombard-Conrad Company
2000 PI, Excavations at Wyva Creek, Government of Guyana,
1999 PI, Skeldon Estate Cultural Heritage Project, Guyana, Ecologistics
1999 PI, North Lake Project, Keller and Associates
1999 PI, Marsing-Rupert Project, Keller and Associates

1999 Investigator, OTA Water Project, Idaho Army National Guard
1998 Project Director, Integrated Cultural Resource Management Plan, IANG
1998 Project Director, Star Postal Facility Project, U.S. Postal Service, Denver
1998 Project Director, ICRMP Planning Survey, Department of Defense, IANG
1998 PI, Orchard Training Area Survey, Idaho Army National Guard
1998 PI, Military Training Areas Survey Phase II, IANG
1998 Project Director, Silver City Historical Exhibit Project, Kinross Mining Company
1998 PI, Florida Mountain Monitoring Project, Kinross Mining
1998 PI, Excavations at 10-CN-5, South West Idaho
1997 PI, Simplot Road Expansion Project.
1997 PI, Florida Mountain Monitoring Project.
1997 PI, Excavations at 10-CN-5
1997 PI, Delamar Mines Projects
1996 Tait Aggregate Project, Mountain Home, Idaho
1996 PI, OTA Archaeological Survey, Ada County, Idaho
1996 PI, Military Lands Survey, Eastern Idaho
1996 PI, Intermountain Gas Line Project
1996 PI, Delamar Mine Wetlands Project
1996 PI, Delamar Mine Exploration Project
1996 PI, Delamar Line Project
1996 Co-Investigator, Excavations at 10-CN-1, Southwest, Idaho
1995 Shrub Rehab Project, BLM/Kinross Mining Company
1995 PI, Stephens Land Exchange Project, BLM
1995 PI, Simplot Right-a Way Project, Grandview Idaho
1995 PI, North Fork Payette Hydroelectric Project, Myers Engineering
1995 PI, Kuna, Horseshoe Bend and Glenns Ferry Water Projects, Ida-Ore
1995 PI, Delamar Mine Project, Kinross Mining Company
1995 PI, Cascade Water Line Project, Water District
1995 Co-Investigator, with Camille Sayer, Test Excavations at Hammett Site, Elmore County,
1995 Co-Investigator with Camille Sayer, Test Excavations at 10-AA-12, 10-AA-14, 10-AA-188, 10-AA-189, Bureau of Land Management
1995 Air Monitoring Site Project, Micron Technology, Inc.
1994 PI, Star Water District Project. Kellar Associates, Inc.
1994 PI, Placerville Timber Sale Project, Bureau of Land Management
1994 PI, Idaho National Guard BPNRA Survey
1994 PI, Idaho Falls FmHA Project
1994 PI, G and B Redi Mix Project, Middleton, Idaho
1994 PI, Donnelly Water Project Survey, Ida-Ore Planning and Development
1994 PI, Cold Springs Farm BLM-Right-A-Way Project
1994 PI, Cascade Revitalization Project, Ida-Ore Planning
1994 PI, Cable Upgrade Project, Geological Survey, Water Resources Division, Birds of Prey Area
1994 PI, Turning Point Project Survey, Nampa, Turning Point Inc.
1994 PI, Key Bank, Locust Grove Project Survey, BRS Architects
1994 PI, Archaeological Survey of the Randy Jones Farm Inventory, Bannock and Oneida Counties, FmHA
1994 Co-Investigator with Camille Sayer, Excavations at 10-EL-392
1994 Co-Investigator with Camille Sayer, Excavations at 10-AA-256
1993 Project Director, I-84 Plant Sites Survey at Milepost 107 near Hammett, Idaho. Wildish
1993 Project Director, Baker Borrow Dump Locations, Hammett, Idaho Wildish Land Co.
1993 Project Director, Wilson-Baker-Borrow Project. Wildish Land Company
1993 Project Director, Kanaka Rapids Transmission Line Survey, Myers Engineering, Boise
1993 Project Director, I-84 Water Line and Access Road Survey, Hammett, Idaho, Wildish
1993 PI, Test Excavations at 10-PE-22, Payette County, Idaho. Anderson Perry and Associates, La Grande, Oregon

1993 PI, FHA Property Survey, Preston, Idaho
1993 PI, Ethnographic Research with Wapishana of Southern Guyana
1993 PI, Ethnographic Research in the Rupununi Savannah, Guyana
1993 Project Director, Neighbors-Brown Borrow Source Project, Hammett, Idaho
1993 PI, BLM 416 Fire Rehab Survey, Elmore County, Idaho
1993 PI, Boulder Rapids Transmission Line Survey, Myers Engineering
1992 Project Director, Wellfield Fire REHAB, Boise BLM
1992 Project Director, U-3 Hydro Project, Ida-West
1992 Project Director, Test Excavations at 10-TF-319, Myers Engineering
1992 Project Director, Smith Land Exchange Survey and Excavations, Elmore County, Idaho
1992 Project Director, Castle Creek CRI Survey, BLM, Boise
1992 Project Director, Black Ridge Fire REHAB, Shoshone BLM
1992 Project Director, AGI Construction Project
1992 PI, Horseshoe Bend Hydro Project, HSB Hydroelectric Company
1992 PI, Excavations at 10-GG-1, BSU
1991 Project Director, Three Creek Well Fire REHAB
1991 Project Director, Stanford Ranch Survey, FHA
1991 Project Director, Snow Creek Survey, U.S. Air Force
1991 Project Director, Shrub Fire REHAB, BLM
1991 Project Director, RRMP Fire REHAB, BLM
1991 Project Director, Kanaka and Empire Survey and Testing, Myers Engineering
1991 Project Director, Glanzman and McArthur Surveys, FHA
1991 Project Director, Dewitt-Feller Survey, FHA
1991 PI, U.S. Air Force Snow Creek Survey
1991 PI, Mile 28 Hydro Project, Jerome, Idaho, Powers Engineering
1991 PI, Idaho Power Prison Transmission Line Survey, Idaho Power
1991 PI, Bliss Dam Road Survey, Idaho Power
1991 PI, Bliss Archaeological Project
1991 PI, Auger Falls Hydro Project, J-U-B Engineers
1990 Project Survey, Carl Willie Property Survey, Malad, FHA
1990 Project Director, Malad High Drop Hydroelectric Project, Consulting Associates Inc.
1990 Project Director, Lazy CH Property Survey
1990 Project Director, GW Farm Survey, FHA
1990 Project Director, Fuller-Dewitt Survey, Montpelier, FHA
1990 Project Director, Faust Property Survey, FHA
1990 Project Director, Brownlee Campground Expansion, Idaho Power
1990 Project Director, Arco Area Farm Properties Survey, FHA
1989 Project Director, Moores Spring Investigation, Forest Service
1989 Project Director, Danskin Shelter Project, U.S. Forest Service
1989 Project Director, Brownlee Land Exchange Project, BLM
1989 Co-Researcher, BIA, Duck Valley Reservation Historical Overview, 1989-91
1988 Project Director/PI, Florida Mountain Project
1988 Project Director, Clover Creek Archaeological Project, (ISHPO, BLM)
1988 Director, Three Island Archaeological Project
1988 Director, Broken Wagon Fire REHAB Project, BLM
1988 Director, BLM Inventory Project
1988 Archaeologist, Magic Dam Project
1987 Project Director-PI, South Mountain Archaeological Project
1987 Project Director, Three Island Archaeological Project
1987 Project Director, Fire REHAB Surveys, Southwestern Idaho
1987 Project Director, Dike Hydroelectric Project
1987 Project Director, Clover Creek Project
1987 Archaeologist, Eagle Fish Hatchery Locality Project, Corps of Engineers
1987 Archaeologist, Dietrich Hydroelectric Project

1986 Project Director, Three Island Crossing
1986 Project Director, BLM Surveys in Oregon
1986 PI, Baker Caves, BLM, Shoshone, Idaho
1986 Library Collections Research, University of Guyana, Georgetown
1986 BLM Project Director, Oregon and Idaho
1985 PI, Surveys in SE Oregon for BLM, Vale, Oregon
1984 PI, Test Excavations at Lowman, Idaho
1984 PI, Cultural Resource Evaluations near Riggins, Idaho
1984 Member, O Central Project, Northeastern Brazil. Wesley R. Hurt, Alan L. Bryan and Ruth Gruhn, Directors
1984 Consultant, Surveys in SE Oregon for BLM, Vale District
1983 PI, Test Excavations at 10-OE-1844, BLM
1983 PI, Excavations at Rock Creek Hydroelectric Project
1983 PI, Cultural Resource Evaluation at Goose Creek. J-U-B Engineer
1982 Project Director, Archaeological Excavations at 10-TF-527, Twin Falls County, Idaho
1982 Project Director, Archaeological Excavations at 10-OE-2488
1982 Co-Investigator, with K.M. Ames, Excavations at 10-BNO-1, Banks, Idaho
1982 Archaeological Survey of the Pershing II--Idaho Site Cultural Resource Survey. Corps of Engineers
1981 Project Director, Archaeological Survey of the East and South Forks of the Owyhee
1981 Archaeological Survey of the Seedskadee Wildlife Refuge, Wyoming
1980 Project Director, Archaeological Test Excavations at Bliss, Idaho
1980 Project Director, Archaeological Survey at Southeastern Idaho
1979 Project Director, Southcentral Owyhee County Archaeological Survey. Idaho State Historical Society
1979 Project Director, Excavations of Nahas Cave, Idaho State Historical Society
1979 Project Director, Excavation of the Confluence Site (10-OE-1973). Idaho State Historical Society
1979 Consulting Archaeologist, Archaeological Survey of Idaho Power's 12.5 KV U.G. Cable Line from Bear to Cuprum, Idaho. U.S. Forest Service Contract.
1978 Project Director, archaeological survey of Pole Creek, Owyhee County, Idaho. Idaho Historical Society Project.
1978 PI, archaeological excavations at Camas and Pole Creeks, Owyhee County, Idaho. Bureau of Land Management and Idaho Historical Society
1978 Field Archaeologist, archaeological reconnaissance of south central Owyhee County, Idaho. Idaho State Historical Society Project
1978 Co-investigator, with Michael Ostrogorsky, cultural resource evaluations of the proposed Dike and Wiley Dam projects, Snake River Canyon near Bliss, Idaho. Edaw, Inc.
1978 Archaeologist, test excavations at the V.A. ground extension site, Boise, Idaho. Idaho State Historic Society Project
1978 Archaeologist, evaluation of the Twin Falls Municipal Airport extension. J-U-B Engineers
1977 PI, archaeological test excavations of sites in the Boise National Forest
1977 PI, archaeological survey and reconnaissance, Boise National Forest
1977 Field Supervisor, Pacific Power and Light Line Survey, Southwestern Idaho
1977 Field Director, archaeological test excavations at the Fargo Wasteway Site, Homedale, ID
1977 Field Archaeologist, test excavations along the Clearwater River, Northern Idaho. Highway Archaeology Program
1977 Field Archaeologist, supervising survey team from State Highway Archaeology Program
1977 Field Archaeologist, archaeological survey in Pole Creek, Owyhee County, Idaho. Idaho State Historical Society
1977 Co-investigator with Max G. Pavesic, archaeological survey of the proposed Council
1976 Project Director, Land Exchange Survey, Boise National Forest, Boise, Idaho
1976 Project Director, Archaeological Survey of the Field Group and Little Valley Desert Land Entries, for U.S. Bureau of Land Management
1976 Field Director, archaeological test excavations, La Grande, Oregon
1976 Field Director, archaeological test excavations at Johnson's Creek, Valley County, Idaho. U.S. Forest Service

1976 Field Director, Archaeological Survey of the Payette Lake Sewer Line Project
1976 Field Director, archaeological survey of proposed geothermal sites near Vale, Oregon
1976 Field Archaeologist, cultural resource inventories of proposed land exchanges
1976 Acting State Highway Archaeologist
1975 Project Director, Archaeological Survey of the Camas Creek Drainage, Owyhee County, Idaho. Cooperative effort between Boise State University and the Indiana University Museum and Bureau of Land Management
1974 Field Archaeologist, U.S. Forest Service Survey, Wayne-Hoosier National Forest, Monroe County, Indiana. Indiana Historical Society Project
1974 Field Archaeologist, U.S. Forest Service Survey, Wayne-Hoosier National Forest, Perry County, Indiana. Indiana Historical Society Project
1974 Field Archaeologist, Cedar Mesa Project, Museum of Northern Arizona, University of British Columbia Project, Southeastern Utah
1972 Archaeologist, Tipi ring study near Williston, North Dakota
1972 Archaeologist, surveys in eastern and southern Utah. Masters research, re-survey of portions of James Gunnerson's 1957 survey of the Fremont area
1970 Visitation of archaeological sites in the United States, Canada, Europe, Mexico and Africa
1970 Part-time crew member, test excavations in the lower Illinois River Valley, Northwestern University
1970 Crew member, excavations at the Ingram Site, Monroe County, Indiana, IU Museum
1970 Archaeological Surveys in Monroe County, Indiana
1969 Student crew member, archaeological surveys and test excavations, Glenn A. Black Lab of Archaeology, Indiana University. Experience with Archaic, Woodland and Mississippian components in Indiana
1969 Archaeological Methods and Techniques, classroom, lab and field archaeology, Indiana
1967 Student at Indiana University Field School. Excavations at Yankeetown Site, Indiana

CONTRACTS AND GRANTS:

2016 OTC Expansion Project, Idaho Army National Guard, $145,000
2016 Collections Processing, Idaho Transportation Department, $5,000.00
2015 DAGIR Project, Idaho Army National Guard, $33,000
2015 Duck Valley Road Project, $2500
2014 Carbon Isotope Analysis of Faunal Remains from Shell Mounds in Northwestern Guyana. World Bank. US $50,000
2014 Archaeological Excavations at Warapana Shell Midden. Ministry of Culture, Youth and Sport, Republic of Guyana. $3500
2014 Archaeological Test Excavations at Tunnel Hill, Sawtooth National Forest. $10,000
2013 Archaeological Excavations at Karanambu, Status: Funded, Investigators: Plew, M. G. (Principal), Primary Sponsor: Republic of Guyana. $3000
2013 Hatwai Analysis, Idaho Department of Transportation, $5000
2013 Danskin Analysis, Boise National Forest, $5000
2012 Continuation of INCRMP Study, Idaho Army National Guard, $5000
2012 Analysis of Danskin Rockshelter, $18,000
2011 Excavations at Siriki Shell Mound, Government of Guyana, G$398,000
2010 Testing of site 10-EL-438, Idaho Power Company, $6000
2010 ICRMP Project, Idaho Army National Guard, $47,000
2011 Excavations at Wyva Creek, Government of Guyana, G$300,000
2010 Survey of Bara Bara Shanale, MCYS, G$ 350,000
2010 Boise National Forest Tests, BSN, $10,000
2010 Danskin Site Analysis, $12,000
2009 Excavations at 10-EL-216, Idaho Power Company, $10,000
2008 3 Eagle Project, M3 Company, $3600
2008 106 Criteria Project, Idaho Army National Guard, $40,000

2007 Crossroads Museum Project (joint BSU/Canyon County project), U.S. Department of Transportation, $450,000
2007 Danskin Landing Project, U.S. Forest Service, $4500
2007 Cow Hollow Park Project, BLM, $16,000
2007 Canyon Crossroads Project, $45,000
2006 Kimberly Wind Power Project, $750
2006 Kuna Wastewater Project, $750
2006 Cascade Wastewater Project, 1200
2006 Duck Valley Airport Extension Project, $2,000
2006 KV38 Power line Project-Duck Valley Extension, $7300
2006 Blacks Creek Project, $3500
2006 Osprey Ridge Development Project, $3500
2006 Red Ridge Project, $4000
2006 Nicholson Exchange, $4000
2006 Nicholson Land Exchange Addendum, $1700
2006 Blackhawk Development Project, $1000.00
2006 Cow Creek Project, BLM, Oregon, $7000
2005 Services Contract, Idaho Army National Guard, $13,000
2005 Blackhawk Project, $1200
2005 Stratton Project, $1200
2005 Synthetic Energy Project, $500
2005 Falcon Crest Project, $1800
2005 Dry Creek Development Project, $3500
2005 Cascade Water Project, $750
2005 North Fork of Owyhee Test Excavations, $10,000
2005 MHAFB Monitoring, $50,000
2004 Powers Power Line Survey, Powers Engineering, $28,000
2004 North Fork Owyhee River Project, $10,000
2004 10-VY-7 Excavations, $9,000
2004 Consultation Services, USAF, MHAFB, Prewitt Associates, $9000
2004 Goodwin Boat Ramp Project, $500
2003 Orchard Training Area Project/Monitoring, IDANG, $15,000.00
2003 Archaeological Survey of the Iwokrama Mountains, Iwokrama/European Union, $3,000
2003 Eagle-Pitcher Diatom Mining Survey, $5000
2003 Jug Mountain Project, $750
2003 Antelope Overhang Project, BLM, Oregon, $10,000
2003 Bull Creek Rockshelter Project, BLM, Oregon. $10,000
2003 Camas and BA Projects, Tallons Inc., $2000
2003 Shoshoni-Paiute Field School, U.S. Air Force, $167,000
2002 Greenleaf Water Project, $500
2002 Wallin Farms Project, $1000
2002 PSI Tower Projects, $7500
2001 IDARNG, OTA, $13,000
2001 IDARNG, ICRMP Project, $17,000
2000 Undergraduate Research Initiative Grants, BSU, $2200
2000 Envirosafe Land Exchange, $1,000
2000 Communications Tower Projects, $1200
2000 East Simco Survey, $15,000
2000 OTA Monitoring Project, 13,000
2000 Simco Land Exchange, $500
2000 Simplot Water and Land Exchange Projects, $1500
2000 Lombard-Conrad Architects, $500
1999 Military Training Area Phase III Project, $15,000
1999 IANG OTA Contract, $13,000

1999 North Cascade Project, Keller and Associates, $700
1999 Marsing-Rupert Project, Keller and Associates, $1000
1999 Skeldon Estate Cultural Heritage Project, Ecologistics, Inc. $5000
1998 IANG OTA Contract, $15,000
1998 Silver City Exhibit Project, $15,000
1998 Military Training Area Phase II Survey, $20,000
1998 ICRMP Project, IANG, DOE, $17,000
1998 Florida Mountain Monitoring Project, $2500
1997 State of Idaho Military Division, State Lands Survey, $50,000
1997 Intermountain Gas Contract, $350
1997 Tait Aggregate Contract, $350
1997 City of Riggins Water Project, Birdsall Associates, $500
1997 Kinross Delamar Road Projects, Kinross Mining, $1250
1997 IANG OTA Contract, $13,000
1997 Roswell City Water Project, $400
1997 Florida Mountain Monitoring Project, $8000
1997 Simplot Road Project, $150
1996 Idaho National Guard SBPNRA Project, $13,000.00.
1996 BLM SRBPNA Project, $6,000.00
1996 Delamar Projects, Kinross Mining Company, $3,000.00.
1995 Faculty Research Grant "Fishing Strategies among the Wapishana of Southern Guyana," $2500
1995 Birds of Prey Cooperative Program Grant, BLM, $10,000
1995 National Trust for Historic Preservation, $300
1995 Donnelly Water Line Project, $1500
1995 Kuna Streets Improvement Project Survey, $400
1995 BLM/Birds of Prey Cooperative Program, Field School $5600
1995 Kinross Mining Company Contracts, Delamar, $3000
1995 Ida-Ore Water Projects, Ida-Ore Inc., $1500
1995 Micron Technology, Inc. Contract, $400
1995 Idaho National Guard SBPNRA Project, $13,000
1995 North Fork Payette Hydroelectric Project, Meyers Engineering, $1200
1994 Cable Upgrade Project, Geological Survey, BLM, $300
1994 Star Water Project, Kellar Associates, $300
1994 Jones Property Project, FmHA, $2500
1994 Cascade and Donnelly Water Projects, $900
1994 Anderson and Port Wood Project, FmHA, $500
1994 Colds Springs Project, BLM, $300
1994 Placerville Timber Sale Project, Bureau of Land Management, $5500
1994 G and B Redi Mix Project, $250
1994 Key Bank Survey Project, BRS Architects, $250
1994 Turning Point Cultural Resources Survey, $250
1994 National Guard SBPNRA Project, $13,000
1993 I-84 Plant Sites Project, Wildish, $500
1993 I-84 Water Line/Road Access Project, Wildish, $250
1993 Baker Borrow Dump Project, Wildish, $250
1993 Nyssa Water Line Project, Anderson, Perry and Associates, $6000
1993 Nuff Property Survey, FHA, $2000
1993 416 CRI BLM Fire Rehab Survey, BLM, $2500
1993 Boulder Rapids Project, Myers Engineering, $250
1993 Kanaka Rapids Project, Myers Engineering, $250
1993 Wilson-Baker Borrow Project, Wildish, $250
1993 Neighbors-Brown Borrow Project, Wildish, $500
1993 Lava Site Survey, Cloverdale Nursery, $400
1992 Excavations at 10-GG-1, Faculty Research Grant, $1900

1992 Excavations at 10-TF-319, Myers Engineering, $1200
1992 Castle Creek CRI Survey, BLM, $2000
1992 Survey and Excavations of Smith Land Exchange, BLM, $3500
1992 AIG Construction Project, AIG, Boise, $300
1992 Black Ridge Survey, BLM, $9600
1992 Wellfield Fire REHAB Survey, BLM, $9250
1991 Archaeological Assemblage Diversity in the Late Archaic of Southern Idaho. Faculty Research Grant, $1,950
1991 Stanford Ranch Project, FHA, $3500
1991 Snow Creek Project, U.S. Air Force, $750
1991 Fuller Dewitt Project, FHA, $1600
1991 Three Creek REHAB Project, $3400
1991 Bliss Dam Project, Idaho Power, $500
1991 RRMP Fire REHAB Project, BLM, $2100
1991 Auger Falls Project, J-U-B Engineers, $2000
1991 Kanaka, Boulder and Empire Project, Myers Engineering, $2750
1991 Vale Transmission Survey, Idaho Power, $500
1991 Shrub Fire REHAB Project, BLM, $1500
1991 Excavations and Survey at Horseshoe Bend, Horseshoe Bend Hydroelectric Co., $14,500
1991 Duck Valley Project (3 years), 1991-92, $127,000
1990 Brownlee Archaeological Survey, BLM, $16,000
1990 Idaho Power Brownlee Campground project, $500
1990 CW Rim Ranch Investigation, $350
1990 Malad High Drop Hydroelectric Project, $1000
1990 Bear River Lazy CH Project, FHA, Montpelier, $1650
1990 Arco Farms Project, FHA, Arco, Idaho, $3500
1990 Robert Faust Property Investigation, Payette, $350
1989 Danskin Project, U.S. Forest Service, $6000
1989 Danskin Shelter, Historic Preservation Grant, $ 2000
1988 BLM Fire Rehab Surveys, $2500
1988 Faculty Research Grant, "Three Island Crossing," $1800
1988 Clover Creek, Historic Preservation Grant, $2500
1988 Florida Mountain Project, CH2M Hill, $29,500
1988 BLM Inventory Contract, $1500
1988 Three Island Crossing Project, Glenns Ferry, Idaho, Faculty Research Grant, $1800
1988 Dam Survey, Idaho Power, $300
1988 Magic Dam Project, Myers Engineering, $700
1988 Broken Wagon Fire Rehab Project, U.S. BLM, $1800
1988 Inventory Project, U.S. Bureau of Land Management, Boise, $1600
1987 Corps of Engineers Project, Eagle Hatchery, $300
1987 South Mountain Archaeological Project, $7500
1987 Dike Hydroelectric Project, $2750
1987 Faculty Research Grant, "Ethnoarchaeological Investigations in Southern Guyana," $2000
1986 SE Oregon Survey, Vale, BLM, $7000
1986 Three Island Crossing, $5000
1985 Archaeological Evaluations near Riggins, Idaho. General Electric, $3,500
1985 Faculty Research Grant "Archaeology of the Baker Caves," $1200
1984 Archaeological Excavations at 10-BO-1, Banks, ID. Federal Highway Commission, $90,121
1984 Archaeological Investigations at Goose Creek, J-U-B Engineers, $1,000
1984 Test Excavations near Lowman, Idaho, Federal Highway Administration, $10,000
1983 Pershing II–Idaho Site Cultural Resource Survey. Corps of Engineers, $2000
1983 Archaeological Test Excavations at Rock Creek Hydroelectric Project, J-U-B Engineers, $2500
1983 Archaeological Investigations at Auger Falls, Idaho, $7000

1983 Cultural Resource Survey of Seedskadee Wildlife Refuge, Wyoming (with M. Ostrogorsky) $2500
1982 Owyhee River Overview, Research Grant, Idaho State Historical Society, $15,000
1982 Consultant, Class I Inventory of Boise and Shoshone BLM Districts, Professional Analysts, Portland, $250
1981 Owyhee River Survey, Research Grant, Idaho State Historical Society, $17,000
1981 Archaeological Test Excavations near Bliss, Idaho. Idaho Power Company (with M. Ostrogorsky), $127,000
1980 Fremont Investigations in Southeastern Idaho, Research Grant, Idaho State Historical Society, $9,000
1979 Southcentral Owyhee County Archaeological Project, Research Grant, Idaho State Historical Society, 1979-80, $9000
1978 Archaeological evaluation of the Twin Falls Airport extension, J-U-B Engineers contract, $150
1978 Archaeological excavations at Camas and Pole Creeks, Owyhee County, Idaho. U.S. Bureau of Land Management contract, $2395
1978 Southcentral Owyhee County Archaeological Project, Research Grant, Idaho State Historical Society, 1978-79, $16,000
1978 Archaeological Survey of Transmission Line from Bear to Cuprum, Idaho, U.S. Forest Service, $1500
1978 Archaeological Survey of Wiley and Dike Dam Project, Edaw, Inc. contract, (with M. Ostrogorsky), $5000
1977 Archaeological clearance of land exchange parcels in the Boise National Forest, U.S. Forest Service contract, $1500
1977 Archaeological test excavations in the Boise National Forest, U.S. Forest Service contract, $1300
1977 Overview: Prehistory of the Western Snake River Plain, HDR Engineers, Santa Barbara. Contract, $250
1977 Southcentral Owyhee County Archaeological Project, Research Grant, Idaho State Historical Society, 1977-78, $10,000
1976 Archaeological survey of the Field Group and Little Valley Desert Land Entries, Owyhee County, Idaho. U.S. Bureau of Land Management contract, $1200
1976 Archaeological clearance of land exchanges in the Boise National Forest, U.S. Forest Service contract, $250
1975 Grant-in-aid for Doctoral Research, Indiana University Advanced Studies and Research Program, $400
1975 Archaeological inventory survey of the Camas Creek Drainage, Owyhee County, Idaho. U.S. Bureau of Land Management contract, $8000
1974 Archaeological survey of proposed ORV trails in the Wayne-Hoosier National Forest—Monroe and Perry Counties, Indiana. Indiana Historical Society Grant, $800

LABORATORY AND COLLECTIONS EXPERIENCE:

2000-present, Walter Roth Museum of Anthropology
1999 Rupununi Weavers Museum
1995 Pitt Rivers Museum, Oxford University
1995 Museum of Mankind, Ethnography Division, British Museum
1995 Museum of Archaeology and Anthropology, Cambridge University
1988 South Australian Museum, Adelaide, Australia
1987 Caribbean Studies Library, Georgetown, Guyana
1986 Walter E. Roth Museum of Anthropology, Georgetown, Guyana
1975 Southwest Idaho Curatorial Center, Boise, Idaho
1974 University of Utah Anthropological Collections
1974 Museum of Northern Arizona
1974 Archeological Collections, Department of Anthropology, Washington State University

1974 Archaeological, Ethnological Collections, Indiana University Museum
1970 Glenn A. Black Laboratory of Archaeology, Indiana University, 1970-75.

MUSEUM EXPERIENCE:

Special skills include curation and administration, conservation of archaeological materials, computerization of archaeological, ethnological and historical collections.
Research Associate, Museum, College of Southern Idaho.

Ph.D. inside minor in Museology.

2000-present Consultant, Walter Roth Museum of Anthropology, Member, Scientific Advisory Board
1999- Consultant, Canyon County Parks and Recreation
1999- Collections and Exhibit Consultant, Walter Roth Museum
1998 Western Canadian Museums, Canadian Studies Grant, Canadian Government
1998 Project Director, "Silver City: A Legacy of Change," Kinross Mining Company
1995 Museum Research, Oxford, Cambridge, British Museum.
1988 Consultant, Masacare Rocks St. Park Exhibit
1987 Visited South Australian Museum for Collections Research.
1987 Visited Museums in Adelaide and Sydney, Australia, summer.
1987 Consultant, Baker Caves Exhibit, College of Southern Idaho and U.S.B.L.M.
1986 Consultant, "Idaho's Heritage," Exhibit and pamphlet, Association for the Humanities in Idaho
1986 Visited Museums in Trinidad and Guyana.
1979 Consultant, "People of the Snake River." Exhibit and monograph preparation supported by grant from the Association for the Humanities in Idaho, 1979-80.
1977 Visited museums in England, Greece and Egypt, 1977-78
1975 Visited museums in Austria, England, France, Germany and Italy, 1975-76.
1975 T.C. Steele State Memorial Museum, Brown County, Indiana.
1975 Indiana University Fine Arts Museum, Bloomington, Indiana.
1975 Graduate Assistantship, Indiana University Museum, 1975-76.
1974 Supervisor, Indiana University Project Team, Indiana. Statewide Ethnological and Historical Bicentennial inventory project, Indiana Museum Association, 1974-75.
1974 Museum of Northern Arizona, Flagstaff, Arizona.
1974 Indianapolis Children's Museum, Indianapolis, Indiana.
1974 Indiana State Museum, Indianapolis, Indiana.
1974 Attended seminar on the methods of ethnological collections inventory at Indianapolis,
1970 Indiana University Museum, Bloomington, Indiana, 1970-76

PROFESSIONAL MEETINGS AND CONFERENCES/INVITED LECTURES:

2013 Invited Lecturer, Ministry of Culture, Youth and Sport Annual Lecture, "Recent Archaeological Investigations in the Rupununi Savannahs."
2012 Chair, Idaho Archaeological Society Conference.
2012 Invited Presenter, 3rd International Amazonian Conference, Lima.
2012 Invited Participant, Portable Art Symposium, 79th Annual Meeting of the Society for American Archaeology.
2011 Invited Lecturer, Guyana United Nations Indigenous Peoples Day, "The Prehistory of Guyana's Indigenous Peoples, Ministry of Culture, and Youth Sport.
2011 Recent Discoveries of Pictographic Rock Art in the Rupununi Savannahs of Southern Guyana. Paper presented at the Annual Meeting of the American Rock Art Association.
2011 Chair, Idaho Archaeological Society Conference.

2011 Invited Speaker, Walter Roth Museum of Anthropology "Recent Investigation of the Siriki Shell Mound.
2010 Invited Lecturer, Annual Ministry of Culture Lecture, "Recent Discoveries in the Prehistory of Guyana, Guyana National Museum.
2010 Invited Presenter, Amazonian Dark Soils Symposium, World Archeological Conference, London.
2009 Invited Lecture, "Recent Investigations in the South Rupununi Savannahs," Walter Roth Museum of Anthropology Series, Georgetown, Guyana.
2008 Invited Lecture, "Comments on Prehistoric Guiana," the Launching of Williams book *Prehistoric Guiana,* Ministry of Culture, Youth and Sport, Georgetown, Guyana.
2007 First Walter Roth Museum of Anthropology Lecture: "Recent Investigations in the Rupununi Savannahs, Guyana," Ministry of Culture, Youth and Sport, Georgetown.
2002 Invited Presenter, Ministry of Culture. Republic of Guyana "Guyanese Archaeology," University of Guyana.
2001 Invited Presenter, Workshop: "Archaeological Methods," Walter Roth Museum and University of Guyana.
2000 Invited Presenter, Symposium: "Mobility in the Northeastern Great Basin" 27th Great Basin Anthropological Conference.
1999 Participant, Public Meetings Regarding Skeldon Estate Expansion, Skeldon, Guyana.
1998 Session Chair, "Historical Issues" and Great Basin Issues, Native American Studies Conference, Boise State University, February 26-28.
1998 Co-Chair, 25th Annual Conference of the Idaho Archaeological Society, Boise State University
1998 Invited Participant, Carib Studies Conference, Georgetown, Guyana.
1997 Session Chair, Historical Issues, Native American Studies Conference, Boise.
1995 Session Organizer, Southern Idaho Archaeology, Idaho Academy of Sciences 37th Annual Meeting, Northwest Nazarene College, Nampa.
1994 Invited Participant, "The Horse in the Intermountain West," Boise, Idaho, Idaho Horse Board/ National Endowment for the Humanities.
1992 Invited Participant, Symposium: Christopher Columbus and the Conquest of the Americas, Idaho Social Science Teachers Annual Meeting, Boise, Idaho.
1991 Invited Participant, Symposium: The Natural and Cultural History of the Snake River Plain, 64th Annual Meeting of the Northwest Scientific Association, Boise State University.
1988 Discussant, 1st International Conference on Resource Management, Oregon State University.
1988 Chair, Symposium "Aboriginal Fishing in Western North America" 28th Annual Conference of the Western Association of Sociology and Anthropology, Boise.
1988 Invited Participant, Snake River Plain Symposium: Prehistory of the Snake River Plain, Idaho Academy of Sciences Meeting, Boise.
1988 Co-Chair, Symposium: Prehistory of Southern Idaho and the Snake River Plain. 41st Annual Meeting of the Northwest Anthropological Conference, Tacoma.
1988 Chair, Symposium: Snake River Plain Prehistory. Great Basin Anthropological Conference, Park City, Utah.
1988 Discussant, Second Western Point Typology Conference, Idaho State University.
1988 Co-Chair (with Thomas Green), 15th Annual Meeting of the Idaho Archaeological Society.
1987 Participant, First National Conference on Tourism, Georgetown, Guyana.
1986 Invited Participant, Second Great Basin/Intermountain Pottery Conference. Idaho State University.

TECHNICAL REPORTS:

2015 Report on Archaeological Evaluation of the New Meadows Wastewater Reuse System Improvement Project. Report on file, Cascade Engineering, McCall, Idaho.
2015 Report on Duck Valley Road Improvement Project. Report on File, Duck Valley Indian Reservation, Duck Valley, Nevada.
2014 (with Louisa Daggers) A Cultural Resource Assessment/Archaeological Survey of the Guyana Goldfield Inc. Mining Concession Immediate Impact Zones. Submitted to Guyana Goldfields, Inc., Toronto, Canada.
2014 Excavations at Indian Crossing, Near Hammett, Idaho, Report to Dale Hooley.
2013 Excavations at Three Island Crossing.
2013 Technical Report Identifying the Potential Range of Cultural Resources Within the Aurora Gold Mining Project, Guyana. ENVIRON International Corporation. New York, New York.
2012 Report on Archaeological Survey of the Proposed Tribal Headquarters, Duck Valley. Report to the Shoshoni Paiute Tribes.
2012 Executive Report on Excavations at Siriki Shell Mound, Report to Guyana EPA.
2012 Excavations at Wyva Creek Shell Mound, Northwest, Guyana, Report to MCYS, Guyana.
2011 Excavations at Three Island Crossing.
2010 Test Excavations near Warm Lake, Boise National Forest, Report to BNF.
2010 Test Excavations at Bara Bara Shanale, Northcentral Guyana, Report to Guyana EPA.
2010 Excavations at Kabakaburi Shell Mound, Guyana, University of Guyana.
2009 Excavations at 10-EL-216.
2009 Archaeological Excavations at Cow Hollow, Bureau of Land Management, Vale, Oregon.
2008 Evaluation of the Falcon Crest Development Project, Materials Survey and Testing, Boise.
2008 Test Excavations at Errol's Landing, Iwokrama Rainforest, Guyana. Report to MCYS.
2007 M3 Eagle Project, Report on file, M3 Company.
2007 Report on the Falcon Crest Survey, Materials Testing.
2007 Report on Dry Creek Development Survey, Materials Testing.
2006 Archaeological Excavations at Cow Creek, Cassia County, Idaho, Bureau of Land Management, Burley District.
2006 Archaeological Survey of the Blacks Creek Development, Materials Testing and Surveys, Boise.
2006 Archaeological Review of Waste Water Collection, West Side Cascade Lake, Keller Engineering.
2006 Nickolson Land Exchange, BLM.
2006 Nickolson Land Exchange Addendum, Bureau of Land Management.
2006 Blackhawk South Development Project, Secesh Engineering, McCall, Idaho.
2006 Red Ridge Development Project, Secesh Engineering, McCall, Idaho.
2006 Wind Power Generation Project, Twin Falls County, Carol Sperry.
2006 (with Chris Willson) A Cultural Resources Survey of the Owyhee Airfield Extension Project. Located on the Duck Valley Indian Reservation, Nevada, Armstrong Engineering, Grand Junction, Colorado.
2006 (with Chris Willson) A Cultural Resources Survey of the Duck KV38 Power Line Extension, Raft River Electric.
2006 Idaho Air National Guard ICRMP, IANG.
2006 Archaeological Survey along the Rupununi River between Karanambu and Yupukari, Southern Guyana. A Report to the Ministry of Culture, Youth and Sport and EPA, Republic of Guyana.
2006 Survey in the Vicinity of Aishalton, Government of Guyana.
2006 Report on Camas Creek Archaeological Survey, Tallons, Report on Archaeological Evaluation of Sites on the Mountain Home Training Range, U.S. Air Force.
2006 A Report on the Cultural Resources Evaluation of the Osprey Ridge Project, Materials Testing and Survey.
2005 Report on BA Site, Saylor Range, Tallons, Inc.

2005 Report on Monitoring Sites on the Saylor Creek Range, MHAFB. Archaeological Survey of the Proposed 138Kv Transmission Line, Powers Engineering, Inc.
2005 Report on the Blackhawk Survey, Report on File, Secesh Engineering, Inc.
2005 A Report on the Survey of Shea Village, Report on File, EPA, Guyana.
2005 A Report on the Survey of the North Fork of the Owyhee River, Vale District BLM.
2005 A Report on the Survey of the Cascade Water Treatment Facility, City of Cascade.
2005 Kuna Wastewater Project, Keller Engineering, Meridian.
2004 Preliminary Report on Test Excavations at 10-VY-7, Robert Hunt and Associates.
2004 OTA Range 22 Assembly Project, IDANG
2003 Report on the Goodwin Boat Ramp Project, Marsing, Idaho.
2003 A Report on the Archaeological Evaluation of the Weiser Wetlands Project. Northwest Natural Resource Group
2003 Weapons Screening Line Project, Army National Guard
2003 OTA Engineering Training Area 2003, IDARNG
2003 Report on Women's Prison Facility Project, Lombard Associates
2003 Jug-Mountain 2 Survey Project, Valley County, Idaho, Secesh Engineering
2003 Archaeological Survey of Diatom Mines, Eastern Oregon, Eagle-Pitcher Mining Co.
2002 Report on the West Cascade Project, Kellar Associates
2002 Report on the Archeological Survey of the Proposed Mountain Home Water Project, Kellar Associates, Meridian
2002 Report on Archaeological Monitoring of Wetlands Modifications, West Rock Project. West Rock Corporation, Los Angeles.
2002 Report on Archaeological Survey of the Cinder Pit AA Area, OTA, IDANG
2002 Report on the Archaeological Survey of the Cascade Lake Boat Jetty Project. Cascade Property Owners Associations.
2002 Report on the Simplot Right-of-Way Project, Report on File, SHPO and Simplot Company
2001 Report on Becky Idaho Monopole Site, Report on File, SHPO, PSI
2001 Report on Black Canyon Monopole Project, Report on File, PSI Inc., Salt Lake City
2001 Report on the C-Line Monopole Site, Report on File, PSI, Inc., Salt Lake City
2001 Report on the Archaeological Survey of the Wallin Farm Project, Marsing, Idaho
2001 Report on the Chattim Hill Land Exchange, Report on File, Simplot Livestock Company
2000 Report on Kuna Communication Tower Project, Report on File, SHPO, PSI
2000 Report on Glenns Ferry Communication Tower Project, Report on File, SHPO, PSI
1999 Report on OTA Water Guzzlers, BLM, IANG
1999 Report on North Lake Project, on file, Keller and Associates
1999 Report on Archaeological Survey of the Marsing and Rupert Projects, Report on file, Keller and Associates
1999 A Cultural Heritage Assessment of the Skeldon Estate Expansion, Guyana, Report on File, Ecologistics, Inc., Waterloo, Canada
1999 A Report on OTA Waterline Development, Report on File, IANG, Boise
2000 Report on the Archaeological Survey of the Proposed Envirosafe Land Exchange, Report on File, Envirosafe, Inc.
2000 Report on the Simco Land Exchange, Report on File, BLM
2000 Report on Archaeological Survey of the Visitors Center Project, Report on File, SHPO, Lombard-Conrad Architects
1998 (with Sharon Plager) U.S. Army National Guard Cultural Resources Planning Level Survey, Orchard Training Area, Idaho, Department of the Army
1998 (with Sharon Plager) A Report on Monitoring of Type I Cultural Resource Sites within the Stone Cabin Mine Area, Kinross Mining Company
1997 Report on the Survey of the Rosswell City Water Project, Report on File, Kellar Associates, Boise
1997 Report on Simplot Right-of-Way Project, Report on File, J.R. Simplot Company, Grandview, Idaho

1997 Report on Kinross Borrow Excavations, Report on File, Kinross Mining Company, Jordan Valley, Oregon
1997 OTA Demolition Project Report, Report on File, Idaho Army National Guard, Boise
1996 Report on Evaluation of the Riggins Water Project, Report on File, Birdsall Associates
1996 Report on the Archaeological Survey of the Wetlands Road Right of Way Project
1996 Report on the Archaeological Survey of the Mayfield Ingress/Egress Project. Report on File, Bureau of Land Management, Boise
1996 Report on the Archaeological Survey of the Delamar Sediments Ponds, Report on File, Kinross Mining Company, Jordan Valley, Oregon
1996 Report on the Archaeological Survey of the Intermountain Gas Pipeline Project, Report on File, Intermountain Gas, Boise
1996 Report on the Evaluation of the Tait Aggregate Source, Report on File, Tait Aggregate Co. Mountain Home, Idaho
1996 Report on File, Kinross Mining Company, Jordan Valley Oregon
1995 Report on the Stevens Land Exchange Project, Report on File, BLM, Boise
1995 Report on the Donnelly Water Line Project, Report Submitted to Donnelly Water District, Cascade
1995 Report on the Kuna Water District Project, Ida-Ore, Report on File, Boise
1995 Report of the Archaeological Survey of the Glenns Ferry Senior Housing Project, Report on File, Ida-Ore, Boise
1995 Report of a Cultural Resources Survey of the Horseshoe Bend Water Treatment Facility Area, Report on File, Ida-Ore, Boise
1995 Report of the Archaeological Survey of the Simplot Right-of-Way Project, Grandview, Idaho. Report on File, Simplot Company, Grandview
1995 Report on the Archaeological Survey of the Shrub Reseeding Project, Report on File, Bureau of Land Management, Boise District Office
1995 Report on the Delamar Mining Project, Report on File, Kinross Mining, Jordan Valley, Oregon
1995 An Archaeological Report on the Proposed North Fork Payette Hydroelectric Project, Report on File, Myers Engineering, Boise
1995 Report on the Archaeological Survey of the Air Monitoring Station Locality, Report on File, Micron Technology, Inc.
1994 Report on the Cable Upgrade Project, Ada County. Report on File, BLM, Water Resources Division, Boise
1994 Report on the Jones Property Inventory, Bannock County Idaho, Report on File, FmHA, Boise
1994 Report on the Cascade and Donnelly Water Projects, Report on File, Ida-Ore Planning and Development, Boise
1994 Report on the Star Water Project. Report on File, Kellar and Associates, Boise
1994 Report on the Anderson and Port Wood Projects Bonneville County, Idaho. Report on File, FmHA, Boise
1994 Report on the Cold Springs Project, Elmore County, Idaho. Bureau of Land Management
1994 (with Camille Sayer) Archaeological Survey of the Placerville Timber Sale. Report on file, Boise District, BLM
1994 Report on the G and B Redi Mix Project. Report on File, G and B, Nampa, Idaho
1994 (with Camille Sayer) Report on the Archaeological Survey of the Key Bank-Locust BRS Architects
1994 Report on the Archaeological Survey of the Turning Point Construction Project, Nampa
1993 A Report on the Archaeological Survey of the Boulder Rapids Transmission Line Survey. Report on file, Myers Engineering, Boise
1993 An Archaeological Survey of the Kanaka Rapids Transmission Line Survey. Report on File, Myers Engineering, Boise, Idaho
1993 An Archaeological Report on the Wilson-Baker Borrow Project near Hammett, Idaho. Submitted to Wildish Land Company, Eugene, Oregon
1993 An Archaeological Report of the Survey of the Neighbors-Brown Borrow Source, Hammett, Idaho. Report submitted to Wildish Land Company, Eugene, Oregon

1993 A Report on the Archaeological Survey of the I-84 Plant Sites at Milepost 107, Hammett, Idaho. Report submitted to the Wildish Land Company, Eugene, Oregon
1993 A Report on the Nuff Property Survey, Farmers Home Administration
1993 A Report on the Archaeological Survey near Preston, Idaho Report Submitted to FHA, Boise State University
1993 A Report on the Archaeological Survey of the 416 CRI Fire Rehab, Elmore County, Idaho. Report Submitted to Boise District, BLM, Boise
1993 Report on the Archaeological Survey of the Lava Site. Report Prepared for Cloverdale Nursery, Boise
1992 An Archaeological Survey of the U-3 Hydroelectric Project. A Report submitted to Ida-West Energy Company, Boise
1992 Preliminary Report on Archaeological Excavations at 10-GG-1, Southwest Idaho, Office of Research Administration, Boise State University
1992 Final Summary Report of Archaeological Excavations at 10-GG-1, Southwest Idaho
1992 A Report on the Archaeological Survey of the Castle Creek CRI, Owyhee County, Idaho. Report submitted to the BLM, Boise District, Boise
1992 A Report on Test Excavations at 10-TF-319. Report on file, Myers Engineering, Boise
1991 A Report on the Survey of the Idaho Power Prison Transmission Line, Vale, Oregon. Submitted to Idaho Power Company, Boise
1991 A Report on the Cultural Resources Survey of the Shrub Fire REHAB. Report on file, Boise District BLM
1991 A Report on the Cultural Resources Survey of the RRMP Fire REHAB Survey. Report on file, Boise District BLM
1991 A Report on the Cultural Resources Survey of the Three Creek Well, REHAB. Report on file, Boise District, Bureau of Land Management
1991 A Report on the Stanford Ranch Survey, Owyhee County, Idaho. Report submitted to FHA, Marsing
1991 A Report on the Dewitt-Feller Property. Report on file, FHA, Montpelier
1991 A Report on the Archaeological Survey of the Snow Creek Campsite. Report on file, U.S. Air Force, Ogden, Utah
1990 (with James H. Hale) A Report on the Brownlee Land Exchange Survey. Report submitted to the Bureau of Land Management
1990 A Survey Report on the G-W Farm, Near Melba, Idaho. Report Submitted to FHA, Caldwell
1990 A Report on the Archaeological Survey of the Lazy CH property, Bear Lake County. Report submitted to the FHA, Montpelier, Idaho
1990 A Report on the Survey of the Carl Willie Property. Malad, Idaho. A Report submitted to the FHA, Malad, Idaho
1990 A Report on the Survey of the Farm Properties in the Areas of Arco, Idaho. A Report submitted to the Farmers Home Administration, Arco, Idaho
1990 An Archaeological Survey of the Robert Faust Farm, Payette County, Idaho. Report submitted to the FHA Payette, Idaho
1990 A Report on the Archaeological Survey of the Proposed Malad High Drop Hydroelectric Project. Report submitted to Consulting Associates, Inc.
1990 A Report on the Archaeological Survey of the Brownlee Campground Expansion. Report submitted to Idaho Power Company
1988 Report on the Magic Dam Survey. Report submitted to Myers Engineering, Boise. June
1988 Report on the Broken Wagon Fire Rehab Survey, Report to the Bureau of Land Management, October
1988 Report on the Survey of the Pine Creek Rip-Rap and Dredge Project, Baker County, Oregon. Report on file, Idaho Power Company, Boise, December
1988 Report on the Florida Mountain Project. Submitted to CH2M Hill, Corvallis, Oregon, October
1987 A Cultural Resources Survey of the Fire Rehabilitation Survey of Alkali Flat and Henry Gulch Areas. Vale District, Bureau of Land Management, Oregon. Report on file, Vale District, BLM, Vale, Oregon

1987 (with James C. Woods) A Cultural Resource survey of the Euiguren Land Exchange, Vale District, Bureau of Land Management, Oregon. Report on file, Vale District, BLM, Vale, Oregon
1987 Report on the Dietrich Hydroelectric Project near Dietrich, Idaho. Report on file, Bingham Engineering, Salt Lake City
1987 (with Russell T. Gould) A Report on the Cultural Resource Inventory of the Pothole Reservoir Fire Rehab, Elmore and Owyhee Counties, Idaho Report on file, Boise District, BLM, Boise
1987 A Preliminary Report on Use-Wear Analysis of Stone Knives from the Western Desert, Australia. Report on file, South Australian Museum, Adelaide, Australia
1987 Report on the Dietrich Hydroelectric Transmission Corridor. Report on file, Bingham Engineering, Salt Lake City
1986 A Report on the Cultural Resource Survey of the AEC Well Fire REHAB, Stiff Tree Draw Quadrangle, Idaho. Report on file, Bureau of Land Management, Boise District, Boise
1986 A Report on the Beet Dump Fire Rehab Cultural Resource Inventory, Sand Dune Quadrangle, Idaho. Report on file, Bureau of Land Management, Boise District, Boise
1986 A Final Report on the Cultural Resource Survey of the Riddle Land Exchange. Report on file, Bureau of Land Management, Boise
1985 An Archaeological Evaluation of the Lincoln Bypass Hydroelectric Project. Report on file, Bingham Engineering. Salt Lake City
1985 (with Daniel S. Meatte) A Cultural Evaluation of the East Fork Ditch Hydroelectric Project. Report on File, Myers Engineering, Boise
1985 An Archaeological Survey of the Shingle Creek Hydroelectric Project. Report of file, Myers Engineering, Boise
1985 An Archaeological Survey of the Upper Hat Creek Hydroelectric Project. Report on file, Myers Engineering, Boise
1985 Archaeological Test Excavations at Site V-256, Star Mountain Realty Exchange: Preliminary Report. Report on file, U.S. Bureau of Land Management, Vale District, Oregon
1985 Progress Report on Vale District Cultural Resource Activities, 1985. Report on file, U.S. Bureau of Land Management, Vale District, Oregon
1984 A Report on the Archaeological Evaluation of the Magic Dam Hydroelectric Transmission Line Project. Report submitted to Ralston Associates, Kuna
1984 A Report on Archaeological Sensitivity Mapping of the Vale District Bureau of Land Management, Vale, Oregon. Report on file, Bureau of Land Management, Vale, Oregon
1984 A Report on the Archaeological Evaluation at Duncan Mount, Idaho. Report on file, Pacific Power and Light Company, Portland
1983 Archaeological Test Excavations in the Auger Falls Hydroelectric Project Area, Twin Falls County, Idaho. Report to J-U-B Engineers, Boise
1983 (with James L. Huntley) A Report on Archaeological Collection and Test Excavations of Site 10-OE-2844. Sands Basin, Idaho. Report on file, Bureau of Land Management, Boise
1982 Ethnohistoric Overview of the Western Snake River Area. Prepared for Geomorphology of the Western Snake River Plain. Elton B. Bentley, Principal investigator
1982 Management Options and Research Directions—Class I for Boise and Shoshone BLM. Report on file, professional analysts, Eugene
1982 A Report of Archaeological Test Excavations at the Prehistoric Sites in the Rock Creek Hydroelectric Project, Twin Falls County, Idaho. Report submitted to J-U-B Engineers, Boise
1981 Prehistoric Demography in the Owyhee Uplands, Idaho: A Comparison of Ethnographic and Archaeological Models. Report on file (site survey proposal), Idaho State Historical Society, Boise
1980 An Archaeological Survey of the Lye Lake Ranch near Bliss, Idaho. Report on file, Idaho State Historical Society, Boise
1979 Transmission Line Survey from Cuprum to Bear, Idaho. Letter Report on file, Department of Lands, Boise.
1979 Tentative Re-Classification of Idaho Shoshoni Ware, ms. of file, Nevada State Museum
1977 A Preliminary Report on the Archaeological Evaluation of the Custer Creek Land Exchange, Boise National Forest. Report on file, Boise National Forest, Boise

1977 Final Report on the Archaeological Evaluation of the Custer Land Exchange, Boise National Forest. Report on file, Boise National Forest, Boise
1977 A Preliminary Report on the Archaeological Evaluation of Land Exchanges in Boise and Valley Counties, Idaho. Report on file, Boise National Forest, Boise
1977 Final Report on the Archaeological Evaluation of Land Exchanges in Boise and Valley Counties, Idaho. Report on file, Boise National Forest, Boise
1977 A Preliminary Report on the Archaeological Test Excavations at Sites 10-VY-95, 10-VY-96 and 10-VY-97, Valley County, Idaho. Report on file, Boise National Forest, Boise
1977 Final Report on the Archaeological Excavations at Sites 10-VY-95, 10-VY-96 and 10-VY-97, Valley County, Idaho. Report on file, Boise National Forest, Boise
1977 Addendum to the Final Report on the Archaeological Evaluation of Land Exchanges in Boise and Valley Counties, Idaho. Report on file, Boise National Forest, Boise
1977 Prehistory of the Western Snake River Plain: An Overview. Report on file, Exosciences Division, Henningson, Durham and Richardson, Santa Barbara
1976 (with Daniel S. Meatte) An Antiquities Assessment of Proposed Geothermal Drilling Sites, Malheur County, Oregon. Report on file, Vale District, BLM, Vale
1974 An Archaeological Survey of Proposed ORV Trails in the Wayne-Hoosier National Forest. Report on file, U.S. Forest Service Office, Bedford, Indiana
1972 Plains Beadwork. Unpublished ms. on file, Indiana University Museum, Bloomington

PRESENTED PAPERS:

2014 Incised Stones from Idaho. Paper Presented at the 79th Annual Meeting of the Society for American Archaeology, Austin, Texas.
2014 Preliminary Test Excavations at site 10-EL-215. Paper Presented at the 39th Annual Meeting of the Idaho Archaeological Society, Boise.
2013 The Prehistory of the Indigenous Cultures of Guyana. Guyana United Nations World Indigenous Peoples Day Lecture, Georgetown.
2013 Recent Archaeological Discoveries in the Rupununi Savannahs, Lecture, Accepted, July 11, 2013, Plew, M. G., Annual Cultural Lecture, Ministry of Culture, Republic of Guyana, Georgetown Guyana, International, Professional, Peer-reviewed/Refereed, Invited.
2012 Archaeological Excavations at site 10-EL-215, Southwest Idaho. Paper Presented at the 40thAnnual Meeting of the Idaho Archaeological Society, Moscow.
2012 The Use of Contemporary Harvest Data for Thinking about Prehistoric Resource Depression. Idaho Academy of Sciences Meeting, Twin Falls.
2011 Archaeological Investigations at site 10-EL-216, Southwest Idaho. Idaho Archaeological Society Meeting.
2011 Contributions of Denis Williams to the Archaeology of Guyana. Faculty of Social Sciences, University of Guyana.
2010 The Archaeology of Guyana, Walter Roth Museum Lecture Series.
2010 Archaeology of Kabakaburi Mound, Kabakaburi Village Council.
2010 Recent Discoveries in the Prehistory of Guyana. Annual Science Lecture, Ministry of Culture, National Museum, Guyana.
2009 Recent Work in the Vicinity of Shea, Southern Guyana. Walter Roth Museum Lecture Series.
2009 Observations on Legal Protections of Archaeological Sites and Remains in Guyana Association for the Study of Law, Culture and Humanities, Georgetown Law Center.
2009 Revisiting the Fremont Question in Idaho. 38th Annual Conference of the Idaho Archaeological Society, Boise.
2008 Archaeology of Antelope Creek Rockshelter. 30th Annual Conference of the Idaho Archaeological Society, Boise, Idaho.

2007 Report on Archaeological Test Excavations at Little Owl Cave, Oregon. Paper Presented at the 28th Annual Conference of the Idaho Archaeological Society (with Willson, T. Jacobs and S. Plager).

2000 (with Pam Huter and Kristen Mercer) Archaeological Test Excavations at 10-EL-1577, King Hill, Idaho, Paper Presented at the 27th Annual Conference of the Idaho Archaeological Society, McCall, Idaho.

2000 A History of Recent Archaeological Research in the Northeastern Great Basin. Paper presented at the 27th Conference of the Great Basin Anthropological Society, Ogden.

1999 (with Pamela Huter) Recent Investigations at 10-CN-5, Southwest Idaho. 26th Annual Meeting of the Idaho Archaeological Society, Moscow.

1998 The Prehistory of Guyana: Old Traditions and New Perspectives. Paper Presented to Carib Studies Conference, Georgetown, Guyana.

1998 (with Sharon Plager) Fish Remains from Three Sites in Southwestern Idaho. Paper Presented at the 25th Annual Conference of the Idaho Archaeological Society.

1997 Recent Evidence of Paleoindian Occupation in the Lower Amazon: Implication for the Prehistory of Guyana. Twenty Seventh Annual Idaho Archaeologist Conference, Caldwell, Idaho.

1996 (with Russell T. Gould) Site Structure at Three Island Crossing (10-EL-294), Southwestern Idaho. Paper Presented at the 25th Great Basin Anthropological Conference, Kings Beach, California.

1996 (with Sharon Plager and Camille Sayer) Recent Archaeological Investigations in Southwestern Idaho. Paper Presented at the 23rd Annual Conference of the Idaho Archaeological Society, Twin Falls, Idaho.

1995 (with Russell T. Gould) Optimal Foraging Approaches to Prehistoric Subsistence on the Middle Snake River: Ecological Dynamics of Trade- Offs and Strategic Responses. Paper Presented at the 37th Annual Meeting of the Idaho Academy of Sciences, Nampa, April 6, 1995.

1995 Defining Residential Structures: Insights from Hunter- Gatherer and Ethnoarchaeological Research. Paper Presented at the 22nd Annual Conference of the Idaho Archaeological Society Meeting, October 28, 1995. Boise.

1995 (with Beau Hanson) Field Flow Fractionation: Implications for Phytolith Fractionation and Sorting. Paper Presented at the 22nd Annual Conference of the Idaho Archaeological Society Meeting October 28, 1995. Boise.

1994 (with Russell T. Gould) Optimal Foraging Approaches to Prehistoric Salmon Fishing in the Northern Great Basin: The Ecological Dynamics of Trade-Offs and Strategic Responses. Paper Presented at the 59th Annual Meeting of the Society for American Archaeology, Anaheim, California, April 20-24, 1994.

1994 (with Russell T. Gould) Prehistoric Salmon Fishing in the Northern Great Basin Ecological Dynamics, Trade-Offs, and Foraging Strategies. Paper Presented at the 22nd Annual Meeting of the Idaho Archaeological Society, Twin Falls. October 22, 1994.

1992 A Reassessment of Aboriginal Fishing Strategies on the Middle Snake River. Paper presented at the Annual Meeting of the Pacific Division, American Association for the Advancement of Science, Missoula.

1991 (with Russell Gould) Archaeological Investigations of the 10-GG-1, near Bliss, Idaho. Paper Presented at the 18th Annual Meeting of the Idaho Archaeological Conference.

1990 (with James Hale) Excavations at Danskin Rockshelter. 16th Annual Meeting of the Idaho Archaeological Society, October.

1989 Excavations at Clover Creek. Paper Presented at the 17th Annual Conference of the Idaho Archaeological Society.

1988 A Review of the Archaeology of the Owyhee Uplands, Idaho. Paper presented at the 41st meeting of the Northwest Anthropological conference, Tacoma.

1988 (with Russell Gould) Archaeological Investigations at Three Island Crossing. Paper presented at the 41st Annual Meeting of the Northwest Anthropological Conference, Tacoma.

1988 (with S. Forbes and M. Bennick) A report in the Southwest Idaho Ceramic Project. Paper presented at the 41st Annual Conference of the Northwest Anthropological Conference, Tacoma.

1988 Owyhee Country Archaeology. Museum Lecture Series, Idaho Museum of Natural History.
1988 Southwest Idaho Point Typology. Second Point Typology Conference, Idaho State University.
1987 Use-Wear Analysis of Stone Knives from the Western Desert, Australia. Paper Presented at the 14th Annual Conference of the Idaho Archaeological Society, Boise, Idaho.
1986 A Progress Report on the Baker Caves. Paper Presented at the 13th Annual Conference of the Idaho Archaeological Society, College of Southern Idaho, Twin Falls.
1986 (with Susan Neitzel, Kevin Meyer and Gary Bowyer) Archaeological Excavations at Three Island Crossing. Paper presented at the 13th Annual Conference of the Idaho Archaeological Society. College of Southern Idaho, Twin Falls.
1986 Archaeological Assemblage Variability in Fishing Locales of the Western Snake River Plain. Paper Presented at the 28th Annual Meeting of the Western Association of Sociology and Anthropology, Boise, Idaho. (Refereed paper)
1986 Problems in North and South American Prehistory. Paper presented to Amerindian Research Unit, University of Guyana.
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1986 Discussant, Cultural Resource Management, 1st International Conference on Resource Management, Oregon State University.
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1992d Book Review. "Hunter-Gatherers: Archaeological and Evolutionary Perspectives" by Robert L. Bettinger. *Idaho Archaeologist* 15(2):31-32.
1992e A Pottery Collection form Near King Hill, Idaho. *Idaho Archaeologist* 15(2):27-28.
1991a Part II. Prehistorical Overview. In *Duck Valley Historical Overview.* Bureau of Indian Affairs, Portland.
1991b Prehistoric Land Use of the Snake River Plain. *Northwest Science*. 65 (2):35.
1991c Book Review. "Quantifying Diversity in Archaeology," edited by Leonard and Jones, Cambridge University Press. *Idaho Archaeologist* 14(2):3.

1990a Modeling Alternative Subsistence Strategies for the Middle Snake River. *North American Archaeologist* 11(1): 1-15.
1990b Archaeological Test Excavations at the Clover Creek Site. *Idaho Archaeologist* 13(1): 1-15.
1990c Use Wear Analysis of Knives from the Western Desert Australia. *The Artefact* 13:2-11. Melbourne.
1990d Archaeological Test Excavations at Deep Creek Rockshelter, Southwest, Idaho. *Idaho Archaeologist* 13(1).
1990e (with Molly K. Bennick) Prehistoric Ceramics in Southwestern Idaho: A Report on the Southwest Idaho Ceramic Project. *Hunter-Gatherer Ceramics in the Great Basin*. Nevada State Museum Anthropological papers, No. 22.
1989a Additional Comments on the Five Fingers and "Y" Complexes: A Reply to Agenbroad. *Plains Anthropologist* 34(123): 59-61.
1989b (with James Hale) A Report on Excavations at Danskin Rockshelter. *Cultural Resource Reports* No. 1989-1. Boise State University.
1989c Book Review of "Lithic Assemblages of Dirty Shame Rockshelter: Changing Traditions in the Northern Intermontane. *Idaho Archaeologist* 12(1): 15-16.
1989d Two Aboriginal Metal Projectiles from Swiss Valley, Near King Hill, Idaho. *Idaho Archaeologist* 12(1): 17-18.
1988a Comments on the Analysis of Lithic Flakes from Calico. *Journal of Field Archaeology* 14(2): 503.
1988b Archaeological Assemblage Variability in Fishing Locales of the Western Snake River Plain. *North American Archaeologist* 9(3): 247-257.
1987a (with Kevin Meyer) An Aboriginally Worked Brass Bipoint from Three Island Crossing. *Idaho Archaeologist* 19(1):17-18.
1987b The Dating of Salmo Gairdneri and Non-Salmonid Remains from Nahas Cave. *Idaho Archaeologist 10(1): 19-20.*
1987c A Reassessment of the Five Fingers and "Y" Buffalo Jumps, Southwest, Idaho. *Plains Anthropologist* 32(117): 317-321.
1987d Comments on the Distribution of Folsom Points in Eastern Oregon and Western Idaho. *Northwest Anthropological Research Notes* 20(2): 221-225.
1987e Editor's Note: Schellbach Cave. *Idaho Archaeologist* 10(2): 23.
1986 An Archaic Biface Cache from Lower Rock Creek, Twin Falls County, Idaho. *Idaho Archaeologist* 9(1): 21-24.
1985a (with James C. Woods) Observation of Edge Damage and Technological Effects of Flaked Stone Tools. In *Approaches to Stone Tool Analysis: Essay in Honor of Don E. Crabtree*. University of New Mexico Press.
1985b *A Prehistoric Settlement Pattern for the Southcentral Owyhee Upland, Idaho*. Ph.D. dissertation, Department of Anthropology, Indiana University. Ann Arbor: University Microfilms.
1985c (with James C. Woods) Fired Clay Cylinders from Deep Creek Rockshelter. *Idaho Archaeologist* 8(2): 39-40.
1985d Archaeological Test Excavations at the Kuney Site: A Middle Archaic site in the south Hills Country. *Idaho Archaeologist* 8(2): 27-36.
1985e Editor's Preface. *Idaho Archaeologist* 8(1): 2.
1984a Prehistory of the Owyhee County. *Desert News* 1(1).
1984b Implications of Nutritional Potentials of Anadromous fish Resources on the Western Snake River Plain. *Journal of California and Great Basin Anthropology*.
1984c Archaeological Test Excavations at the Hemmert Site (10-BL-14), Southeastern Idaho. *Idaho Archaeologist* 7(1): 2-8.
1983 Archaeological Test Excavations at 10-OE-1838, Southwest Idaho. *Idaho Archaeologist* 6(1):9-11.
1982a Thin Section analysis of Pottery from Site 10-GG-1, Southcentral Idaho. *Idaho Archaeologist* 5(2):9-15, Caldwell.
1982b CRM Publication: A Comment. *Journal of Field Archaeology* 9(2): 284, Boston.

1982c A Compendium of Radiocarbon Dates for Southern Idaho Archaeological Sites. *Journal of California and Great Basin Anthropology* 4(1):113-122, Riverside.
1982d A Preliminary Overview of the Owyhee Country. *Idaho Archaeologist* 6(1-2): 47-54.
1982e (with James C. Woods) Archaeological Investigations on the East and South Forks of the Owyhee River Canyon. *Idaho Archaeologist* 6(1-2): 25-32, Caldwell.
1981a Southern Idaho Plain: What are the Facts? A Reply to Butler. *Plains Anthropologist* 26(92): 161-164, Lincoln.
1981b An Incised Stone From Gooding County, Idaho. *Idaho Archaeologist* 4(3):8-9, Caldwell.
1981c A Preliminary Report on Archaeological Excavations at Nahas Cave. *Idaho Archaeologist* 4(3): 1-7, Caldwell.
1981d (with Sally Cupan) Incised Stones from the Pend O'Reille River Area, Norther Idaho. *Idaho Archaeologist* 5(1):11-13, Caldwell.
1981e (with James C. Woods) Cryptocrystalline Quarry Localities in the Owyhee River Country. *Idaho Archaeologist* 5(1): 11-13, Caldwell.
1981f (with James Huntley, senior author) A Pottery Vessel from the Mud Springs Site. *Idaho Archaeologist* 5(1): 1-3, Caldwell.
1981g (with Max G. Pavesic and Roderick Sprague, co-compilers) Bibliography of Idaho Archaeology 1977-79. *Northwest Anthropological Research Notes* 1592):248-260, Moscow.
1980a Comments on Butler's "Native Pottery of the Upper Snake and Salmon River Country." *Idaho Archaeologist* 3(3):4-6, Boise.
1980b (with James Woods) Fired Clay Cylinders from Nahas Cave, Southwestern Idaho. *Idaho Archaeologist* 4(1):8-11, Boise.
1980c Recent Data From Nahas Cave: A Further Note on the Origins of the Bow and Arrow in the Northern Great Basin, *The Masterkey*.
1980d The Use and Misuse of Published Data: A Reply to Harrison and Hanson. *Idaho Archaeologist* 4(1):4-6, Boise.
1980e Fish Remains from Nahas Cave: Archaeological Evidence of Anadromous Fishes in Southwestern Idaho. *Journal of California and Great Basin Anthropology* 2(1):129-132, Riverside.
1980f Southern Idaho Plain: Corrections. *Plains Anthropologist* 25(88):246, Lincoln.
1980g Abstract: "Implications of the Nutritional Potentials of Anadromous Fish Resources on the Western Snake River Plain." *Northwest Anthropological Research Notes* 18(1):73.
1979a Aboriginal Hunting Complexes in the Owyhee Upland, Idaho. *The Masterkey* 3(3): 108-111, Los Angeles.
1979b Southern Idaho Plain: Implications for Fremont-Shoshoni Relationships in Southwestern Idaho. *Plains Anthropologist* 24:(86):329-335, Lincoln.
1978 The Rock Art of Upper Pole Creek, Owyhee County, Idaho. *Idaho Archaeologist* 1:3:9-12. Caldwell.
1977a Boise River Drainage System Archaeological Survey, *Progress Report* No. 121, Idaho State Historical Society, Boise.
1977b Boise River Drainage Archaeological Survey, *Progress Report* No. 12, Idaho State Historical Society, Boise.
1977c Southcentral Owyhee County Archaeological Survey, *Progress Report* No. 2, Idaho State Historical Society, Boise.
1977d Southcentral Owyhee County Archaeological Survey, *Progress Report* No. 2, Idaho State Historical Society, Boise.
1977e A Note on a Notched Stone Cobble From Southwestern Idaho. *Idaho Archaeologist* 1:3:9-12. Caldwell.
1976b Shield Bearing Warrior Motif Petroglyphs from Southwestern Idaho. *Masterkey* 50:3:1212. Los Angeles.
1974 *The Fremont Culture: A Re-evaluation*. Masters Thesis, Department of Anthropology, Indiana University, Bloomington.

IN PRESS WORK:

Prehistory of Guyana: Old Traditions and New Perspectives. In *Carib Studies in Linguistics, Ethnobotany and Culture* edited by Janette Forte and Fabiola Jara. University of Utrecht/Guyana Trobenbos Foundation.

WORK UNDER REVIEW:

(with Jeremy Johnson) Nutritional Values of Freshwater Mussels on the Western Snake River. *Journal of Northwest Anthropology.*

WORK IN PREPARATION:

(with Russell T. Gould) Lithic Procurement and Prehistoric Mobility on the Middle Snake River.
Paper in preparation for submission to the *Journal of California and Great Basin Anthropology.*

Functional Variability in the Archaic of Southern Idaho. In preparation for *North American Archaeologist.*

Nutritional Analysis of Fishes of the Middle Snake River: Habitat Variance and Harvest Techniques. In preparation for *Journal of Northwest Anthropology*.

New Insights Regarding Mortuary Practices in the Rupununi Savannas, In preparation for *Antiquity.*

A Re-Assessment of the Shell Mounds of the Guiana Shield, In preparation for *Latin American Antiquity*

ONGOING RESEARCH PROJECTS:

"Use Wear Analysis of Lithic Debris from 10-CN-1"

"SRBPNCA Lithic Sourcing Project"

"Aboriginal Scavenging of Fish: Experimental and Ethnoarchaeological Observations"

"Archaeological Fish Remains Bibliography Project"
(with David J. Singh and Raymond Ramsaroop) "Nutritional Analysis of Guyanese Fishes: Implications for Optimal Selection Strategies of Amerindians"

"Archaeological Excavations at the Shell Mounds in the Pomeroon River Country, Guyana"

REFERENCES

Dr. Janette Bulkan
Professor, School of Forestry
University of British Columbia
Vancouver, Canada

Dr. John P. Ziker
Professor of Anthropology
Department of Anthropology

Boise State University
Boise, Idaho

Dr. Lee Sappington
Associate Professor of Anthropology
Department of Anthropology
University of Idaho
Moscow, Idaho

Dr. James Rose
Director of Culture and Head, National Trust of Guyana
Ministry of Culture, Youth and Sport
Government of Guyana
Georgetown, Guyana

Dr. Al Creighton
Dean, Social Sciences
University of Guyana
Georgetown, Guyana

James C. Woods
Professor of Anthropology
College of Southern Idaho
Twin Falls, Idaho

Dr. Pei-Lin Yu
Assistant Professor of Anthropology
Boise State University
Boise, Idaho

Kristin Snopkowski

Curriculum Vitae

EDUCATION

2011 **University of New Mexico**, Albuquerque, NM
Ph.D., Anthropology

2005 **University of New Mexico**, Albuquerque, NM
M.S., Anthropology

2002 **Cornell University**, Ithaca, NY
B.S., Computer Science

EMPLOYMENT

2014 – Present **Assistant Professor**, Boise State University
Department of Anthropology

2011-2014 **Post-doctoral Research Fellow,** London School of Hygiene and Tropical Medicine
Department of Population Health

PUBLICATIONS

2015 **Snopkowski, K.** & H. Kaplan "Fertility Theory: Theory of Intergenerational Wealth Flows" In James D. Wright (Ed.), *International Encyclopedia of the Social and Behavioral Sciences Second Edition* (pp. 35-39). Amsterdam, Elsevier.

2015 **Snopkowski, K.** & R. Sear "Grandparental help in Indonesia is directed preferentially towards needier descendants: A potential confounder when exploring grandparental influences on child health" Social Science & Medicine, 128: 105-114. doi: 10.1016/j.socscimed.2015.01.012

2014 **Snopkowski, K.**, C. Moya, & R. Sear "A test of the intergenerational conflict model in Indonesia shows no evidence of earlier menopause in female-dispersing groups" Proceedings of the Royal Society B: Biological Sciences, 281(1788): 20140580. doi: 10.1098/rspb.2014.0580

2014 **Snopkowski, K.** & H. Kaplan "A Synthetic Biosocial Model of Fertility Transition: Testing the Relative Contribution of Embodied Capital Theory, Changing Cultural

Norms, and Women's Labor Force Participation." American Journal of Physical Anthropology, 154(3): 322-333. doi:10.1002/ajpa,22512

2014 Sheppard, P., **K. Snopkowski,** & R. Sear "Father absence and reproduction-related outcomes in a transitional fertility population." Human Nature, 25(2): 213-234. doi:10.1007/s12110-014-9195-2

2013 **Snopkowski, K**. & R. Sear "Kin influences on fertility in Thailand: Effects and mechanisms." Evolution and Human Behavior, 34: 130–138. doi:10.1016/j.evolhumbehav.2012.11.004

Manuscripts in Submission

Snopkowski, K. &. R. Sear "Does Grandparental Help Mediate the Relationship between Kin Presence and Fertility?" Demographic Research

Snopkowski, K. "Serial monogamy as a female reproductive strategy in San Borja, Bolivia" Human Nature

Snopkowski, K., Towner, M., Shenk, M., & H. Colleran "Pathways from Education to Fertility Decline: A multi-site comparative study" Philosophical Transactions B

Moya, C., **Snopkowski, K**. & R. Sear "What Men Want: Can men really benefit from higher fertility than what is optimal for women?" Philosophical Transactions B

Snopkowski, K. & H. Kaplan "Demographic Transition" International Encyclopedia of Anthropology

GRANTS AND FELLOWSHIPS

2013	British Society for Population Studies International Travel Grant
2012	National Centre for Research Methods Training Bursary
2008	University of New Mexico Student Resource Allocation Committee Grant
2008	University of New Mexico Research, Projects and Travel Grant
2006- 2007	New Mexico Scholars 3% Tuition Scholarship
2005	University of New Mexico Student Resource Allocation Committee Grant

INVITED TALKS

September 2015 "Reproductive Decision-Making in Transitional Contexts" University of California Los Angeles Center for Behavior, Evolution, and Culture Speaker Series; Los Angeles, CA, USA

February 2013 "Family and Fertility in Developing Countries"
Oxford Institute of Population Ageing Seminar Series; Oxford, UK

November 2012 "Kin Influences on Fertility in Thailand: Effects and Mechanisms"
Population Seminar Series at London School of Economics; London, UK

November 2011 "Evaluating Theories of the Demographic Transition in San Borja, Bolivia"
University College London Anthropology Department Seminar Series; London, UK

November 2011 "Evaluating Theories of the Demographic Transition in San Borja, Bolivia"
Newcastle University's Centre for Behaviour and Evolution & Institute of Neuroscience Seminar Series; Newcastle, UK

CONFERENCE PAPERS PRESENTED

November 2015 **Snopkowski, K.** "Men's reproductive decision making in Indonesia"
American Anthropological Association, Denver, CO.

April 2015 **Snopkowski, K.** & R. Sear "Does Grandparental Help Mediate the Relationship between Kin Presence and Fertility?" Northwest Evolutionary, Ecology, and Human Behavior Annual Symposium, Boise, ID.

December 2014 **Snopkowski, K.** "Women's number of partners influences reproductive success and child outcomes in San Borja, Bolivia". Annual Meeting of the American Anthropological Association, Washington DC.

February 2014 **Snopkowski, K.**, C. Moya & R. Sear "Intergenerational Conflict: Does ethnic-group postnuptial residence predict age at menopause?"
Cooperation and Conflict in the Family Conference. Sydney, Australia.

January 2014 **Snopkowski, K.** & R. Sear "Is the Helping Behavior of Grandparents Predicted by Need? Evidence from Indonesia" IUSSP Cyberseminar. Family Demography: Advancing knowledge about intergenerational relationships and exchanges in low and middle-income countries. University of Southampton, UK.

November 2013 **Snopkowski, K.** "A Synthetic Biosocial Model of Fertility Transition: Testing the Relative Contribution of Embodied Capital Theory, Changing Cultural Norms, and Women's Labor Force Participation." Annual Meeting of the London Evolutionary Research Network. London, UK.

July 2013 **Snopkowski, K.,** C. Moya, & R. Sear "The interplay of individual- and community-level postnuptial residence on fertility outcomes: Do community norms or individual decisions matter more?" Annual Meeting of the Human Behavior and Evolution Society. Miami, FL.

April 2013 **Snopkowski, K.** & R. Sear "Kin and Fertility in Indonesia: How do different measures of parental availability affect the results?" Annual Meeting of the Population Association of America. New Orleans, LA.

March 2013 **Snopkowski, K.** & R. Sear "Kin and Fertility in Indonesia: How do different measures of parental availability affect the results?" Annual Meeting of the European Human Behavior and Evolution Association. Amsterdam, Netherlands.

March 2013 **Snopkowski, K.** & R. Sear "Kin Influences on Fertility in Thailand: Effects and Mechanisms" Annual Meeting of the Southeast Asian Studies Symposium. Oxford, UK

November 2012 **Snopkowski, K**. & R. Sear "Kin and Fertility" Annual Meeting of the American Anthropological Association Meeting. San Francisco, CA

June 2012 **Snopkowski, K**. & R. Sear "Kin Influences on Fertility in Thailand: Effects and Mechanisms" Annual Meeting of the Human Behavior and Evolution Society. Albuquerque, NM

May 2012 **Snopkowski, K.** "Testing Hypotheses of the Demographic Transition in San Borja, Bolivia" Annual Meeting of the Population Association of America. San Francisco, CA

March 2012 **Snopkowski, K.** "Testing Hypotheses of the Demographic Transition in San Borja, Bolivia" Annual Meeting of the European Human Behaviour and Evolution Association. Durham, UK

January 2012 **Snopkowski, K.** "The effect of familial mortality rates on the timing of first reproduction" Annual Meeting of Centre for Behaviour and Evolution. Newcastle, UK

TEACHING EXPERIENCE

Boise State University

Biological Anthropology
Human Evolutionary History and Development
Human Behavioral Ecology

Statistical Methods in Anthropology

University of New Mexico

Sex, Reproduction and the Demographic Transition
Computer Laboratory in Human Evolutionary Ecology
Computing for Business Students

RESEARCH EXPERIENCE

2011 – 2014 Post-doctoral Research Fellow on *Family Matters: Intergenerational Influences on Fertility* Project. Funded by European Research Council. PI: Rebecca Sear

2008 Dissertation Research: Interviewed over 500 women about reproductive decision making to test differing hypotheses of the Demographic Transition in San Borja, Bolivia

2005 Pilot Dissertation Study: Interviewed over 50 women to determine feasibility of Demographic Transition study in San Borja, Bolivia

STUDENT MENTORING

Paula Sheppard, PhD 2014 - 2nd Supervisor
Susan Schaffnit, PhD 2014 - 2nd Supervisor

PEER REVIEWER

Evolution and Human Behavior
Human Nature
PLOS ONE
Demographic Research

COMMUNITY OUTREACH

2013 Blog contributor to OpenPop.org
2009 Science Fair Judge for Social Science Projects; Albuquerque Public Schools

PROFESSIONAL MEMBERSHIPS

European Human Behaviour and Evolution Association
Population Association of America
Human Behavior and Evolution Society
British Society for Population Studies
Evolutionary Demography Society

Curriculum Vitae
PEI-LIN YU

Anthropology Department
Boise State University
1910 University Dr, Boise, ID 83725
(208)- 426-3059
email: pei-linyu@boisestate.edu
CITIZENSHIP: United States

EDUCATION
2006 Doctor of Philosophy, Anthropology, Southern Methodist University, 3225 Daniel St., Dallas TX 75205.
Dissertation: *Pit Cooking and Intensification in the American Southwest and Pacific Northwest.*
1999 Master of Arts, Archaeology, Southern Methodist University, 3225 Daniel St., Dallas TX 75205
1989 Bachelor of Science in Anthropology, University of New Mexico, Albuquerque, New Mexico, 87131

SELECTED PROFESSIONAL EXPERIENCE (all supervisors may be contacted)

July 2014 – Present
Assistant Professor of Anthropology, Boise State University. Duties: Conduct research on high altitude landscape scale archaeology and traditional ecological knowledge; also on archaeology, ethnoarchaeology, and human behavioral ecology in SE China and eastern Taiwan. Teach undergraduate and graduate courses in Archaeology and Anthropology. Advise graduate students. Service as facilitator for federal Cooperative Ecosystem Studies Units membership. Salary: available on request. Supervisor: Department Chair John Ziker, 208-426-2121.

March 2014 – July 2014
Research Coordinator, Rocky Mountain Cooperative Ecosystem Studies Unit (RM-CESU). Duties: sole management of a national science network of federal and university partners to conduct scientific research, technical assistance, and education for 15 Rocky Mountains parks. Technical and peer review, and management assistance, for scientific and cultural projects in parks. Data management for hundreds of active projects. Analysis and interpretation of resources-related policy documents for Regional Office, and recommendations for policy improvement and implementation. Salary: GS-14 Step 1. Supervisor: Patrick Malone, Assistant Regional Director. National Park Service Intermountain Region, 12795 W. Alameda Parkway, Denver CO 80225. Ph. (303) 969-2314.

November 2009 – May 2014
Cultural Specialist, Rocky Mountain Cooperative Ecosystem Studies Unit. Duties: Co-manage a national science network of federal and university partners to conduct scientific research, technical assistance, and education for 15 Rocky Mountains parks. Technical and peer review, and management assistance, for scientific and cultural projects in parks. Data management for hundreds of active projects. Analysis and interpretation of resources-related policy documents for Regional Office, and recommendations for policy improvement and implementation.

Drafting of summaries and analyses of highly complex issues, briefing IMR Resources and park leadership on sensitive policy issues, preparation of materials for meetings with state and tribal government officials, and speaking to varied audiences. Specialization: recruitment of tribal colleges into the research network; facilitation of Native American student education and training opportunities; facilitation of cultural heritage projects using Native American expertise for parks and programs.

Served as Vice Chair of the Intermountain Region Resources Stewardship Advisory Team, Chair of RSAT Policy Committee. Cultural Resources representative to the Intermountain Region's Wilderness Executive Committee. Team member, NPS Climate Change and Cultural Resources Adaptation Group. Author regional and

national reports on the RM-CESU and the National Network of CESUs including the Annual Report to Congress 2009-11. Committee Chair, NPS Cotter Award for Excellence in Archaeology. Cultural Resources Representative, Regional Wilderness Executive Committee. Coordinate regional and national teleconferences and meetings.

Peer review and writing assistance on park proposals for national competitive grants and technical reports. Panelist for competitive research proposals at student and professional levels including NPS Servicewide Comprehensive Call. Co-author on successful park grants including Ice Patch Archaeology Project funded at $625,000 for Glacier National Park. Technical assistance to parks and programs for archaeology, applied anthropology, historic preservation, and cultural conservation including interpretation and implementation of federal laws, policies, directives, and guidelines. Member, five MA committees, four PhD committees at University of Montana. Salary: GS-13 Step 4. Supervisor: Thomas Lincoln, Assistant Regional Director. National Park Service Intermountain Region, 12795 W. Alameda Parkway, Denver CO 80225. Ph. (303) 987-6611.

August 2007-October 2009

Assistant Professor *and* Program Director for Native American Graves Protection and Repatriation Act (NAGPRA) and Archaeological Collections, California State University Sacramento.
Director of NAGPRA and Legacy Collections Program Duties: Initiated program from scratch through procurement of funding, staffing, and curation space through external partner contracts and grants and advocacy within the Cal State University system. Analyzed policy options and made recommendations to University president and provost, drafted summaries and analyses of complex repatriation issues, and briefed university officials on sensitive policy matters. Implemented compliance with NAGPRA; including inventory, cataloging, database development and management, legal research, tribal consultation, determinations of cultural affiliation, publication of Notices of Inventory Completion, negotiation of tribal agreements, and repatriation procedures. Scoped new Repository Building on campus. Successfully competed for >$300,000 in grants and contracts for cultural affiliation and archaeological research associated with NAGPRA implementation. Worked closely with nine California tribes, bands, and rancherias.

Supervised two full-time staff and five-ten student volunteers and work-study employees. Professor Duties: Taught Anthropology courses (see below) to undergraduate and graduate students. Published articles and edited volumes covering diverse anthropological methods and theories. Research emphasis: Ethnoarchaeology; Cultural Heritage Laws, Policies, Values, Stewardship. Classes taught (undergraduate): Hunter-Gatherers in Global Perspective; Cultural Resources Management in Theory and Practice; Pacific Northwest Archaeology. Member, three University NAGPRA committees; Chair, Department Collections Committee. Salary: $52,000 per annum. Supervisor: Dr. David Zeanah, Chair. 6000 J Street, Sacramento CA 95819. Ph (916)-278-5683.

September 2001-August 2007

Power Office Archaeologist, Bureau of Reclamation's Pacific Northwest Region. Duties: Coordinated Section 106 compliance for the Grand Coulee Dam and Lake Roosevelt, WA and Hungry Horse Dam and Reservoir, MT. Responsible for Section 106 of the Nat'l Historic Preservation Act compliance, Archaeological Resources Protection Act (ARPA) investigations of cultural site looting and damage as well as permitted excavations; and NAGPRA for recovery and repatriation of Native American burials. Close coordination with law enforcement. Consultation with five Northwest Interior tribes, three SHPOs, four federal agencies affected by Federal Columbia Power System operations. Analyzed and interpreted cultural resources policy documents, drafted briefing statements and memos for Reclamation leadership and policymakers, prepared materials for meetings with a wide variety of government officials, and spoke with to varied audiences. Application of federal cultural resources laws and policies to further program priorities and resource allocation. Developed region's first GIS database for heritage resources.

Developed Agreements (Cooperative; Programmatic; MOAs; MOUs) with State Historic Preservation Offices, Native American Tribes, four other federal agencies, and the Advisory Council for Historic Preservation for large-scale undertakings. Museum property management for extensive collections. Contracting Officer's Representative for projects in archaeological research, museum curation, NAGPRA compliance, and Historic American Engineering Record documentation of two major hydroelectric dam/powerplants. Ending Salary: GS-

12 Step 4. Supervisor: Monte McClendon (ret.), Supervisory Environmental Specialist, Pacific Northwest Regional Office, 1150 N. Curtis Rd., Boise ID 83706. Ph (208)-378-5036. Lynne MacDonald at USBR's Denver Office, lmacdonald@usbr.gov, can address inquiries.

January 2000-September 2001

Park Archaeologist, Great Smoky Mountains National Park, Gatlinburg, TN. Duties: Developed park's first archaeological program. Section 106 and 110 compliance for all park undertakings included archaeological survey, testing, and evaluation of prehistoric Cherokee and historic farming, logging, and CCC properties for the National Register. Site mapping; artifact description, analysis and illustration; supervision of two to four seasonal paid crew, and up to ten volunteer field crew. Analyzed and interpreted cultural resources policy for complex undertakings including the Road to Nowhere the Cherokee Land Exchange projects, and recommendations to park leadership. Managed department budget and equipment, implemented Cooperative Agreement with University of Tennessee. ARPA compliance and reporting of cultural site looting and damage as well as permitted excavations. Close coordination with law enforcement. Supervised field crew, volunteer crew, and museum collections staff. Contracting Officer's Representative for cultural resources contracts, grants and cooperative agreements. Consulted with the TN and NC State Historic Preservation Offices, three Native American tribes, and the Advisory Council for Historic Preservation. Ending Salary: GS-11 Step 2. Supervisor: David L. Chapman, Park Historian (ret.), Great Smoky Mountains National Park, 107 Park Headquarters Rd., Gatlinburg TN 37738. Ph. (865)-430-0339.

June 1998-August 1999

Crew Member, Folsom Archaeological Project/QUEST Fund, Southern Methodist University. Duties: Excavation, mapping, documentation, field preparation of samples and recovered bone and artifacts, field cataloging and packaging, at Paleoindian age bison-bonebed. Specialized bone illustration and mapping. Field data-cleaning. $12.00/hourly pay. Supervisor: David Meltzer, Professor, Southern Methodist University Department of Anthropology, P.O. Box 750336, Dallas, TX 75275-0336. Ph. (214) 768-2826.

June 1995-August 1997

Crew Member (1995) and Unit Supervisor (1996-7), Hudson-Meng Bison Bonebed Archaeological Project/Colorado State University and US Forest Service. Duties: Excavation, mapping, documentation, field preparation of samples and recovered bone and artifacts, field cataloging and packaging, at Paleoindian age bison-bonebed. Specialized bone illustration and mapping. Field data-cleaning. $10.00/ hourly pay. Supervision of 4-6 crew. Supervisor: Larry Todd, Professor (Ret.), Colorado State University Department of Anthropology. B-219 Andrew G. Clark Building, Colorado State University, Fort Collins, CO 80523-1787, Ph. (970) 491-5447.

September 1991-October 1993

Field assistant, Pumé Ethnoarchaeological Research Project, Apure, Venezuela. Duties: Collection of quantified subsistence time allocation data including mobile individual focal follows, household scans, hourly camp scans, and manufacturing event sampling in a tropical hunter-gatherer community. Lived as traditional hunter-gatherer embedded in the community. Salary: expenses plus $2,000 stipend. Supervisor: Russell D. Greaves, PhD Candidate, Department of Anthropology, University of Utah, 270 S. 1400 East Room 102, William Stewart Building. Salt Lake City, UT 84112-0060 Ph. 801-581-6251.

May 1988-September 1991

District Archaeologist, Winema National Forest. Duties: Inventory, analysis and curation of prehistoric Klamath sites and historic logging, ranching and pioneering sites on the Klamath Ranger District, Klamath Falls, Oregon. Survey, site mapping, artifact description, analysis, and illustration. Planning, organization and implementation of all cultural resource management activities for the district. Rapid inventory and management of sites in wildfire situations. Management of cultural resource equipment and budget. Section 106 compliance and appropriate documentation to the State Historic Preservation Office. Oral history interviewing. Supervised and trained field crew and historic visitor center staff. Ending salary: GS-9 Step 2. Supervisor: Frank Erickson,

District Ranger (Ret.), Klamath Ranger District. 1936 California Ave, Klamath Falls, OR 97601. Ph. (503)-885-3400.

SELECTED JOB-RELATED TRAINING and QUALIFICATIONS

2015	NSF WIDER-PERSIST Revision of Anthropology Department Curricula with emphasis on ANTH 103, Introduction to Archaeology
2015	Course Design Institute, Boise State University Center for Teaching and Learning
2014-present	Ten Before Tenure Program, Boise State Univ.
2010-14	Federal Agreements Technical Representative
2001-7	Federal Contracting Officer's Representative
1989, 2005	Archaeological Site Damage/Looting Data Collection/Law Enforcement support. Beginning, Intermediate, Advanced.
2004	NPS Workshop on Museum Collections Management, Tucson, AZ
2003	NPS Workshop on Remote Sensing Techniques in Archaeology, Collinsville IL.
2002	Archaeological Resources Protection Act Training, Albuquerque, NM.
2001	Cultural Resources Protection and Fire Management Training, Tucson AZ.
1988-2001	Red-card, Type II Wildland Firefighter (FFT2).

UNIVERSITY COURSES TAUGHT *indicates one-credit workshops

- North American Prehistory
- Ethnoarchaeology in Theory and Practice
- Introduction to Archaeology
- Introduction to Human Evolution
- Human Evolution Lab
- Hunter Gatherers in Global Perspective
- Cultural Resources Management in Theory and Practice
- Archaeology of the Pacific Northwest
- The Human Diet in Evolutionary Perspective*
- Introduction to the Archaeology of China*
- Living Ethnoarchaeology*
- Gender in Archaeology*
- Archaeology of Climate Change*

PUBLICATIONS, by date (also please see http://works.bepress.com/pei-lin_yu/)

In press
A. Williams, K. Barnett, M. Schmader, and A. M. Prentiss: "Spatial Analysis of Fur Trade Era Floor and Roof at Housepit 54." *In* The Last House at Bridge River: The Archaeology of An Aboriginal Household in British Columbia During the Fur Trade Period, A. M. Prentiss, ed. University of Utah Press, Salt Lake City.

In Press
Yu, P. L.
Forager intensification and development of agriculture in the Amazon Basin: an hypothesis from an ethnoarchaeological perspective. *In* Examining Amazonia's past, present and future from a biocultural perspective: Engaging perspectives of health, environment and nutrition, L. Forline and C. Perez-Hilton, eds. Springer Environmental Science, Dordrecht Netherlands.

In Preparation
Yu, P. L.
A cross-cultural analysis of archaeological site damage assessment procedures and recommendations for their improvement: U.S. National Park Service and City of QuFu, Shandong Province, China.

In Preparation
Chen, S. Q., and P. Yu: "Origins of Agriculture in China: Bifurcated Evolutions."

In Preparation, contract signed
Yu, P., G. Smith, and S. Chen
Relevancy and Application of Heritage in Contemporary Society. Left Coast Press, Walnut Creek CA.

In Review
Chen, S. Q., and P. L. Yu: "The Upper Paleolithic Adaptations of North China." Archaeological Research in Asia.

2015 Yu, P. L. and M. Schmader, guest editors
Special Issue of the Journal of Anthropological Archaeology Vol. 38, June 2015. "Archaeology IS Anthropology: Lewis Binford's Dynamic Contributions to Archaeology Theory and Practice.

2015 Yu, P. L., M. Schmader, and J. Enloe
"I'm the oldest New Archaeologist in Town": The intellectual evolution of Lewis R. Binford. Journ. Anth. Arche. 38:2-7.

2015 Yu, P. L.
Ethnoarchaeology of foraging and the case of the vanishing agriculturalists in the Amazon Basin. Journ. Anth. Arche. 38:59-66.

2015 Yu, P. L., ed.
Rivers, Fish, and the People: Tradition, Science, and Historical Ecology of River Fisheries in the American West. University of Utah Press, Salt Lake City.

2015 Yu, P. L.
Introduction. *In* Rivers, Fish, and the People: Tradition, Science, and Historical Ecology of River Fisheries in the American West. P. Yu, ed. Pp. 1-11. University of Utah Press, Salt Lake City.

2015 Yu, P. L., and J. M. Cook
Scale and organization in traditional salmon fishing: insights from ancient technology of the Upper Columbia River. *In* Rivers, Fish, and the People: Tradition, Science, and Historical Ecology of River Fisheries in the American West. P. Yu, ed. Pp. 70-95. University of Utah Press, Salt Lake City.

2014 MacDonald, D., W. Andrefsky, and P. Yu, eds.
Lithics in the West. University of Montana Press, Missoula.

2014 Yu, P. L.
Ethnoarchaeology as a strategy for building frames of reference for research problems. *In* Hunter Gatherer & Mid-Range Societies section of the Encyclopedia of Global Archaeology, A. Prentiss, ed. Springer Publishing, New York.

2014 Yu, P. L.
Volunteer Profile. SAA Archaeological Record 14(2):6-7.

2014 Yu, P. L., and J. M. Cook
Implications of Upper Columbia River Lithic Technology for Prehistoric Fishing in the Rockies. *In* Lithics in the West, W. Andrefsky, D. MacDonald, and P. Yu, eds. Pp. 16-34. University of Montana Press, Missoula.

2014 Lee, C., R. L. Kelly, R. Reckin, I. Matt, P. L. Yu
Ice Patch Archaeology in Western North America. SAA Archaeological Record 14(2):15-19.

2013 Yu, P. L.
Cultural Resources in Wilderness, Cultural Resources for Wilderness. NPS Intermountain Region "Wild Matters" on-line publication series. Denver, CO.

2012 Yu, P. L.
Foreword. *In* Teaching My Spirit to Fly, M. Bagshaw, author. Little Standing Spruce Pub., Santa Fe NM.

2012 Yu, P. L.
Heritage Values and Stewardship of Ancestral Remains (in Mandarin). Journal of Oriental Archaeology 8:35-43. Shandong University, Jinan, China.

2012 Yu, P. L., H. Fang, C. Shen, and G. Smith
The International Conference "Cultural Heritage Values in China: Identifying, Evaluating, and Treating Impacts to Cultural Relics," Shandong University, Jinan, and Qufu Town, Shandong Province, China, October 26-28, 2010. Journal of Heritage and Society. *Heritage and Society* 4 (2):261-264

2011 MacDonald, D., E. S. Hale, P. L. Yu, M. Hektner, and D. S. Dick
Prehistoric/historic ecology and land restoration within the Gardiner Basin, Yellowstone National Park, Montana. *Questioning Greater Yellowstone's Future Climate, Land Use, and Invasive Species. Proceedings of the 10th Biennial Scientific Conference on the Greater Yellowstone Ecosystem*, October 11-13, 2010. C. Andersen, ed. Pp. 137-145. National Park Service, Mammoth Hot Springs MT.

2010 Meyer, L., P. L. Yu, R. Skeirik, and V. Salazar-Halfmoon
Grappling with Climate Change: Impacts to Heritage Resources. *National Park Service, Vanishing Treasures Year-End Report: A Climate of Change, Climate Change Issue.* National Park Service, U.S. Department of the Interior, Vanishing Treasures Program, pp. 22-25.

2009 Yu, P. L.
Heritage Values among the Pumé of Venezuela. *In* Heritage Values in Contemporary Society, G. S. Smith, P. Messenger, and H. Soderland, eds. Pp. 199-208. Left Coast Press, Walnut Creek CA.

2009 Yu, P. L.
Ancient Pit Cooking in the American Southwest and Pacific Northwest: A Study in Foraging Intensification. Verlag Dr Muller Publishing, Saarbruecken, Germany.

2008 Yu, P. L.
Whose family? Negotiating ownership of the ancestors. *In* Kennewick Man: Perspectives on the Ancient One, H. Burke, C. Smith, D. Lippert, J. Watkins, and L. Zimmerman, eds. Pp. 144-145. Left Coast Press, Walnut Creek CA.

2006 Yu, P. L., F. Sellet, and R. D. Greaves, eds.
Archaeology and Ethnoarchaeology of Mobility. University of Florida Press, Gainesville.

2006 Yu, P. L.
From Atlatl to Bow and Arrow: Implicating Projectile Technology in Changing Systems of Hunter-gatherer Mobility. In *Archaeology and Ethnoarchaeology of Mobility*, F. Sellet, R. Greaves, and P. Yu, eds. Pp. 201-220. University Press of Florida, Gainesville.

2006 Yu, P. L., B. Mills, and A. Neuzil
What skills do I need to get and keep a job in archaeology? *The SAA Archaeological Record* 6(3):9-13

1999 Yu, P. L., and R. Greaves
Into the life of the nation: land use and self-determination among traditional Pumé hunter-gatherers in Venezuela. *Cultural Survival Quarterly* 23(4): 78-79.

1997 Yu, P. L.
Hungry Lightning: Field Notes of a Woman Anthropologist. University of New Mexico Press, Albuquerque.

SELECTED PRESENTATIONS (presented papers unless otherwise noted)

2015 A Frame of Reference for First Encounters: Paleolithic Foragers and Neolithic Farmers in Taiwan. 11th Conference on Hunting and Gathering Societies, Austria, Vienna.

2015 Plenary invited lecture: A Climate of Change for China's Mountain Heritage. Taishan Mountain Satellite Symposium of the 22nd International Congress of Historical Sciences, Taishan, China.

2015 Archaic Women Hunting in the High Country? Ethnoarchaeological and Evolutionary Perspectives. 80th Annual Society for American Archaeology Meeting, San Francisco, CA.

2015 When Neolithic Met Paleolithic: Evolutionary Implications of the Transition in Taiwan. Poster presented at the 3rd Annual Northwest Evolution, Ecology, and Human Behavior Conference, Boise ID.

2014 "Hot, Dry, Flooded, and Burned: Archaeology and Climate Change in the National Park Service. 79th Annual Society for American Archaeology Meeting, Austin TX.

2014 "Emerging Research in Natural Resource Management Through a Consortium of Regional Universities and Federal Agencies." Northwest Science Conference, Missoula MT.

2013 Invited Paper: "Children as Formational Agents in the Archaeological Record: Some Ethnoarchaeological Observations." Symposium: Archaeology of the Under-represented. 78th Annual Society for American Archaeology Meeting, Honolulu, HI.

Webinar: "Cultural Resources in Wilderness: Symbiotic Management." National webinar presented by the Arthur Carhart Center for Wilderness Training, Missoula MT.

2012 Invited Paper: "Science and Compliance: A Mutualistic Relationship in Cultural Resources." Symposium: What We Value, from the Past and Present. 11th Biennial Scientific Conference on the Greater Yellowstone Ecosystem Greater Yellowstone in Transition: Linking Science and Decision Making, Mammoth Hot Springs, WY.

Invited Paper: "Forager intensification and the development of agriculture in the Amazon Basin." Symposium: Processual Archaeology Beyond Binford: Current and Future Directions. 77th Annual Society for American Archaeology Meeting, Memphis, TN.

2011 Rocky Mountains CESU projects in cultural science, scholarship, and stewardship: the first ten years. 10th Rocky Mountain Anthropological Conference, Missoula, MT

2011 Scale and organization in traditional salmon butchering: insights from traditional technology of the Upper Columbia River. Society for the 76th Annual Society for American Archaeology Meeting, Sacramento, CA.

2011 A Snapshot of Climate Change-related Activity in the National Park Service's Archaeology Program: 2011. Society for the 76th Annual Society for American Archaeology Meeting, Sacramento, CA.

2010 Invited Paper: Heritage Values and Stewardship of Ancestral Remains in China and America. Presented at the symposium entitled Cultural Heritage Values in China: Identifying, Evaluating, and Treating Impacts to Cultural Relics, in Jinan, Shandong Province, China.

Additional papers presented from 1996-2008 available on request

SELECTED SYMPOSIA AND WORKSHOPS

2015/16 Co-chair, "Households and Evolutionary Process" session of the 4th Annual Northwest Evolution, Ecology, and Human Behavior Conference, Boise ID.

2011 Co-chair, Federal Lands Heritage and Cultural Resources Research in the Rocky Mountains: A Showcase of Cooperative Ecosystem Studies Unit (CESU) System Projects. 10th Rocky Mountain Anthropological Conference, Missoula, MT.

2010 Co-chair, Heritage Values and Stewardship of Ancestral Remains in China and America. Presented at the symposium entitled Cultural Heritage Values in China: Identifying, Evaluating, and Treating Impacts to Cultural Relics, in Jinan, Shandong Province, China.

2010 Co-chair, Archaeology IS Anthropology: Celebrating 50 Years with Lewis Binford, 75th Annual Society for American Archaeology Meeting, St. Louis, MO.

2009 Co-chair, Toward a New Curriculum: the Future of Applied Archaeology in Higher Education, 74th Annual Society for American Archaeology Meeting, Atlanta, GA.

2008 Discussant, Heritage Values: The Past in Contemporary Society.

Discussant, Archaeological Field School Working Group. Both in the 73rd Annual Society for American Archaeology Meeting, Vancouver, BC.

CONFERENCES ORGANIZED

2016 Co-Organizer, Royal Ontario Museum's Relevancy and Application of Heritage in Contemporary Society. Ontario, Canada. Funded by Wenner-Gren Foundation.

2010, 2012 Co-organizer, Rocky Mountains Wilderness Stewardship Workshop (2010, 2012), Lubrecht Experimental Forest, Potomac, MT.

2011 Organizing Sponsor, 10th Rocky Mountain Anthropological Conference, Missoula, MT.

2005 The Technology of Archaeology, for the Idaho Archaeology Society Conference, Boise, ID

AWARDS

ACADEMIC
2015 Boise State University College of Arts and Sciences Faculty Fellow
2008-2009 Faculty Research Fellow, Institute for Social Research, Sacramento State University
1998 First Place, SMU Anthropology Graduate Student Paper Competition
1997 First Place, SMU/Sigma Xi Graduate Student Research Poster Competition
1989 Graduation with Distinction; Phi Beta Kappa; National Dean's List; Who's Who in American Colleges and Universities; University of New Mexico Dean's List

SELECTED PROFESSIONAL
2013, 2012 Exceptional Performance, National Park Service Intermountain Region
2012 U. S. Secretary of the Interior's Partnerships in Conservation Award for the Glacier National Park Ice Patch Archeology and Paleoecology Project
2011, 2013 Leader in Wilderness Stewardship, National Park Service's Intermountain Region
2008-2009 Faculty Research Fellow, Institute for Social Research, Sacramento State University
2003, 2004, 2006 S.T.A.R. (Special Thanks for Achieving Results) Award, Bureau of Reclamation
2000 S.T.A.R. (Special Thanks for Achieving Results) Award, National Park Service.
1998 Godbey Author's Award, Southern Methodist University
1990, 1991 Certificate of Merit for Superior Performance, U.S. Forest Service

SELECTED PROFESSIONAL MEMBERSHIPS, DUTIES, AFFILIATIONS

2015-ongoing: Representative for Boise State University to the Rocky Mountains Cooperative Ecosystem Studies Unit
2015: Member, Curriculum Committee, Boise State College of Arts and Sciences
2014-present: Cultural Resources Advisor, Great Northern Landscape Conservation Cooperative (US Fish and Wildlife Service)
2014-present: Board Member, American Antiquity
2014: Member, Promotion and Tenure Committee, Boise State College of Social Sciences and Public Affairs
2012-2014: Cultural Resources Representative and Vice Chair, NPS Intermountain Region, Wilderness Executive Committee
2010-present: Chair, John L. Cotter Award for Excellence in NPS Archeology.
2010-12: Chair, National Park Service Intermountain Region, Resources Stewardship Advisory Team's Policy Committee.
2010-12: Vice Chair, Intermountain Region Resources Stewardship Advisory Team.
2007-2009 Chair, Sacramento State University Collections Committee
2007-2009 Member, Sacramento State University Tribal NAGPRA Committee

SCHOLARSHIPS, CONTRACTS, GRANTS AWARDED or IN REVIEW (listing of non-awarded proposals avail. on request)

2015, Fulbright Fellowship Submission, "Neolithic Crops of Taiwan: Adaptation, Resiliency, and Heritage." Under review.
2015, Chiang Ching-Kuo Foundation for International Scholarly Exchange Grant proposal, "Neolithic Crops of Taiwan: Adaptation, Resiliency, and Heritage." Under review.
2015, full partnership for Boise State University in the Rocky Mountains Cooperative Ecosystem Studies Unit (assembled and presented application)

2015, Pre-proposal approved for Cultural Science Plan for the Great Northern Landscape Conservation Cooperative (full proposal in development)
2015, assisted with successful NSF WIDER-PERSIST Grant Proposal for Anthropology Dept., $19,985
2015, Workshop Grant from Wenner-Gren Foundation for Workshop "Relevancy and Application of Heritage in Contemporary Society," $20,000.
2014 Co-recipient, Seed Grant from Boise State Office of Sponsored Projects for "Promoting Community Resilience to Critical Events through Implementation of a Community-based, Interdisciplinary Education Module," $4,300
2012 Co-recipient, Secretary of the Interior's Partners in Conservation Award for Ice Patch Archaeology Partnership at Glacier National Park
2011 Co-authored grant proposal, National Park Service Climate Change Response Grant (Vanishing Treasures historic and prehistoric structures vulnerability assessments and risk analysis project), $718,432.
2010 Co-authored grant proposal, National Park Service Climate Change Response Grant (Ice Patch Archaeology at Glacier National Park in partnership with Blackfeet, Salish/Kootenai Tribes, Universities of Wyoming and Colorado), $651,000
2009 National NAGPRA Grant (federal compliance with NAGPRA for looted sites) $84,116
2008-2009 California Department of Transportation Contracts (federal compliance with NAGPRA for highway construction collections) $227,000 total
2008, 2009 President's Research Grants, Sacramento State University $6,000 total
2007 Faculty Fellow Research Grant, Institute for Social Research, Sacramento State University $1,000.

SCIENTIFIC REVIEW PANELS

2009-14, Jerry O'Neal National Park Service Research Fellowship
2010-14, George Melendez Wright Climate Change Fellowships Proposal Review Panelist
2012 National Park Service Servicewide Comprehensive Call Guidance Team Member, IMR Cultural Resource funding including Cultural Cyclic.
2012 Interagency Joint Fire Sciences Proposal Review Panelist, Cultural Resources and Fire

GRADUATE STUDENT ADVISING

Audrey Rogers and Kaitlyn Mansfield, Masters of Applied Archaeology projects (in process)

Committee Member: Shawn Roberts, MAA, "Re-assessing mobility on the Snake River Plain with Kelly's Mobility Index" (Boise State University, 2014).

Committee Member: Mark Beil, MA, Local Ecological Knowledge and Chronic Disease in the Forth McDermitt Paiute-Shoshone Tribe" (Boise State University, 2015).

Committee Member: Bryon Schroeder, PhD, "Barrier or backbone? Middle Rocky Mountain Research from a Northern Wind River Range perspective. (U. of Montana, 2015)

Committee Member: Elizabeth Agosto, MA, "Investigation of Craniofacial Morphological Variation at Sully (39SL4)." (U. of Montana, 2013)

Committee Member: Emily Eide, MA, "Cultural Landscapes in Conflict: Balancing National Park Service, Tribal, and Public Interests in National Parklands" (U. of Montana, 2013)

Committee Member: Heidi Johnson, MA, A Preliminary Analysis of Cut Mark Degeneration in Bone Due to the Application of Hydrated Calcium Oxide." (U. of Montana, 2013)

Committee Member: Helen Keremedjiev, PhD, "Ethnography of Cultural Heritage Interpretation and Commemoration Practices at Bear Paw, Big Hole, Little Bighorn, and Rosebud Battlefields." (U. of Montana, 2013)

Committee Member: Kelly French, MA, "Lithic Technology and Risk: Winter Households at Bridge River Village." (U. of Montana, 2014)

Committee Member: Nikki Manning, MA "What Lies Beneath: The Missoula Historic Underground Project Urban Ecosystem Transformation, Adaptive Re-Use and Preservation." (U. of Montana, 2014)

Committee Member: Matthew Mattes, MA, "Lithic Technology and Residential Considerations of the S7istkin Site." (U. of Montana, 2014)

Committee Member: Jaclyn Schmidt, MA, "Right of Possession: A Comparative Legal Analysis of NAGPRA." (U. of Montana, 2014)

JOB-RELATED SKILLS

Research experience and instruction at university level: archaeology, anthropology, ethnoarchaeology, heritage values, historic preservation, and anthropological techniques and data. Managing regional science partnership program. Analyzing, interpreting, and applying historic preservation and other public heritage/cultural resources policies, guidelines, and administrative procedures, and implementing them through wide variety of partnerships. Native American Graves Protection/Repatration Act and cultural heritage program management. Certified in Federal contracting and agreement administration. Professional repository management to federal standards. Skill in communicating technical and non-technical materials to a variety of audiences in multiple formats; extensive public speaking experience. Technical and non-technical publications and assistance with website design. Microsoft and Apple operating systems; SPSS, MS Access, Past Perfect, MS Excel, and Arc GIS. Type II Wildland Firefighter 1988-'89, 2000-'02. Type 65 wpm. Languages: Spanish, French, Mandarin, Pumé Indian, Latin.

RESEARCH INTERESTS

Ethnoarchaeology; Human Behavioral Ecology; Taiwan and China Upper Paleolithic to Neolithic transitions; human behavioral and management response to climate change; traditional ecological knowledge; Protected Areas and Cultural Heritage law and policy in the U.S., South America, and Asia; hunting and gathering peoples; gender and technology; heritage values and repatriation practices; indigenous archaeology.

OTHER SKILLS

Certified group exercise instructor for boxing, kickboxing, Zumba, PiYo, and strength conditioning; CPR/AED certified.

REFERENCES

Robert L. Kelly, Full Professor
Department of Anthropology
1000 E. University Ave Dept 3431
University of Wyoming
Laramie, WY 82071
RLKELLY@uwyo.edu
307-766-3135 (office)
307-399-0423 (cell)

Anna M. Prentiss, Full Professor
Department of Anthropology
32 Campus Dr.
University of Montana
Missoula, MT 59801
anna.prentiss@mso.umt.edu
406-243-6152

Stan Bond
Chief Archeologist
Department of Interior
National Park Service
1201 "Eye" Street N.W.
Washington, DC 20005
202-354-2123
Stanley_c_bond@nps.gov

David Zeanah, Full Professor
Sacramento State University Anthropology Department
6000 J Street
Sacramento, CA 95819
(916) 278-5683
zeanah@csus.edu

Curriculum Vitae
John Peter Ziker, Ph.D.

Office Address
Department of Anthropology
Boise State University
1910 University Drive
Boise, ID 83725-1950
208-426-2121
208-426-4329(fax)
e-mail: jziker@boisestate.edu

Professional Preparation
1998 Ph.D. in Anthropology, UC Santa Barbara
1992 M.A. in Anthropology, University of California, Santa Barbara
1988 B.A. in Anthropology, *summa cum laude*, Honor's College, Arizona State University

Professional Experience
Chair, 2012 (August) – Present, Department of Anthropology, Boise State University
Professor, 2011 (August) – Present, Department of Anthropology, Boise State University

Editor, 2012 (November) – Present, Sibirica: Interdisciplinary Journal of Siberian Studies, Berghahn Books.

Reviews Editor, 2005 (April) – Present, Sibirica: Interdisciplinary Journal of Siberian Studies, Berghahn Books.

Associate Professor, 2008 (August) – 2011, Department of Anthropology, Boise State University

Contributing Editor (Evolutionary Anthropology Section), 2008 – 2011, Anthropology News

Fulbright Visiting Chair in North American Studies at the University of Calgary, 2009-2010

Assistant Professor, 2003 (August) – 2008 (July), Department of Anthropology, Boise State University

Research Fellow, 2001-2003, Max Planck Institute for Social Anthropology, Halle/S., Germany

Term Assistant Professor, 2000-2001, Department of Anthropology, University of Alaska Fairbanks

Visiting Assistant Professor, Spring 1999 and Spring 2000, Department of Anthropology, Indiana University of Pennsylvania

Postdoctoral Fellow, Fall 2000, Kennan Institute for Advanced Russian Studies, Woodrow Wilson Center

Professional Interests

Human Behavioral Ecology
Cooperation
Environmental Anthropology
Kinship and Social Organization
Circumpolar Peoples
Former Soviet Union/Peoples of Siberia

Peer Review Activity

Verified Reviewer for 8 journals: https://publons.com/author/586600/john-ziker#profile

Books

2014. John P. Ziker (ed.). Histories from the North: Environments, Movements, and Narratives (2nd Edition). Dubuque, IA: Kendall Hunt Publishers.

2011. John P. Ziker and Florian Stammler (eds.) Histories from the North: Environments, Movements, and Narratives. Boise State University/University of Lapland: Boise/Rovaniemi.

2010. Konstantin B. Klokov and John P. Ziker (eds.) Pripoliarnaia Perepis' 1926/27 gg. v Evropeiskom Severe (Arkhangel'sk Gubernia i Avtonomnaia Oblast' Komi. [The 1926/27 Polar Census in the European North (Arkhangel'sk Gubernia and Komi Autonomous Oblast')]. MPSS: St. Petersburg.

2002. John P. Ziker Peoples of the Tundra: Native Siberians in the Post Communist Transition. Prospect Heights, Ill.: Waveland Press, Inc.

Journal, Special Issue

2010. John P. Ziker and David G. Anderson (eds.) "Special Issue on Siberian Demography." Sibirica: Interdisciplinary Journal of Siberian Studies Volume 9, Issue 3.

Papers and Book Chapters in Production

In Press. John P. Ziker. "Diets of Hunter-Gatherers in the Arctic and Sub-Arctic." In Julia Lee-Thorp and M. Anne Katzenberg (eds.), The Oxford Handbook of the Archaeology of Diet. Oxford University Press: Oxford.

In Press. Stepan N. Katyginskii and John P. Ziker. "Dolgan National Games." Sibirica: Interdisciplinary Journal of Siberian Studies.

Accepted for Publication. John P. Ziker, David A. Nolin and Joellie Rasmussen. "The Effects of Wealth on Male Reproduction among Monogamous Hunter-Fisher-Trappers in Northern Siberia." Current Anthropology.

Submitted. David. A. Nolin and John P. Ziker. Reproductive responses to economic

uncertainty: fertility decline in post-Soviet Ust'-Avam, Siberia. Human Nature.

In Prep. David. A. Nolin and John P. Ziker. Wealth and Cohort Effects on Fertility Decline in an Indigenous Siberian Community in Response to Rapid Economic Change.

Published Papers and Book Chapters

2015. John P. Ziker, Joellie Rasmussen, and David A. Nolin. "Indigenous Siberians solve collective-action problems through stable food sharing strategies and traditional knowledge." Sustainability Science. DOI: 10.1007/s11625-015-0293-9.

2015. John P. Ziker. "Linking Disparate Approaches to the Study of Social Norms: An Example from Northern Siberia." Sibirica: Interdisciplinary Journal of Siberian Studies 14 (1): 68-101.

2015. John P. Ziker. "Stress, Alcohol, and Demographic Change in Northern Siberia." Pp. 128-133 in McElroy, Ann and Patricia K. Townsend (eds.), Medical Anthropology in Ecological Perspective, Sixth Edition. Westview Press.

2014. John P. Ziker. "The Long, Lonely Road of Homo Academicus: Focusing the research lens on the professor's own schedule." The Blue Review 3/31/2014. http://thebluereview.org/faculty-time-allocation/ (accessed June 16, 2014).

2014. John P. Ziker. "Subsistence and Sharing in Northern Siberia: Experimental Economics with the Dolgan and the Nganasan." Pp. 337-356 in Ensminger, J. and J. Henrich (eds.) Experimenting with Social Norms: Fairness and Punishment in Cross-Cultural Perspective. Russell Sage Foundation Publications.

2013. John P. Ziker. "The Fire is our Grandfather: Virtuous Practice and Narrative in Northern Siberia." Pp. 249-261 in David G. Anderson, Robert P. Wishart, and Virginie Vaté, (eds.), About the Hearth: Perspectives on the Home, Hearth and Household in the Circumpolar North. NewYork/Oxford: Berghahn.

2012. John P. Ziker. "Resilience of Domestic Groups and Communities on the lower Enisei River throughout the Twentieth Century." Sibirica: Interdisciplinary Journal of Siberian Studies 11(1): 1-42.

2011. John P. Ziker and Florian Stammler. "Introduction." Pp. 1- 6 in John P. Ziker and Florian Stammler (eds.) Histories from the North: Environments, Movements, and Narratives. Boise State University/University of Lapland: Boise/Rovaniemi.

2011. John P. Ziker. "Toward an Integrated Theory of Social Norms. Pp. 30-36 in John P. Ziker and Florian Stammler (eds.) Histories from the North: Environments, Movements, and Narratives. Boise State University/University of Lapland: Boise/Rovaniemi.

2011. John P. Ziker. "Ethnodemographics and Identity of Indigenous People in the Central Taimyr Lowlands." Pp. 219-237 in Per Axelsson & Peter Sköld (eds.) Indigenous

Peoples and Demography. The Complex Relation between Identity and Statistics. Berghahn Books: New York.

2011. Per Axelsson, Peter Sköld, David Anderson and John Ziker. "Epilogue: From Indigenous Demographics to an Indigenous Demography?" Pp. 295-308 in Per Axelsson & Peter Sköld (eds.) Indigenous Peoples and Demography. The Complex Relation between Identity and Statistics. Berghahn Books: New York.

2011. John P. Ziker. "Subsistence and Residence in the Putoran Uplands and Taimyr Lowlands in the 1920s." Pp. 244-267 in David G. Anderson (ed.), The 1926/27 Soviet Polar Census Expedition. Berghahn Books: New York.

2011. David G. Anderson, Evgenii Ineshin and John Ziker. "The Spatial Demography of the 'Outer Taiga' of the Zhuia River Valley, Eastern Siberia." Pp. 199-225 in David G. Anderson (ed.), The 1926/27 Soviet Polar Census Expedition. Berghahn Books: New York.

2010. Joseph Henrich, Jean Ensminger, Richard McElreath, Abigail Barr, Clark Barrett, Alexander Bolyanatz, Juan Camilo Cardenas, Michael Gurven, Edwins Gwako, Natalie Henrich, Carolyn Lesorogol, Frank Marlowe, David Tracer and John Ziker. "Markets, Religion, Community Size and the Evolution of Fairness and Punishment." Science 327 (5972): 1480-1484.

2010. John P. Ziker and David G. Anderson. "Introduction to the Special Issue on Siberian Demography." Sibirica 9(3): 1-8.

2010. John P. Ziker. "Changing Gender Roles and Economies in Taimyr." Anthropology of East Europe Review, Special Issue: "Gender Shift in the North of Russia" 28(2): 102-119.

2010. John P. Ziker and Tayana B. Arakchaa. [In Russian]. "The 'Fire-Tent' Nenetses on the western side of Enesei River: Subsistence economy, way of life, and social organization. Pp. 348-378 in K.B. Klokov and J.P. Ziker (eds.) The Polar Census of 1926/27 in the European North (Arkangel'sk *Guberniia* and Komi Autonomous *Oblast '*). Saint Petersberg: MPSS.

2009. David Anderson, Evgeny Ineshin and John P. Ziker. [in Russian]. "Spatial Demography of the 'Far Taiga' in the Zhuia River Valley in Eastern Siberia." Reports of the Laboratory of Ancient Technology, Issue 7. Pp. 224-246. Irkutsk: Irkutsk State Technical University Press.

2009. Lou Schmitt, Sephan Larsson, Jan Burdukiewicz, John Ziker, Krister Svedhage, Jeannette Zamon, and Holger Steffen. "Chronological insights, cultural change, and resource exploitation on the west coast of Sweden during the Late Palaeolothic/early Mesolithic transition." Oxford Journal of Archaeology 28(1): 1-27.

2009. John Ziker. "Stress, Alcohol, and Demographic Change in Northern Siberia." Pp. 298-303 in Patricia Townsend and Ann McElroy (eds.) Medical Anthropology in Ecological Perspective: Fifth Edition. Boulder, CO: Westview Press.

2007. John P. Ziker. "Subsistence and Food Sharing in Northern Siberia: Social and Nutritional Ecology of the Dolgan and the Nganasan." Ecology of Food and Nutrition 46: 445-467.

2007. John P. Ziker. "Flexibility in Indigenous Exchange Practices in Northern Russia." Pp. 155-167 in Leo Paul Dana and Robert B. Anderson (eds.) International Handbook of Research on Indigenous Entrepreneurship. Cheltenham: Edward Elgar Publishing, Ltd.

2006. John P. Ziker. "The Social Movement of Meat in Taimyr, Northern Russia." Nomadic Peoples 10(2): 105-133.

2006. Henrich J, McElreath R, Barr A, Ensminger J, Barrett C, Bolyanatz A, Cardenas JC, Gurven M, Gwako E, Henrich N, Lesorogol C, Marlowe F, Tracer D, and Ziker J. "Costly Punishment across Human Societies." Science 312 (5781): 1767-1770.

2005. John P. Ziker. [in Russian] "The Central Taimyr Lowlands in 1926/27: Identity and Settlement Pattern of the Native Peoples." Pp. 79-87 in David G. Anderson (ed.) Turukhanskaia Ekspeditsia Pripoliarnoi Perepisi: Etnografiia i Demografia Malochislennykh Narodov Severe. Krasnoyarsk: Krasnoyarsk Regional Studies Museum.

2005. John P Ziker. "Siberia," "Russia and Evolution," "Evolutionary Humanism," and "Work and Skills." Encyclopedia of Anthropology. H. James Birx (ed.). Thousand Oaks, CA: Sage Publications.

2005. John Ziker and Michael Schnegg. "Food Sharing at Meals: Kinship, Reciprocity, and Clustering in the Taimyr Autonomous Region, Northern Russia." Human Nature 16(2): 178-210.

2005. John P. Ziker. "Property, Hunting, and Food Sharing in the Taimyr Autonomous Region (North-Central Siberia)." Pp 98-101 in Chris Hann (ed.) Property Relations: the Halle Focus Group 2000- 2005. Halle, Germany: Max Planck Institute for Social Anthropology.

2004. John P. Ziker. "Anthropology of Eurasia, Postsocialism and Beyond." Reviews in Anthropology 33(2): 163-175.

2003. John P. Ziker. "Assigned Territories, Family/Clan/Communal Holdings, and Common-Pool Resources in the Taimyr Autonomous Region, Northern Russia." Human Ecology 31(3): 331-368.

2003. John P. Ziker. "'Horseradish Is No Sweeter than Turnips' Entitlements and Sustainability in the Taimyr Autonomous Region, Northern Russia." Pp. 363-390 in C.

Hann and the "Property Relations" Group (eds.), The Post-Socialist Agrarian Question, Halle Studies in the Anthropology of Eurasia, Volume 1, LIT-Verlag: Münster, Hamburg, London.

2003. John P. Ziker. "Kinship and Friendship in the Taimyr Autonomous Region, Northern Russia." Sozialer Sinn 2003/1: 59-80.

2002. John P. Ziker. "Raw and Cooked in Arctic Siberia: Seasonality, Gender and Diet among the Dolgan and Nganasan Hunter Gatherers." Nutritional Anthropology 25(2): 20-33.

2002. John P. Ziker. "Land Use and Economic Change among the Dolgan and the Nganasan." Pp. 191-208 in E. Kasten (ed.) People and the Land: Pathways to Reform in Post-Soviet Siberia, Vol. 1, Dietrich Reimer Verlag.

2001. John P. Ziker. "*Traditsionnaia Pishcha i Pitanie Dolgan i Nganasan*" ["Traditional Food and Nutrition of the Dolgan and Nganasan."] Pp. 152-156 in David G. Anderson (ed.) *Sel's koe Z dravoo khranenie u Malochisl en nykh Nar od ov Severa K anady i Ross ii , Cha st' 2, N arodnai a Medist ina* . [Village Health Care among the Small-Numbering Peoples of the Canadian and Russian North, Part 2, Folk Medicine.] Novosibirsk: Sibprint Agency.

2001. John P. Ziker. "Land Use and Social Change among the Dolgan and Nganasan of Northern Siberia." Pp. 47-66 in David G. Anderson and Kazunobo Ikeya (eds.) Parks, Property, Power: Managing Hunting Practice and Identity within State Policy Regimes. Senri Ethnological Studies No. 59. Osaka: National Museum of Ethnology.

1999. John P. Ziker. "Survival Economy and Core-Periphery Dynamics in the Taimyr Autonomous Region, Russia." Anthropology of Eastern Europe Review 17(2): 59-65.

1998. John P. Ziker. "Land Tenure and Economic Collapse in Northern Siberia." Arctic Research in the U.S. Volume 12, pp. 73-80. Arlington, VA: National Science Foundation, Interagency Arctic Research Policy Committee.

1998. John P. Ziker. "Kinship and Exchange Among the Dolgan and Nganasan of Northern Siberia." Pp. 191-238 in Barry Isaac (ed.) Research in Economic Anthropology, Volume 19. Greenwich, Conn.: JAI Press.

1996. John P. Ziker. "Problems of the North," Pp: 59-75 in Kathryn Lyon, Laada Bilaniuk, and Ben Fitzhugh (eds.) Michigan Discussions in Anthropology, Vol. 12: Post-Soviet Eurasia: Anthropological Perspectives on a World in Transition.

1996. John P. Ziker. "*Robinzony I Pyatnisty, Odnako*" ["Robinsons and Fridays, You Don't Say"]. With Ivan Shmetterling. Ekspert 48: 82-85.

1988. John P. Ziker. Caste in India: Marriage, Kinship, and Religion. Honors Thesis, Arizona State University.

Awards and Honors
Research Grants

- Pending. Fulbright U.S. Scholar Program. "Childhood Trauma and Addiction and Mental Health Outcomes in the NLSCY: Direct epigenetic effects or behavioral responses to compromised phenotypes?" $35,000.

- 2009-2011 National Science Foundation. "Environments, Movements, Narratives in the Circumpolar North: Final BOREAS Conference." Award 0946278, $236,355.

- 2009-2010 Fulbright Visiting Chair in North American Studies at the University of Calgary, $25,000.

- 2006-2011 National Science Foundation, Continuing Grant: "Home, Hearth, and Household in the Siberian and Northern Canada," Award 0631970, $375,365

- 2000-2001 L.S.B. Leakey Foundation, Standard Grant: "The Behavioral Ecology of Food Sharing among North Siberian Foragers."

- 2000-2001 American Council of Teachers of Russian, Regional Exchange Scholar Program: "Distribution of Food Products among Indigenous Hunters of Arctic Siberia."

- 2000-2001 Wenner-Gren Foundation for Anthropological Research (Richard Carley Hunt Fellowship): "Tiajono-Nya—Peoples of the Tundra in the Post-Communist Transition.

- July 1 – December 31, 1999, Research Scholar, Kennan Institute for Advanced Russian Studies, Woodrow Wilson International Center for Scholars

- 1996/1997 International Research and Exchanges Board, Individual Advanced Research Opportunities Fellowship

- 1996 National Science Foundation Dissertation Improvement Grant, Arctic Social Sciences, Award 9528936 (P.I. Professor Napoleon A. Chagnon)

- American Council of Teachers of Russia/U.S. Department of State, Program for Research & Training on Eastern Europe and the Independent States of the Former Soviet Union, 1996 Combined Research and Training Fellowship

- 1995/1996 Humanities/Social Science Research Grant, University of California, Santa Barbara

- American Council of Teachers of Russian/U.S. Information Agency, 1993/1994 Research Scholar Fellowship at Moscow State University, Russia

Other Awards

- Fulbright Canada, 2011 Eco-Leadership Fellowship for "Sustainable Space and Community Garden at Boise State University," $3500, January 2011.
- Associated Students of BSU, Golden Apple Award, February, 2009
- Boise State University, Albertson's Library, Library Assessment Collections Grant (with Memo Cordova) for Anthropology, $3000, June 2008
- College of SSPA, Service to the Profession Grant, Fall 2007
- Fellow (peer-nomination), Society for Applied Anthropology, 2007-present
- College of SSPA, Annual Faculty Award for Tenure-Track Research, 2006
- Associated Students of Boise State University, Certificate of Excellence for Outstanding Service as College of SSPA Faculty, December 6, 2006
- Boise State University, Office of Research, Faculty Research Associate Fellowship 2006-2007
- Boise State University, Albertson's Library, Library Assessment Collections Grant (with Beverly Miller) for Anthropology, $3000, June 2006
- Boise State University, College of SSPA, Research Award, Fall, 2006
- International Canadian Studies Institute, BC and Yukon, Consulate General of Canada, Seattle, July 2006
- Boise State University, College of SSPA, Teaching Award, Fall 2005
- Boise State University, College of SSPA, Research Award, Spring 2004, Spring 2005, and Spring 2006
- Boise State University, College of SSPA, Undergraduate Research Initiative, Fall 2003 and Spring 2004
- 1998/1999 UCSB Graduate Division Travel Grant: CHAGS 8, Osaka, Japan
- Dissertation Fellowship, Spring 1998, Fall 1998, Graduate Division, UC Santa Barbara

- Elman Service Fellowships, 1995/1996, 1996/1997, 1997/1998, Anthropology Department, UC Santa Barbara

- Regents' and Tuition Fellowship, 1991-1992, University of California, Santa Barbara

- Cynthia Lakin Award, 1988, Anthropology Department, Arizona State University

- Phi Beta Kappa, Beta Branch, 1987, Arizona State University

Short Publications

2015. John P. Ziker. "Modalities of Cooperation, Ecological Context, and Proximate Strategies." Comment on Who Helps and Why?: Cooperative Networks in Mpimbwe by Claudia Kasper and Monique Borgerhoff Mulder Current Anthropology 56(5): 725.

2013. John P. Ziker. Comment on Drew Gerkey's "Cooperation in Context Public Goods Games and Post-Soviet Collectives in Kamchatka, Russia." Current Anthropology 54(2): 169-170.

2013. A.V. Kharinskii and John Ziker. "Pastbishchnaia Territoria Domashnego Olenia i ee Iskusstvennye i Estestvennye Markery: Na Primere Obshchiny "Uluki" (Severobaikal'skii Raion Buriatii)" [Pasture Territory of Domestic Reindeer and its Manmade and Natural Markers: The Example of the Obshchina 'Uluki' (North Baikal District, Buriat Republic]. Pp 277-280 in N.A. Tomilov, D.G. Anderson, M.A. Korusenko, S.S. Tikhonov, and A.V Kharinskii (eds.) Proceedings of the 20th International Scientific Symposium "The Integration of Archaeological and Ethnographic Research" in two volumes. Irkutsk: Irkutsk State Technical University Press.

2012. John P. Ziker. "Issleduia Problemy Traditsionnogo Sotsiuma." Pp. 77-79 in L.A. Churilova (otv. red.), Pervaia Taimyrskaia Muzeinaia Internet-Conferentsia. Sbornik Trudov. Dudinka: Taimyrskaia Kraevedcheskii Muzei.

2012. John P. Ziker. "Environmental Change and the Sustainability of Subsistence Practices among Northern Indigenous Peoples." Pp. 1-8 in Environmental Change and Subsistence of Northern Peoples: Adaptation to the Changes of the Terrestrial Ecosystem. Proceedings of the 26th International Abashiri Symposium. Abashiri, Japan: Association for the Promotion of Northern Cultures.

2012. Joseph Henrich, Robert Boyd, Richard McElreath, Michael Gurven, Peter J. Richerson, Jean Ensminger, Michael Alvard, Abigail Barr, Clark Barrett, Alexander Bolyanatz, Colin F. Camerer, Juan-Camilo Cardenas, Ernst Fehr, Herbert M. Gintis, Francisco Gil-White, Edwins Laban Gwako, Natalie Henrich,Kim Hill, Carolyn Lesorogol, John Q. Patton, Frank W. Marlowe, David P. Tracer, and John Ziker. "Culture Does Account for Variation in Game Behavior." Proceedings of the National Academy of Sciences.109 (2): E32-E33.

2010. Joseph Henrich, Jean Ensminger, Richard McElreath, Abigail Barr, Clark Barrett, Alexander Bolyanatz, Juan Camilo Cardenas, Michael Gurven, Edwins Gwako, Natalie Henrich, Carolyn Lesorogol, Frank Marlowe, David Tracer and John Ziker. "Evolution of Fairness: Rereading the Data Response." Science: 329(5990): 389-390

2010. "Final BOREAS Conference: Environments, Movements, Narratives in the Circumpolar North." Witness the Arctic 14(1): 19-20.

2010. Review of Mikhail G. Turov "Evenki Economy in the Central Siberian Taiga at the Turn of the 20th Century: Principles of Land Use" (Northern Hunter-Gatherers Research Series, Volume 5, Edmonton: Canadian Circumpolar Institute Press, 2010). Sibirica 9(2): 86-88.

2010. John Ziker, Per Axelsson, Peter Sköld and David Anderson. "Indigenous Peoples and Demography." Anthropology News 51(5): 10-12.

2008. John P Ziker. "Home, Hearth and Household: A Collaborative Project in the Circumpolar North." Anthropology News. 49(9): 7-8.

2008. Review of Susan Crate "Cows, Kin, and Globalization: An Ethnography of Sustainability" (AltaMira Press, 2006). Sibirica 8(1): Fall, 2008: 86-87.

2007. Review of Igor Krupnik, Rachel Mason, and Tonia W. Horton "Northern Ethnographic Landscapes: Perspectives From Circumpolar Nations" (Contributions to Circumpolar Anthropology, 6) (Smithsonian Institution/UAF Press, 2005)." Sibirica, 6(1): 127-129.

2006. Review of Alexei Yurchak "Everything Was Forever Until It Was No More: The Last Soviet Generation" (Princeton, 2005). American Anthropologist. Dec 2006, Vol. 108, No. 4: 927-928.

2006. Review of Robert McGhee "The Last Imaginary Place: A Human History of the Arctic World" (Key Porter Books, 2004). Journal of the Royal Anthropological Institute (N.S.): 12: 678-679.

2004. "Non-Market Cooperation in the Indigenous Food Economy of Taimyr, Arctic Russia: Evidence for Control and Benefit." Comment on Michael Gurven "To Give or Not to Give: The Behavioral Ecology of Human Food Transfers." Behavior and Brain Sciences 27(4): 571.

2003. Comment on Dwight W. Read and Steven A. LeBlanc "Population Growth, Carrying Capacity, and Conflict." Current Anthropology 44(1): 79-80.

1996. "*Obsuzhdeniye Proekta Zakona Rossiiskoi Federatsii 'Osnovy Pravovogo Statusa Korennykh Narodov Severa*.'" ["Comments on the Draft Law of the Russian Federation on Fundamentals of Legal Status for the Native Peoples of the North."] *Etnograficheskoe Obozrenie* 2: 141-143.

Working Papers

2011. Exploring Public Participation in the Treasure Valley: Preliminary Research Findings. Brian Wampler, John Ziker, Susan G. Mason, John McClellan, Roman Lewis, and Joe Hackman. (http://sspa.boisestate.edu/planning/files/2011/10/TVTransportation_White_Paper_Final.pdf)

2009. Barr A, Wallace C, Ensminger J, Henrich J, Barrett C, Bolyanatz A, Cardenas JC, Gurven M, Gwako E, Lesorogol C, Marlowe F, McElreath R, Tracer D, and Ziker J. "Homo Æqualis: A Cross-Society Experimental Analysis of Three Bargaining Games." Oxford, Department of Economics Working Paper, Paper No. 422. (http://www.economics.ox.ac.uk/research/WP/pdf/paper422.pdf)

2002. John P. Ziker. "Assigned Territories, Family/Clan Holdings, and Common-Pool Resources in the Taimyr Autonomous Region, Northern Russia." Max Planck Institute for Social Anthropology Working Paper No. 32. (http://eth.mpg.de/pubs/pubs.html)

Evolutionary Anthropology Society Section News Columns
(Authored by John Ziker unless otherwise noted)

2012. "Master's Program in Anthropology at Boise State" and "Montreal 2011." 53(1): 28-29.

2011. "Indigenous Peoples and Environmental Change." Anthropology News 52(9): 32.

2011. "Advocacy in Evolutionary Anthropology: The Aché of Paraguay by Mason Ireland and John P. Ziker." Anthropology News 52(8): 36-37.

2011. "The Gift of Maps by Gwilym Lucas Eades." Anthropology News 52(7): 40-41.

2011. **"**Why Holism Matters By John J. Crandall." Anthropology News 52(5): 33.

2011. "Winners at New Orleans." Anthropology News 52(4): 32.

2011. "Advocacy and Science in Evolutionary Anthropology." Anthropology News 52(3): 33.

2011. "Long-Range Plan Is a Big Mistake." Anthropology News 52(2): 40-41.

2010. "EAS Sessions at the 2010 AAA Annual Meeting." Anthropology News 51(8): 45.

2010 "Human Behavior and Evolution Society Meeting" Anthropology News, 51, 7 (October): 51.

2010. "EAS Members Featured in AAAS Journal Science," Anthropology News, 51, 5 (May): 44

2010. "Human Nature," Anthropology News, 51, 4 (April): 40.

2010. "Anthropological Models of Forager Mobility," Anthropology News, 51, 3 (March): 42-43.

2010. "Chagnon and Neel Vindicated, Yet Again," Anthropology News, 51, 2 (February) 40.

2010. "Benefits of Joining EAS," Anthropology News, 51, 1 (January): 40

2009. "Culture and the Mind by Brooke Scelza," Anthropology News, 50, 9 (December): 41-42.

2009. " EAS Sessions and the 108th AAA Meeting by Betsy Venard and John P. Ziker," Anthropology News, 50, 8 (November): 46-7.

2009. "Costly Signaling and Consensus Analysis by Jeremy Koster," Anthropology News, 50, 7 (October): 54

2009. "Evolution of Aggression by William Knowlden and John P. Ziker," Anthropology News, 50, 5 (May): 50

2009. "2009 AAA Meeting: Awards, Sessions, Papers and Registration by John Patton," Anthropology News, 50, 4 (April) 42.

2009. "2008 Annual Report: Status, Activities, and Future Plans by Patricia Draper," Anthropology News, 50, 3 (March): 45

2009. " Nuclear Family Conflict by Jonathan Stieglitz," Anthropology News, 50, 2 (February): 45.

2009. "Altruism and Anthropology," Anthropology News, 50, 1 (January): 42

2008. "Evolutionary Anthropology in Europe," Anthropology News, 49, 9 (December): 46.

2008. "Call for Service to the Society, Upcoming Conference on Human Aggression, EAS Sessions at the 107th AAA Meeting," Anthropology News, 49, 8 (November): 53.

2008. "Evolution and Politics," Anthropology News, Vol. 49, 7 (October): 52-53.

2008. "Evolutionary Anthropology and Religion," Anthropology News, 49, 5 (May): 57.

2008. "Evolutionary Anthropology and the Environment," Anthropology News, 49, 4 (April): 52-53.

2008. "2007 Annual Report by Eric Alden Smith," Anthropology News, 49, 3 (March): 49.

2008. "Untitled (Ziker's EAS Column Manifesto)," Anthropology News, 49, 2 (February): 44-45.

Conference Presentations (Sole Authored by John P. Ziker)

2015. "Sharing and the Distribution of Skill and Knowledge." Paper presented to the Polygyny Paradox Project Group, Santa Fe Institute, Santa Fe, NM, February 1.

2014. "Kin Provisioning, Risk Minimization, and Generosity in Indigenous Food Sharing Networks in the Siberian Arctic." Paper presented to ICASS VIII, Prince George, BC, May 25.

2013. "The logic of traditional worldviews and promotion of social norms." Paper Presented to the 20th International Scientific Symposium "The Integration of Archaeological and Ethnographic Research, Irkutsk, May 28-30.

2010. "Sharing, Cooperation, and Food Security: Is Circulation of Resources by Hunter-Fisher-Trappers in North Central Siberia a Response to Economic Risk?" Paper presented at the 109th Annual Meeting of the American Anthropological Association, New Orleans, Louisiana, November 19.

2010. "If sharing is not a form of exchange, then what is it?" Paper presented at the Human Behavior and Evolution Society Conference, June 17, Eugene, OR.

2010. "Contextualizing the caribou skin lodge in the circumpolar North." Paper presented to the 43rd Annual Meeting of the Canadian Archaeological Association, Calgary, April 30.

2010. "Reconstructing Settlement and Subsistence in Siberia." Paper presented to the 43rd Annual Meeting of the Canadian Archaeological Association, Calgary, April 30.

2010. "Reconstruction of Past Movements." Paper presented to the Workshop "What Would a Good Anthropological Model of Mobility Look Like?" University of Cologne, January 14.

2009. "The Fire is Our Grandfather: Social Relations and Inferences of the Home-Hearth in Northern Siberia." Paper presented to the 42nd Annual Chacmool Conference: Identity Crisis: Archaeology and Problems of Social Identity, University of Calgary, November 14.

2009. "Toward an Integrated Theory of Social Norms, Part 1." Paper presented to the BOREAS Final Conference: Environments, Movements and Narratives in the Circumpolar North, Arctic Centre, Rovaniemi, Finland, October 28.

2009. "Subsistence and Residence in the Putoran Uplands-Taimyr Lowlands in the 1920s - 1960s." Paper presented to the Workshop: The Role of the State in Population Movements: The Circumpolar North and Other Periphery Regions. Arctic Centre, Rovaniemi, Finland, October 26.

2009. "Violent Death in Northern Siberia: Application of Evolutionary Hypotheses." Poster presentation for Evolution of Human Aggression: Lessons for Today's Conflicts,

The Barbara L. and Norman C. Tanner Center for Nonviolent Human Rights Advocacy, University of Utah, Salt Lake City, February 25-27.

2008. "Kinship and Gender in Taimyr, Russia." Workshop Gender Shift in Northern Communities of Russia, Sponsored by the Max Planck Institute for Social Anthropology and the Wenner-Gren Foundation, Cesvaine, Latvia, May 4.

2007. "Food Distribution among Hunter-Gatherers in Northern Siberia: Tests of Evolutionary Hypotheses." Annual Meeting of the American Anthropological Association, Invited Session: New Research in the Evolutionary Ecology of Food Transfer, Washington, DC, December 2.

2007. "Homes, Hearths, and Households in the Lena Goldfields and Taimyr Lowlands, Russia, and Rae-Edzo, Canada." Paper presented to the 15th Arctic Conference Pocatello, ID, Nov. 2.

2007. "Resource Distribution by Dolgan and Nganasan Hunters and their Families in Taimyr, Northern Russia." The Ethnohistory and Archaeology of Northern Eurasia: Theory, Methods, and Practice, Irkutsk, Russia, May 19-25.

2006. "Ethnodemographics and Identity of Indigenous People in the Central Taimyr Lowlands." International Workshop: Indigenous Identity in Demographical Sources, Umeå University, Umeå, Sweden, September 29–30.

2006. "Food Distribution in Northern Siberia and the Evolution of Cooperation." Paper presented to Human Behavior and Evolution Society annual meeting, University of Pennsylvania and Drexel University, Philadelphia, June 7-11.

2005. "Darwinian evolutionary theory and social behavior: Analysis of cooperative networks among indigenous Siberian minorities in the Taimyr Autonomous Okrug, Russia." Paper presented to the annual meeting of the Association of Politics and Life Sciences, Washington DC, August 31-September 4.

2005. "An Evolutionary Analysis of Indigenous Siberian Food-Sharing Networks." Paper presented to the annual meeting of the Human Behavior and Evolution Society, Austin, Texas, June 1-5.

2005. "The Social Context of Fairness and Rational Choice in Siberia." Paper presented to the Roots of Human Sociality Conference. Pasadena, California, April 15-17.

2005. "Land Tenure and Game-Management Strategies Among the Dolgan of Northern Siberia: Points for Comparison." Paper presented to the 41st Annual Meeting of the Idaho Chapter of the Wildlife Society, Boise, Idaho, March 10.

2004. "Rational Choice and Limits on Agency in Siberia." Workshop: Rational Choice and the Limits of Individual Agency, Max Planck Institute for Social Anthropology, Halle (Saale) Germany, September 16-18.

2004. "Hunter Status and Reproductive Success in Northern Siberia." Paper presented to the annual meeting of the Human Behavior and Evolution Society. Berlin, Germany, July 21-25.

2004. "The Social Movement of Meat in Taimyr, Northern Russia." Paper presented to the 5th International Congress of Arctic Social Sciences. Fairbanks, Alaska, May 19-23.

2003. "Tradition and the Conflict between Generations in Taimyr: The Logic of Conformity and Dialectic of Learning." Siberian Studies Center Workshop: Everything is Still Before You: Being Young in Siberia Today, Max Planck Institute for Social Anthropology, Halle (Saale) Germany, November 15-17.

2003. "Sharing in Siberia: Social Networks and Explanatory Hypotheses." The Human Behavioral Ecology Workshop: Future Questions, Approaches, and Applications for a Second Generation, Cooperation and Competition, University of Maine, Department Anthropology and Climate Change Institute, May 8-11.

2002. "The Food Sharing Debate: A Case Study From Siberia." Paper presented to the 9th International Conference on Hunting and Gathering Societies, Edinburgh, Scotland, September 9.

2002. "Socio-Ecological Contexts of Livestock Theft." Collective and Multiple Forms of Property in Land and Animals, Max Planck Institute for Social Anthropology, Halle (Saale) Germany, August 21.

2002. "Theoretical Approaches in the United States." Who Owns Siberian Ethnography? An International Workshop on Methods and Approaches to Ethnography in the Russian North, Max Planck Institute for Social Anthropology, Halle (Saale) Germany, March 7.

2002. "Kinship, Friendship, and Public Goods in Native Siberian Food Sharing." Tagung: Verwandtschaft und Freundshaft. Zur Unterscheidung und Relevanz zweier Beziehungssysteme. Bielefeld, Germany, February 10.

2001. "The Raw and the Cooked in Arctic Siberia: Seasonality, Gender and Diet among the Dolgan and Nganasan Hunter Gatherers." Paper presented to the 100th Annual Meeting of the American Anthropological Association, Washington, DC, November 28.

2001. "The Dolgan of Northern Russia: Native Language in School and Community." Paper presented to the Annual Meeting of the Alaskan Anthropological Association, Fairbanks, AK, March 23.

2001. "Clan Holdings, Assigned Territories, and Common Pool Resources: Land Tenure Developments in the Taimyr Autonomous Region, Northern Russia." Paper presented to the 40th Annual Meeting of the Western Regional Science Association, Palm Springs, CA, February 28.

2000. "Land Tenure and Economic Change among the Dolgan and Nganasan." Paper presented to the "Postsocialisms in the Russian North" workshop at the Max Planck Institute for Social Anthropology, Halle (Saale), Germany, November 9.

2000. "Food Sharing among Indigenous Hunters of the Russian Arctic: Models and Preliminary Evidence." Paper presented to the 12th Annual Meeting of the Human Behavioral and Evolution Society, Amherst, Massachusetts, June 11.

2000. "The Socio-Demography of a Native Siberian Village." Paper presented to the Arctic Forum, Washington, DC, May 18.

2000. "Challenges to Self-Determination Among the Siberian Dolgan and Nganasan." Association for the Study of Nationalities Conference, Columbia, New York, April 14.

1999. "Survival Economy and Core-Periphery Dynamics in the Taimyr Autonomous Region." Paper presented to Soyuz-99, Bloomington, Indiana, April 10.

1998. "Land Use and Social Change among the Dolgan and Nganasan of Northern Siberia." Paper presented to the 8th International Conference on Hunting and Gathering Societies, Osaka, Japan, October 29.

1998. "Land Tenure and Kinship in Northern Siberia." Paper presented to the 10th Annual Meeting of the Human Behavioral and Evolution Society, Davis, California, July 10.

1997. "Kinship, Economy, and Ethnicity Among the Dolgan of Northern Siberia." Paper presented to the 96th Annual Meeting of the American Anthropological Association, November 23.

1997. [In Russian] "*Rodstvo, Obmen, i Etnos v Taimyrskoi Tundre: Rezultaty Issledovanii (1995-1997)*." ["Kinship, Exchange, and Ethnicity in the Taimyr Tundra: Results of Investigations (1995-1997)."] Paper presented to the 60th Anniversary Conference of the Taimyr Regional Territorial Studies Museum, Dudinka, Krasnoyarskii Territory, October 17.

1995. "Ethnocentrism and Detection of Ethnicity." 7th Annual Meeting of the Human Behavior and Evolution Society, Santa Barbara, California, June 28-July 1.

Co-Authored Conference Papers

2015. Glass, Delaney, Shane Scaggs, Haley Myers, Lisa Greer, and John P. Ziker. "Four Pathways to Generosity: Evolutionary Mechanisms Differentially Affect Charitable

Donations." Paper presented at the 114th meeting of the American Anthropological Association, Denver, November 21.

2015. Ziker, John P., and David A. Nolin. "Wealth and Cohort Effects on Fertility Decline in an Indigenous Siberian Community in Response to Rapid Economic Change." Paper presented at the 114th meeting of the American Anthropological Association, Denver, November 19.

2015. Ziker, John P., and David A. Nolin. "Reproductive Decision Making in Ust'-Avam, Siberia: Fertility Decline as a Response to Economic Uncertainty." Paper presented at the 27th Annual Conference of the Human Behavior & Evolution Society. Columbia, MO. May 27.

2014. Ziker, John P., David A. Nolin, Joellie Rasmussen. "Skill and Wealth-Based Determinants of Men's Reproductive Success among Monogamous Hunter-Fisher-Trappers in Northern Siberia." Paper presented at the 113th Annual Meeting of the American Anthropological Association, Washington, DC, December 2.

2013. Ziker, John and Joellie Rasmussen. "Food Sharing Networks and Variation in Capital in Siberia: Implications for the Evolution of Cooperation." Paper presented at the 112th meeting of the American Anthropological Association, Chicago, November 23, 2013.

2012. Mertens, Karl and John Ziker. "Pastoral and Foraging Economy of the Evenki: Understanding the Role of Movement In a Taiga Environment." Paper presented to the 111th meeting of the American Anthropological Association, San Francisco, November 17, 2012.

2011. Ziker, John and Artur Kharinsky. "Mobility and Revival of Reindeer Herding Among Evenk Hunters in Eastern Siberia, Russia." Paper presented to the 110th Annual Meeting of the American Anthropological Association, Montreal, November 17.

2009. Ziker, J., A. Blake, and B. Venard. "Spousal Violence in Northern Siberia: Testing Hypotheses of Male Sexual Proprietariness." Poster presented to the 108th Annual Meeting of the American Anthropological Association, Philadelphia, December 4.

2009. Ziker, J., P. Nietfeld, T. Andrews and J.B. Zoe. "A Knowledge Repatriation Project on Caribou-Skin Dwellings with Tlicho First Nation." The Society for Applied Anthropology 69th Annual Meeting, Santa Fe Convention Center, Santa Fe, March 17-21.

2008. Ziker, J. and C. Hill. "Global Change in Siberia: Past and Present Human-Caribou/Reindeer Interaction." Poster presented to the BSU Focus the Nation Research Symposium, Boise, ID, January 31.

2007. Gorrell, N., Arakchaa T., and J. Ziker. "The History and Economy of the Taimyr Lowlands." Paper presented to the 15th Arctic Conference Pocatello, ID, November. 2.

2007. Harter, K., and J. Ziker. "Latter-Day Saints Childcare Networks in Boise, Idaho." Poster presented to Human Behavior and Evolution Society annual meeting, College of William and Mary, Williamsburg, Virginia. June 29.

2006. Ziker, J., Harter, K., Kennedy, E.C., and S. Sweat. "Trust, Reciprocity, and Resources: Using Experimental Games to Understand Perspectives of College Students." Poster presented to Human Behavior and Evolution Society annual meeting, University of Pennsylvania and Drexel University, Philadelphia, June 7-11.

2005. Ziker, J. and Wadley, K. "Demographic Health and the Community Well-Being in the Taimyr Lowlands, Northern Russia." Paper presented to the Annual Meeting of the Society for Applied Anthropology, Santa Fe, New Mexico, April 9.

2002. Ziker, J. and A. Venstel. "Reindeer Herding and Hunting Among the Dolgan: A Comparative Study of Property Relations in the Russian Far North." European Association for Social Anthropology, 7th Biennial Conference, Copenhagen, August 14-17.

1997. Chagnon, N.A., Ziker, J., Thompson, B., Price, M. & Eerkens, J. "The Density of Kinship in Tribal and Peasant Communities." Paper presented to the 9th Annual Meeting of the Human Behavior and Evolution Society, June 5.

Invited Lectures

2015. "Sharing Meat and Norms of Sharing: Pathways to Cooperation among Contemporary North Siberian Hunter-Gatherers." Lecture presented at the University College, London, Anthropology Departmental Seminar, December 2.

2015. "Village Life in Siberia: Economic Inequalities, Reproductive Dynamics, Fairness, and Sharing in an Indigenous Community." Lecture presented at the Asia Center, University of Utah, April 23.

2011. "Environmental Change and the Sustainability of Subsistence Practices among Northern Indigenous Peoples." Lecture presented at 26th International Abashiri Symposium, Abashiri City, Hokkaido, Japan, October 1.

2010. "Sustainable Indigenous Economies in the Siberian Arctic." Public Lecture presented at the Prince of Wales Northern Heritage Centre, Yellowknife, Canada, April 13.

2005. "Property, Hunting, and Food Sharing among the Dolgan and the Nganasan in the Russian Far North". Department of Anthropology, University of California at Davis, January 31.

1999. "Surviving the Transition: Indigenous Communities in the Russian Far North." Public Lecture for the Yale Center for International and Area Studies and the Council on European Studies, Yale University, November 15.

1999. "Social Change and Indigenous Communities in Siberia." Presentation to the Russia/Eurasia Area Studies Course, Foreign Services Institute, U.S. State Department, August 16.

1997. [In Russian] "*Rodstvennye Svyazi, Obmen, i Etnos v Taimyrskoi Tundre.*" ["Kinship Relations, Exchange and Ethnicity in the Taimyr Tundra."] Field Report, Northern Sector, Institute of Ethnology and Anthropology, Russian Academy of Sciences, November 11.

BSU Campus Lectures
2007. With Christopher Hill. "Environments, Histories, and Migrations in Siberia from 10,000 y.b.p. to the Present." Anthropology Club Colloquium, October 25.

2006. "First Nations, the Treaty Process, and Environmental Rights in British Columbia, Canada." International Connections Brown Bag Luncheon Seminar, April 24, 2006.

2006. "Comparing Canadian First Nations and Small Numbering Peoples in Siberia: Land and Resource Issues." Canada Week Lecture. April 3, 2006.

2006. With Lisa Brady. "Natural Rights: Human Rights and Environmental Change". Presented at Martin Luther King Jr./Human Rights Celebration, January 19, 2006.

2005. With Lisa Brady. "Environment and Human Rights: A global responsibility" Presented at the Point of View conference on Environment and Human Rights, November 9, 2005.

Media
2010. "Puteshestvie v proshloe." ["Trip to the past"]. NTV News. August 10, 2010. http://www.ntv.ru/novosti/201847/

2006. "BSU Professor Profile" Idaho Local by Buffy Naillon, Boise State Radio, August 8.
http://www.publicbroadcasting.net/idaho/news.newsmain?action=article&ARTICLE_ID=952446

2006. "John P. Ziker" Special Guest on *Peoples and Cultures* by Michael Alvard, KAMU, College Station, TX, July 11.

2004. "Conversations with John Ziker." Special guest on *Conversations* by Peter Lutze, TVTV Channel 11, February 26.

2000. "The Return to Subsistence Among the Dolgan and Nganasan"—*Alaska Edition*, KUAC Public Radio, November 30 and December 1.

2000. "Speaking Dolgan." *Dialogue*—from the Woodrow Wilson International Center for Scholars, Public Radio International, Broadcast # 529, April 24-30.

Field Research and Language Experience
July 1010, Severobaikal'skii Raion of the Republic of Buryatia, Russia: Ethno-archaeological survey of reindeer herding families in the north Baikal uplands. Research supported by the National Science Foundation under Grant No. 0631970.

May 2008, Kyzyl and Bai-Taiginskii Raion of the Republic of Tuva, Russia: Ethnographic survey of nomadic households; public lectures at Tuvan State University; meetings with ethnographer and other faculty. Research supported by the National Science Foundation under Grant No. 0631970.

June-August 2007, Bodaibinskii Raion of Irkutsk Region and Taimyr (Dolgano-Nenetskii) Municipal District (renamed in 2007). I spent three weeks with partners from Irkutsk State University, Chita State University, and Boise State University conducting ethno-archaeological and ethnographic surveys of reindeer herding communities on the Zhuya River in Irkutsk Region. I spent three weeks in the Central Taimyr Lowlands conducting research on the vernacular architecture of Dolgan and Nganasan mobile dwellings, as well as renewing community census information. Research supported by the National Science Foundation under Grant No. 0631970, and a 2007 Faculty Research Associates Fellowship from BSU.

January-March 2003, Taimyr Autonomous Region: I spent two and one half months in my main study community conducting fieldwork on hunting, food sharing, hunter status, demographics, and ultimatum/dictator games. Fieldwork was supported by the Max Planck Institute for Social Anthropology.

May-November 2001, St. Petersburg and Taimyr Autonomous Region: I spent six months in Russia working on publications and conducting ethnographic field work on two projects (funded by grants from the Leakey Foundation and the Wenner Gren Foundation). The scientific-technical exchange was supported by a grant from the American Council of Teachers of Russian.

March-November 1997, Russia, Northern Siberia: I conducted dissertation improvement research as a 1996/1997 IREX Individual Advanced Research Opportunities scholar with further support from NSF Award # 9528936.

November-June 1995-1996 and September-November 1996, Russia, Northern Siberia: I conducted dissertation research with support from the US Department of State, Program for Research & Training on Eastern Europe and the Independent States of the Former Soviet Union (Title VIII) Combined Research and Training Fellowship, administered by the ACTR/ACCELS Research Scholar Program, as well as with support from NSF Award # 9528936, and a UCSB Humanities/Social Science Research Grant.

September-June 1993-1994, Russia, Northern Siberia: As a U.S. Information Agency Research Scholar in the Ethnography Department, History Faculty, Moscow State University, I spent two months in the proposed dissertation focal community and received approval for my research. I also conducted research at the Institute of Scientific Information for the Social Sciences and at the library of the Institute of Ethnology and Anthropology.

July-September 1992, Russia, Northern Siberia: I made a one month trip to the Taimyr Region of northern Krasnoyarskii Krai to study the feasibility of dissertation research.

March 1989-June 1991, Russia, Armenia, Kazakstan: I made five trips to the Soviet Union during my employment as project manager for Kiser Research Inc., Washington, DC.

February-May 1988, Russia, Uzbekistan: I completed a three month intensive Russian language course at the Moscow Energy Institute, a program administered by the American Council of Teachers of Russian.

Summer 1986, Norwich University: I completed an intensive course in Russian language.

Membership in Professional Societies
American Anthropological Association
Human Behavior and Evolution Society
International Arctic Social Scientists Association
Society for Applied Anthropology, Fellow

Graduate Students

Karl Mertens, M.A. 2015, "Mobility and Economy among the Evenkis in Eastern Siberia."

Joellie Rasmussen, M.A. 2014, "Explaining Variance in Reproductive Success and Food Sharing in Ust'-Avam."

Corrina Smith, M.A.A. 2011, "Anthropology As Science: Rationale for Teaching Biological Anthropology as a High School Science Elective and Pilot Semester Curriculum."

Tayana Arakchaa, M.A. 2009, "Household and Property Relations in Tuva."

Nikki Gorrell, M.A.A. 2008, "An Educational Program for the Basque Museum: A Series of Recommendations."

Current Graduate Students

Elizabeth Kringen

Valerie Hayes

Shawn G. Benner

Department of Geosciences
Boise State University
Boise ID 83725
(208) 850-9033
email: sgbenner@gmail.com

EDUCATION

Ph.D., Department of Earth Sciences, University of Waterloo, 2000
Hydrogeology, Geochemistry and Microbiology of a Reactive Barrier for Acid Mine Drainage
M.Sc., Department of Geology, University of Montana, 1994
Fate of Heavy Metals During Surface-groundwater Interaction
B.A., Geology Department, Colorado College, 1988
Evolution of a Complex Stratovolcano

PROFESSIONAL EXPERIENCE

Associate Professor 2009-present
Geosciences, Boise State University
Boise State NSF-EPSCoR Director 2013-Present
Office of Research, *Boise State University*
Visiting Scholar 2002-Present
Geological and Environmental Sciences, Stanford University
Assistant Professor 2004-2009
Geosciences, Boise State University
Assistant Research Professor 2002-2004
Desert Research Institute, University of Nevada
Graduate Faculty 2003-2004
Hydrological Sciences Program, University of Nevada, Reno
Post Doctoral Fellow 2000-2002
Geological and Environmental Sciences, Stanford University
Lecturer 1998-2000
Department of Earth Sciences, University of Waterloo
Lecturer 1997
Geology Department, Colorado College

RESEARCH INTERESTS

My research interests are in biogeochemistry and hydrology with an emphasis on how biogeochemical and hydrologic processes influence transformations in soils, surface waters and groundwater. I am interested in examining scientific problems from the molecular to the field scale and my research approach often integrates microscopic techniques with fieldwork and laboratory experimentation and involves collaborative team efforts. My research often focuses on environmental contamination as well as biogeochemical changes related to climate change. I am also interested in problems requiring integration of society and environmental systems.

GRANTS AND CONTRACTS

Current

NSF Idaho EPSCoR Research Infrastructure Improvement Grant Managing Idaho's Landscapes for Ecosystem Services 09/01/2011-078/31/2013 $20,000,000, Co-PI.

NSF-Critical Zone Observatory: Reynolds Creek Critical Zone Observatory. $2,500,000, Co-PI.

NSF-Hydrologic Sciences Collaborative Research: Novel interdisciplinary flume experiments to investigate the role of the hyporheic zone in greenhouse gas generation. $250,000, Co-PI.

Fire and Erosion in Western Rangelands: Evaluation of Post-fire Treatments, Idaho Federal Appropriations 06/01/08-05/30/12, $1,500,000, Co-PI.

Supplemental to: Fire and Erosion in Western Rangelands: Evaluation of Post-fire Treatments, Idaho Federal Appropriations 06/01/08-05/30/12, $120,000, Co-PI.

Past

Idaho Water Resources Research Institute: Characterizing Boise River watershed water quality using Basins. 3/15/12-03/14/13 $15,000, PI

Inductively Coupled Plasma Mass Spectrometry (ICP-MS) Capability for Trace Element Analyses in the Center for Geochemical Characterization, Murdock Charitable Trust 06/01/08-12/30/12,$314,000, PI

NSF Idaho EPSCoR Research Infrastructure Improvement Grant 09/01/2011-078/31/2013 $400,000, Institutional Liaison PI.

Evaluation the Source and Release Mechanism of Elevated Uranium Concentrations in the Shallow Treasure Valley Aquifer: Year I. Idaho Department of Environmental Quality 06/01/08-05/30/09, $50,000.00, PI

Elucidating Bioreductive Transformations within Physically Complex Media: Impact on the Fate and Transport of Uranium and Chromium. DOE Natural and Accelerated Bioremediation Research (NABIR) Program. 9/15/03-9/30/07, $83,000, Co-PI

Increasing Carbon Storage within Soils through Controlled Microbial Respiration Processes GCEP. 06/01/07-05/30/08, $35,000/yr, PI

Life Cycle Plan: Cesium Signature Detection. DOE NA-22. 06/01/06-05/30/09 $50,000/yr, Co-PI

Reconnaissance Study of Arsenic Distribution in the Shallow Aquifer of the Treasure Valley, Idaho Water Resources Research Institute. 3/15/04-09/30/07 $26,750, PI

Nutrient Cycling in a Tropical Watershed, Thailand. 06/01/06-05/30/07 $15,000/yr, PI

Idaho Space Grant Fellowship: Katrina Ladd, Idaho NASA Space Grant Program Project 9/15/05-6/30/07 $30,000, Advisor

Influence of Grade Control Structures on Nutrients, United States Army Corp of Engineers *Amount:* $74,000 9/01/03-3/31/04 *PI*.

Nutrient Attenuation Associated with Stream Restoration Nevada Department of Environmental Protection, the United States Army Corp of Engineers, and the Cities of Reno/Sparks. $400,000/yr, 3/15/02-2/14/03, PI.

Modeling for the Underground Testing Area, Climax Department of Energy NNSA/NSO $1,200,000 7/1/03-6/30/06, Co-PI.

PUBLICATIONS

Publication Impact Metrics

Web of Science: Total Citations: 1795; Citations per item: 45; h-index: 20

Google Scholar: Total Citations: 2694; h-index 20; i10-index: 26

Refereed Journal Articles

Stuckey, J.W.; Schaefer, M.V.; Kocar, B.D.; Dittmar. J.; Pacheco, J.L.; **Benner, S.G.**; Fendorf, S. 2014. Arsenian pyrite formation Concentrates arsenic within peat deposits of Mekong Delta sediments. Geochimica Cosmochimica Acta. *In Review*.

Benner, S.G.; Tantasarin, C.; Kunkel, M.L.; Ziegler, A.D. 2014. Turbidity-based estimates of carbon-nitrogen flux dynamics in a headwater catchment in northern Thailand, *Hydrologic Processes In Review*

Kocar, B.; **Benner, S.G.**; Fendorf, S. 2014. Deciphering and predicting spatial and temporal concentrations of arsenic within the Mekong Delta aquifer. *Environmental Chemistry*, Accepted.

Eiriksson, D.; Whitson, M.; Luce, C.H. Marshall, H.P.; Bradford, J.; **Benner, S.G.;** Black, T. Hetrick, H.; McNamara, J.P. 2013. An evaluation of the hydrologic relevance of lateral flow in snow at hillslope and catchment scales. *Hydrologic Processes* 27, 640–654.

Stanaway, D.; Haggerty, R.; **Benner, SG.**; Flores, A.; Feris, K.P. 2012. Persistent metal contamination limits lotic ecosystem heterotrophic metabolism after more than 100 years of exposure: a novel application of the Resazurin Resorufin Smart Tracer. *Environmental Science and Technology*, 46 (18) 9862-9871.

Poulos, M.J.; Pierce, J.L.; Flores, A.N.; and **Benner, S.G.** 2012. Hillslope Asymmetry Maps Reveal Widespread, Multi-Scale Organization. *Geophysical Research Letters, 39*L06406.

Sankey, J. B., Germino, M. J., **Benner, S. G.**, Glenn, N. F., & Hoover, A. N. 2012. Transport of biologically important nutrients by wind in an eroding cold desert. *Aeolian Research.* doi: 10.1016/j.aeolia.2012.01.003

Yuen, J.Q., Olin, P.H., Lim, H.S., **Benner, S.G.**, Sutherland, R.A., Ziegler, A.D. 2012. Accumulation of Potentially Toxic Elements in Road Deposited Sediments in Residential and Light Industrial Neighborhoods of Singapore. *Journal of Environmental Management 101, 151-163.* doi:10.1016/j.jenvman.2011.11.017.

Smith, T.J., McNamara, J.P., Flores, A.N., Gribb, M.M., Aishlin P.S., **Benner, S.G.** (2011) Small soil storage capacity limits benefit of winter snowpack to upland vegetation. *Hydrologic Processes* 25 (25) 3858-3865. doi: 10.1002/hyp.8340

Geroy, I.J., Gribb, M.M., Marshall, H.P., Chandler, D.G., **Benner, S.G.**, and McNamara, J.P. (2011) Aspect influences on soil water retention and storage. *Hydrologic Processes* 25 (25) 3836-3842. doi: 10.1002/hyp.8281.

Thoma, M.J., McNamara, J.P., Gribb, M.M., **Benner, S.G.**(2011) Seasonal recharge components in an urban/agricultural mountain front aquifer system using noble gas thermometry *Journal of Hydrology* 409 (1-2) 118-127. doi:10.1016/j.jhydrol.2011.08.003

Kunkel Melvin L.; Flores Alejandro N.; Smith Toni J.; McNamara, J.P.; **Benner, S.G.** 2011 A simplified approach for estimating soil carbon and nitrogen stocks in semi-arid complex terrain *Geoderma* 165 (1) 1-11 DOI: 10.1016/j.geoderma.2011.06.011

Benner, S.G., Fendorf, S. (2010) Arsenic in South Asia Groundwater *Geography Compass* 4 (10) 1532-1552.

Benner, S.G. 2010 Anthropogenic Arsenic, News and Views, *Nature Geoscience 3, 5-6*.

Tufano, K.J., **Benner, S.G.** Mayer, K.U., Marcus, M.A. Nico, P.S., Fendorf S. 2009 Aggregate-Scale Heterogeneity in Iron (Hydr)oxide Reductive Transformations. *Vadose Zone Journal 8, 1004-1012.*

Busbee, M.W., Kocar, B.D., **Benner, S.G.** 2009 Irrigation produces elevated arsenic in the underlying groundwater of a semi-arid basin in Southwestern Idaho. *Applied Geochemistry 24, 843-859*

Polizzotto, M., Kocar, B. **Benner, S.G.**, Sampson, M., Fendorf, S. (2008) Contributions of Near-Surface Arsenic Release to History's Largest Mass Poisoning. *Nature, 453 505-508.*

Benner, S.G., Polizzotto, M., Fendorf, S., Sampson, M. (2008) Hydrologic Constraints on Arsenic Release from Flood Plain Sediments in Cambodia, *Applied Geochemistry 23, 3072-3087.*

Kocar, B., Fendorf, S., **Benner, S.G.**, Polizzotto, M., Sampson, M. (2008) Shallow Biogeochemical Dynamics leading to Arsenic Release, Submitted, *Applied Geochemistry 23, 3059-3071.*

Mayer, K.U., **Benner, S.G.**, and Blowes, D.W. 2006 Application of the reactive transport model MIN3P to a reactive barrier treating acid mine drainage. *Contaminant Hydrogeology*, 85, 3-4, 195-211.

Hansel, C. M., **Benner**, **S. G.** et al. 2005 Factors influencing competing Fe(II)-induced mineralization pathways of ferrihydrite. *Environmental Science and Technology* 38, 18, 7147-7153.

Young, M.H., McDonald, E.V., Caldwell, T.C., **Benner, S.G.**, and Meadows, D. 2004. Hydraulic properties of desert pavements, Mojave desert, California, USA. *Vadose Zone Journal 3, 956-963.*

Hansel C. M., **Benner, S. G.** Nico, P. Fendorf, S. 2004. Structural constraints of ferric (hydr)oxides on dissimilatory iron reduction and the fate of Fe(II) *Geochimica et Cosmochimica Acta , 68, 15 3217-3229*

Hansel, C. M., **Benner, S. G.**, Neiss, J., Dohnalkova, A., Kukkadapu, R.K., Fendorf, S.E. 2003. Secondary mineralization pathways induced by dissimilatory iron reduction of ferrihydrite under advective flow. *Geochimica et Cosmochimica Acta 67,16 2977-2992.*

Benner, S. G., Hansel, C. M., Wielinga, B. W., Barber, T. Fendorf, S.E. 2002. Reductive dissolution and biomineralization of iron oxides under dynamic flow conditions. *Environmental Science and Technology 36, 8 1705-1711*

McGregor, R., **Benner, S.G.**, Blowes, D.W. Ludwig, R., 2002. Sulfate Reduction Reactive Barriers to Treat Acidity and Heavy Metals: Two Case Studies. In: Handbook of ground water remediation of metals, radionuclides, and nutrients with permeable reactive barriers, edited by D.L. Naftz, S.J. Morrison, C.A. Fuller, and J.A. Davis.

Ludwig, R., McGregor, R., Blowes, D.W., **Benner, S.**, Mountjoy, K. 2002. Geochemistry of an organic-based permeable reactive barrier for treatment of heavy metals. *Ground Water 40, 1, 59-66.*

Benner, S.G., Blowes, D.W., Ptacek, C.J., and Mayer, K.U. 2002. Rates of sulfate reduction and metal sulfide precipitation in a permeable reactive barrier. *Applied Geochemistry 17,3, 301-320.*

Mayer, K.U., **Benner, S.G.**, Frind, E.O., Thornton, S.F., Learner, D.L. 2001. Reactive transport modeling of processes controlling the distribution and natural attenuation of phenolic compounds in a deep sandstone aquifer. *Journal of Contaminant Hydrology. 53 341-368.*

Benner, S.G., Blowes, D.W., Molson, J.W.H. 2001. Modeling preferential flow in permeable reactive barriers: Implications for performance and design. *Ground Water 39, 3, 371-379.*

Blowes, D.W., Ptacek, C.J., **Benner, S.G.**, McRae, C.W.T. and Puls, R. W. 2000. Treatment of dissolved metals and nutrients using permeable reactive barriers. *Journal of Contaminant Hydrology (45) 1-2, 123-137.*

Benner, S.G., Gould, D., and Blowes, D.W., 2000. Microbial populations associated with the generation and treatment of acid mine drainage. *Chemical Geology 169, 435-448.*

Herbert Jr., R.B., **Benner, S.G.**, and Blowes, D.W., 2000. Solid Phase iron-sulfur geochemistry of a reactive barrier for treatment of mine drainage. *Applied Geochemistry 15, 1331-1343.*

Benner, S.G., Herbert Jr., R.B., Blowes, D.W., Ptacek, C.J., Gould, D. 1999. Geochemistry and microbiology of a permeable reactive barrier for acid mine drainage. *Environmental Science and Technology. 33 2793-2799.*

Blowes, D.W., Ptacek, C.J., **Benner, S.G.**, Waybrant, K.R., and Bain, J.G. 1998. Porous reactive walls for the prevention of acid mine drainage: a review. *Mineral Processing and Extractive Metallurgy Review 19 25-17.*

Herbert Jr., R.B., **Benner, S.G.**, Pratt, A.R., and Blowes, D.W. 1998. Surface chemistry and morphology of poorly crystalline iron sulfides precipitated in media containing sulfate-reducing bacteria. *Chemical Geology* 144, 87-97.

Benner, S.G., Blowes, D.W., and Ptacek, C.J. 1997. Full-scale porous reactive wall for the prevention of acid mine drainage. *Groundwater Monitoring and Remediation, 17,4 Fall 1997.*

Kempter, K.A., Benner, S.G., Williams, S.N. 1996. Rincon de la Vieja Volcano, Guanacaste Province, Costa Rica: geology of the southwestern flank and hazards implications. *Journal of Volcanology and Geothermal Research, 71, 109-127.*

Benner, S.G., Smart, E.W., and Moore, J.N. 1995. Metal behavior during surface-groundwater interaction, Silver Bow Creek, Montana. *Environmental Science and Technology, 29, 1789-1795.*

Refereed Papers in Conference Proceedings

Mayer, K. U., Benner, S. G. Frind, E. O. Thornton, S. F., and Lerner D. L. Multicomponent reactive transport modeling of natural attenuation at the Four Ashes Research Site, UK GQ2001, June 18th-21st 2001 at the University of Sheffield.

Benner, S.G., Blowes, D.W., and Ptacek, C.J. 2000. Long Term Performance of the Nickel Rim Reactive Barrier, A Summary. ***In:*** Proceedings of the Fifth International conference on acid rock drainage: ICARD 2000. May 21-24 Denver Colorado. Society for Mining Metallurgy and Exploration, Littleton Colorado.

Mayer, U., Benner, S.G., Blowes, D.W. 1999 The Reactive Transport Model MIN3P: Application to acid mine drainage generation and treatment- Nickel Rim Mine Site. ***In:*** Proceedings of the Sudbury 99: Mining and the Environment II Conference, Sudbury Ontario, Canada. September 12-16, 1999.

Benner, S.G., Blowes, D.W., Gould, W.D. 1998. Generation and treatment of acid mine drainage: Correlating bacterial populations with water chemistry, ***In:*** Proceedings of The Eighth Annual V.M. Goldschmidt Conference Toulouse, France Aug 30 – Sept 3. p 147-148.

Blowes, D.W., Ptacek, C.J., Benner, S.G., McRae, C.W.T. 1998. Treatment of dissolved metals using permeable reactive barriers. ***In:*** IAHS Publication no. 250, Groundwater Quality: Remediation and Protection, Proceedings of the GQ '98 Conference, Tubingen, Germany, September 21-25, pp. 483-490.

Herbert Jr, R.B., Benner, S.G., and Blowes, D.W. 1998. Reactive barrier treatment of groundwater contaminated by acid mine drainage: Sulfur accumulation and sulfide formation. IAHS Publication no. 250, Groundwater Quality: Remediation and Protection, Proceedings of the GQ '98 Conference, Tubingen, Germany, September 21-25.

Benner, S.G., Blowes, D.W., and Ptacek, C.J. 1997. Porous reactive wall for prevention of acid mine drainage: results of a full-scale field demonstration. ***In:*** 1997 International Containment Technology Conference and Exhibition, St. Petersburg, Florida, U.S.A., February 9-12, 1997, pp. 835-843.

Waybrant, K.R., Benner, S.G., Blowes, D.W., and Ptacek, C.J. 1997. A geochemical and mineralogical investigation of porous reactive walls for the prevention of acid mine drainage. ***In:*** Fourth International Conference on Acid Rock Drainage, Vancouver, B.C. Canada, May 30- June 6, 1997. pp. 14.

Non-refereed Papers in Conference Proceedings

Blowes, D.W., Ptacek, C.J., Benner, S.G., Waybrant, K.R., Bain, J.G., 1998. Permeable reactive barriers for the treatment of mine tailings drainage water. ***In:*** Proceedings of the Uranium Mining and Hydrogeology II, International Conference and Workshop, Germany, September 15-17, 1998, Vol. II-Supplements, pp. 113-120.

Benner, S.G., Blowes, D.W., and Ptacek, C.J. 1997. Porous reactive wall for the prevention of acid mine drainage: a full-scale field trial. ***In:*** Thirteenth BIOMINET General Annual Meeting, Ottawa, Canada, January 20, 1997. pp. 61-72.

Benner, S.G., Blowes, D.W., and Ptacek, C.J. 1997. Sulfate reduction in a permeable reactive wall for the prevention of acid mine drainage. ***In:*** 213th ACS National Meeting, San Francisco CA, April 13-17, 1997.Vol. 37 (1)., pp. 140-141 (extended abstract).

Wielinga, B., Benner, S., Brick, C., Moore, J., and Gannon, J. 1994. Geomicrobial profile through the hyporheic zone of a historic mining flood plain. ***In:*** International Conference on Groundwater Ecology, Atlanta GA, March 27-30, 1994.

ALEJANDRO N. FLORES

Department of Geosciences
Boise State University
1910 University Drive, MS 1535
Boise, ID 83725-1535

Phone: (208) 426-2903
Fax: (208) 426-4061
Email: lejoflores@boisestate.edu

EDUCATION

Ph. D. **Massachusetts Institute of Technology (MIT), Cambridge, MA**
Hydrology (Dept. Civil and Environmental Engineering), February 2009

M.S. **Colorado State University, Fort Collins, CO**
Civil Engineering, December 2003

B.S. **Colorado State University, Fort Collins, CO**
Civil Engineering, May 2001

PROFESSIONAL APPOINTMENTS

Associate Professor, Department of Geosciences, Boise State University
Boise, ID — July 2015 to present

Assistant Professor, Department of Geosciences, Boise State University
Boise, ID — July 2009 to June 2014

Assistant Research Professor, Department of Geosciences, Boise State University
Boise, ID — January 2009 to July 2009

Postdoctoral Researcher, Department of Civil and Environmental Engineering, MIT
Cambridge, MA — November 2008 to January 2009

Graduate Research Assistant, Department of Civil and Environmental Engineering, MIT
Cambridge, MA — September 2003 to November 2008

Graduate Research Assistant, Civil Engineering Department, Colorado State University
Fort Collins, CO — May 2001 to August 2003

OTHER AFFILIATIONS

Visiting Assistant Professor, School of Civil and Env. Engineering, Georgia Tech
Atlanta, GA — April 2013 to present

RESEARCH

PUBLICATIONS IN REFEREED JOURNALS

* denotes student author, authors highlighted in **bold text** indicate Flores group members

1. *Kormos, P. R., J. P. McNamara, M. S. Seyfried, H. P. Marshall, D. Marks, and A. N. Flores (2015), Bedrock infiltration estimates from a catchment water storage-based modeling approach in the rain snow transition zone, J. Hydrology, 525, 231-248, doi:10.1016/j.jhydrol.2015.03.032.
2. *Lin, L.-F., A. M. Ebtehaj, R. L. Bras, **A. N. Flores**, and J. Wang (2014), Dynamical downscaling of GPM precipitation observations for hydrologic applications via WRF 4D-Var assimilation of precipitation, *J. Hydrometeor.*, doi:10.1175/JHM-D-14-0042.1.
3. ***Walters, R. D.**, **K. A. Watson**, H.-P. Marshall, J. P. McNamara, and A. N. Flores (2014), A physiographic approach to downscaling fractional snow cover data in mountainous regions, *Remote Sensing Env.*, 152, 413-425, doi: 10.1016/j.rse.2014.07.001.
4. *Kormos, P. R., D. Marks, J. P. McNamara, H.-P. Marshall, A. Winstral, and **A. N. Flores** (2014), Snow distribution, melt and surface water inputs to the soil in the mountain rain-snow transition zone, *J. Hydrol.*, 519(A), 190-204, doi:10.1016/j.jhydrol.2014.06.051.
5. *Anderson, B. T., J. P. McNamara, H.-P. Marshall, and **A. N. Flores** (2014), Insights into the physical processes controlling correlations between snow distribution and terrain properties, *Water Resour. Res.*, 50, doi:10.1002/2013WR013714.
6. **Flores, A. N.**, D. Entekhabi, and R. L. Bras (2014), Application of a hillslope-scale soil moisture data assimilation system to military trafficability assessment, *J. Terramechanics*, 51, 53-66, doi: 10.1016/j.jterra.2013.11.004.

7. *Johnson, B., B. Malama, W. Barrash, and **A. N. Flores** (2013), Recognizing and modeling variable drawdown due to evapotranspiration in a semiarid riparian zone considering local differences in vegetation and distance from a river source, *Water Resources Research*, 49, doi:10.1002/wrcr.20122.
8. *Stanaway, D., R. Haggerty, S. G. Benner **A. N. Flores**, and K. Feris (2012), Persistent metal contamination limits lotic ecosystem heterotrophic metabolism after more than 100 years of exposure: a novel application of the Resazurin Resorufin Smart Tracer, *Environmental Science & Technology (ES&T)*, 46 (18), pp 9862–9871, doi: 10.1021/es3015666.
9. **Flores**, **A. N.,** R. L. Bras and D. Entekhabi (2012), Hydrologic data assimilation with a hillslope-scale resolving model and L-band radar observations: Synthetic experiments with the ensemble Kalman filter, *Water Resources Research*, 48, W08509, doi:10.1029/2011WR011500.
10. ***Poulos, M. J.**, J. L. Pierce, **A. N. Flores**, and S. G. Benner (2012), Hillslope asymmetry maps reveal widespread, multi-scale organization, *Geophysical Research Letters*, doi:10.1029/2012GL051283.
11. *Smith, T. J., J. P. McNamara, **A. N. Flores**, M. M. Gribb, P. S. Aishlin, and S. G. Benner (2011), Small soil storage capacity limits benefit of winter snowpack to upland vegetation, *Hydrological Processes*, **25**(25), 3858-3865, doi:10.1002/hyp.8340.
12. ***Kunkel, M. L.**, A. N. Flores, *T. J. Smith, J. P. McNamara, and S. G. Benner (2011), Spatial distribution of organic carbon in a semi-arid complex terrain, *Geoderma*, **165**(1), 1-11, doi:10.1016/j.geoderma.2011.06.011.
13. **Flores, A. N.**, D. Entekhabi, and R. L. Bras (2010), Reproducibility of soil moisture ensembles when representing soil parameter uncertainty and correlation using a Latin Hypercube-based approach, *Water Resources Research*, **46**, W04506, doi:10.1029/2009WR008155.
14. **Flores, A. N.**, V. Y. Ivanov, D. Entekhabi, and R. L. Bras (2009), Impacts of hillslope-scale organization in topography, soil moisture, soil temperature, and vegetation on modeling surface microwave radiation emission, *IEEE Transactions on Geoscience and Remote Sensing*, **47**(8), 2557-2571.
15. **Flores, A. N.**, B. P. Bledsoe, C. O. Cuhaciyan, and E. E. Wohl (2006), Channel-reach morphology dependence on energy, scale, and hydroclimatic processes with implications for prediction using geospatial data, *Water Resources Research*, **42**, W06412, doi:10.1029/2005WR004226.

Manuscripts in review:

1. ***Tappa, D. J., A. N. Flores**, S. G. Benner, M. J. Kohn, J. P. McNamara, S. Evans, Isotopic composition of precipitation in a topographically complex, seasonally snow-dominated watershed: hydrometeorological controls and variations from the global meteoric water line

PUBLICATIONS (NOT PEER REVIEWED)

1. **Flores, A. N.**, M. Durand, S. Steele-Dunne, and B. F. Zaitchik (2011), Platforms for change: The increasing importance of sustained satellite observation for global hydrologic change monitoring, AGU Hydrology Section Newsletter, July 2011, 29-32.
2. **Flores, A. N.**, D. Entekhabi, and R. L. Bras (2010), A data assimilation approach for the prediction of soil moisture at tactical scales fusing multiple scale data sources and models, OP-010, Proceedings of the 27th Army Science Conference, 29 November-2 December 2010, Orlando, FL.
3. **Flores, A. N.**, V. Y. Ivanov, D. Entekhabi, and R. L. Bras (2008), Hillslope-scale controls on remote sensing of soil moisture with microwave radiometry, Geoscience and Remote Sensing Symposium, 2008. IGARSS 2008. IEEE International, vol.2, no., pp. II-695-II-698, 7-11 July 2008, doi: 10.1109/IGARSS.2008.4779088.
4. **Flores A. N.**, E. Istanbulluoglu, R.L. Bras, and D. Entekhabi (2004). A framework for the prediction of soil moisture, Proceedings of the 24th Army Science Conference, 29 November -2 December 2004, Orlando FL.

INVITED PRESENTATIONS AND SEMINARS

1. Hydrology in the era of Big Data: models, remote sensing, and data fusion and assimilation to translate information to knowledge, University of Idaho, Electrical and Computer Engineering, 18 April 2013.
2. What do hillslopes reveal about snow, vegetation, and landscape evolution? Goddard Space Flight Center, Terrestrial Water Cycle Group seminar, 27 March 2013.

3. What do hillslopes reveal about snow, vegetation, and landscape evolution? Duke University, Department of Civil and Environmental Engineering, 19 March 2013.
4. What do hillslopes reveal about snow, vegetation, and landscape evolution? Georgia Institute of Technology, Department of Civil and Environmental Engineering Environmental Fluid Mechanics Seminar, 21 February 2013.
5. An Inherently Spatiotemporally Variable Science: Advancing Research and Teaching to Support Data-rich Hydrologic Science, Colorado School of Mines, Department of Civil and Environmental Engineering, 28 March 2012.
6. From numbers to knowledge: Fusing data and models to improve decision-making under uncertainty across spatial scales, Idaho Power, Boise, ID, 14 February 2012.
7. Prospects of active microwave observations for hillslope-scale soil moisture estimation through data assimilation, University of Montana, Missoula, March 1, 2010
8. Improving soil moisture knowledge at hillslope scales in a semiarid watershed: A data assimilation approach, Boise State University, October 12, 2009
9. Assimilation of remotely sensed soil moisture data: challenges and opportunities, Boise State University, March 31, 2008.
10. Assimilation of remotely sensed soil moisture data: challenges and opportunities, University of Wyoming, March 11, 2008.
11. The role of topography, vegetation and soils in predictability of high-resolution soil moisture and implications for data assimilation, ARO Terrestrial Sciences Soil Moisture/Arid Lands Research Review Meeting, Fort Carson, CO, 5-6 March 2007.
12. A framework to combine models and observations to predict soil moisture at fine spatial scales, Ralph Parsons Laboratory, Massachusetts Institute of Technology, April 26, 2005.
13. The dependence of channel morphology on scale, energy and hydroclimatology and some implications for prediction of reach-scale channel morphology with geospatial data, Ralph Parsons Laboratory, Massachusetts Institute of Technology, December 4, 2003.

PRESENTATIONS AT NATIONAL/INTERNATIONAL CONFERENCES

1. **Watson, K. A.**, H.-P. Marshall, J. P. McNamara, and **A. N. Flores,** Dynamical downscaling of winter precipitation events to generate forcing for hydrologic models, 94th AMS Annual Meeting, Atlanta, GA, 2-6 February 2014.
2. Srestha, R., N. F. Glenn, and **A. N. Flores**, Modeling dynamics of western juniper under climate change in a semiarid ecosystem, AGU Fall Meeting, San Francisco, CA, 9-13 December 2013.
3. **Watson, K. A.**, H.-P. Marshall, J. P. McNamara, and **A. N. Flores**, Influence of high-resolution land-surface initialization on near surface hydrometeorological variables in a coupled land-atmosphere model, AGU Fall Meeting, San Francisco, CA, 9-13 December 2013.
4. **Murray, E. M.**, K. Cobourn, **A. N. Flores**, J. L. Pierce, and **M. L. Kunkel**, The impact of changing snowmelt timing on non-irrigated crop yield in Idaho, AGU Fall Meeting, San Francisco, CA, 9-13 December 2013.
5. **Dawson, B.**, **A. N. Flores**, K. Cobourn, and J. L. Pierce, Monitoring agriculture in the Snake River Plain from space, AGU Fall Meeting, San Francisco, CA, 9-13 December 2013.
6. **Lin, L.-F.**, J. Wang, **A. N. Flores**, and R. L. Bras, Dynamical downscaling of GPM precipitation observations through 4DVAR data assimilation, AGU Fall Meeting, San Francisco, CA, 9-13 December 2013.
7. Poulos, M. J., J. L. Pierce, J. P. McNamara, A. N. Flores, and S. G. Benner, A multi-scale assessment of how topoclimate-driven ecohydrologic feedbacks impact drainage erosion, incision and expansion, AGU Fall Meeting, San Francisco, CA, 9-13 December 2013.
8. **Lin, L.-F.**, R. L. Bras, **A. N. Flores**, and J. Wang, Dynamic downscaling of GPM-like precipitation data – A case study of 4DVAR data assimilation of rain rates, PMM Science Meeting, Annapolis, MD, 18-21 March 2013.
9. **Walters, R. D., K. A. Watson, A. N. Flores**, A physiographic approach to downscaling remotely sensed fractional snow cover data, AGU Fall Meeting, San Francisco, CA, 3-7 December 2012.
10. **Tappa, D. J., A. N. Flores**, S. G. Benner, M. J. Kohn, J. P. McNamara, S. Evans, Isotopic composition of precipitation in a topographically complex, seasonally snow-dominated watershed:

hydrometeorological controls and variations from the global meteoric water line, AGU Fall Meeting, San Francisco, CA, 3-7 December 2012.

11. McCutcheon, R., S. G. Benner, M. J. Kohn, **A. N. Flores**, J. P. McNamara, Stable isotopes of water used to trace relationships between vegetation and streamflow in a semi-arid catchment, AGU Fall Meeting, San Francisco, CA, 3-7 December 2012.
12. Poulos, M. J., J. L. Pierce, S. G. Benner, J. P. McNamara, **A. N. Flores**, Differences in drainage network incision and expansion associated with aspect-related variability in soil water storage and vegetation, AGU Fall Meeting, San Francisco, CA, 3-7 December 2012.
13. Kormos, P. R., J. P. McNamara, M. S. Seyfried, D. G. Marks, **A. N. Flores**, H.P. Marshall, C. J. Williams, Critical zone soil properties effects on soil water storage and flux, AGU Fall Meeting, San Francisco, CA, 3-7 December 2012.
14. **Kunkel, M. L.** and **A. N. Flores**, Interactions between long- and short-period teleconnections associated with distinct seasonal streamflow volume typologies, EPSCoR Western Tri-State Consortium Annual Meeting, Sun Valley, ID, 2-5 April 2012. ***Recipient Outstanding Student Paper Award.***
15. **Walters, R. D.,** J. P. McNamara, H.-P. Marshall, and **A. N.** Flores, A physiographic approach to downscaling climate model snow outputs for hydrologic impacts assessment, EPSCoR Western Tri-State Consortium Annual Meeting, Sun Valley, ID, 2-5 April 2012.
16. **Walters, R. D.**, J. P. McNamara, H. P. Marshall, and **A. N. Flores**, A physically-based approach to downscale coarse snow model output for hydrologic modeling at hillslope scales, *AGU Fall Meeting*, San Francisco, CA, 5-9 December, 2011.
17. Stanaway, D.J., **A.N. Flores**, R. Haggerty, S.G. Benner, and K.P. Feris, Lotic ecosystem response to chronic metal contamination assessed by the resazurin-resorufin smart tracer with data assimilation by the Markov chain Monte Carlo method, *AGU Fall Meeting*, San Francisco, CA, 5-9 December, 2011.
18. **Loughridge, R. E.**, and **A.N. Flores**, Quantifying topographic controls on the distribution and abundance of terrestrial vegetation in a semiarid mountain watershed, Idaho, USA, *AGU Fall Meeting*, San Francisco, CA, 5-9 December, 2011.
19. **Tappa, D. J.**, J. P. McNamara, S. G. Benner, M. J. Kohn, and **A. N. Flores**, Stable isotope compositions of precipitation in a semi-arid climate: variations from the global meteoric water line, *AGU Fall Meeting*, San Francisco, CA, 5-9 December, 2011.
20. **Beebe, G.**, **A. N. Flores**, K. Coburn, How will Idaho's Agricultural Producers Adapt to Changing Precipitation Patterns? Evidence from an Integrated Hydrologic-Economic Model with Bayesian Updating, *AGU Fall Meeting*, San Francisco, CA, 5-9 December, 2011.
21. **Poulos, M. J.**, J. L. Pierce, **A. N. Flores**, S. G. Benner, J. P. McNamara, Valley asymmetry and topoclimate-driven feedbacks among hillslope hydrology, soil development, vegetation, and erosion, *AGU Fall Meeting*, San Francisco, CA, 5-9 December, 2011.
22. **Kunkel, M.L.**, D.A. Raff, L.D. Brekke, and **A.N. Flores**, Non-stationarity in atmospheric and oceanic teleconnections: historical affects on streamflow and statistical models for forecasting streamflows, *AGU Fall Meeting*, San Francisco, CA, 5-9 December, 2011.
23. **Hopkins, A.**, A. Heilig, H. P. Marshall, **A. N. Flores**, Potential application of NASA SMAP radar data to detect the aerial extent of snowpack melt, *AGU Fall Meeting*, San Francisco, CA, 5-9 December, 2011.
24. **Flores, A. N.**, P. LaPorte, K. Smith, Developing a regional retrospective ensemble precipitation dataset for watershed hydrology modeling, Idaho, USA, *AGU Fall Meeting*, San Francisco, CA, 5-9 December, 2011.
25. **Lin, L.-F.**, **A. N. Flores**, G. Bisht, U. Narayan, J. Wang, and R. L. Bras, Dynamic downscaling of GPM precipitation and SMAP soil moisture using WRF-ptRIBS-VEGGIE model – a preliminary test, *2011 Precipitation Measurement Missions Science Team Meeting*, Denver, CO, 7-10 November 2011.
26. Johnson, B. A., B. Malama, W. Barrash, and **A. N. Flores**, Characterization of evapotranspiration in the riparian zone of the Lower Boise River, with implications for groundwater flow, *AGU Fall Meeting*, San Francisco, CA, 13-17 December 2010.

27. Shallcross, A. T., J. P. McNamara, **A. N. Flores**, H. P. Marshall, D. G. Marks, and N. F. Glenn, Estimating basin snow volume using aerial LiDAR and binary regression trees, *AGU Fall Meeting*, San Francisco, CA, 13-17 December, 2010 (**invited**).
28. Burnop, A. C., V. R. Sridhar, J. P. McNamara, and **A. N. Flores**, The impact of accurate parameterization of snow storage in operational hydrology models, *AGU Fall Meeting*, San Francisco, CA, 13-17 December 2010.
29. **Flores, A. N.,** D. Entekhabi, and R. L. Bras, A Data Assimilation Approach for the Prediction of Soil Moisture At Tactical Scales Fusing Multiple Scale Data Sources and Models, *27th Army Science Conference*, Orlando, FL, 29 November – 2 December, 2010.
30. **Flores, A. N.,** D. Entekhabi, and R. L. Bras, Data assimilation as a paradigm for improving hydrological applications at hillslope scales: an example using synthetic SMAP observations, *Remote Sensing and Hydrology Symposium 2010*, Jackson, WY, 28-30 September 2010 (**invited**).
31. **Flores, A. N.**, D. Entekhabi, and R. L. Bras, Data assimilation can improve hydrological applications at hillslope scales: an example using synthetic SMAP observations, 2010 CUAHSI Biennial Science Meeting, Boulder, CO, 19-21 July, 2010.
32. Poulos, M. J., J. L. Pierce, **A. N. Flores**, S. G. Benner, Microclimate Influences on Slope Angles in the Western U.S., Goldschmidt Conference, Knoxville Tennessee, 13-18 June, 2010.
33. **Flores, A. N**., C. Pathak, S. U. S. Senarath, and R. L. Bras, A new way to view design of hydrologic monitoring networks: optimization to improve predictability of hydrologic systems in a data assimilation system in South Florida, U.S.A., *EWRI of ASCE World Environmental and Water Resources Congress 2010*, Providence, RI, 16-20 May 2010.
34. **Flores, A. N.**, C. Pathak, S. U. S. Senarath, and R. L. Bras, Designing hydrologic monitoring networks to improve the predictability of hydrologic models in South Florida, USA: A data assimilation approach, *EWRI of ASCE India 2010*, Chennai, India, 5-7 January 2010.
35. **Kunkel, M.** and **A. N. Flores**, A teleconnection-based forecasting model for natural streamflow in Idaho, USA, *90th Annual Meeting of the American Meteorological Society*, Atlanta, GA, 17-21 January 2010.
36. Poulos, M.J., J.L. Pierce, **A.N. Flores**, S. G. Benner, T. J. Smith, J. P. McNamara, Aspect-driven changes in slope stability due to ecohydrologic feedbacks, *AGU Fall Meeting*, San Francisco, CA, 14-18 December 2009.
37. **Flores, A. N.**, C. Pathak, S. U. S. Senarath, and R. L. Bras, Designing hydrologic monitoring networks to maximize predictability of hydrologic conditions in a data assimilation system: A case study from South Florida, USA, *AGU Fall Meeting*, San Francisco, CA, 14-18 December 2009.
38. Poulos, M.J., J.L. Pierce, T. Smith, S. Benner, **A.N. Flores**, J. McNamara, and M. Gribb, Microclimate controls on slope angles in the Idaho Batholith, *AGU Chapman Conference on Examining Ecohydrological Feedbacks of Landscape Change Along Elevation Gradients in Semiarid Regions,* Boise and Sun Valley, ID, 4-8 October 2009.
39. **Flores, A.N.**, D. Entekhabi, and R.L. Bras, Assimilation of anticipated L-band microwave observations for hillslope-scale soil moisture estimation in semiarid landscapes: the importance of topography and soils, *AGU Chapman Conference on Examining Ecohydrological Feedbacks of Landscape Change Along Elevation Gradients in Semiarid Regions,* Boise and Sun Valley, ID, 4-8 October 2009.
40. **Flores, A.N.**, D. Entekhabi, and R. L. Bras, Synthetic experiments to estimate hillslope-scale soil moisture through assimilation of anticipated remotely sensed microwave products, *23rd Conference on Hydrology, 89th Annual Meeting of the American Meteorological Society*, Phoenix, AZ, 11-15 January 2009.
41. **Flores, A.N.**, D. Entekhabi, and R. L. Bras, Hillslope-scale soil moisture estimation with the ensemble Kalman Filter and a process ecohydrology model: Evaluation of anticipated microwave observations, *AGU Fall Meeting*, San Francisco, CA, 15-19 December 2008
42. **Flores, A.N.**, D. Entekhabi, and R. L. Bras, Soil moisture active-passive (SMAP) mission data for hillslope-scale soil moisture estimation with a spatially distributed ecohydrology model and data assimilation, *International Workshop on Microwave Remote Sensing for Land Hydrology*, Oxnard, CA, 20-22 October 2008.

43. **Flores, A. N.**, V. Y. Ivanov, D. Entekhabi, and R. L. Bras, Hillslope-scale controls on remote sensing of soil moisture with microwave radiometry, *IEEE Geoscience and Remote Sensing Symposium (IGARSS) '08*, Boston, MA, 6-11 July 2008.
44. **Flores, A. N.**, V. Y. Ivanov, D. Entekhabi, and R. L. Bras, Assessing the role of hillslope-scale heterogeneity in soil moisture remote sensing and data assimilation using microwave radiometry, *22nd Conference on Hydrology, 88th Annual Meeting of the American Meteorological Society*, New Orleans, LA, 20-24 January 2008.
45. **Flores, A. N.**, D. Entekhabi, and R. L. Bras, Modeling uncertainty and correlation in soil properties using restricted pairing and implications for ensemble-based hillslope-scale soil moisture and temperature estimation, *AGU Fall Meeting*, San Francisco, CA, 10-14 December 2007. ***Recipient Outstanding Student Paper Award.***
46. **Flores, A. N.**, R. L. Bras, and D. Entekhabi, Predicting soil moisture with models and observations through an ensemble quasi steady-state filter, *GSA Annual Meeting and Exposition*, Philadelphia, PA, October 22-25, 2006.
47. **Flores, A. N.**, R. L. Bras, and D. Entekhabi, Downscaling remotely sensed soil moisture observations to hillslope scales with physically based distributed models through data assimilation, *AGU Hydrology Days*, Fort Collins, CO, March 20-22, 2006.
48. Istanbulluoglu, E., R. L. Bras, and **A. N. Flores**, On the dynamics of soil moisture, vegetation, and erosion: Implications of stochastic climate forcing, *AGU Fall Meeting*, San Francisco, CA, December 13-17, 2004.
49. **Flores, A. N.**, E. Istanbulluoglu, R. L. Bras, and D. Entekhabi, A Framework for the Prediction of Soil Moisture, *Proceedings of the 24th Army Science Conference*, Orlando, FL, November 29-December 2, 2004.
50. Bledsoe, B. P., **A. N. Flores**, S. C. Sanborn, and C. O. Cuhaciyan, Multi-scale factors influencing stream substrate size within and among watersheds, *AGU Fall Meeting*, San Francisco, CA, December 8-12, 2003.
51. Bledsoe, B. P., **A. N. Flores**, N. L. Poff and C. O. Cuhaciyan. Prediction of local stream habitat attributes with spatial analysis of watershed-scale data, *North American Benthocological Society (NABS) Annual Meeting*, Athens, GA, May 27-June 1, 2003.
52. Poff, N. L., B. P. Bledsoe, J. D. Olden and **A. N. Flores**, Functional organization of benthic invertebrate communities along multiscale environmental gradients, *NABS Annual Meeting*, Athens, GA, May 27-June 1, 2003.
53. **Flores, A. N.** and B. P. Bledsoe. Factors affecting predictions of stream reach morphology using remotely sensed data: implications for restoration and habitat evaluation, *AGU Hydrology Days*, Fort Collins, CO, March 31-April 2, 2003.
54. **Flores, A. N.** and B. P. Bledsoe. Depicting channel reaches at sub-link scales using digital elevation models, *AGU Hydrology Days*, Fort Collins, CO, March 31-April 2, 2003.
55. Bledsoe, B. P., E. E. Wohl, D. V. Pizzi, K. Sable, **A. N. Flores**, C. O. Cuhaciyan, S. C. Sanborn, Hydrogeomorphic classification of western streams for ecological assessment, *AGU Fall Meeting*, San Francisco, CA, December 6-10 2002.
56. **Flores, A. N.** and B. P. Bledsoe. Investigating spatial variability in slope and flow energy within and between watersheds, *AGU Fall Meeting*, San Francisco, CA, December 10-14, 2002.
57. **Flores, A. N.** and B. P. Bledsoe. Watershed-scale implications of Hack's slope-drainage area relationship and application to the prediction of in-channel features of ecological interest. *GSA Annual Meeting and Exposition*, Denver, CO, October 27-30, 2002.
58. **Flores, A. N.** and B. P. Bledsoe. Application of Hack's law to predict in channel features of ecological interest with coarse scale watershed variables. *AGU Hydrology Days*, Fort Collins, CO, April 1-4, 2002.
59. Bledsoe, B. P., R. J. Anderson, B. McCaig, **A. N. Flores**, and C. C. Watson. Modeling Package for Assessing the Potential Effects of Land Use Change on Stream Form and Integrity, *ASCE Wetlands Engineering and River Restoration Conference*, Reno, NV, August 27-31, 2001.

TECHNICAL REPORTS

1. Flores, A. N. 2011. Hydrologic Monitoring Network Optimization – Development of a Regional

Scale Monitoring Plan. Submitted to South Florida Water Management District, West Palm Beach, Florida.
2. Flores, A. N. 2009. Hydrologic Monitoring Network Optimization – A Pilot Study. Final report. Submitted to South Florida Water Management District, West Palm Beach, Florida.
3. Bras, R.L., D. Entekhabi, A.N. Flores. 2008. A framework for the prediction of soil moisture fusing multiple scale data sources and modeling. Final report. Submitted to U.S. Army Research Office, Research Triangle Park, North Carolina.
4. Bledsoe, B.P., D.A. Raff, A.N. Flores. 2004. GeoTool User's Manual. Final Report Submitted to U.S. Army Corps of Engineers, Engineering Research and Development Center Vicksburg, Mississippi, 88 pp. + app.

CURRENT SUPPORT

CAREER: Citizens, Conservation, and Climate: Research and Education for Climate Literacy in Managed Landscapes. Alejandro Flores (sole PI)**;** Source of funding: NSF**,** Performance period: 2014/04/01-2019/05/31**;** Total budget: $457,205

Scalable vegetation structure for ecosystem modeling in the western US. Nancy Glenn (PI), Alejandro Flores (Co-I), Susan Ustin (Co-I)**;** Source of funding: NASA Terrestrial Ecology Program**;** Performance Period: 2014/01/01-2016/12/31; Total budget: $748,916

Multiple frequency active microwave remote sensing for snow water equivalent retrieval from space: a data assimilation approach. Alejandro Flores (PI), Hans-Peter Marshall (Co-I), Kelly Elder (Co-I); Source of funding: NASA Terrestrial Hydrology Program**;** Performance period: 2015/07/01-2018/06/30**;** Total budget: $295,577

Reynolds Creek Carbon Critical Zone Observatory. Kathleen Lohse (PI), Shawn Benner (Co-PI), Alejandro Flores (Co-PI), Nancy Glenn (Co-PI), Mark Seyfried (Co-PI); Source of funding: National Science Foundation**;** Performance period: 2014/01/01-2018/12/31**;** Total budget: $2,500,000

Intermediate-range Climate Forecasting to Support Water Supply and Flood Control with a Regionally Focused Mesoscale Model. Alejandro Flores (PI); Source of funding: US Bureau of Reclamation Science and Technology Program; Performance period: 2015/03/01-2017/08/30; Total budget: $148,604

A Web-Enabled Site Suitability and Visualization Tool to Support Idaho's Growing Wine Industry. Alejandro Flores (PI), Nancy Glenn (Co-PI); Source of funding: Idaho State Department of Agriculture Specialty Crop Block Grant; Performance period: 2015/10/01-2017/09/30; Total budget: $139,487

Modeling long-term effects of fuel treatments on fuel loads and fire regimes in the Great Basin. Nancy Glenn (PI), Alejandro Flores (Co-PI); Source of funding: Joint Fire Science Program; Performance period: 2015/10/01-2018/09/30; Total budget: $357,278

EPSCoR RII Track 2: Collaborative Research: The Western Consortium for Watershed Analysis, Visualization, and Exploration (WC-WAVE). Idaho leads: Peter Goodwin (PI), Alejandro Flores (Co-PI), Donna Delparte (Co-PI), Luke Sheneman (Co-PI)**;** Source of funding: National Science Foundation**;** Performance period: 2013/09/01-2016/08/31**;** Total budget: $2,000,000 (state-wide)

EPSCoR RII Track 1: Managing Idaho's Landscapes for Ecosystem Services; Role: Science lead, integrated modeling**;** Source of funding: National Science Foundation**;** Performance period: 2013/06/14-2018/06/13**;** Total Budget: $20,000,000 (state-wide)

Water Institutions and Agricultural Land-Use in the Western US; Kelly Cobourn (PI), Alejandro Flores (Co-I); Source of Funding: NASA Land-Cover/Land-Use Change for Early Career Scientists**;** Performance period: 2013/01/01-2015/12/31**;** Total budget: $239,666

Combining Remotely Sensed Vegetation Data and Ecohydrologic Process Models to Improve Estimation of Root Zone Moisture at Spatial Scales Relevant to the Army. Alejandro Flores (PI)**;** Source of funding: U.S. Army Research Office (Young Investigator Program)**;** Performance period: 2011/08/01-2015/07/31. Total budget: $150,000

COMPLETED PROJECTS

Improved retrieval of vegetation water content in a semiarid mountain watershed using NASA remote sensing products. Alejandro Flores (sole PI)**;** Source of funding: NASA via Idaho Space Grant Consortium Research Seed Grant**;** Performance period: 2011/06/25-2013/06/24; Total budget: $99,810 (includes cost share)

Idaho ESPCoR: Remote Sensing of the Cryosphere: Calibration and Validation. Aaron Thomas (Administrative PI), Hans-Peter Marshall (Science PI), Alejandro Flores (Co-I), and others**;** Source of funding: NASA EPSCoR**;** Performance period: 2011/01/01-2014/12/31;
Total budget: $1.4 Million (includes cost share)

Multiple Teleconnection Index Based Prediction of Natural Flow. Alejandro Flores (sole PI); Source of funding: U.S. Bureau of Reclamation**;** Total budget: $75,000

Evaluating the Effect of Improved Snow and Soil Representation in Physically Based, Distributed Hydrologic Models. Jim McNamara (PI), Alejandro Flores (Co-I), and others; Source of funding: National Oceanic and Atmospheric Administration; Total budget: $360,146

Measuring and Modeling Hydrologic Fluxes and States from Aquifer to Atmosphere at Multiple Scales. Warren Barrash (PI), Alejandro Flores (Co-PI), and others; Source of funding: U.S. Army Research Office (EPSCoR); Total budget: $665,880.

RAPID: An Unusual Opportunity to Track Snow Ablation Using Stable Isotope Evolution of the 2011-2012 Snowpack Near Boise, Idaho; Samantha Evans (PI), Alejandro Flores (Co-PI), Matt Kohn (Co-PI) HP Marshall (Co-PI)**;** Source of funding: National Science Foundation; Total budget: $24,777

Assessing Impacts of Geolocation Errors on Soil Moisture Data Assimilation. Alejandro Flores (sole PI)**;** Source of funding: Idaho Space Grant Consortium travel grant**;** Total budget: $4000

Constructing a Local Meteoric Water Line for the Treasure Valley, Idaho. Alejandro Flores (sole PI)**;** Source of funding: U.S. Geological Survey via Idaho Water Resources Research Institute**;** Total budget: $45,576 (includes cost share)

A Framework to Assess Land-Atmosphere Coupling in the Snake River basin Area, Idaho Using Coupled Models and Observations. Alejandro Flores (sole PI)**;** Source of funding: NASA EPSCoR via Idaho Space Grant Consortium Research Initiation Grant**;** Total budget: $29,988

Hydrologic Monitoring Network Optimization – Development of a Regional Scale Monitoring Plan. Alejandro Flores (sole PI)**;** Source of Funding: South Florida Water Management District; Total Budget: $32,500

TEACHING

COURSES TAUGHT AND SCHEDULED

Fall 2015:
GEOS/BIOL 497/597: Scientific Programming for Earth and Ecological Discovery

Summer 2015:
GEOS 697: Interdisciplinary Modeling Class (associated with Western Consortium of EPSCoR states; Boise State lead instructor)

Spring 2015:
GEOS 518: Applied hydrologic modeling

Spring 2014:
GEOS 518: Applied hydrologic modeling

Fall 2013:
GEOS 697 (Special topics): Global Hydrologic Change

Spring 2013:

GEOS 620: Fundamentals of Simulation Modeling in Hydrologic Science
GEOS 697 (Special topics): Land-atmosphere modeling: Practicum

Fall 2012:
GEOS 411/511: Hydrology: Land Atmosphere Interaction
GEOS 697 (Special topics): Advances in coupled land-atmosphere modeling

Spring 2012:
GEOS 620: Fundamentals of Simulation Modeling in Hydrologic Science
GEOS 505: Introduction to Numerical Methods in the Geosciences

Fall 2011:
GEOS 212 (co-taught): Water in the West
GEOS 411/511: Hydrology: Land Atmosphere Interaction

Spring 2011:
GEOS 497/597, CE 597 (Special topics): Introduction to Numerical Methods for Geoscientists
GEOS 697 (Special topics): Applications of Hydrologic Modeling

Fall 2010:
GEOS 212 (co-taught): Water in the West
GEOS 697 (special topics): Fundamentals of Hydrologic Modeling

Spring 2010:
GEOS 597 (Special topics): Review of the state of the art in climate downscaling
GEOS 697 (Special topics): A MATLAB Primer for Hydrologic and Environmental Sciences

Fall 2009:
GEOS 212 (co-taught): Water in the West
GEOS 697 (Special topics): A MATLAB Primer for Hydrologic and Environmental Sciences

ADVISING ACTIVITIES

Postdoctoral advising:

Bangshuai Han	Geosciences	**Co-Advisor**	
Qingtao Zhou	Geosciences	**Advisor**	
Matt Masarik	Geosciences	**Advisor**	

Graduate advising:

Miguel Aguayo	PhD	Geosciences	**Advisor**	full time
Melvin Kunkel	PhD	Geosciences	**Advisor**	part time
Katelyn Watson	PhD	Geosciences	**Advisor**	full time
Reggie Walters	PhD	Geosciences	**Advisor**	full time
Hamid Dashti	PhD	Geosciences	**Co-Advisor**	full time
Liaofan Lin	PhD	Civ. Env. Eng. – Georgia Tech	**Co-Advisor**	full time
Lucy Gelb	MS	Hydrologic Sciences	**Advisor**	full time
Andrea Leonard	MS	Hydrologic Sciences	**Advisor**	full time
Amy Steimke	MS	Hydrologic Sciences	**Advisor**	full time
Mike Poulos	PhD	Geosciences	Committee Member	full time
Hank Hetrick	PhD	Geophysics	Committee Member	full time
Blaine Dawson	MS	Hydrologic Sciences	**Advisor**	completed
Ricci Loughridge	MS	Hydrologic Sciences	**Advisor**	completed
Erin Murray	MS	Hydrologic Sciences	**Co-Advisor**	completed
Daniel Tappa	MS	Hydrologic Sciences	**Advisor**	completed
Reggie Walters	MS	Hydrologic Sciences	**Advisor**	completed
Gretchen Beebe	MS	Mathematics	**Co-Advisor**	completed
Mike Poulos	MS	Hydrologic Sciences	**Co-Advisor**	completed
Brian Anderson	MS	Hydrologic Sciences	Committee Member	completed

Esther Babcock	PhD	Geophysics	Committee Member	completed
Erik Boe	MS	Hydrologic Sciences	Committee Member	completed
Alex Boehm (ISU)	MS	Geo. Info. Science – Idaho State Univ.	Committee Member	completed
Alison Burnop	MS	Hydrologic Sciences	Committee Member	completed
Alex Frye	MS	Hydrologic Sciences	Committee Member	completed
Scott Havens	PhD	Geophysics	Committee Member	completed
Andrew Hedrick	MS	Geophysics	Committee Member	completed
Brady Johnson	MS	Hydrologic Sciences	Committee Member	completed
Patrick Kormos	PhD	Geosciences	Committee Member	completed
Joseph Lohmeier	MS	Mathematics	Committee Member	completed
Ryan McCutcheon	MS	Hydrologic Sciences	Committee Member	completed
Alden Shallcross	MS	Hydrologic Sciences	Committee Member	completed
Toni Smith	MS	Hydrologic Sciences	Committee Member	completed
Dan Stanaway	MS	Hydrologic Sciences	Committee Member	completed
Brian Yelen	MS	Hydrologic Sciences	Committee Member	completed

Undergraduate research advising:

Martika Flores-Ramos	BS	Civil Engineering	Terrestrial Laser Scanning of sage-steppe
Esther Contreras	BS	Civil Engineering	Hydrologic model mesh generation
Austin Hopkins	BS	Geosciences	Snowmelt detection with SMAP radar
Paige LaPorte	BS	Geosciences	Topographic trends in vegetation
Kimberly Smith	BS	Geosciences	Measurement of stable isotopes

SERVICE AND OUTREACH

PROFESSIONAL SERVICE

International:

Reviewer, Development of Decision Support Tool for the Terrestrial Biodiversity of Kuwait, Kuwait Foundation for the Advancement of Sciences

National:

Member, Socio-Environmental Synthesis Center (SESynC) Scientific Review Panel, (2015-present)
Co-chair, Critical Zone Observatory Focus Research Group, Community Surface Dynamics Modeling System (CSDMS) Executive Committee (2014-present)
Representative to the Consortium of Universities for the Advancement of Hydrologic Science, Incorporated (CUAHSI), Boise State University
Chair, AGU Hydrology Section Remote Sensing Technical Subcommittee (2014-present)
Appointed Member, AGU Hydrology Section Remote Sensing Technical Subcommittee (2010-2012)
Member, NASA Soil Moisture Active Passive (SMAP) Satellite Algorithms Working Group
Member, NASA SMAP Calibration/Validation Working Group
Member, NASA SMAP Applications Working Group
Member, EWRI Uncertainty Analysis Approaches of Hydrologic Models Task Committee
Panelist, Science of Terra and Aqua Missions 2013
Reviewer, ASCE Journal of Hydrologic Engineering
Reviewer, Geophysical Research Letters
Reviewer, Journal of Hydrology
Reviewer, Advances in Water Resources
Reviewer, Journal of Hydrometeorology
Reviewer, Water Resources Research
Reviewer, IEEE Geoscience and Remote Sensing Letters
Reviewer, IEEE Transactions on Geoscience and Remote Sensing (TGRS)
Reviewer, IEEE Journal of Selected Topics in Applied Remote Sensing (JSTARS)
Reviewer, Army Research Office

Reviewer, National Science Foundation
Co-Convener, AGU Fall Meeting 2012, 2013 Session " Hydrologic Data Assimilation"
Co-Convener, AGU Fall Meeting 2012 Session "Modeling and Observation of the Terrestrial Hydrological Cycle to Capture Multiscale Complexity of Land-Atmosphere Interactions"
Co-Convener, AGU Fall Meeting 2011 Session "Recent advances in data assimilation and remote sensing for land surface hydrology"
Co-Convener, AGU Fall 2010 Session "Advances in hydrologic data assimilation and uncertainty analysis"

State:
Member, Idaho Higher Education Cyberinfrastructure Advisory Committee (CIAC)
Member, EPSCoR RII Track 1 and RII Track 2 Science Writing Teams

University:
Member, Division of Research and Economic Development Cyberinfrastructure Working Group
Member, Department of Research Computing Steering Committee
Panelist, New faculty orientation "Building a successful research program." 19 August 2013.
Member, Boise State University Center for Teaching and Learning Advisory Board
Member, Boise State University STEM Education Research Scholars Group
Faculty Advisor, Idaho Science and Aerospace Scholars Summer 2010

College:
Member, College of Arts and Sciences Mini Development Grant Award Committee

Department:
Geophysics Faculty Search Committee, AY 2013
Graduate Program Committee, AY 2013-present
Chair and organizer, Geoscience Department Seminar, AY 2011
Coordinator, Geoscience Department Webpage Update (Spring 2010-present)

SYNERGISTIC ACTIVITIES AND OUTREACH

Guest Teacher, Idaho Science and Aerospace Scholars, Boise, ID, 12 July 2013

- Developed and delivered an afternoon-long course on water resource and remote sensing for ISAS high schools students. The course focused on how adequate water supplies could be developed for a mission to Mars.

Guest Speaker, Pacific Northwest Louis Stokes Alliance for Minority Participation (LSAMP) Alliance Annual Conference, Boise ID, 2 March 2013

- Presented the importance, benefits, and process of graduate education for STEM majors.

Guest Speaker, Boise State University Louis Stokes Alliance for Minority Participation (LSAMP), Boise, ID, February, April 2010; June 2011

- Presented the importance, benefits, and process of graduate education for STEM majors. June 2011 lecture is available at http://www.youtube.com/watch?v=bxeoSmd0QrA
- Panel discussion on student involvement and professional networking for STEM majors.

Guest Speaker, Boise State University eDay engineering outreach, Boise, ID, April 2011

- "Hydrology and water resources" presentation for Treasure Valley area 7th-8th grade students from underrepresented groups

Hydrology Expert, starHydro Hydrology and Geomorphology Education Software, MIT, Cambridge, MA**,** 2006-present

- Communicated hydrology and fluvial geomorphology concepts to software developers programming a Java-based application for undergraduate and graduate students in hydrology and geomorphology.
- Application encourages students to: (1) develop intuitive understanding of hydrology and geomorphology concepts through interaction with digital elevation models, and (2) become familiar with concepts underlying distributed modeling.

MIT IDEAS Competition, Judge, 2011, 2006, 2007

- Evaluated proposals for small grants from groups comprised of MIT students
- Assessed the innovation, feasibility, sustainability, and potential impact on the target community of proposed solutions
- Provided written responses to proponents and summarized proposals to judging panel

PROFESSIONAL MEMBERSHIPS AND REGISTRATIONS

Engineering Intern (Colorado)
American Geophysical Union
American Meteorological Society
Association for Computing Machinery
American Association for the Advancement of Science
IEEE Geoscience and Remote Sensing Society
Sigma Xi
Tau Beta Pi
Chi Epsilon

Nancy F. Glenn, Ph.D., P.E.
Professor, Department of Geosciences,
Boise State University, 1910 University Dr., Boise, Idaho 83725
nancyglenn@boisestate.edu; http://bcal.boisestate.edu; 208.426.2933

EDUCATION
University of Nevada, Reno, Geo-Engineering, Ph.D., 2000
University of California, Berkeley, Civil Engineering, M.S., 1996
University of Nevada, Reno, Geological Engineering, B.S., 1994
Licensed Professor Engineer, #14023, Idaho

PROFESSIONAL EXPERIENCE
Leadership Roles:
2014-Present, Chair, Cluster hire search and Lead for Human-Environment Systems, Boise State University
2011-Present, Joint appointment, DOE Idaho National Laboratory (INL)
2012-2013, Lead Scientist, Idaho NSF EPSCoR Water Resources in a Changing Climate
2004-2013, Director, Boise Center Aerospace Laboratory, Dept Geosciences, ISU
2008-2010, Co-chair, Dept Geosciences, Idaho State University

Academic Accomplishments:
2013-Present, Professor, Dept Geosciences, Boise State University
2010-2013, Research Professor, Dept Geosciences, Idaho State University (ISU)
2005-2010, Associate Research Professor, Dept of Geosciences, Idaho State University
2000-2005, Assistant Research Professor, Dept of Geosciences, Idaho State University

Consulting:
1996-1997, Staff Geotechnical Engineer, GeoEngineers Inc., Redmond, WA, 1996-1997

ADMINISTRATIVE TRAINING
Chairing the Academic Department, A Workshop for Division and Department Chairs and Deans, American Council on Education, 2010

AWARDS
Idaho Business Review 2007 Accomplished Under 40
Idaho State University Outstanding Researcher 2007-2008

I. RESEARCH

1. PUBLICATIONS
Peer-Reviewed (*student author)

58. Olsoy, P.J., Mitchell, J.J., Levia, D.F., Clark, P.E., Glenn, N.F., in press, Estimation of big sagebrush leaf area index with terrestrial laser scanning, *Ecological Indicators,* 10.1016/j.ecolind.2015.10.034.

57. Li, A., Glenn, N.F., Olsoy, P.J., Mitchell, J.J., Shrestha, R., 2015, Aboveground biomass estimates of sagebrush using terrestrial and airborne LiDAR data in a dryland ecosystem, *Ag & Forest Met, 213 (November): 138–47. doi:10.1016/j.agrformet.2015.06.005.*

56. Harpold, A. A., Marshall, J. A., Lyon, S. W., Barnhart, T. B., Fisher, B., Donovan, M., Brubaker, K. M., Crosby, C. J., Glenn, N. F., Glennie, C. L., Kirchner, P. B., Lam, N., Mankoff, K. D., McCreight, J. L., Molotch, N. P., Musselman, K. N., Pelletier, J., Russo, T., Sangireddy, H., Sjöberg, Y., Swetnam, T., and West, N. 2015. Laser vision: lidar as a transformative tool to advance critical zone science, *Hydrol. Earth Syst. Sci. Discuss.*, 12, 1017-1058, doi:10.5194/hessd-12-1017-2015, 2015.

55. Passalacqua, P., Belmont, P., Staley, D. M., Simley, J. D., Arrowsmith, J R., Bode, C. A., Crosby, C., DeLong, S., Glenn, N.F., Kelly, S. A., Lague, D., Sangireddy, H., Schaffrath,K., Tarboton, D., Wasklewicz, T, Wheaton, J., 2015. Analyzing high resolution topography for advancing the understanding of mass and energy transfer through landscapes: A review. Earth-Science Reviews, Volume 148, Pages 174–193.

54. Mitchell, J.J, Shrestha, R., Spaete, L.P., Glenn, N.F., 2015, Combining airborne hyperspectral and LiDAR data across local sites for upscaling shrubland structural information: lessons for HyspIRI. *Remote Sensing of Environment,* Volume 167, Pages 98-110, doi:10.1016/j.rse.2015.04.015.

53. Paprocki, N., Glenn, N.F., Atkinson, Eric C., Strickler, Katherine M., Watson, C., Heath, J.A., et al., 2015, Changing Habitat Use Associated with Distribution Shifts of Wintering Raptors, *Journal of Wildlife Habitat,* 79 (3): 402–12.

52. Olsoy, Peter J.; Forbey, Jennifer S.; Rachlow, Janet L.; Nobler, Jordan D.; Glenn, Nancy F.; and Shipley, Lisa A.. (2015). "Fearscapes: Mapping Functional Properties of Cover for Prey with Terrestrial LiDAR". BioScience, 65(1), 74-80. http://dx.doi.org/10.1093/biosci/biu189.

51. Yang, P., Ames, D.P., Fonseca, A., Anderson, D., Shrestha, R., Glenn, N.F., 2014, What is the Effect of LiDAR-Derived DEM Resolution on Large-Scale Watershed Model Results?, *Environmental Modelling & Software, 58, 48-57.*

50. Olsoy, P.*, Glenn, N.F., Clark, P.E., 2014, Estimating Sagebrush Biomass Using Terrestrial

Laser Scanning, *Rangeland Ecology & Management*, 67 (2): 224-228.

49. Olsoy, P.*, Glenn, N.F., Clark, P.E, Derryberry, D.R, 2014, Aboveground total and green biomass of dryland shrub derived from terrestrial laser scanning, *ISPRS Journal of Photogrammetry and Remote Sensing*, 88, 166-173.

48. Murgoitio, J.*, Shrestha, R., Glenn, N., Spaete, L., 2014, Airborne LiDAR and terrestrial laser scanning derived vegetation obstruction factors for visibility models, *Transactions in GIS*, 18(1): 147-160.

47. Mitchell, J.J., Shrestha, R., Moore-Ellison, C.*, and Glenn, N.F., 2014, Single and Multi-date Landsat Classifications of Basalt to Support Soil Survey Efforts, *Remote Sensing*, 2013, 5(10), 4857-4876; doi:10.3390/rs5104857.

46. Murgoitio, J.*, Shrestha, R., Glenn, N.F, Spaete, L.P, 2013, Improved visibility calculations with tree trunk obstruction modelling from aerial LiDAR, *International Journal of Geographical Information Science*, 27, 10: 1865-1883, DOI:10.1080/13658816.2013.767460.

46. Gould, S.*, Glenn, N., Sankey, T., McNamara, J., Spaete, L., 2013, Influence of a dense, low-height shrub species on the accuracy of a LiDAR-derived DEM, *PE&RS*, 79, 5: 421-431.

45. Hruska, R.C., Mitchell, J.J., Anderson, M.O., Glenn, N.F., 2012, Radiometric and Geometric Analysis of Hyperspectral Imagery Acquired from an Unmanned Aerial Vehicle, *Remote Sensing,* 4(9):2736-2752.

44. Benjankar, R.*, Jorde, K., Yager, E., Egger, G., Goodwin, P., Glenn, N., 2012, The impact of river modification and dam operation on floodplain vegetation succession trends in the Kootenai River, USA, *Ecological Engineering*, 46, 88-97.

43. Mitchell, J.*, Glenn, N.F., Sankey, T., Derryberry, D.R., Germino, M., 2012, Remote sensing of sagebrush canopy nitrogen, *Remote Sensing of Environment*, 124, 217-223.

42. Sankey, J., Germino, M., Benner, S., Olin, P., Glenn, N.F, Hoover, A., 2012, Transport of biologically important nutrients by wind in an eroding cold desert, *Aeolian Research*, Vol 7, 17-27.

41. Sankey, J., Germino, M., Glenn, N.F., 2012, Dust supply varies with sagebrush microsites and time since burning in experimental erosion events, *JGR-Biogeosciences*, 117, G01013, doi:10.1029/2011JG001724, 2012.

40. Mitchell, J.*, Glenn, N.F., Sankey, T., Derryberry, D.R., Anderson, M.O., Hruska, R., 2012, Spectroscopic detection of nitrogen concentrations in sagebrush, *Remote Sensing Letters*, 3(4), 285-294.

39. Hasselquist N.J., Germino M.J., Sankey J.B., Ingram L.J., Glenn, N.F., 2011, Aeolian nutrient fluxes following wildfire in sagebrush steppe: implications for soil carbon storage. *Biogeosciences*, 8, 3649-3659.

38. Sankey, J.*, Eitel, J.U., Glenn, N.F., Germino, M.J., Vierling, L.A., 2011, Quantifying burning effects, roughness and potential dust emission with laser altimetry of soil surfaces at submeter scales, *Geormorphology*, doi:10.1016/j.geomorph.2011.08.016, 135, 181-190.

37. Benjankar, R.*, Egger, G., Jorde, K., Goodwin, P., Glenn, N., 2011, Dynamic floodplain vegetation model development for the Kootenai River, USA, *Journal of Environmental Management*, 92: 3058-3070.

36. Sankey, T., Glenn, N.F., 2011, Landsat 5 TM and lidar fusion for sub-pixel juniper tree cover estimates, *Photogrammetric Engineering & Remote Sensing*, 77(12), 1241-1248.

35. Streutker, D.R., Glenn, N.F., Shrestha, R., 2011, A slope-based method for matching elevation surfaces, *Photogrammetric Engineering and Remote Sensing*, 77(7), 743-750. This paper won: 2nd place for the 2012 John I. Davidson President's Award for Practical Papers from American Society of Photogrammetry and Remote Sensing (ASPRS).

34. Mitchell, J.*, Glenn, N.F., Sankey, T., Derryberry, D.R., Anderson, M.O., Hruska, R., 2011, Small-footprint LiDAR estimations of sagebrush canopy characteristics. *Photogrammetric Engineering & Remote Sensing*, 77 (5), 521-530.

33. Glenn, N.F, Spaete, L., Sankey, T., Derryberry, D., Hardegree, S., Mitchell, J.*, 2011, Errors in LiDAR-derived shrub height and crown area on sloped terrain, *Journal of Arid Environments*, 75 (4), 377-382.

32. Spaete, L., Glenn, N., Derryberry, D., Sankey, T., Mitchell, J., Hardegree, S., 2011, Vegetation and slope effects on accuracy of a LiDAR-derived DEM in the sagebrush steppe, *Remote Sensing Letters*, 2 (4), 317-326.

31. Tinkham, W.T.*, Huang, H.*, Smith, A.M.S., Shrestha, R., Falkowski, M.J., Hudak, A.T., Link, T.E., Glenn, N.F., Marks, D.G., 2011, Letter: A Comparison of Two Open Source LiDAR Surface Classification Algorithms, *Remote Sensing*, 3(3), 638-649; doi:10.3390/rs3030638.

30. Benjankar, R.*, Glenn, N.F., Egger, G., Jorde, K., Goodwin, P., 2010, Comparison of Field-Observed and Simulated Map Output from a Dynamic Floodplain Vegetation Model Using Remote Sensing and GIS Techniques, *GIScience & Remote Sensing*, 47 (4), 480-497

29. Homan, J.W.*, Luce, C., McNamara, J., Glenn, N., 2010, Improvement of

distributed snowmelt energy balance modeling with MODIS-based NDSI-derived fractional snow-covered area data, *Hydrologic Processes*, DOI: 10.1002/hyp.7857

28. Sankey, T.T., Glenn, N., Ehinger, S.*, Boehm, A., and S. Hardegree. 2010. Characterizing western juniper expansion via a fusion of Landsat 5 Thematic Mapper and lidar data. *Rangeland Ecology and Management,* 63, 514-523.

27. Sankey, J.*, Glenn, N, Germino, M, Gironella, A, Thackray, G., 2010, Relationships of Aeolian Surface Change with LiDAR-Derived Landscape Surface Roughness following Wildfire, *Geomorphology,* 119, 135–145, 10.1016/j.geomorph.2010.03.013

26. Glenn, N.F. and Finley, C.*, 2010, Fire and vegetation type effects on soil hydrophobicity and infiltration in the sagebrush-steppe: I. Field analysis, *Journal of Arid Environments,* 74, 653-659, 10.1016/j.jaridenv.2009.11.009

25. Finley, C.*, and Glenn, N.F., 2010, Fire and vegetation type effects on soil hydrophobicity and infiltration in the sagebrush-steppe: II. Hyperspectral analysis, *Journal of Arid Environments,*74, 660-666, 10.1016/j.jaridenv.2009.11.010

24. Wang, C., and Glenn, N.F., 2009, Estimation of fire severity using pre- and post-fire LiDAR data in sagebrush steppe rangelands, *International Journal of Wildland Fire*, 18, 848–856.

23. Mitchell, J.*, and Glenn, N.F., 2009, Matched filtering subpixel abundance estimates in mixture-tuned matched filtering classifications of leafy spurge (Euphorbia esula L.), *International Journal of Remote Sensing*, 30 (23), 6099-6119.

22. Norton, J.*, Glenn, N., Germino, M., Weber, K., Seefeldt, S., 2009, Relative suitability of indices derived from Landsat ETM+ and SPOT 5 for detecting fire severity in sagebrush steppe, *International Journal of Applied Earth Observation and Geoinformation*, 11(5): 360-367, 10.1016/j.jag.2009.06.005.

21. Sankey, J.*, Germino, M., Glenn, N., 2009, Aeolian sediment transport following wildfire in sagebrush steppe, *Journal of Arid Environments*, 73 (10): 912–919, DOI: 10.1016/j.jaridenv.2009.03.016.

20. Sankey, J.*, Germino, M., Glenn, N., 2009, Relationships of post-fire aeolian transport to soil and atmospheric moisture, *Aeolian Research*, 1(1-2): 75-85, DOI: 10.1016/j.aeolia.2009.07.002.

19. Singh, N.*, and Glenn, N.F., 2009, Multitemporal spectral analysis for cheatgrass (Bromus tectorum) classification, *International Journal of Remote Sensing*, 30 (13): 3441 - 3462.

18. Lifton, Z.*, Thackray, G., Van Kirk, R., Glenn, N., 2009, Influence of rock strength on the valley morphometry of Big Creek, central Idaho, USA, *Geomorphology,* 111: 173–181.

17. Wang, C., and Glenn, N.F., 2009, Integrating LiDAR intensity and elevation data for terrain characterization in a forested area, *IEEE Geoscience and Remote Sensing Letters*, 6 (3), 463-466.

16. Mitchell, J.*, and Glenn, N.F., 2009, Leafy Spurge (Euphorbia esula L.) Classification Performance Using Hyperspectral and Multispectral Sensors, *Rangeland Ecology & Management*, 62.

15. Wang, C., and Glenn, N.F., 2008, A linear regression method for tree canopy height estimation using airborne LiDAR data, *Canadian Journal of Remote Sensing*, 34:217-227.

14. Moore, C.*, Hoffman, G., Glenn, N., 2007, Quantifying Basalt Rock Outcrops in NRCS Soil Map Units Using Landsat-5 Data, *Soil Survey Horizons*, 48: 59–62.

13. Khan, S., Glenn, N.F., 2006. New strike-slip faults and litho-units mapped in Chitral (N. Pakistan) using field and ASTER data yield regionally significant results, *International Journal of Remote Sensing,* 27 (20): 4495–4512.

12. Mundt, J.*, Glenn, N., Weber, K., Pettingill, J., 2006. Determining target detection limits and accuracy delineation using an incremental technique. *Remote Sensing of Environment,* 105, 34-40.

11. Streutker, D. and Glenn, N., 2006. LiDAR measurement of sagebrush steppe vegetation heights. *Remote Sensing of Environment*, 102, 135-145.

10. Mundt, J.*, Streutker, D., Glenn, N., 2006. Mapping sagebrush distribution via fusion of hyperspectral and LiDAR classifications. *Photogrammetric Engineering and Remote Sensing,* 72 (1): 47-54.

9. Glenn, N.F., Streutker, D., Chadwick, J., Thackray, G., Dorsch, S.*, 2006. Analysis of LiDAR-derived topographic information for characterizing and differentiating landslide morphology and activity. *Geomorphology*, 73 (1-2) 131-148.

8. Mundt, J.*, Glenn, N., Weber, K., Prather, T., Lass, L., Pettingill, J., 2005. Discrimination of hoary cress and determination of its detection limits via hyperspectral image processing and accuracy assessment techniques. *Remote Sensing of Environment*, 96: 509–517.

7. Glenn, N.F., Mundt, J.T.*, Weber, K.T., Prather, T.S., Lass, L.W., Pettingill, J., 2005. Hyperspectral data processing for repeat detection of small infestations of leafy spurge. *Remote Sensing of Environment*, 95: 399–412.

6. Chadwick, J., Glenn, N., Thackray, G., Dorsch, S.*, 2005. Landslide Surveillance: New Tools for an Old Problem. *EOS*, 86(11): 109, 114.

5. Chadwick, J., Dorsch, S.*, Glenn, N., Thackray, G., Shilling K., 2005. Application of Multi-Temporal High Resolution Imagery and GPS in a Study of the Motion of a Canyon Rim Landslide. *ISPRS Journal of Photogrammetry and Remote Sensing*, 59(4): 212-221.

4. Lass. L., Prather, T., Glenn, N., Weber, K., Mundt, J*., Pettingill, J., 2005. Early Detection of Spotted Knapweed and Babysbreath with a Hyperspectral Sensor, *Weed Science,* 53:242–251.

3. Glenn, N.F., J.R. Carr, 2004. Establishing a relationship between soil moisture and RADARSAT-1 SAR data obtained over the Great Basin, Nevada, U.S.A. *Canadian Journal of Remote Sensing* 30/2, pp.1-6.

2. Glenn, N. F., J.R. Carr, 2004. The effects of soil moisture on SAR delineation of geomorphic surfaces in the Great Basin, Nevada, U.S.A. *Journal of Arid Environments* 56/4, pp. 643-657.

1. Glenn, N. F., J.R. Carr, 2003. The use of geostatistics in relating soil moisture to RADARSAT-1 SAR data obtained over the Great Basin, Nevada, U.S.A. *Computers and Geosciences*, 29/5, pp.577-586.

2. GRANTS AWARDED, ~$10M

PIs are listed in order (PI, Co-PI, etc)

Workshops-NEON: Training in Scientific Discoveries with NEON's AOP, NSF, $100,000, 11/1/2015-11/30/2017

Modeling the long-term effects of fuel reduction and seeding treatments on fuel loads and fire regimes in the Great Basin, Joint Fire Sciences Program, $268,810, 11/2015-10/2018

Integrating TLS and ALS to Describe Riparian Vegetation Structure, Glenn, N., Spaete, L., Bureau of Reclamation / Sound Science LLC, $45,592, 6/1/2015-9/30/2015

Monitoring Earth's Hydrosphere: Integrating Remote Sensing, Modeling, and Verification, Flores, L., Glenn, N., McNamara, J., Marshall, HP, $1,479,990, 10/1/2014-9/30/2017

Scalable Vegetation Structure for Ecosystem Modeling in the Western US, Glenn, N., Flores, L., Mitchell, J, Ustin, S., NASA Terrestrial Ecology, $748,000, 1/1/2014-12/31/2016

Birds of Prey Remote Sensing, Glenn, N., BLM, $34,460, 10/01/2014 – 09/30/2017

INL Joint Appointment, Glenn, N., DOE, $54,167, 10/01/2014-9/30/2015

Quantifying and predicting fuels and the effects of reduction treatments along successional and invasion gradients in sagebrush habitats, October 2011 – September 2014, Shinneman, D., Pilliod, D., Arkle, R., Glenn, N., $546,723, Joint Fire Science Program, ($73,137 to ISU via subcontract from USGS)

BCAL MapWindow Virtual Watersheds, October 2010 – September 2015, $487,500, Glenn, N., Ames, D., NOAA

Orchard Training Area Impacts Mapping and Cave Visualization, Glenn, N., Idaho Military Division, $17,000, 9/1/2013 – 12/31/2013

Orchard Training Area Vegetation and Cave Mapping, Glenn, N., Idaho Military Division, $89,000, 10/01/2012 – 09/30/2014

Collaborative Research: Making Point Clouds Useful to Earth Scientists, Glenn, N., $219,000 ($320,000 total), NSF, 9/01/2012 – 08/31/2015

LiDAR Remote Sensing of Snake River and Priest Lake, Glenn, N., $142,000, IDWR/FEMA, October 2011-May 2012
Water Resources in a Changing Climate, September 2008-December 2013, Baxter, C., Crosby, B., Germino, M., Ames, D., Finney, B., Thackray, G, Glenn, N. (ISU PIs), NSF Idaho EPSCoR ($15M to State of Idaho) (Glenn's portion: $65,000 for outreach, $234,750 for CI, $155,583 for Lead Scientist)
BCAL MapWindow Watershed Modeling LiDAR, September 2009-September 2013, $340,650, Ames, D., Glenn, N., NOAA
Collaborative Research: Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada, and New Mexico, September 2009-August 2013, $2M to Idaho from NSF EPSCoR; (Glenn, N., Ames, D., for Idaho State University's portion ($387,200 over 3 years))
Remote Sensing Strategic Planning: Joint Appointment, January 2011-September 2013, $193,565, Glenn, N., Idaho National Laboratory
Remote Sensing Strategic Planning: BCAL Support, January 2011-September 2012, $70,095, Glenn, N., Idaho National Laboratory
Faculty Staff Exchange: Post-doctoral Researcher, October 2010-September 2011, $48,250, Glenn, N., Idaho National Laboratory
UAV and hyperspectral remote sensing, April 2009-September 2011, $41,000, Glenn, N., Idaho National Laboratory
CESU Rapid Carbon Assessment, June 2011-October 2011, Glenn, N., $11,297, USDA NRCS
Upgrade of Computing Equipment in the Digital Mapping Laboratory, Idaho State University, $75,000, August 2009-2010, Crosby, B., Ames, D., Glenn, N., Welhan, J., NSF
Fusion of remotely sensed data sources for modeling eolian soil transport, July 2007 – May 2011, $360,515, Glenn, N., Germino, M., Department of Defense
Hyperspectral and LiDAR landscape modeling, October 2006-September 2010, $462,120, Glenn, N., NOAA
Evaluating Invasive Species and Habitat Quality in The Owyhee Uplands With Remote Sensing, September 2007-August 2011, $27,000, Glenn, N., BLM
Rangeland Fire and Erosion, August 2008-July 2010, $159,000, Germino, M., Glenn, N., BLM
Development of a Geospatial Outreach Program – Boise Center Aerospace Laboratory, October 2005 – September 2010, $475,900, Glenn, N., Ames, D., NOAA.
Quantifying Basalt Rock Outcrops in NRCS Soil Map Units Using Landsat-5 Data, September 2007-December 2008, $23,500, Glenn, N., USDA NRCS
Implementation of Remote Sensing Techniques for Invasive Species Management, August 2006-September 2009, $43,459, Glenn, N., USDA NRCS.
Eolian transport and remote sensing, INRA SSGP Doctoral Fellow Program, Fall 2006-Spring 2008 ($50,000), Glenn, N., funding for Joel Sankey, PhD in Engineering and Applied Sciences
Hyperspectral remote sensing, INRA SSGP Doctoral Fellow Program, Fall 2007-Spring 2009 ($50,000), Glenn, N., funding for Jessica Mitchell, PhD in Engineering and Applied Sciences
Creation of a New Learning Community by Integration of Breeze, WebCT, Distance Learning and Smart Screens at Idaho State University, July 1, 2006-June 30, 2007, Glenn, N., Ames, D., Hughes, S., $59,556, Idaho SBOE.

Pacific NorthWest Regional Collaboratory (PNWRC) Rangeland Monitoring FY06, October 2006 – August 2007, $53,800, Glenn, N., Battelle Memorial Institute, Pacific Northwest Division.
Boise Center Aerospace Laboratory, October 2004 – September 2007, $494,739, Glenn, N., Ames, D., Hughes, S., Weber, K., NOAA.
Landscape Data Fusion and Assessment: Improved Feature Extraction using Multivariate Stacking, Year 3, July 2005 – June 2006, $53,427, Glenn, N., Battelle Memorial Institute, Pacific Northwest Division.
Detection, Prediction, Impact, and Management of Invasive Plants Using GIS, June 2002- May 2005, $1,500,000, Weber, K., Glenn, N.F., Germino, M., NASA Goddard, NAG5-2301.
Development and Implementation of Remote Sensing Techniques to Monitor Invasive Plant Species in the State of Idaho, October 2001 – March 2005, $801,695, Pettingill, J., Glenn, N.F. (ISU PI), Weber, K., Prather, T., Lass, L., NASA Stennis, NAG13-02029
Synthetic Aperture Radar Analysis of Multi-scale Geologic and Environmental Processes in Idaho and the Intermountain West, August 2001-July 2004, $575,000, Thackray, G.D., Hughes, S.S., Glenn, N.F., and Rodgers D.W., NASA EPSCoR, NCC5-577. Two year extension, August 2004 – July 2006, with additional $377,445.
Landscape Data Fusion and Assessment: Improved Feature Extraction using Multivariate Stacking, Year 2, May 2004 – May 2005, $49,252, House, E., Glenn, N.F., Windholz, T., Weber, K., Battelle Memorial Institute, Pacific Northwest Division.
NativeView Connections, March 2004 – February 2005, $25,000, Glenn, N., Hughes, S., Idaho Space Grant Consortium, from NASA Workforce Development Program.
Selenium Information System Project (SISP), July 2004 – September 2005, $68,537, Weber, K., Windholz, T., Glenn, N., Bechtel BWXT ID LLC.
Student Outreach and Training for Long-term Environmental Studies in Remote Sensing with INEEL, December 2001-September 2004, $105,646, Inouye, R., Glenn, N.F., Bechtel BWXT ID LLC
Landscape Data Fusion and Assessment: Improved Feature Extraction using Multivariate Stacking, March 2003 – March 2004, $102,224, House, E., Glenn, N.F., Windholz, T., Weber, K., Battelle Memorial Institute, Pacific Northwest Division
Wildfire Effects on Rangeland Ecosystems and Livestock Grazing in Idaho, May 2001- March 2004, $500,000, Weber, K., Glenn, N.F., Holmer, R., Link, P., Minshall, W., Maschner, H., and Peterson, C., NASA Goddard, NAG5-10982
GeoSTAC, August 2002 – July 2003, $30,174, Hughes, S., Glenn, N., NASA EPSCoR, Idaho Space Grant Consortium
Postdoctoral Researcher in Remote Sensing at Idaho State University, August 2002 – July 2003, $15,000, Glenn, N., NASA EPSCoR, Idaho Space Grant Consortium
Application of the SEBAL methodology for estimating evapotranspiration and consumptive use of water through remote sensing (student and outreach support), May 2002 – December 2003, $37,340, Glenn, N.F., Hughes, S.S., Idaho Department of Water Resources
Development of a selenium information system, December 2001 – September 2002, $20,000, Glenn, N.F. and Co-PI: Weber, K.T., Bechtel BWXT ID LLC
Modeling landslide hazards and sediment transport after wildfires with remote sensing: Yellowjacket Creek drainage, Lemhi County, Idaho, June 2001 – February 2002, $10,000, Glenn, N.F., NASA Idaho Space Grant Consortium

3. INVITED TALKS (from more than 125 presentations, 2000-2013)

Glenn, N.F., Li, A., Shrestha, R., Spaete, L, Improving Aboveground Carbon Estimates in Dryland Ecosystems with Airborne Lidar and Satellite Laser Altimetry, AGU December 2014 (Invited)

Glenn, N.F., Shrestha, R., Spaete, L, Wheaton, J., Hudak, A., Bailey, P., Spatially-explicit techniques for earth surface characterization using multi-source and multi-temporal laser scanning data, AGU December 2013 (Invited)

Glenn, N.F., LiDAR for Evapotranspiration Modeling, Western States Remote Sensing of Evapotranspiration Workshop, October 2011, Boise, ID

Glenn, N.F. Mitchell, J., Spaete, L., Sankey, T., Shrestha, R., Hardesgree, S.P., Modeling low-height vegetation with airborne, LiDAR ID# EP44B-05, American Geophysical Union, 13-17 December 2010, San Francisco, CA.

Shrestha, R., Glenn, N.F., Spaete, L., 2010. Multi-temporal LiDAR change detection for terrain analysis using slope-based automatic co-registration ID# EP51D-0574, American Geophysical Union, 13-17 December 2010, San Francisco, CA.

Shrestha, R., Glenn, N.F., Hudak, A.T., Spaete, L., 2010. Characterizing bare-earth elevations from airborne LiDAR data in a shrub-dominated mountain environment ID# C33C-0554, American Geophysical Union, 13-17 December 2010, San Francisco, CA.

Glenn, N., 2008. LiDAR derived surface morphology and change detection, *Studying Earth Surface Processes with High-Resolution Topographic Data Workshop*, Boulder, CO

Glenn, N., 2008, Lasers in the Sage, Rangeland Ecology & Management Tri-State Short Course, April 2008, Boise, ID

Glenn, N., 2008, Introduction & Application of Remote Sensing for Surveying, Idaho Society of Professional Land Surveyors Annual Conference, February 2008, Pocatello, ID

Glenn, N., 2007, Detection and modeling of invasive plants and their surrounding environments with hyperspectral imaging and other platforms in semiarid regions, University of Idaho, Moscow, ID, May 2007.

Glenn, N., 2006, LiDAR and Hyperspectral Remote Sensing for Landscape Modeling, Southwest GIS User's Group Meeting, May 2006, Nampa, ID

Glenn, N. and Streutker, D., 2006, LiDAR and Hyperspectral Remote Sensing for Landscape Modeling, University of Idaho Center for Ecohydraulics Research Colloquium, March 2006, Boise, ID

Glenn, N., 2006, Remote Sensing of Cheatgrass in Idaho, BLM Owyhee Initiative Project Meeting, January 2006, Portland, OR

Glenn, N., 2005. Analysis of LiDAR-derived topographic information for characterizing and differentiating landslide morphology and activity, Colorado School of Mines Heiland Lecture Series, Golden, Colorado, March 2005.

Glenn, N. , 2005, Remote Sensing for Natural Resources and Beyond, Presented to the US Fish and Wildlife Service, Boise, ID, March 2005

Glenn, N. , 2005, Results of the NASA BAA: Development of Remote Sensing Techniques to Monitor Invasive Species in the State of Idaho, Idaho Weed Conference, Nampa, Idaho, February 2005

Glenn, N., and Pettingill, J., 2004. NASA Remote Sensing of Invasive Weeds Project, Presentation, 12th North America Weed Management Association Annual Conference, Rapid City, SD, September, 2004

II. TEACHING

1. Classroom Instruction

Geography 361/561 Remote Sensing & Image Processing, Fall 2015 (11)
Geography 361/561 Remote Sensing & Image Processing, Online Course, Summer 2015 (8)
Geography 361/561 Remote Sensing & Image Processing, Online Course, Spring 2014 (8)
Geography 361/561 Remote Sensing & Image Processing, Fall 2014 (30)
Geosciences 581 Selected Topics in Remote Sensing Fall 2014 (5)
Geosciences 661 Advanced Image Processing Spring 2014 (4)
Geology 4409/5509 Remote Sensing

- Spring 2012, 40 students, Boise (12), Pocatello (14), Idaho Falls (11)
- Spring 2011, 37 students, Boise (9), Pocatello (16), Idaho Falls (12)
- Spring 2010, 30 students, Boise (12), Pocatello (12), Idaho Falls (6)
- Spring 2009, 26 students, Boise (8), Pocatello (17), Idaho Falls (1)
- Spring 2008, 19 students, Boise (4), Pocatello (8), Idaho Falls (7)
- Spring 2007, 24 students, Boise (5), Pocatello (10), Idaho Falls (9)
- Spring 2006, 24 students, Boise (4), Pocatello (13), Idaho Falls (7)
- Spring 2005, 12 students, Boise (1), Pocatello (11)
- Spring 2001, 13 students, Pocatello
- Fall 2001, 14 students, Pocatello (developed new course)

Geology 6609 Advanced Image Processing

- Fall 2012, 7 students, Boise (5), Pocatello (4), Moscow (2) (enrolled students from ISU, Boise State University, and University of Idaho)
- Fall 2010, 7 students, Boise (3), Pocatello (2), Idaho Falls (2)
- Fall 2008, 2 students, Pocatello (1), Boise (1)
- Fall 2007, 2 students, Pocatello (2)
- Fall 2006, 5 students, Boise (2), Pocatello (1), Idaho Falls (2) (developed new upper graduate student level course)

Geology 5599 LiDAR and Image Processing

- Fall 2011, 7 students, Boise (3), Idaho Falls (4) (developed new upper level graduate student level course)
- Fall 2012, 10 students, Boise (1 UI, 2 BSU, 1 ISU), Pocatello (4), Moscow (2 UI)

Geology 6606 Geostatistics

- Spring 2012, 20 students, Boise (4), Pocatello (12), Idaho Falls (4)

Geology Field Camp

- Summer 2007, 21 students, 3 days
- Summer 2006, 21 students, 3 days
- Summer 2005, 21 students, 3 days
- Summer 2004, 7 – 21 students, 2 - 4 days

2. Research Experiences Offered to Students (beyond formal advising)

- 2014-Present, Kate Carter-Cram, Sage International High School Student
- Fall 2015 – Undergraduate
  - Rick Raymondi
  - Maren Watkins
- Summer 2015 – Undergraduate
  - Maren Watkins
  - Soraya (Catherine) Yazdanpour
- Spring 2015 – Undergraduate
  - Maren Watkins
- Summer 2014 - Undergraduates
  - William Carter, Timothy Phero
- Spring 2013 - Graduate
  - Mike Griffel, Post-baccalaureate Geotech Certificate, Geol 648, Remote sensing fire
- Fall 2012 - Graduate
  - Michael Overton, M.S. GIScience, Geol 648, 2 credits, LiDAR programming
  - Mike Griffel, Post-baccalaureate Geotech Certificate, Geol 648, Remote sensing fire
- Spring 2011 – Undergraduate and graduate
  - Andrew Farias, B.S. Geomatics, Geol 582, 3 credits, *LiDAR remote sensing*
  - Mike Griffel, Post-baccalaureate Geotech Certificate, *Coordinated internship with Idaho Department of Water Resources*
- Spring 2009 - Undergraduate

    - Ashley Hayes, B.S. Geology, Geol 582, 3 credits, *Remote sensing*
- Spring 2007-Spring 2011 - Undergraduate
    - Carol Moore, B.S. EES, Mapping rock outcrops with remote sensing
        - This research has resulted in one publication to date, a $20,000 grant award, and an **undergraduate research award** for Carol by the Cooperative Ecosystems Studies Unit (CESU); undergraduate research also supported by Idaho NSF and NASA EPSCoR
- Spring 2007 - Graduate
    - Brian Davis, Post-baccalaureate Geotechnology Certificate, Geol 648, 2 credits, *Mapping invasive species with remote sensing*
- Fall 2006 - Undergraduate
    - Carol Moore, B.S. Geology, Geol 482, 2 credits, *Determining rock outcrops with remote sensing in Clark County for NRCS soil surveys*
- Spring 2006 - Graduate
    - Randy Lee, INL, MS GIS, Geol 648, 3 credits, *Development of spectral and spatial techniques for elevation models for hydrology*
- Fall 2003 - Undergraduate
    - Chad Gentry, B.S. Biology, Geol 482, 1 credit, *Remote sensing*
- Fall 2002 - Graduate
    - Jeremy Shive, M.S. Biology, Geol 648, 1 credit, *Development of hyperspectral remote sensing techniques*
    - Tanya Johnson, B.S. Anthropology, Geol 482, 3 credits, *Remote sensing of archaeological sites in the Eastern Snake River Plain*
- Spring 2002 - Graduate
    - Ben McMahan, M.S. Anthropology, Geol 648,1 credit, *Multitemporal stacking to simulate hyperspectral imaging*

3. Internship Experiences Offered to Students

- Kate Carter-Cram, Sage International School, Summer 2014-present
- Parker Moore, Meridian High School Junior, Fall 2011
- Scott Miller, BS Geology, internship at NOAA-Boulder with Dr. Bob Zamora, Summer 2007
- Jackie Langille, BS Geology, internship at NOAA-Boulder with Dr. Bob Zamora, Summer 2006, *Correlation of Precipitation and Soil Water Content to Rising River Levels*
- Allan Anselmo, MS GIS, internship at NOAA-Boulder with Dr. Bob Zamora, Summer 2005, *Programming for Soil Moisture*

4. Graduate Students

Primary advisor:

- Ann Marie Raymondi, MS Biology
- Hamid Dashti, PhD Geosciences
- Nayani Ilangakoon, PhD Geosciences
- Shital Dhakal, MS Hydrology

- Alex Boehm, Linking Regional Climate to Slope Aspect and Soils to assess potential causes of success and failure of seedling establishment, MS GISci, August 2015
- Randy Lee, MS in GISci (non-thesis)
- Kyle Anderson, Use of Terrestrial Laser Scanning to Estimate Fuelbed Characteristics in Shrub-Steppe, MS GISci, December 2014
    - Michigan Biological Field Station
- Jacob Tibbits, MS in GISci (non-thesis), December 2013
    - Eureka County - BLM
- Peter Olsoy, LiDAR-hyperspectral data fusion, MS GISci, May 2013
    - PhD Student Washington State University
- Amberle Keith, Non-thesis MS GISci, May 2013
- Denise Jensen, Non-thesis MS GISci, May 2013
- Catherine Zajanc, Non-thesis MS GISci, May 2013
- Jayson Murgoitio, LiDAR line-of-sight modeling, MS GISci, May 2012
    - Bureau of Land Management Scientist, Idaho
- Sam Gould, LiDAR accuracy and validation in mountain watersheds, MS GISci, May 2012
    - Weld County GIS
- Jed Gregory, Non-thesis MS GISci, May 2012
    - Bureau of Land Management Scientist, Wyoming
- Jessica Mitchell, December 2010, Application in Hyperspectral and LiDAR Remote Sensing to Improve the Characterization of Low-height Sparse Vegetation Ecosystems, PhD INRA Fellow / Engineering and Applied Science
    - Assistant Professor, Appalachian State University
- Joel Sankey, December 2009, Dynamics of Post-Wildfire Aeolian Transport in Cold Desert Shrub Steppe, PhD, INRA Fellow / Engineering and Applied Science
    - USGS
- Sara Ehinger, Design, Development, and Application of LiDAR Data Processing Tools, MS GISci, May 2010
    - GIS Scientist with USFS
- Jessica Mitchell, August 2007, Spectral and spatial detection limits of leafy spurge (*Euphorbia esula* L.): Sensor Comparisons and Matched Filtered Behavior, MS GIS
- Jill Norton, December 2006, The Use of Remote Sensing Imagery to Determine Wildland Burn Severity In Semiarid Sagebrush-Steppe Rangelands, M.S. GIS
    - GIS Scientist with Power Engineers
- Charles Finley, August 2006, Field evaluation and hyperspectral imagery analysis of fire-induced water repellent soils and burn severity in Southern Idaho rangelands, M.S. GIS
    - GIS Scientist with Idaho Power
- Nagendra Singh, May 2005, Development of a Multitemporal Data Analysis Approach for Extracting Information from Medium-Resolution Imagery: An application for cheatgrass detection (*Bromis tectorum*), M.S. Geology
    - Oak Ridge National Lab Remote Sensing Scientist

- Jacob Mundt, December 2003, Detection of leafy spurge *(Euphorbia esula)* in Swan Valley, Idaho, using hyperspectral remote sensing with limited training data, M.S. Geology.
    - Weld County GIS and Web Manager
- Diane Sprague-Wheeler, May 2003, The Use of Remote Sensing Imagery for Evaluation of Post-Wildfire Susceptibility to Landslide and Erosion Hazards in the Salmon-Challis National Forest, Lemhi County, Idaho, M.S. Geology.
    - Geologist, Soda Springs Ranger District, Caribou-Targhee National Forest

Secondary advisor/Committee Member:

- Stephanie Coates, MS Biology
- Elizabeth Ronar, MS Hydrology
- Ryan Will, MS Hydrology
- Chris Tennant, May 2014, PhD Geosciences, Served on PhD Advisory Committee (pre-candidacy)
- Theo Barnhart, May 2013, MS Geology, Morphodynamics of the Selawik Retrogressive Thaw Slump, Northwest Alaska
- Teva Veluppillia, Non-thesis MS GISci, May 2012
- Robert Beazer, August 2013, PhD EAS, Integrating Social Attitudes, Spatial Data, and Monte Carlo Simulation Modeling for Siting of High Voltage Power Lines
- Danny Anderson, May 2012, PhD EAS, Detailed Hydrographic Feature Extraction from High-Resolution LiDAR Data
- Yang Cao, PhD EAS Advisory Committee, Spring 2012
- Kacy Krieger, January 2012, MS Geology, The Topographic Form and Evolution of Thermal Erosion Features: A First Analysis Using Airborne and Ground-Base LiDAR in Arctic Alaska Jiri Kadlec, PhD EAS Advisory Committee, Fall 2011
- Robert Beazer, PhD EAS Advisory Committee, Fall 2011
- Pam Bond, May 2011, MS GISci, Sagebrush Steppe Shrub Height and Canopy Cover Estimation Using LiDAR and Landsat 5 TM Data
- Carl Rudeen, May 2012, MS GISci, Sage grouse modeling
- Amber Hoover, August 2010, MS Biology, A Comprehensive Examination of the Interactions between Aeolian Sediment Transport and Vegetation
- Brian Marchionni, expected Fall 2009, MS GIS, Design and Development of an Extensible Open Source Geospatial Toolbox and Graphical Modeling Environment
- Jeyakanthan Veluppillai, Fall 2008, MS GIS, Development and application of soil and water assessment tool interfaces for MapWindow GIS application (OpenSWAT)
- Christopher Michaelis, Spring 2007, MS GIS, Application of OGC specifications to client-side GIS
- Bettie Keetch, July 2006, Using PTRA and QuarkNet Teaching Materials and Methods in the Secondary School Classroom, M.S. Natural Sciences
- Zach Lifton, August 2005, Bedrock controls on the fluvial geomorphology of Big Creek, Valley County, Idaho, M.S. Geology
- Ryan Baum, May 2005, Multiple stressors and landscape variations in remotely sensed vegetation indices of sagebrush-steppe over the past ca. 20 years, M.S. GIS

- Stephen Dorsch, May 2004, The Geologic Framework, Movement History and Mechanics of the Salmon Falls Landslide, Twin Falls County, Idaho, M.S. Geology, (served as Ex-Officio Committee Member)
- Jen Carr Merrill, August 2003, The Formation of Leaton Gulch, Grouse Peak, Pahsimeroi Mountains, Custer County, Idaho: Neoproterozoic Conglomerates and Breccias and Their Relation to the Beaverhead Impact Structure, M.S. Geology (served on thesis committee for defense only)

Served as Graduate Faculty Representative (GFR):

- Richard Boyes, May 2013, Ph.D., Counseling
- Jessica Berry, May 2013, Ph.D., Counseling
- Nancy Byron, May 2013, M.S., Counseling
- Suzanne Burton, May 2013, M.S., Counseling
- Cordelia Germino, May 2012, M.S., Education
- David Nichols, May 2012, M.S., Counseling
- Melanie Person, May 2012, Ph.D., Counseling
- Amy Davis, April 2011, M.S., Counseling
- Addy (Adriana) Wissel, May 2011, Ph.D., Counseling
- Kristi Weismann, April 2010, M.S. Counseling, Department of Counseling
- Laura Alvarez, April 2010, M.S. Counseling, Department of Counseling
- Colleen Matthews, April 2009, M.S., Speech Language Pathology
- Kris Kirsch, April 2008, M.S. Counseling, Department of Counseling
- Chelsea D'Addabbo, April 2008, M.S., Speech Language Pathology
- Nicole Jordan, April 2007, Mental Health Counseling, M.S. Counseling, Department of Counseling
- Leslie Soares, April 2007, M.S., Speech Language Pathology
- Camilla Pearson, July 2006, Structural Family Therapy, M.S. Counseling, Department of Counseling
- Nikki Kerns, April and July 2006, Cochlear Implantation and Aural Rehabilitation, Speech Language Pathology
- Rhonda Oppelt, April 2006, M.S. Counseling, Department of Counseling
- Lisa Paternoster, April 2005, Structural Family Therapy, M.S. Counseling, Department of Counseling
- Cyndia Glorfield, March 2005, Emotionally Focused Therapy, M.S. Counseling, Department of Counseling
- Jeremy Shive, May 2004, Mapping Amphibian Habitat Distribution in the Frank Church-River of No Return Wilderness, ID Using Multiple Scales of Remotely Sensed Data, M.S. Thesis, Biology

Served as Committee Member for Other Universities:

- Jeff Reeder, M.S., University of Idaho Ecohydraulics, December 2012, A method for automatic and unsupervised detection of shallow landslides from LiDAR-derived, high-rsolution digital elevation models using a wavelet transform

- Rohan Benjankar, Ph.D., University of Idaho Ecohydraulics, Summer 2009, Quantification of reservoir operation-based losses to floodplain physical processes and impact on the floodplain vegetation at the Kootenai River, USA
- Joel Homan, MS Hydrology, Boise State University, Incorporating the MODIS Snow Product into Distributed Snowmelt Models, Spring 2008

Post-doctoral scientists and Research professors

- Dr. Aihua Li, Post-doc, September 2012 - present
- Dr. Rupesh Shrestha, Post-doc, April 2010-2015
- Dr. Jessica Mitchell, Post-doc, September 2012 – 2013
- Dr. Teki Sankey, Research Assistant Professor, September 2008-2012
- Dr. Cheng Wang, Post-doc, Remote Sensing, August 2007-June 2009
- Dr. David Streutker, Post-doc, Physics, April 2003-August 2006
- Dr. Mohamed Aly, Post-doc, Geology, August 2006 – July 2008
- Dr. Ahmed Said, Research Assistant Professor, Hydrology, October 2006-April 2008
- Dr. John Chadwick, Post-doc, Geology, July 2002 – July 2005

Student Awards

- Carol Moore, 2011, Undergraduate student, Best Poster Award, Using 3D visualizations for environmental outreach. EPSCoR Third Annual Western Tri-State Consortium Meeting, April 2011, Santa Ana Pueblo, NM.
- Joel Sankey, 2010, Outstanding PhD Student, Idaho State University
- Jacob Tibbits - INRA First Prize Student Poster Award, 2007 for: Tibbits, J., Theau, J., Glenn, N., Weber, K.), October 2007. The use of Remote Sensing and GIS to Model Rangeland Health Characteristics. INRA-BSU Environmental Sensing Symposium, Boise, ID.
- Jessica Mitchell - INRA Second Prize Student Poster Award, 2007 for: Mitchell, J., Glenn, N., October 2007. Matched Filter Abundance Estimates in Mixture Tuned Matched Filtered Classifications of Leafy Spurge. INRA-BSU Environmental Sensing Symposium, Boise, ID.
- Carol Moore, Undergraduate Student Researcher Award, Great Basin Cooperative Ecosystems Studies Unit, 2008 Reno, NV, CESU Annual Meeting
- Yardenia Martinez (University of Houston) - Society of Exploration Geophysics Best Student Poster Paper for Martinez, Y., Khan, S., Link, P., Glenn, N., Mapping geology and structure using multispectral and hyperspectral data and evaluating topographic correction methods: Case study, Salmon River Mountains of east-central Idaho, 2005 SEG Annual Meeting

5. Workshops & Other

March 2015, LiDAR Derived DEMs applied to Landslide, Fault, Earthuake Rupture, and Landscape Changes, National Autonomous University of Mexico, Mexico City, Mexico; in coordination with OpenTopography, 25 students for 2 days.

June 2014, LiDAR Processing Workshop, Czech Globe, Brno, Czech Republic
25 participants for 4 days for hands-on LiDAR image processing and hyperspectral processing using BCAL LiDAR Tools

June 2011, Spaceward Bound Workshop, a NASA and Idaho Space Grant Consortium workshop for teachers to learn about remote sensing and field geology, Idaho, June 24, 2011

April 2011, LiDAR Processing Workshop, International Symposium for the Remote Sensing of the Environment, Sydney, Australia
20 participants from 8 different countries for hands-on LiDAR image processing using ISU BCAL software tools

August 2010, LiDAR Processing Workshop, Idaho EPSCoR, Boise, Idaho
15 student and faculty participants for hands-on LiDAR image processing using ISU BCAL software tools

March 2009, ISU Boise Research Day, Panelist, Boise, Idaho
1 hour panel on collecting, organizing, and analyzing data for research

April 2003, Hyperspectral Workshop, University Place, Idaho Falls, Idaho
1 day hyperspectral image processing workshop (speakers and hands-on) for INL, ISU, and other university, state and federal agencies

October 2002, Idaho State Department of Agriculture (ISDA), Boise, Idaho
1-day hands-on remote sensing workshop for county weed managers for continuing education credit

August 2002, Surface Energy Balance Algorithm for Land (SEBAL) Expert Training, Pocatello, Idaho
Organized 5-day workshop for 17 attendees from state and federal government, various universities, and the private sector.

May 2001, Remote Sensing Workshop, Intermountain GIS Conference, Boise, Idaho Taught 1 day workshop of fundamentals of remote sensing

III. SERVICE
Boise State University (2013-) & Idaho State University (2000-2013)
1. International

- **Czech Globe,** Hosted visiting scientists at BSU and provided workshop in Czech Republic (May-June 2014)

2. University

- Lead, Search Committee for Human Environment Systems Cluster Hire, 2014-

- Joint appointment with DOE Idaho National Laboratory (INL), 2011-
- Lead, Cyberinfrastructure NSF Idaho EPSCoR, 2013-
- Dean, College of Science and Engineering Search Committee, 2013
- Vice President for Research and Economic Development Search Committee, 2011-2012
- Member of President's advisory group, 2011
- Member, ISU-College of Science and Engineering Advisory Board, 2010-2012
- Member, ISU-Meridian Health Sciences Center Dean's Advisory Council, 2007-2013
- Serve on Idaho Cyberinfrastructure Working Group, NSF EPSCoR Idaho, 2009-2012
- Member of Promotion Committee for Matt Germino, Biology, 2010-2011
- Search committee member for soils position, Biology, 2009-2010
- Attended National EPSCoR Conference and Legislative Visits as ISU representative, February 2009-2010
- Adjunct Graduate Faculty with an endorsement to chair thesis or dissertation committees, Boise State University, 2008-
- Affiliate Graduate Faculty, University of Idaho, 2007-
- Organized booth for ISU-Boise ISU Day at the Capitol, 2007
- Presenter at ISU Office of Research "Collaborative Research" Seminar, 2007
- Member of VP for Research search committee, 2006 and 2007
- ISU Meridian Health Sciences Center Research Committee, Chair 2006-2009; Member 2009-
- ISU-Meridian Health Sciences Center Strategic Task Force Committee, 2006-
- ISU Technical Representative, Pacific Northwest Regional Collaboratory (PNWRC), 2000-2007
- Idaho Space Grant Consortium, ISU Representative Executive Committee Member, 2001, 2008 –2010
- ISU GIS Oversight Committee Member, 2002 – 2008
- ISU Geotechnology Faculty Member, 2002 -
- Developed collaborative ties for ISU presence in the Idaho Water Center (IWC), starting in 2004 and leading to ISU's research space in the IWC in November 2005
- ISU Day at the Capitol, Legislative Luncheon, 2004
- Support Clinical Lab Sciences (Department of Biology, Boise), Institute of Rural Health, Pharmacy, Public health, and CSED with poster development and printing for conferences, 2004-present
- GIS and Remote Sensing Presentations to Nursing Students, 2004-2005
- Serve on selection committee for the ISU Boise Student Excellence Award, 2005 – 2009
- Generated grants by serving as PI or Co-PI providing over $1M in indirects to university
- PI on several outreach and curriculum-based grants for university-wide benefit:
    - *Creation of a New Learning Community by Integration of Breeze, WebCT, Distance Learning and Smart Screens at Idaho State University*, July 1, 2006-June 30, 2007, Glenn, N., Ames, D., Hughes, S., $59,556, Idaho SBOE.
    - *Development of a Geospatial Outreach Program - Boise Center Aerospace Laboratory*, October 2005 – September 2008, $475,900, Glenn, N., Ames, D., NOAA.

  - *NativeView Connections,* March 2004 – February 2005, $25,000, Glenn, N., Hughes, S., Idaho Space Grant Consortium, from NASA Workforce Development Program.
  - *GeoSTAC*, August 2002 – July 2003, $30,174, Hughes, S., Glenn, N., NASA EPSCoR, Idaho Space Grant Consortium
- GFR to multiple students and departments (see list under 'Students')

3. University-wide Research Centers

- Search committee member, Lecturer, ISU GIS TReC (2004-2005)
- Numerous outreach and education grants with ISU GIS TReC, for example:
  - *Detection, Prediction, Impact, and Management of Invasive Plants Using GIS,* June 2002- May 2005, $1,500,000, Weber, K., Glenn, N.F., Germino, M., NASA Goddard, NAG5-2301.
  - *Development and Implementation of Remote Sensing Techniques to Monitor Invasive Plant Species in the State of Idaho*, October 2001 - March 2005, $801,695, Pettingill, J., Glenn, N.F. (ISU PI), Weber, K., Prather, T., Lass, L., NASA Stennis, NAG13-02029 (ISU's portion is $193,036).
- Outreach and education grant with the Center for Ecological Research and Education (CERE)
  - *Student Outreach and Training for Long-term Environmental Studies in Remote Sensing with INEEL*, December 2001-September 2004, $105,646, Inouye, R., Glenn, N.F., Bechtel BWXT ID LLC

4. Department of Geosciences

- Department Co-Chair, 2008-2010
- P&T committee for Dr. Dan Ames, 2008
- Search committees:
  - Cyberinfrastructure TT, 2011-2012
  - Geospatial Lecturer, 2011
  - Geospatial Hydrology, 2010-2011
  - Geospatial Analysis Non TT Teaching/Research Position, 2007
  - Earth and Environmental Science TT Geoscience Position, 2003-2004; 2004-2005
  - Idaho Falls Geoscience TT Teaching/Research Position, 2003-2004
- Regularly attend weekly faculty meetings
- Active participant in department reviews and documents
- Co-authored PhD in Geosciences proposal
- Support of Idaho Falls GIS laboratory, software/IT support, 2003-2004, 2010-2011
- Support of ISU Digital Mapping Laboratory, 1.2 years full-time salary, 2004-2005
- Grants providing indirects in which $500,000 has been recovered by the department
- Represent and establish ISU-Geosciences presence in Boise, ID, resulting in establishing the Department of Geosciences' Boise Center Aerospace Laboratory (BCAL) in 2004
- Assisted in developing GeoSTAC (website, course design and development)

5. Community Service

- Co-Founder and previous member of the Board of Directors for Sage International Charter School, including author of $700,000 grant awarded to Sage International Charter School, 2008-2012
- Established the Idaho LiDAR Consortium, a website and collaboration tool to share LiDAR remote sensing data and reduce acquisition costs for State of Idaho
- Host to Open-House for ISU BCAL IQ-Station, 2011-2012
- Host to 60 4th graders from Mountain View Elementary – tour lab/visualization IQ-Station, speak about research, 2011
- Host to College of Idaho undergraduates – tour lab, speak about research, 2010
- Search committee member for IDWR GIS Section Manager, 2010
- Idaho Water Center Green Team, 2008-2009
- Idaho Water Center GIS Day, 2008
- Parents Association Committee, Treasure Valley YMCA, Member, 2005-2009
- Hosted Open House for ISU BCAL at the Idaho Water Center's University of Idaho's Presidential Sustainability Symposium, October 2008
- Eurasian Water Milfoil Outreach Talk, June 2008
- Review Panel for The Nature Conservancy's Landscape Toolbox, 2008-
- Idaho Geospatial Committee, Higher Education Representative, 2003 – 2009
  The role of the IGC, as defined by Governor Kempthorne's Executive Order 2001-07, is to provide policy level direction and promote efficient and effective use of resources for matters related to geographic information.
- Mars Rover, TECH Challenge Volunteer (April 2003, 2004, 2010), 1 day remote sensing workshops for middle school students
- Women in GIS (WIG), Member, 2003-2009; This is an informal group (about 20 women) founded in and local to Boise. The mission of WIG is to provide educational opportunities for K-12 in geospatial technologies (GIS, GPS, and remote sensing). Examples of projects include education in the classroom, hosting public workshops at conferences, hosting GIS Day activities (Nov 2003, 2008), demonstrating GPS techniques to the public (May 2009).
- Weed Legislative Tour with demonstration of GPS/GIS/Remote sensing capabilities, Member of Organizing Committee, Ada and Bonneville Counties, 2004

6. Professional

Committees

- Member, NASA's Terrestrial Ecology, Carbon Cycle, Land Use and Biodiversity (TECLUB), 2014-
- Member, User Working Group, NASA's Oak Ridge National Laboratory, Distributed Active Archive Center for Biogeochemical Dynamics, 2014-
- Panel Member, Algorithm Theoretical Basis Documents (ATBD) for NASA's ICESat-2, 2014-
- Chair, Coordinating Committee, Great Basin Research and Management Partnership, 2014 - (Member since 2013)

- Advisory Board Member, OpenTopography (NSF), 2010-
- Committee Member, UNAVCO (NSF) Terrestrial Imaging Geodesy Working Group, 2013-2015
- Board Member, Boise WaterShed Inc., 2014-
- NIH Panel Review Member, 2011
- NSF Panel Review Member, 2009-2013
- Member, Idaho Geological Survey Geologic Mapping Advisory Committee, 2009-
- Established Idaho LiDAR Consortium and Chair of State of Idaho Elevation Framework Technical Working Group, 2009-
- University of Nevada Reno, College of Science, Mackay School of Earth Sciences and Engineering, Geological Sciences & Engineering ABET, 2012
- University of Nevada Reno, College of Science, Mackay School of Earth Sciences and Engineering, Geological Sciences & Engineering Advisory Board Member, 2009-2012
- Search Committee Member for CI Coordinator for Idaho NSF EPSCoR, 2010
- Remote sensing review for identification of core indicators for the Bureau of Land Management (BLM), October 2008
- Working group member for NSF/National Center for Airborne Laser Mapping Workshop: Studying Earth Surface Processes with High-Resolution Topographic Data Workshop; developed whitepaper with colleagues from the University of Arizona, San Diego State University, and UC Davis titled "Current capabilities and community needs for software tools and educational resources for use with LiDAR high resolution topography data" for the National Research Council.
- University of Idaho Department of Civil Engineering, Center for Ecohydraulics Search Committee Member for Geomorphologist, 2007
- INRA and BSU Symposium on Environmental Sensing, October, 2007, Planning Committee and Session Chair, 2007
- American Society for Photogrammetry and Remote Sensing, Intermountain Region Fall Technical Meeting, 2005, Idaho Water Center, Boise, Idaho, Co-Convener
- Geological Society of America, Rocky Mountain (56th Annual) and Cordilleran (100th Annual) Joint Meeting, May, 2004; Hydrologic Science, Geomorphology, and Environmental Geoscience Session, Chair
- NASA Applications Division Remote Sensing of Invasive Plant Member, 2007-
- NASA Applications Division and USDA Agricultural Decision Support Systems, Remote Sensing of Invasive Plant Member, 2003
- American Society for Photogrammetry and Remote Sensing, Intermountain Region Fall Technical Meeting, November 3, 2005, Boise, Idaho, Convener
- NASA Applications Division PP&A Disaster Management Panel, Member, 2002
- American Society for Photogrammetry and Remote Sensing, Intermountain Region Spring Technical Meeting, April 12, 2001, Pocatello, Idaho, Convener;
- General Assembly of the European Geophysical Society, Nice, France, April, 2001; Program NH7.05 Landslides and related phenomena: Remote sensing and monitoring of landslides, Co-chair

- CEOS (Committee of Earth Observation Satellites) International Landslide Hazard Disaster Working Group, Member and Co-Editor, 2001-2002

Manuscript Reviews

- Canadian Journal of Remote Sensing
- Catena
- Environmental and Engineering Geoscience
- Environmental Management
- Environmental Research
- Earth Surface Processes and Landforms
- Earth Science Reviews
- Geological Society of America Bulletin
- Geophysics
- Geophysical Research Letters
- Geology
- Geomorphology
- ISPRS Journal of Photogrammetry and Remote Sensing
- International Journal of Applied Earth Observation and Geoinformation
- International Journal of Digital Earth
- IEEE Transactions on Geoscience and Remote Sensing
- Journal of Arid Environments
- Photogrammetic Engineering and Remote Sensing (PE&RS)
- Remote Sensing of Environment
- Remote Sensing
- Sensors
- Weed Science, Weed Technology
- Wetlands

Book Reviews

- Wiley: 6th Edition of Remote Sensing and Image Interpretation by Thomas M. Lillesand, Ralph W. Kiefer, and Jonathan W. Chipman
- Oxford University Press, Remote Sensing of Vegetation, by Jones & Vaughan

Proposal Reviews

- NSF Division of Ecological & Biological Cluster
- NSF Division of Earth Sciences Instrumentation & Facilities Program
- NASA Solid Earth and Natural Hazards Program
- NASA EPSCoR – National and Statewide
- NASA Innovation in Aeronautics Instruction
- Idaho Space Grant Consortium Fellowship and Research Initiation Grants
- US Civilian Research & Development Foundation: Azerbaijan-U.S. Bilateral Grants Program and Central Asia Research Travel Grant Program
- USDA NRI Competitive Grants Program

- USDA Cooperative State Research, Education and Extension Service Small Business Innovation Research Program (1, 2011)
- University of Missouri Research Board
- ACS Petroleum Research Fund
- Department of Defense ERDC (5, 2011)
- Bureau of Reclamation (2, 2011)

Professional Organizations

- American Geophysical Union, Member, 1999-
- American Society for Photogrammetry and Remote Sensing, Member, 1999-
- Society of Aeolian Research, 2010-
- Society of Women Engineers, Member, 1994-2000
- Tau Beta Pi, Engineering Honor Society, Member
- Association of Engineering Geologists, Member, 1994-2000
- ISU Professional Women, Member, 2000-2002, 2004
- Urban Regional Information Systems Association (URISA), Member
    - Vice-president, Northern Rockies Chapter, 2003-2004
    - President, Northern Rockies Chapter, 2004-2005

Matthew J. Kohn

Personal Data

Address: Department of Geosciences
Boise State University
Boise, Idaho 83725
208-426-2757 mattkohn@boisestate.edu

Educational Experience

1991: Ph. D. in Geology, Rensselaer Polytechnic Institute, Troy, NY 12180
1989: M. S. in Geology, Rensselaer Polytechnic Institute, Troy, NY 12180
1986: B. S. in Geology, Massachusetts Institute of Technology, Cambridge, MA 02139

Research Interests and Expertise

Development and use of geochemical techniques to investigate paleoecology, paleoclimate, metamorphism, and orogenesis, including major elements, trace elements, stable isotopes, and radiogenic isotopes. Climatic and physiological analysis of organic phosphates. Chemical and isotopic analysis of metamorphic minerals. Stable isotope, electron microprobe, ion microprobe, and ICP-MS analysis; geochronology; thermodynamics, kinetics and phase equilibria.

Research and Teaching Positions

2011- University Distinguished Professor, Boise State University
2010- Professor, Boise State University
2007-2010 Associate Professor, Boise State University
2005-2006 Visiting Professor, sabbatical leave, Washington State University
2004-2007 Associate Professor, University of South Carolina
1998-2004 Assistant Professor, University of South Carolina
1996-98 Post-Doctoral research staff, Lawrence Livermore National Laboratory
1994-96 Research scientist, University of Wisconsin - Madison.
1995 Visiting Assistant Professor, Northern Illinois University (Fall Semester).
1991-93 NSF Post-Doctoral fellow, stable isotope geochemistry, UW-Madison.
1986-91 NSF graduate fellow, RA, TA, metamorphic petrology, RPI.
1983-86 Undergraduate researcher, sedimentology and structural geology, MIT.

Awards, Fellowships, and Honors

Undergraduate Research (MIT):
Sea Grant, 1984, 1985; Goetze Grant, 1985
Graduate Research (RPI):
GSA research grant, 1987, 1988; Sigma Xi grant, 1987; NSF graduate fellowship, 1986-1989
Professional:
NSF post-doctoral fellowship, 1991-1993
Two Thumbs Up Teaching/Service Award, 2002 (USC; multiple recipients each year)
Undergraduate Research Mentor of the Year Award, 2004 (USC; 1 recipient each year)
Fellow, Mineralogical Society of America (2007)
Fellow, Geological Society of America (2008)
University Distinguished Professor, BSU (2011; permanent designation)
Mineralogical Society of America Distinguished Lecturer (2012-2013)
Shell London Lecturer (2013)

Proposals Funded (~$8.5M)

Proposal title	Source/dates	Amount
PIRE: Exterra Field Institute and Research Endeavor (E-FIRE)	NSF-PIRE/OIA (lead PI) 2016-2021	$4.02M
Field testing Raman microspectroscopic thermobarometers in garnet	NSF-Petrology and Geochemistry 2015-2017	$147k
MRI: Acquisition of an electron probe microanalyzer for Earth Science and Materials research and education	NSF-Instrumentation and Facilities (lead PI). 2014-2016	$987k
Collaborative research: Deciphering subduction dynamics: Case study of the Catalina Schist	NSF-Tectonics (co-PI). 2014-2016	$42k
Collaborative research: calibrating mid-Miocene greenhouse climate and ecology in a key high southern latitude locale	NSF-Sedimentary Geology and Paleobiology (lead PI). 2014-2016	$99k
Metamorphic and tectonic evolution of the Tethyan Himalaya, central Nepal	NSF-Tectonics. 2013-2015	$191k
Experimental calibration of stable isotope and REE partitioning in bioapatite	NSF-Geobiology, low-Temp Geochemistry. 2013-2015	$143k
RAPID: An unusual opportunity to track snow ablation using stable isotope evolution of the 2011-2012 snowpack near Boise, Idaho	NSF-Hydrologic Sciences. 2012-2013	$20k
Petrologic and chronologic evaluation of Himalayan tectonic models in southern Bhutan	NSF-Tectonics. 2011-2014	$205k
Acquisition of a stable isotope mass spectrometer for Earth science and ecological research	NSF-Instrumentation and Facilities (lead PI). 2009-2010	$377k
Acquisition of a 213nm laser and cathodo-luminescence-detector for microanalysis of zircon and other Earth materials	NSF-Instrumentation and Facilities (lead PI), 2008-2009	$138k
Collaborative research: Testing mechanical models of Himalayan orogenesis in NW India (co-PI with D. Robinson)	NSF-Tectonics, 2008-2012	$275k
Collaborative research: How did the grassland biome evolve in South America? (co-PI with C.A.E. Strömberg and R.H. Madden)	NSF-Paleobiology, 2008-2012	$120k
Collaborative Research: Tectonic rates from differential garnet geochronology	NSF-Petrology & Geochem., (lead PI) 2008-2010	$105k
Acquisition of a stable isotope ratio mass spectrometer for climate change research (co-PI with R. Thunell)	NSF-Instrumentation and Facilities, 2006-2007	$336k
Testing paleoenvironmental models of the Cretaceous Western Interior Seaway via stable isotopes of fossil turtles and fish	PRF (American Chemical Society), 2006-2008	$79k
Timing, conditions, and rates of thrust transport in the Nepalese Himalaya	NSF-Tectonics, 2005-2008	$130k

Testing Paleozoic vs. Cenozoic metamorphism in the Greater Himalaya, Nepal	NSF-Petrology & Geochem., 2005-2006	$36k
Collaborative Research: Extensional unroofing of the central Menderes metamorphic complex, southwestern Turkey (Co-PI with E. Catlos)	NSF-Tectonics, 2005-2008	$50k
Timing and magnitude of climate change across the Eocene-Oligocene transition, northern Great Plains, USA,	NSF – Paleoclimate, 2004-2007	$231k
Evolution of LREE+Th distributions in minerals during prograde metamorphism	NSF-Petrology & Geochem., 2003-2005	$88k
SGER: Fossil bone as a paleoclimate indicator	NSF – Geology and Paleontology 2003-2005	$24k
Collaborative Research: Acadian vs. Taconian tectonism in the southern Appalachian Western Blue Ridge – Implications for models of terrane accretion.	NSF – Tectonics, (lead PI) 2003-2005	$135k
Metamorphic evolution of the Main Central Thrust, Nepal	NSF-Petrology & Geochem., 2000-2004	$209k
Monazite dating via the electron microprobe: a new geochronologic technique	USC, 2001-2002	$12k
Constraints on Miocene uplift of the central Cascade Range, Oregon	NSF – Tectonics, 2000-2002,	$136K
Mountain building and climate change	USC, 1999-2000	$10k
Oxygen isotope compositions of fossil biogenic phosphates: climate reconstruction in East Africa. (With M. Schoeninger and J. Valley)	NSF – Archaeometry, 1996-1997	$60k
Case study investigation of the relationships between fluid infiltration and deformation using oxygen isotope zoning in metamorphic porphyroblasts	NSF-Petrology & Geochem., 1994-1996	$92k
Determination of the importance of fluid infiltration during regional metamorphism via modeling and measurement of oxygen isotope zonation in garnet	NSF –Postdoctoral fellowship, 1991-1993	$70k

Supervision of Postdoctoral Scholars.

1. Christopher Parkinson. Himalayan tectonics. 2001 – 2003
2. Jennifer Chambers. Himalayan tectonics. 2008 – 2010
3. Stacey Corrie. Himalayan tectonics. 2010 – 2013
4. Celina Suarez. Trace elements in fossils. 2011 – 2012

Supervision of Doctoral Students.

1. Alessandro Zanazzi "Paleoclimatology and paleoecology of the Eocene-Oligocene transition, central North America" PhD 2009.
2. Alan B. Coulson. "Ecologic and paleontologic utility of marine turtle bone phosphate oxygen isotopes" PhD 2009.
3. Stacey Corrie "Geochemical and geochronological constraints on the tectonothermal history of the central and eastern Nepal Himalaya." PhD 2010.
4. Amanda Drewicz "Paleoclimatic and paleoecological response of the American Southwest Desert to abrupt Pleistocene climate change." PhD 2016.
5. Robin Trayler "Geochemical partitioning of synthetic bioapatites and mid-Miocene climates of southern South America." PhD 2016.
6. Buchanan Kerswell "Geochemical applications of tourmaline to petrogenesis and Himalayan tectonics." PhD 2020.

Supervision of Masters Students.

1. Jennifer Josef "Continental paleoclimate of Southern Argentina, 38 Ma to the present" M.S., 2002.
2. Robert King "Characterization of fluid flow and metasomatism in the mantle wedge from Franciscan Complex ultramafic blocks" M.S., 2002.
3. Stacey Corrie "Age of metamorphism and tectonic evolution of the Western Blue Ridge, Great Smoky Mountains, NC." M.S., 2005
4. Jessica Sousa "Measuring the rate of garnet growth: implications for Rb-Sr garnet geochronology" M.S. 2011.
5. Andrea Wolfowicz "Ti-in-quartz temperatures of mylonitic orthogneiss, Scandinavian Caledonides" M.S. 2012.
6. Jesse Walters "Metamorphic evolution of the Tethyan Himalayan Sequence, Annapurna region, central Nepal." M.S. 2016.

Supervision of Undergraduate Senior Theses.

1. Jennifer Miselis "Oxygen isotope record of Cascade Range uplift" 2001.
2. Stacey Russo "Paleoclimate record of Plio-Pleistocene Idaho from oxygen isotope compositions of fossil teeth" 2002.
3. Cari Fuller "Ultra-High Pressure metamorphism in Brazil" 2003.

Supervision of Undergraduate Research (Underlined name = research resulted in student co-authored journal publication).

1. L. Childs Cantey. 1999-1999. "Electron microprobe characterization of South Carolina eclogites". B.S., 2000
2. Jennifer Miselis. 1999–2001. "Paleoclimate evolution of central Oregon as a monitor of Cascade Range uplift". B.S., 2001
3. Stacia Russo. 2001–2002. "Oxygen Isotopes of teeth". B.S., 2002
4. Margaret Malloy. 2001–2002. "Electron microprobe dating of metamorphic monazite, Great Smoky Mountains, NC". B.S. 2002.

5. Cari Fuller. 2002–2003. "UHP metamorphism in Brazil." B.S. 2003.
6. J. McIver Law. 2001–2003. "Oxygen isotopic and climatic history of central Oregon and western Idaho during the last 5 million years." B.S. 2003.
7. Lauren Byrne. 2001–2002. "Oxygen isotopes of teeth, and carbon isotopes of plant phytoliths".
8. Kim Davis. 2002–2003. "Stable isotope composition of fossil bone vs. paleosol carbonate – use for paleoclimate studies". B.S. 2004
9. Moriah McKay. 2003–2005. "Carbon isotope compositions of Pleistocene fauna, South Carolina". B.S. 2005
10. Michael Grigsby. 2009–2009. "Stable isotope compositions of modern herbivore, omnivore, and carnivore teeth from Idaho." B.S. 2009
11. Michelle Gordon. 2009–2010. "Stable isotope compositions of fossil teeth from southern Argentina. B.S. 2011.
12. Jennifer Morris. 2010–2011. "Trace elements in modern teeth from Idaho" B.S., 2011
13. Alma Palacios. 2011–2012. "Stable isotope paleoecology of the mid-Pliocene, Hagerman Fossil Beds National Monument, Idaho" B.S. 2015.
14. Joey Dean. 2011–2012. "Oxygen and hydrogen isotope systematics in grasshoppers" B.S. 2012.
15. Christopher Markley. 2011–2012 "Zr and zircon systematics in eclogites" B.S. 2012.
16. Eliza Schulz. 2012–2013 "Stable isotope systematics of grasshoppers" B.S. 2013.
17. Remington Brooks. 2013. "Calibration of keratin stable isotope analysis." B.S. 2013
18. Jean Carlos Ferreira (Brazilian exchange student). 2015. "Thermometry and geochronology of Santa Catalina subduction zone rocks." B.S. 2016
19. Tainah Pinto dos Santos (Brazilian exchange student). 2015. "Thermometry and geochronology of Himalayan metacarbonates, central Bhutan." B.S. 2016

Other Research Supervision.

Mark Wieland. Electron microprobe analyst, 2002 – 2003.
J. McIver Law. Stable isotope analyst, 2003 – 2005.
Emily Hinz. PhD candidate, geophysics. Trace elements in teeth, 2008-2009.
Shannon Murray. PhD candidate, geophysics. Trace elements in wood, 2009-2010.
Erika Akin. Stable isotope analyst, 2009 – 2010.
Dr. Celina Suarez. Trace element analyst, 2010-2011.
Eliza Schulz. Stable isotope analyst, 2014.

Professional Memberships (current only)

American Association for the Advancement of Science (AAAS)
American Geophysical Union (AGU)
Geochemical Society (GS)
Geological Society of America (GSA)
Mineralogical Society of America (MSA)
Society for Advancement of Chicanos and Native Americans in Science (SACNAS)
Society of Vertebrate Paleontology (SVP)

Classes Taught

Geology of the National Parks (non-majors)
Introduction to geology (Physical Geology; non-majors)
Introductory mineralogy (undergraduate majors)
Rocks and minerals/Earth materials (undergraduate majors)
Evolution of mountain belts (undergraduate majors)
Field Geology (undergraduate majors)
Igneous and metamorphic petrology (undergraduate- and graduate-level)
Stable isotope geochemistry (undergraduate- and graduate-level)
Radiogenic isotope geochemistry (undergraduate- and graduate-level)
Paleoclimatology and Paleoceanography (graduate-level)
Methods in stable isotope geochemistry (graduate-level)
Analytical methods (graduate-level)
Southern Appalachian tectonics (graduate-level)
Scandinavian Caledonides tectonics (graduate-level)

Field Work

North America:

New England Appalachians (1986-1995, 1998)
Grenville Province, Central Ontario, Adirondacks (1992, 1995)
Death Valley (1993)
Northern New Mexico (1995)
Northern California (1998, 1999, 2013)
Southern Appalachians (1999-2005)
Central and southeastern Oregon (2000-2005)
Southern Colorado, northern New Mexico (field camp; 2004-2008)
Northwest Nebraska and East Central Wyoming (2005-2006)
Santa Catalina Island, California (2013, 2014)

Asia:

Central Nepal (1997, 2001, 2014)
Western Turkey (2006)
NW India (2007, 2009)
Bhutan (2008, 2011)

South America:

Southern Chile (1987)
Southern Argentina (2009, 2010, 2012, 2015)

Europe:

Swiss, Austrian and Italian Alps (1993, 2009)
Northern Norway (2010)

Service (external):

Member, MSA Centennial Committee (2015-)
Councilor (elected), Mineralogical Society of America (2015-2017)
Member, Proposal Review Panel, NSF (2015-2016)
Chair, MSA Shortcourse Committee (2014-)
Member, Shortcourse Committee, MSA (2012-)
Chair, GSA Mineralogy-Geochemistry-Petrology-Volcanology Award committee (2013-2015)
Member, GSA Mineralogy-Geochemistry-Petrology-Volcanology Award committee (2012-2015)
Member, Development Committee, SVP (2005-)
Secretary (elected), Volcanology-Geochemistry-Petrology section, AGU (2010-2012)
Member, Executive Committee, VGP section, AGU (2010-2012)
AE: Geological Society of America Bulletin (2001-2010)
Member, Proposal Review Panel, NSF (2007-2009)
Member, Bowen Award Committee, VGP, AGU (2004-2006)
AE: Journal of Geophysical Research (1998-2001)
Member, Proposal Review Panel, IGPP-LLNL (1998)

Reviewer For:

National Science Foundation:
- Anthropology
- Continental Dynamics
- Instrumentation and Facilities
- Major Research Instrumentation
- Petrology & Geochemistry
- Post-doctoral Fellows
- Sedimentary Geology and Paleobiology
- Tectonics

German National Science Foundation
Graduate Women in Science
IGPP-LLNL
Petroleum Research Fund
Swiss National Science Foundation

American Journal of Physical Anthropology
American Journal of Science
American Mineralogist
Canadian Mineralogist
Chemical Geology
Contributions to Mineralogy and Petrology
Current Anthropology
Earth and Planetary Science Letters
Geochimica et Cosmochimica Acta
Geological Society of America Bulletin
Geology
Geosphere
Journal of Archaeological Science

Journal of Biogeography
Journal of Ecology
Journal of Geology
Journal of the Geological Society
Journal of Geophysical Research
Journal of Metamorphic Geology
Journal of Petrology
Journal of South American Earth Sciences
Nature
Oecologia
Palaeogeography, Palaeoclimatology, Palaeoecology
Palaios
Paleobiology
PLoS One
Proceedings of the Idaho Academy of Science
Quaternary Science Reviews
Science

Service (internal – college, university, or administrative positions only):

Member, BSU Distinguished Professor Award Committee (2011-)
Member, BSU Honorary Doctorate Committee (2010-)
Member, BSU Employee Campaign Committee (2009-2011)
Member, BSU Interdisciplinary Studies Committee (2008-)
Member, BSU College of Arts & Sciences Awards and Honors Committee (2009-2011)
Member, USC Electron Microscopy Center Advisory Committee (2000-2006)
Chair, Ethics Committee, Geological Sciences, USC (1999 – 2006)
Director, Undergraduate Studies, Geological Sciences, USC (2004-2005)

Publications

Books: 2 books edited

Kohn, MJ (2007) Paleoaltimetry: geochemical and thermodynamic approaches. Reviews in Mineralogy and Geochemistry, v. **66**, Mineralogical Society of America and Geochemical Society, Washington D.C.

Kohn, MJ, Rakovan, J, and Hughes, J, eds. (2002) Phosphates: Geochemical, Geobiological and Materials Importance. Reviews in Mineralogy and Geochemistry, v. **48**, Mineralogical Society of America and Geochemical Society, Washington, D.C.

Articles: 105 peer-reviewed papers published or in press; c. 10 papers in review/prep. After 1991, double underlined names are undergraduate students; underlined names are graduate students; **†** = ≥100 citations; **††** = ≥250 citations (ISI basis)
ISI stats: >5500 citations, h = 41; Google stats: >7000 citations, h=48

Review Cuitiño, JI, Fernicola, JC, **Kohn, MJ**, Trayler, RB, Naipauer, M, Bargo, MS, Kay, RF and Vizcaíno, SF. U-Pb geochronology of the Santa Cruz Formation at the Santa Cruz and Bote rivers (southernmost Patagonia, Argentina) and implications for fossil vertebrate communities. Journal of South American Earth Sciences, in review.

Mandal, S, Robinson, DM, **Kohn, MJ**, Khanal, S, Das, O, and Bose, S. Zircon U-Pb ages and Hf isotopes of the Askot klippe, Kumaun, northwest India: Implications for Paleoproterozoic tectonics, basin evolution and associated metallogeny of the northern Indian cratonic margin. Tectonics. In review.

Kohn, MJ. Carbon isotope discrimination in C3 land plants is independent of atmospheric p_{CO2}. Geochemical Perspectives Letters, in review.

2016 (105) **Kohn, MJ** (2016) Metamorphic chronology – a tool for all ages: Past achievements and future prospects. American Mineralogist, in press.

(104) Wolfowicz, A, **Kohn, MJ**, Northrup, CJ (2016). Thermal structure of shear zones from Ti-in-quartz thermometry of mylonites: Methods and examples from the basal shear zone, northern Scandinavian Caledonides. In: Ductile Shear Zones: from Micro- to Macro-scales. S. Mukherjee and K. Mulchrone, eds. Wiley-Blackwell. In press.

2015 (103) Eagle, RA, Enriquez, M, Grellet-Tinner, G, Pérez-Huerta, A, Hu, D, Tütken, T, Montanari, S, Loyd, SJ, Ramirez, P, Tripati, AK, **Kohn, MJ**, Cerling, TE, Chiappe, LM, Eiler, JM (2015) Isotopic ordering in eggshells reflects body temperatures and suggests differing thermophysiology in two Cretaceous dinosaurs. Nature Communications, DOI:10.1038/ncomms9296.

(102) Penniston-Dorland, SC, **Kohn, MJ**, and Manning, CE. The global range of subduction zone thermal structures from exhumed blueschists and eclogites: Rocks are hotter than models. Earth and Planetary Science Letters, **428**, 243-254.

(101) Selkin, PA, Boyle, J, Carlini, AA, Davies-Vollum, KS, Dunn, R, **Kohn, MJ**, Madden, RH, Strömberg, CAE (2015). Climate, dust, and fire across the Eocene-Oligocene transition, Patagonia. Geology, **43**, 567-570.

(100**)** **Kohn, MJ**, Strömberg, CAE, Madden, RH, Dunn, RE, Evans, S, Palacios, A, and Carlini, AA (2015) Quasi-static Eocene-Oligocene climate in Patagonia promotes slow faunal evolution and mid-Cenozoic cooling. Palaeogeography, Palaeoclimatology, Palaeoecology, **435**, 24-37.

(99) Khanal, S, Robinson, DM, **Kohn, MJ** and Mandal, S (2015) Evidence for a far traveled thrust sheet in the Greater Himalayan thrust system, and an alternative model to building the Himalaya. Tectonics, **34**, 31-52.

(98) **Kohn, MJ**, Corrie, SL, and Markley, C (2015) The fall and rise of metamorphic zircon. American Mineralogist, **100**, 897-908. [**A most-read article**]

(97) Zanazzi, A, Judd, E, Fletcher, A, Bryant, H, and **Kohn, MJ** (2015) Eocene-Oligocene latitudinal climate gradients in North America inferred from stable isotope ratios in perissodactyl tooth enamel. Palaeogeography, Palaeoclimatology, Palaeoecology, **417**, 561-568.

(96) Dunn, RE, Strömberg, CAE, Madden, RH, **Kohn, MJ**, Carlini, AA (2015) Canopy, climate and faunal change in the Cenozoic of Patagonia. Science, **347**, 258-261.

2014 (95) Suarez, CA, Gonzalez, LA, Ludvigson, GA, Kirkland, JI, Cifelli, RL, and **Kohn, MJ** (2015) Multi-taxa isotopic investigation of paleohydrology in the Lower Cretaceous Cedar Mountain Formation, eastern Utah, U.S.A.: Deciphering effects of the Nevadaplano Plateau on regional climate. Journal of Sedimentary Research, **84**, 975-987.

(94) **Kohn, MJ**. (2014) “Thermoba-Raman-try”: calibration of spectroscopic barometers and thermometers for mineral inclusions. Earth and Planetary Science Letters, **388**, 187-196.

(93) **Kohn, MJ** (2014) Himalayan metamorphism and its tectonic implications. Annual Review of Earth and Planetary Sciences, **42**, 381-419.

(92) Vucetich, MG, Pérez, ME, Ciancio, MR, Carlini, AA, Madden, RH and **Kohn, MJ** (2014) A new acaremyid rodent (Caviomorpha, Octodontoidea) from Scarritt Pocket, Deseadan (late Oligocene) of Patagonia (Argentina). Journal of Vertebrate Paleontology, **34**, 689-698.

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JENNIFER PIERCE
Associate Professor
Department of Geosciences
Boise State University
1910 University Dr
Boise, Idaho 83725-1535
Email: jenpierce@boisestate.edu
Work: 208-426-5380
Website: http://earth.boisestate.edu

EDUCATION

Ph.D. **University of New Mexico:** Albuquerque, New Mexico. Fall 2004. Research and Teaching Assistant, Dept. of Earth and Planetary Sciences. Dissertation: Forest Fires, Holocene Climate Change, and Geomorphic Response: South Fork Payette River, Idaho. GPA 4.0

M.A. **University of Oregon:** Eugene, Oregon. May 2000. Research Assistant and Graduate Teaching Fellow, Dept. of Geography. Thesis: The Effects of Dredge Mining on Channel Adjustment: Granite Creek, Eastern Oregon. GPA 4.04

B.A. **The Colorado College:** Colorado Springs, Colorado. May 1995. Dept. of Geology, emphasis in Environmental Geology. Honors Thesis: A Classification and Mineralogical Description of Ferricrete Samples in the New World Mining District of Montana. GPA 3.6

PEER REVIEWED PUBLICATIONS

*** (denotes graduate student author)**
**** (denotes undergraduate student author)**

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ABSTRACTS AND PRESENTATIONS

Pierce, J.L., Meyer, G., Bigio E., Nelson, N., Poulos, M., Jenkins, S., Weppner K.,Riley, K., Fitch, E., Frechette, J., 2015, Who is in the driver's seat? Millennial-scale records of wildfire in the western USA reveal a complex interplay of climate, fire, and vegetation, 2015, AGU Fall Meeting, San Francisco, Dec 14-18. B11N-05.

Will, R., Glenn, N., Benner, S., **Pierce, J.L.,** Spaete, L., Li, A., 2015, Mapping SOC (Soil Organic Carbon) using LiDAR-derived vegetation indices in a random forest regression model, AGU Fall Meeting, San Francisco, Dec 14-18. B43I-0666

Stanbery, C., Will, R., Benner, S., . . **Pierce, J.L**., 2015, Soil Inorganic Carbon Thresholds and Formation: What are the Controls in a Transitional, Semi-Arid Watershed? AGU Fall Meeting, San Francisco, Dec 14-18. H21C-1380.

Poulos, M.J., **Pierce, J.L.,** McNamara, J.P., Flores, A.N., Benner, S.G., 2015, Systematic Mapping and Statistical Analyses of Valley Landform and Vegetation Asymmetries Across Hydroclimatic Gradients, AGU Fall Meeting, San Francisco, Dec 14-18, H11C-1363.

Pierce, J.L., Meyer, G., Bigio E., Nelson, N., Poulos, M., Jenkins, S., Weppner K. Riley, K., Fitch, E., Frechette, J., 2015A synthesis of alluvial records of wildfire in the western USA: a complex interplay of climate and vegetation, Geological Society of America Meeting, Baltimore, MD, Nov. 1-4.

Gibble, K., **Pierce, J.L**., Lindquist, E., 2015, Models and mechanisms of post-fire erosional response in rangelands: a case study from the Boise foothills, Geological Society of America Meeting, Baltimore, MD, Nov. 1-4.

Gibble, K., **Pierce, J.L.,** Lindquist, E., 2015, Post-fire debris flow prediction models and decision making at the wildland urban interface of Boise, Idaho, Geological Society of America Meeting, Baltimore, MD, Nov. 1-4.

Pierce, J.L., Poulos, M.J., 2013, Semi-Arid Landscapes: The Canary in the Climate-Change Coalmine (Invited) AGU Fall Meeting, San Francisco, Dec. 9-13, EP52A-01.

Pierce, J.L, Duffin, J.**, Lindquist, E., Wuerzer,T. Pellant, M., 2013,Smokey Bear is Dead: A New Era of Wildfires in the Western U.S. AGU Fall Meeting, San Francisco, Dec. 9-13 GC23G-08.

Hummer, P.J.**, **Pierce, J.L**., and Benner, S.G., 2013, Dust in the Wind: Modern and Ancient Dust Compositions, AGU Fall Meeting, San Francisco, Dec. 9-13. PP11B-1827.

Murray, E.M.,* Cobourn, K., Flores, A.N., **Pierce, J.L.,** Kunkel, M.L., 2013, The Impact of Changing Snowmelt Timing on Non-Irrigated Crop Yield in Idaho, AGU Fall Meeting, San Francisco, Dec. 9-13 GC13B-1063.

Duffin, J.**, Lindquist, E., **Pierce, J.L**, Wuerzer,T. Lawless, B., McCoy, J., 2013, Modern Approaches to Wildfire Mitigation by Air and by Ground: An Interdisciplinary Perspective AGU Fall Meeting, San Francisco, Dec. 9-13, V23B-2825.

Lindquist, E., **Pierce, J.L**., 2013, Climate change impacts on urban wildfire and flooding policy in Idaho: a comparative policy network perspective AGU Fall Meeting, San Franciso, Dec. 9-13, NH51B-1614.

Poulos, M.J., **Pierce, J.L.,** McNamara, J.P., Flores, A.N., Benner, S.G., 2013, A Multi-Scale Assessment of How Topoclimate-Driven Ecohydrologic Feedbacks Impact Drainage Erosion, Incision and Expansion AGU Fall Meeting, San Francisco, Dec. 9-13, EP53B-0794.

Pierce, J.L., Riley, K.E., Weppner, K.N. and Betancourt, J.L., 2013, The arrival and influence of fire-prone pines in Idaho: a tale of two ecosystems, GSA Fall Meeting, Denver Colorado, Oct. 27-30.

Guilinger, J.**, and **Pierce, J.L.,** 2013, 2013, Quantifying and extrapolating soil inorganic carbon across soils of the western Snake River Plain, Idaho, using pressurized calcimetry, GSA Fall Meeting, Denver Colorado, Oct. 27-30.

Pierce, J.L., and Riley, K.E., 2012, Wildfires and debris flows: substantial contributors to millennial-scale basin-wide sediment yields in the Salmon River, Idaho, GSA Annual Meeting, Charlotte, N.C., Nov. 4-7.

Pierce, J.L., Weppner, K., and Riley, K.E., Northern rocky mountain wildfires and debris flows: millennial-scale interactions among climate, fire, vegetation, and geomorphic response, 2012 (INVITED). GC22C-01. AGU Fall Meeting, San Francisco Dec. 3-7.

Weppner, K.N.*, **Pierce, J.L.,** and Betancourt, J.L., 2012, Climate drivers and landscape response: Holocene fire, vegetation and erosion at City of Rocks National Reserve, Idaho. Northwest Scientific Association, annual meeting, Boise Idaho, March 28-31, 2012.

Micheletty, P.D.**, Goode, J., **Pierce, J.L,** and Buffington, J.M., 2011, Comparison of reach-scale morphologic adjustment in confined and unconfined alluvial mountain rivers, Olympic Peninsula, Washington, EP21C-0717, AGU Fall Meeting, San Francisco, CA, Dec. 5-9

Riley, K.E.*, **Pierce,** J.L, Hopkins, A.J.,** and Wright, G.B., 2011, Wildfires, debris flows, and climate: Using modern and ancient deposits to reconstruct Holocene sediment yields in central Idaho, EP21D-07. AGU Fall Meeting, San Francisco, CA, Dec. 5-9

Austreng, A.C.,* Olin, P.H., Hummer, A.,** **Pierce, J.L**., deGraaff. M., Benner, S.G., 2011 Carbon Sequestration in Semi-arid Ecosystems: Potential Benefits of Sagebrush Restoration B23F-08. AGU Fall Meeting, San Francisco, CA, Dec. 5-9

Poulos, M.J.*, **Pierce, J.L.,** Flores, A.N., Benner, S.G., McNamara, J.P., 2011, Valley Asymmetry and Topoclimate-Driven Feedbacks among Hillslope Hydrology, Soil Development, Vegetation, and Erosion EP31A-0793. AGU Fall Meeting, San Fransciso, CA, Dec. 5-9

Weppner, K.*, **Pierce, J.L**., Betancourt, J.L., 2011, Holocene vegetation, fire and erosional history of City of Rocks National Reserve, South-Central Idaho EP31A-0801. AGU Fall Meeting, San Francisco, CA, Dec. 5-9

Pierce, J.L., Riley, K.E., Kenworthy, M., Poulos, M.J., Weppner, K., Nelson, N., Svenson, L., 2011, What climate conditions enhance hillslope erosion in semi-arid regions? EP51C-06. AGU Fall Meeting, San Francisco, CA, Dec. 5-9

Kenworthy, M.K.*, Rittenour, T., Pierce, J.L., 2011, OSL dating without sand lenses: Late Pleistocene alluvial fan aggradation in the Lost River Range, Idaho, EP51C-05. AGU Fall Meeting, San Francisco, CA, Dec. 5-9

Riley, K.E.*, and **Pierce, J.L**.,2011, Debris flows vs. sheetfloods: How fire, vegetation and climate control erosional response in small steep basins, T-67, GSA Annual Meeting, Minneapolis MN, Oct. 9-12.

Riley, K.E.*, and **Pierce, J.L**.,2011, The role of Holocene climate change and fire-related debris flows on long-term (103-104) sediment yields in the Middle Fork Salmon River Watershed, central Idaho, 12-4, GSA Rocky Mountain and Cordilleran Joint Meeting, Logan UT, May 18–20.

Poulos, M.J.*, Flores, A.N., Benner, S.G., **Pierce, J.L.,** 2011, Valley asymmetry maps for the American cordillera reveal patterns suggestive of tectonic, lithologic, climatic and fluvial drivers, 12-1, GSA Rocky Mountain and Cordilleran Joint Meeting, Logan UT, May 18–20.

J. M. Davis, C. V. Baxter, B. T. Crosby, **J. L. Pierce**, and E. J. Rosi-Marshall, 2010, Do indirect effects of global climate change on forest, fire, and flow dynamics mediate responses of stream-riparian ecosystems? American Society of Limnology and Oceanography and the North American Benthological Society. Joint Meeting June 6-10, 2010, Santa Fe, New Mexico, USA.

Weppner, K.N.*, **Pierce, J.L.,** and Betancourt, J.L., 2010, Holocene climate, wildfire and vegetation in a forest-steppe ecotone at the City of Rocks National Reserve, Idaho, Geological Society of America Abstracts with Programs, Vol. 42, No. 5, p. 417.

Riley, K.*, **Pierce, J.L**., 2010, Fire frequency and fire-related deposition during the Holocene: a study of alluvial fans in the middle fork salmon river watershed, Idaho, Geological Society of America Abstracts with Programs, Vol. 42, No. 5, p. 417.

Sutfin, N.**, **Pierce, J.L**., Sharp, W., 2010, Estimating the age of terminal fluvial deposition on Quaternary fans of the Lost River Basin, Northern Rocky Mountains, USA, Geological Society of America Abstracts with Programs.

Kenworthy, M.K.*, Rittenour, T., **Pierce, J.L.**, 2010, OSL chronology for alluvial fans of the Lost River Range, Idaho: large-scale deposition during OIS 3 and 4, Geological Society of America Abstracts with Programs

Riley, K.E.*, **Pierce, J.L.,** and Hopkins, A.**, 2010, The role of episodic fire-related debris flows on long-term (103-104) sediment yields in the Middle Fork Salmon River Watershed, in central Idaho, EP33C-0785, presented at 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec.

Kenworthy, M.K.*, **Pierce, J.L.**, Rittenour, T., Sharp, W, Pierce, K.L, 2009, Quaternary climate change and hillslope processes: What can we learn from alluvial fans? Eos Trans. AGU, 90(52), Fall Meet. Suppl., Abstract : EP41C-0615.

Kunkel, M., and Pierce, J.L, 2009, The influence of PDO and ONI on the timing of snowmelt in Idaho, Eos Trans. AGU, 90(52), Fall Meet. Suppl., Abstract : U13B-0057.

Pierce, J.L, Baxter, C., Yager, E M, Fremier, A., Crosby, B T, Smith, A M, Kennedy, B., Hicke, J A., Feris, K., 2009, Forests, fire, floods and fish: nonlinear biophysical responses to changing climate, Eos Trans. AGU, 90(52), Fall Meet. Suppl., Abstract : U13B-0074

Poulos, M J., Pierce, J L, Flores, A N, Benner, S G, Smith, T J, McNamara, J P , 2009, Aspect-Driven Changes in Slope Stability Due to Ecohydrologic Feedbacks, Eos Trans. AGU, 90(52), Fall Meet. Suppl., Abstract : EP53D-0640

Pierce, J. L., Meyer, G.A., Nelson, N.A, Svenson, L., Riley, 2009, How does Holocene climate change drive wildfires, sediment delivery from hillslopes, and main channel response? Geological Society of America Abstracts with Programs, Vol. 41, No. 7, p. 40. *(invited)*

Pierce, J. L., Meyer, G.A., and Rittenour, T, 2009, Terrace records of Holocene incision, aggradation, and relationships between hillslope erosion and main channel processes in central Idaho, Geological Society of America Abstracts with Programs, Vol. 41, No. 7, p. 227

Kenworthy, M.K.*, **Pierce, J.L.**, Rittenour, T., 2009, Climate, sediment supply, and stream power: episodes of enhanced deposition on alluvial fans of the Lost River Range, Idaho, Geological Society of America Abstracts with Programs, Vol. 41, No. 7, p. 227.

Poulos, M J., Pierce, J L, Flores, A N, Benner, S G, Smith, T J, McNamara, J P , 2009, Microclimate Controls on Slope Angles in the Idaho Batholith, AGU Chapman Conference: Examining Ecohydrological Feedbacks of Landscape Change Along Elevation Gradients in Semiarid Regions Boise and Sun Valley, Idaho USA 4–8 October 2009.

Svenson, L.,* **Pierce, J.L.**, Wilkins, D., and Whitman, J., 2009, Fire and climate in a lodgepole-pine forest in central Idaho: annual, interannual, centennial, and millennial perspectives, Association of American Geographers Abstracts, March 22-27, Las Vegas, USA.

Pierce, J.L., Meyer, G. A., Rittenour, T., 2008, Main Channel Response to Holocene Climate Change and Hillslope Sedimentation, Geological Society of America Abstracts with Programs, ISSN 0016-7592 - Vol. 40, no. 6.

Poulos, M.J.**, **Pierce, J.L.,** Pierce, K.L, 2008, Drainage Basin Influences on Alluvial Fan Processes in the Lost River Range, Idaho, Geological Society of America Abstracts with Programs, ISSN 0016-7592 - Vol. 40, no. 6.

Meyer, G.A., **Pierce, J.L.,** Frechette, J.D., New, J. Nelson, N.A., Persico, L., 2008, Medieval-Period Droughts, Fires, Floods and Geomorphic Change In Interior Western USA Mountains, Geological Society of America Abstracts with Programs, ISSN 0016-7592 - Vol. 40, no. 6.

Kenworthy, M.K.*, Rittenour, T., **Pierce, J.L.**, 2008, Using OSL to Assess the Role of Climate and Glaciation in Sediment Delivery to Alluvial Fans of the Lost River Range, Idaho Geological Society of America Abstracts with Programs, ISSN 0016-7592 - Vol. 40, no. 6, 150-2.

McVeigh, B.E.,** **Pierce, J.L.**, Pierce, K.L., Sharp, W.D., 2008, Mapping of the Bull Lake and Pinedale Glaciations in the Lost River Range, Idaho, Based on Carbonate Coat Thicknesses of Geomorphic Features Geological Society of America Abstracts with Programs, ISSN 0016-7592 - Vol. 40, no. 6, 150-3.

Sutfin, N.A.**, **Pierce, J.L.**, Sharp; W., Pierce, K.L, 2008, Using the Thickness of Pedogenic Carbonate Coatings as a Proxy for Ages of Alluvial Fan Abandonment in the Lost River Range of Eastern Idaho, Geological Society of America Abstracts with Programs, ISSN 0016-7592 - Vol. 40, no. 6, 150-4.

Kunkel, M.A.,* **Pierce, J.L.**, 2008, Reconstructing Snowmelt in Idaho's Watershed Using Historic Streamflow Records: Methods and Applications, Eos Trans. AGU, 89(53), Fall Meet. Suppl., Abstract C21A-0492.

Weigel, A.B.* Pierson, F.B., Kormos, P.R., Williams, C. J., **Pierce J.L.**, 2008, Soil Water Repellency and Groundcover Effects on Infiltration in Response to Prescribed Burning of Steeply-Sloped Sagebrush Hillslopes. Eos Trans. AGU, 89(53), Fall Meet. Suppl., Abstract H33D-1036.

Pierce, J.L., Rittenour, T., Meyer, G.A., 2008, (INVITED) Relationships between main channel incision and increased sediment yields following forest fires: is climate the driver? Geological Society of America, sectional meeting, Las Vegas, NV.

Kunkel, M.A.*, **Pierce, J.L.**, 2008, Snowmelt, Summer Drought and Fire: Using Stream Gage Data to Extend Snowmelt Records in Fire Prone Areas of Idaho's Watershed, *Western Snow Conference*, April 15-17, Hood River, Oregon

Pierce, J.L., Meyer, G.A., 2008, (INVITED) Modern and Long-term Records of Climate Change and Forest Fires in the Western U.S., American Society of Environmental History National Annual Conference, Boise, Idaho.

Pierce, J. L., Phillips, R. J., Rittenour, T., Sharp, W. D., Pierce, K. L., 2007, What climatic factors control intervals of deposition and stability on alluvial fans? *Geological Society of America Abstracts with Programs,* Vol. 39, No. 6, P. 261.

Meyer, G, Frechette, J. D., New, J. K., **Pierce, J. L.,** 2007, Fire, climate, and fans. *Geological Society of America Abstracts with Programs,* Vol. 39, No. 6, p. 259.

Nelson, N.A.,* **Pierce, J.L**, 2007, Alluvial fan records of fire and geomorphic response in rangeland ecosystems. *Geological Society of America Abstracts with Programs,* Vol. 39, No. 6, p. 259.

Kunkel, M.A.,* **Pierce, J.L**., 2007, Snowmelt, Summer Drought and Fires: Using Stream Gage Data to Extend Snowmelt Records in Fire-prone Areas of Central Idaho. *Eos Trans. AGU, 88*(52), Fall Meet. Suppl., Abstract C33A-03.

Phillips, R. J., **Pierce, J.L.,** Sharp, W.A, and Pierce, K.L., 2006, Climatic and Tectonic Controls on Alluvial Fan Evolution: The Lost River Range, Idaho, American Geophysical Union Abstracts with Programs.

Kunkel, M.A.,* and. **Pierce, J. L,,** 2006, The Influence of ENSO and PDO on Idaho's Snowpack, American Geophysical Union Abstracts with Programs.

Nelson, N.A.,* and. **Pierce, J. L,,** 2006, Spatial Patterns of Post-Fire Soil Water Repellency in Rangelands, American Geophysical Union Abstracts with Programs.

Pierce, J.L., and Meyer, G.A., 2006, Late Holocene records of fire in alluvial fan sediments: fire-climate relationships and implications for management of rocky mountain forests,
Meyer, G. A. **Pierce, J. L,** New, J., and Frechette, J., 2006, episodic erosion forced by fire and climate in the Western United States, Geological Society of America Abstracts with Programs.

Pierce, J.L., and Meyer, G.A., 2006, Holocene Fire Regimes and Geomorphic Response in Conifer Forests of the Northwestern United States: Evidence of Millennial-Scale Climate Change, International Quaternary Association Abstracts with Programs, XIX AMQUA Biennial Meeting August 18-20.

Pierce, J.L., and Meyer, G.A., 2006, Droughts, forest fires, and erosion in the Northern U.S.A. Rockies during the last two millennia, Pacific Climate of North America, Twenty-Second Pacific Climate Workshop, 26-29 March.

Pierce, J.L., and Rittenour, T., 2005, Terrace records of Quaternary incision and relationships between hillslope erosion and main channel processes in Central Idaho, American Geophysical Union Abstracts with Programs.

Pierce, J.L., and Meyer, G.A., 2005, Drought, forest fires, and debris flows: modern and 800-1000 cal yr BP, Geological Society of America Abstracts with Programs, Vol. 37, No. 7, p. 464.

Pierce, J.L., 2005**,** Climate-driven variations in Holocene fire regimes and geomorphic response in central Idaho, Association of American Geographers Meeting, Denver, April 5-9.

Pierce, J.L., and Meyer, G.A., 2005, Alluvial fan records of climate-driven variability in Holocene fire regimes in ponderosa pine forests of central Idaho, Fire History and Climate Synthesis in the Western United States, Workshop Flagstaff Arizona, May 1-3.

Pierce, J.L., and Meyer, G.A., 2005, Debris flows, fires, and channel disturbance: a millennial-scale perspective, Joint meeting of the American Geophysical Union and the North American Benthological Society, New Orleans May 22-27.

Pierce, J.L., Meyer, G.A., 2004, Fire, Holocene Climate Change, and Geomorphic Response Recorded in Alluvial Fan Sediments, American Geophysical Union Abstracts with Programs, vol. 85(47), Abstract B44C-06.

Pierce, J.L., Meyer, G.A., 2004, The Effects of Holocene Climate Change on Fire Regimes in Idaho Ponderosa Pine Forests, Geological Society of America Abstracts with Programs, Vol. 36, No. 4, p. 13.

Pierce, J.L., Meyer, G.A., 2003, A Record of Extreme Sedimentation Events in Central Idaho: Fire, Climate, and Changing Sediment Yields Over the Holocene, American Geophysical Union Abstracts with Programs, vol. 84(46) Abstract H42L-03.

Pierce, J.L., Meyer, G.A., 2003, Holocene fire regimes and geomorphic response in conifer forests of the northwestern United States: evidence of millennial-scale climate change, International Quaternary Association Programs with Abstracts, vol. 16, p. 192.

Pierce, J.L., Meyer, G.A., and Jull, A.J.T., 2002, Variability of fire regimes in ponderosa pine forests, Geological Society of America Abstracts with Programs, v. 34, p. 41.

Pierce, J.L., and Meyer, G.A., 2002, Holocene Forest Fire Records as Evidence of Millennial-Scale Climate Change in the Northwestern United States: American Geophysical Union Abstracts with Programs, vol. 83, p. 265.

Pierce, **J.L**., Meyer, G.A., 2001, Using evidence of fires in alluvial fan stratigraphy to interpret variations in Holocene fire regimes in central Idaho, Geological Society of America Abstracts with Programs, v.33, p.69

Pierce, **J.L**., Meyer, G.A., and Wood, S.H., 2000a, Fires, storms, and erosional events in the Idaho Batholith: Geological Society of America Abstracts with Programs, v.32, p.118

Pierce, **J.L**., Meyer, G.A., and Wood, S.H., 2000b, Processes, magnitude, and timing of fire-related sedimentation events in the western Idaho Batholith: American Geophysical Union Abstracts with Programs, v. 81, p.497.

Pierce, **J.L**., 1999, Dredge mining effects on channel adjustment: Granite Creek, eastern Oregon: Geological Society of America Abstracts with Programs, v.31, p.253

Pierce, **J.L**., 1999, Geomorphic response to historic dredge mining: planimetric and cross-sectional channel changes of Granite Creek, eastern Oregon: American Geophyical Union Abstracts with Programs, v. 80, p. 488.

AWARDS AND GRANTS

2015 An integrated study of post- fire wind and water erosion in western rangelands. Funding Agency: NSF RAPID PI Pierce, J.L., Co PIs Glenn, Nancy, Yager, Elowyn: Amount $46636.

2015 Communities at Risk: Hazards from post-wildfire erosion in the Boise Wildland Urban Interface. Funding Agency: Murdock Foundation. PI Pierce, J.L. Amount $15,000.

2014 Reynolds Creek Critical Zone Observatory, Hypothesis testing and model parameterization of soil respiration across a range of experimentally altered hydroclimates to enable predictions of ecosystem carbon balance in a changing climate, Determining interactive effects of climate induced changes in precipitation regime on soil microbial community structure and function. Funding agency: NSF CZO. Funding amount: $610,628.

2011 The role of Holocene climate change and episodic fire-related sedimentation on long-term (103-104) sediment yields in the Middle Fork Salmon River Watershed, in central Idaho. Funding Agency: NSF EPSCoR PI: Pierce, J.L., Co PIs: Crosby, Ben; Baxter, Colden; Yager, Elowyn; Flores, Lejo. Amount Awarded: **$19,901**

2011 Examining centennial-scale linkages among climate, wildfire, and land-use at the City of Rocks National Reserve. Funding agency: U.S. Park Service. PI. Pierce, J.L. Collaborators: Bastis , Kristen (USPS). Amount requested: $51,139

2011 WSC-Category 2 Collaborative Research: Tracking climate perturbations through the coupled pathways of water and ecosystem services in the intermountain west. PI: McNamara, Jim (Pierce, co-PI). Funding Agency: NSF. Amount requested: $3,832,797

2010 Rangeland Ecosystems: carbon storage, vegetation change, and climate. S. Benner and J. Pierce (co-PIs). $**292,600**

2008 Idaho EPSCoR RII: Water Resources in a Changing Climate V. Walden (P.I.) and many others **$15 million** amount awarded to **J. Pierce**, **$283,000.**

2008 Fire and erosion in rangeland ecosystems **J. Pierce (P.I.)**, S. Benner, N. Glenn, M. Germino, L. Vierling, S. Bunting, Bureau of Land Management **$492,000.**

2007 Assessing climatic controls on intervals of stability and deposition on alluvial fans **J. Pierce (P.I.)**, T. Rittenour, W. Sharp, K. Pierce, National Science Foundation: Geomorphology and Land Use Dynamics **$134,914**.

2007 Fire and Disturbance in the Sawtooths, **J. Pierce (P.I.)**. U.S. Fish and Wildlife, **$15,817.**

2006 Fire and Disturbance in the Sawtooths **J. Pierce (P.I.)**. U.S. Fish and Wildlife **$10,000.**

2006 Drought, fire and timing of snowmelt in central Idaho **J. Pierce (P.I.)** J. McNamara, C. Whitlock. Department of Energy – INRA (Inland Northwest Research Alliance) **$ 62,506**.

2006 Past Records of Fire and Disturbance for the Sawtooth National Recreation Area **J. Pierce (P.I.)** J. Whitman-Meridian Academy High School. M.J. Murdock Charitable Trust, Partners in Science Awards **$15,000**.

2006 Cesium signature detection, **J. Pierce (P.I.)** S. Benner, M. Schmitz Idaho National Laboratories, $**51,624**.

2005 Henry's Fork Watershed Council grant for research within the watershed, R. Van Kirk (P.I.) **J. Pierce** $**5,000.**

2004 V.C. Kelley Outstanding Doctoral Candidate of the Year Scholarship **$2500.**

2004 Outstanding Geoscience Student Award, Association for Women Geoscientists, Denver Chapter

2001 J. Hoover Mackin Award Honorable Mention, Quaternary Geology and Geomorphology Division of the Geological Society of America.

2001 Geological Society of America award for graduate research ($1,975).

2001 Author, NSF-Research Opportunities for Undergraduates grant for supporting undergraduate field assistants ($3600).

2000 Best Talk Award, Annual American Geophysical Union Conference, Wildfires and Surfical Processes Session.

1999 Chrysalis Award for Graduate Research, Association of Woman Geoscientists.

1995 Thomas J. Watson Fellowship Award--$16,500 award for individual research on the environmental effects of mining operations in China, Indonesia, and Australia.

1995 Woman Geoscientist of the Year at the Colorado College --Association for Woman Geoscientists.

1995 Outstanding Geology Student of the Year at the Colorado College--Eastwing Award.

WORK AND TEACHING EXPERIENCE

2010-present Associate Professor, Boise State University Dept. of Geosciences. Courses: Geomorphology, Advanced Geomorphology, Climate Change, Field Geology. Primary advisor for seven masters students, co-advisor for one PhD student.

2005- 2009 Assistant Professor, Boise State University Dept. of Geosciences. Courses: Geomorphology, Advanced Geomorphology, Climate Change, Field Geology. Primary advisor for seven masters students, co-advisor for one PhD student.

2005 Assistant Professor, Idaho State University Dept. of Geosciences. Courses: Physical Geography (taught as Earth Systems Science), Advanced Geomorphology: Geomorphology and Salmon. Main advisor for one master's student, and serving on committees for two other students. Member of the ISU Watershed Science Consortium, and co-director of the new Earth and Environmental Science Program (to be implemented in Fall, 2006).

2003 Teaching assistant for UNM field camp (summer) and Geomorphology (fall). Assisted student mapping projects for summer field camp and 400/500 level geomorphology course.

2003 Instructor, Geomorphology, Dept. of Geosciences, Boise State University. Taught 300-level geomorphology. Prepared lab and lecture material, led course field trips, advised students for GSA geomorphology projects.

2000-2003 Research Assistant, Dept. of Earth and Planetary Science, Univ. of New Mexico. NSF-funded research for dissertation.

1999 Instructor, Geomorphology. Dept. of Geography, University of Oregon. Prepared lecture and labs for the 300 level summer course in geomorphology.

1997-2000 Research and Teaching Assistant, Dept. of Geography, Univ. of Oregon. Courses assisted include physical geography, geomorphology, cartography, human geography, and geography of the post-Soviet states.

1997 Research Assistant, Mineral Policy Center, Washington DC. Researched environmental effects of hard-rock mining operations in the United States, Lobbied for reform of the 1872 Mining Law to the U.S. Congress.

1996-1997 Riparian Specialist, American Water Resource Company, Hailey Idaho. Conducted analysis of riparian and floodplain areas adjacent to the urban interface, and designed and installed bank stabilization structures.

1995-1996 Fellow, Thomas J. Watson Foundation. --$16,500 award for one year of individual research on the environmental effects of mining operations in China, Indonesia, and Australia.

1994-1995 Researcher, KECK Foundation. Described and classified the mineralogy of Ferricrete Samples in the New World Mining District of Montana.

INVITED PRESENTATIONS, FIELD TRIPS, AND SPECIAL MEETINGS

2015 Invited speaker for Geological Society of America Meeting, Baltimore MD Nov. 1-4.
2015 Invited speaker for 'Restoring the West' conference, Logan Utah, Oct. 28-29.

2015 Invited speaker for Geologists of Jackson Hole, Jan. 25,

2015 Invited field trip leader for Idaho Conservation League's 'Wild Idaho' Conference, Sawtooth Valley Idaho, May 23-24.

2013 Invited panelist, Idaho Public Television, Sept.
2012 Invited speaker for Bi-annual American Quaternary Association, Duluth, MN, June 21-24.
2012 Invited panelist "Connecting Science to Policy: The Issue of Climate Change," Boise State University, March 5, 2012

2011 Invited speaker, Idaho State Legislature, March 15th, 2011, "Effects of climate change on Idaho's agricultural production."

2010 Invited speaker for Idaho Conservation League's 'Wild Idaho' Conference, Sawtooth Valley Idaho, May 21-22.

2010 Invited speaker 'Climate Change: Past, Present and Future' for Boise State University Earth Day, April 20, 2010.

2009 K-12 McCall Outdoor Science School Field Instructor (Geology) July 9-10. 2009.

2009 Field Trip leader and invited speaker for Idaho Conservation League's 'Wild Idaho' Conference, Sawtooth Valley Idaho, May 15-17.
2009 Idaho State Legislature, Senate Committee on Agricultural Affairs, Invited Speaker "How will future climate change affect Idaho?" March 10, 2009.

2009 U.S. Geological Survey, invited speaker "Climate change and wildfires in Idaho's Forests" March 10, 2009.

2008 Field trip co-leader" Geology of Table Rock" (Saturday field trip for the community, sponsored by the Geology Student Club). Venue: Table Rock, Boise Idaho November 8, 2008.

2008 Boise State University, Department of Geosciences Seminar Series, Invited Seminar "What Drives Holocene Intervals of Incision and Aggradation of Mountain Stream Channels?" October 13, 2008

2008 "Records of Past Forest Fires and Climate Change " Department of Geology, University of Montana, Missoula Montana, October 26, 2008.

2008 Invited speaker for 'Project Learning Tree', (summer education for Idaho K-12 teachers) *Fire and climate in Idaho's ecosystems: Lessons from the past and implications for the future.*, June 19, 2008

2008 Field Trip leader and invited speaker for Idaho Conservation League's 'Wild Idaho' Conference, Sawtooth Valley Idaho, May 17-18 2008.

2008 Presentation to State of Idaho House of Representatives, Environment, Energy and Technology Committee, *Changing climate patterns in Idaho* February 12, 2008.

2008 "Changing Climate Patterns in Idaho" American Society of Fisheries National Annual Conference. Venue: Feb. 6-8, Post Falls, Idaho

2008 "Forest Fires and Changing Climate Patterns in Idaho" New Horizons in Education, KBSU Radio broadcast, with Dr. Bob Kustra. Venue: Radio broadcast January 18.

2008 "Modern and Long-term Records of Climate Change and Forest Fires in the Western U.S." American Society of Environmental History National Annual Conference, Boise Idaho.

2008 "Forest Fires and Changing Climate Patterns in Idaho" U.S. Fish and Wildlife Service, May 15, Boise Idaho.

2008 Invited speaker for Geological Society of America regional meeting, Las Vegas NV, March 23, 2008

2007 Field Trip leader and invited speaker for Idaho Conservation League's 'Wild Idaho' Conference, Sawtooth Valley Idaho, May 25 2007

2007 Invited Panelist, "Land Management: Changes in our Local Environment" Idaho Environmental Forum Fourth Annual Boise River Conference - Aug. 8, 2007.

2007 Panelist for 'Dialogue' Idaho Public Television program on Wildland Fire, September 13, 2007.

2007 Invited speaker, "Fire and Climate Change" for Boise National Forest District Rangers, November 13, 2007.

2007 Invited speaker, Sigma Xi, Boise State University Chapter, April 23rd, 2007

2007 Invited speaker,University of Idaho, "What Will Climate Change Mean For Idaho And The Interior West?" online webcast.

2007 Invited speaker for the annual meeting of the Society for American Foresters, C'oeur D'Alaine, Idaho

2007 Invited speaker for Geosciences seminar series, University of Idaho.

2006 Invited speaker for the 3rd International Congress of Wildland Fire, San Diego California.

2006 Invited speaker for the International Quaternary Association meeting, Bozeman, Montana

2006 Invited speaker for the Pacific Climate of North America meeting, Monterey California

2006 Invited speaker for the University of Idaho College of Natural Resources seminar series

2005 Invited speaker for the Boise State University Department of Anthropology seminar series

2005 Invited speaker for the Western States Seismic Policy Council Annual Conference, Boise Idaho

2005 Invited participant, "Fire History and Climate Synthesis in the Western United States" workshop May 1-3, Flagstaff Arizona.

2004 Invited speaker for the Idaho State University Department of Biology seminar series

2004 Field trip co-leader, May 2004 Rocky Mountain/Cordilleran GSA meeting, Boise Idaho. Field trip title: "Fire and Ice in Central Idaho: Modern and Holocene Fires, Debris Flows, and Climate in the Payette River Basin, and Quaternary and Glacial Geology in the Sawtooth Mountains."

2003 Field trip leader and organizer, fall 2003 Friends of the Pleistocene field trip (Rocky Mountain Cell). Organized 3-day field trip for ~75 participants, presented results of research, and compiled and edited informal field trip guide.

2002 Invited participant, "Fire and Aquatic Ecosystems" meeting, Boise Idaho.

PROFESSIONAL AND COMMUNITY SERVICE

2011

- Co-convener of special session at the fall 2011 AGU meeting entitled, "Climate Change and Landscape Response I, II &III" co-sponsored by Atmospheric Sciences (A), Global Environmental Change (GC), Paleoceanography and Paleoclimatology (PP). This session had ~50 submissions and four invited speakers.
- Co-convener of special session at the spring 2011 NSF EPSCoR meeting entitled, "Climate Change and Landscape Response ," Albuquerque New Mexico.

- Reviewer for Geological Society of America (journal) and the National Science Foundation (proposals)

- Instructor: McCall Outdoor Science School Teacher Institute, June 23-June 26, 2011. Instructed ~60 K-12 teachers about forest fires in Idaho, and educational methods for learning about fires.
- Volunteer: "FIRE Up Your Summer!" June 11th , 2011, Foothills Learning Center, Boise Idaho, assisted with fire education day led by Kerry Riley (BSU MS student) for ~40 community members.
- Committee Member: Boise State University Science Competition Day organizational committee
- Committee Member: Boise State University Graduate Curriculum committee
- Reviewer: GSA Bulletin, NSF

2010

- Committee Member: Boise State University Science Competition Day organizational committee
- Co-advisor (with Viskupic) for the student Geoclub
- Elected Board Member, Quaternary Geology and Geomorphology Division of the Geological Society of America
- Elected Board Member, Idaho Conservation League
- Reviewer: Quaternary Research, Quaternary Science Reviews, National Science Foundation

2009

- New Murdock charitable trust funded project with Meridian High School (Jeremy Whitman, PI; Wilkins, and Pierce, co-collaborators) will use dendrochrology as an educational tool for K-12 student education.

- K-12 McCall Outdoor Science School Field Instructor (Geology) July 9-10. 2009. Overnight field trip to the South Fork Payette River with ~15 K-12 students. Primary instructor, field geology and geomorphology.

- Field Trip leader and invited speaker for Idaho Conservation League's 'Wild Idaho' Conference, Sawtooth Valley, Idaho, May 15-17.

- Committee Member: Science Competition Day organizational committee (Geosciences representative).

- Co-advisor (with Viskupic) for the student Geoclub

- Elected Board Member, Quaternary Geology and Geomorphology Division of the Geological Society of America
- Reviewer, National Science Foundation
- Reviewer, Geological Society of America Bulletin

2008

- Primary Organizer and Presenter for "Focus the Nation" a two-day, national event to promote education about climate change. Venue: Boise State University, January 30-31, 2008. Primary Coordinator and committee chair for Focus the Nation at Boise State University. Boise State University participated in a nation-wide 'Focus the Nation' event on January 31st, 2008. This event included two days of organized lectures and presentations on global change, a business symposium, a research symposium, a climate change art contest, individual carbon footprint calculation booths, calculation of the university's carbon footprint, and a roundtable discussion with community leaders about local solutions to climate change. (Because this event took place in 2008, I will summarize the outcomes of the event in next year's tenure packet. The bulk of the organization and effort, however, took place in 2007).
- Field trip co-leader" Geology of Table Rock" (Saturday field trip for the community, sponsored by the Geology Student Club). Venue: Table Rock, Boise Idaho November 8, 2008.

- Committee Member: Science Competition Day organizational committee (Geosciences representative).
- College of Arts and Sciences Promotion and Tenure committee
- Elected Board Member, Quaternary Geology and Geomorphology Division of the Geological Society of America
- National Science Foundation proposal review panel member, EAR, November 11-November 15, 2008.
- Reviewer, National Science Foundation
- Reviewer, Geological Society of America Bulletin
- National Science Foundation proposal review panel member, EAR, November 11-November 15, 2008.

STUDENT ADVISING

2011-2012

- Graduate Student Advising:
    a. Primary advisor: Mike Poulos (MS), Kerry Riley (MS), Kerrie Weppner (MS), Megan Kenworthy (MS), Annika Quick (PhD)

b. Committee Member: Andrew Austrang (MS), Mel Kunkel (PhD), Ricci Loughridge (MS), Ryan Warden (MS), Brian Stark (MS)

- Undergraduate Student Advising
  a. Paul Micheletti (Senior Capstone Advisor)
  b. Kara Ferguson (Senior Capstone Advisor)
  c. Dawn Jarrells (Undergraduate Research Advisor)

- High School Student Advising:
  a. Alex Baca (Treasure Valley Math and Science, internship advisor)

Jay D. Carlisle, Ph.D.
Research Director, Intermountain Bird Observatory
Research Assistant Faculty, Department of Biological Sciences
Boise State University
Boise, ID 83725
208-426-5203 (Office)
jaycarlisle@boisestate.edu

EDUCATION

Undergraduate Institutions:	**Major**	**Degree and Year**
Sterling College, Craftsbury Common, VT	Natural Resources	
Audubon Expedition Institute, Belfast, ME	Environmental Education	
The Evergreen State College, Olympia, WA	Ecology	B.S. 1995
Graduate Institution:		
University of South Dakota, Vermillion, SD	Biology	Ph.D. 2005

SKILLS AND QUALIFICATIONS

Communication Skills: For many years I have focused on developing effective communication skills (*written and oral, including listening skills*), with applications to teaching, advising, personnel management, and other aspects of my professional and personal life. This includes taking great joy in sharing natural history, scientific research, and other ecological issues with students and the general public.

Field Research and Experimental Design: I have performed professional field work in various capacities in each year since 1993 in many states and I feel very comfortable in a variety of field situations. I have designed and executed many research projects in addition to my PhD research.

APPOINTMENTS AND OTHER RELEVANT EXPERIENCE

Coordinator, Idaho Bird Conservation Partnership. **2011-**

Assistant Research Faculty, Department of Biological Sciences, Boise State University, Boise, ID. **2011-**

Research Director, Intermountain Bird Observatory, Boise State University, Boise, ID. **2005-**

Conservation Director, Harris Ranch, Boise, ID. **2008-09** (*part-time*)

Instructor, University of South Dakota, Department of Biology. **2005**

Crew Leader / Biological Technician / Field Assistant / Education Intern. **1992-1999**, variety of seasonal positions in many states covering breeding, migration, and winter projects and a wide variety of methods

Travel in Latin America and functionality in Spanish: Argentina, Costa Rica, Guatemala, Mexico, Panama, Peru, and Venezuela; includes 1 month of language school in Guatemala

PUBLICATIONS

Scholer, M. N., B. Martin, M. Ferrer, A. Onrubia, M. J. Bechard, G. S. Kaltenecker, and **J. D. Carlisle**. *In press* (2015). Variable shifts in the autumn migration phenology of soaring birds in southern Spain. ***Ardea.***

Miller, R. A., A. Onrubia, B. Martin, G. S. Kaltenecker, **J. D. Carlisle**, M. J. Bechard, and M. Ferrer. *In press* (2015). Local and regional weather patterns influencing post-breeding migration counts of soaring birds at the Strait of Gibraltar, Spain. ***Ibis.***

Ware, H. E., C. J. W. McClure, J. D. Carlisle, and J. R. Barber. 2015. A phantom road experiment reveals traffic noise is an invisible source of habitat degradation. ***Proceedings of the National Academy of Sciences*** 112:12105-12109.

Jeffries, M. I., R. A. Miller, M. D. Laskowski, and **J. D. Carlisle**. 2015. High Prevalence of *Leucocytozoon* Parasites in Nestling Northern Goshawks (*Accipiter gentilis*) in the Northern Great Basin, U.S.A. ***Journal of Raptor Research*** 49:294-302.

Pollock, J., **J. D. Carlisle**, C. Runco, and G. Kaltenecker. 2015. Increasing capture frequency for Flammulated Owls and Northern Saw-whet Owls during fall migration. ***Journal of Raptor Research*** 49:88-92.

Miller, R. A., **J. D. Carlisle**, N. Paprocki, G. S. Kaltenecker, and J. A. Heath. 2015. Annual variation in autumn migration phenology and energetic condition at a stopover site in the western United States. Pp. 177–191 *in* E. M. Wood and J. L. Kellermann (editors), Phenological synchrony and bird migration: changing climate and seasonal resources in North America. ***Studies in Avian Biology*** 47, CRC Press, Boca Raton, FL.

Miller, R. A., **J. D. Carlisle**, and M. J. Bechard. 2014. Effects of prey abundance on breeding season diet of northern goshawks (*Accipiter gentilis*) within an unusual prey landscape. ***Journal of Raptor Research*** 48:1-12.

McClure, C. J. W., H. E. Ware, **J. Carlisle**, G. Kaltenecker, and J. R. Barber. 2013. An experimental investigation into the effects of traffic noise on distributions of birds: avoiding the phantom road. ***Proceedings of the Royal Society B*** 280 (1773):20132290.

Miller, R. A., **J. D. Carlisle**, M. J. Bechard, and D. Santini. 2013. Predicting nesting habitat of Northern Goshawks in mixed aspen-lodgepole pine forests in a high-elevation shrub-steppe dominated landscape. ***Open Journal of Ecology*** 3:109–115. doi:10.4236/oje.2013.32013.

Carlisle, J. D., K. L. Olmstead, C. H. Richart, and D. L. Swanson. 2012. Food availability, foraging behavior, and diet of autumn landbird migrants in the Boise Foothills of southwestern Idaho. ***Condor*** 114:449-461.

Carlisle, J. D. 2012. Irruptive migration of Chestnut-backed Chickadees to southwestern Idaho. ***Western Birds*** 43:12-20.

Smith, J. P., J. P. Delong, L. L. Leppert, S. L. Stock, G. S. Kaltenecker, and **J. D. Carlisle**. 2012. Morphometric variation in Flammulated Owls captured during autumn migration in the western United States. ***Journal of Raptor Research*** 46:109-120.

Spotswood, E. N., K. R. Goodman, **J. D. Carlisle**, J. Rousseau, R. L. Cormier, D. Humple, S. L. Guers, and G. G. Barton**.** 2012. How safe is mist netting? Evaluating the risk of injury and

mortality to birds. ***Methods in Ecology and Evolution*** 3:29-38. doi: 10.1111/j.2041-210X.2011.00123.x.

Miller, R. A., **J. D. Carlisle**, and G. S. Kaltenecker. 2011. Impacts of regional cold fronts and localized weather phenomena on autumn migration of raptors and landbirds in Southwest Idaho, USA. ***Condor*** 113:274-283.

Carlisle, J. D., S. K. Skagen, B. E. Kus, C. van Riper III, K. L. Paxton, and J. F. Kelly. 2009. Landbird migration in the American West: recent progress and future research directions. ***Condor*** 111:211-225.

Carlisle, J. D., G. S. Kaltenecker, and R. S. Brady. 2007. Status of Broad-winged (*Buteo platypterus*) and Red-shouldered Hawks (*B. lineatus*) during autumn migration in southwestern Idaho, 1995-2006. ***Western Birds*** 38:251-260.

Carlisle, J. D., C. H. Trost, S. L. Stock, and G. S. Kaltenecker. 2006. Autumn landbird communities in the Boise Foothills and Owyhee Mountains of southwestern Idaho compared by mist net captures. ***Western Birds*** 37:215-227.

Stock, S. L., P. J. Heglund, G. S. Kaltenecker, **J. D. Carlisle**, and L. L. Leppert. 2006. Comparative ecology of the Flammulated Owl and Northern Saw-whet Owl during fall migration. ***Journal of Raptor Research*** 40:120-129.

Carlisle, J. D., and R. L. Holberton. 2006. Relative efficiency of fecal versus regurgitation samples for assessing diet and deleterious effects of a tartar emetic on migratory birds. ***Journal of Field Ornithology*** 77:126-135.

Gentry, D., D. L. Swanson, and **J. D. Carlisle**. 2006. Species richness and nesting success of migrant songbirds in natural river corridors and anthropogenic woodlands in southeastern South Dakota. ***Condor*** 108:140-153.

Carlisle, J. D., G. S. Kaltenecker, and D. L. Swanson. 2005. Molt strategies and age differences in migration timing among autumn landbird migrants in southwestern Idaho. ***Auk*** 122:1070-1085.

Carlisle, J. D., G. S. Kaltenecker, and D. L. Swanson. 2005. Stopover ecology of autumn landbird migrants in the Boise Foothills of southwestern Idaho. ***Condor*** 107:244-258.

Carlisle, J. D., and C. J. Ralph. 2005. Towards the establishment of landbird migration monitoring networks in the United States. *In* C.J. Ralph and T. Rich (eds.) Third International Partners in Flight Conference, March 20-24, 2002, Asilomar Conference Grounds, California. USDA Forest Service Gen. Tech. Rep. PSW-GTR-191.

Carlisle, J. D., S. L. Stock, G. S. Kaltenecker, and D. L. Swanson. 2004. Habitat associations, relative abundance, and species richness of autumn landbird migrants in southwestern Idaho. ***Condor*** 106:549-566.

Carlisle, J. D. 2004. Considering the potential importance of western montane habitats during autumn landbird migration. Pages 10-11 *in* Skagen, S. K., Melcher, C. P., and Hazlewood, R. (eds.) 2004. Migration stopover ecology of western avian populations: A southwestern migration workshop. U. S. Geological Survey, Biological Resources Discipline, Open-File Report 2004-1452, 29 p. http://www.fort.usgs.gov/products/publications/21409/21409.pdf

Carlisle, J. D., H. S. Hoff, and P. M. Mabee. 2004. Breeding bird inventory of Spirit Mound Historic Prairie in Clay County – an area being restored to tallgrass prairie. ***South Dakota Bird Notes*** 56:32-41.

COMMUNITY AND SYNERGISTIC ACTIVITIES

- **Coordinator** for **Idaho Bird Conservation Partnership**
    - Promoting better communication and cooperation among the state's natural resource agencies, universities, NGOs, and individuals for coordinating research and conservation.
- **Education** and **community outreach** in association with research activities (20+ years).
    - Hands-on education to thousands of people aged 5 to 85 and mentoring over 150 students (mostly undergraduate), young biologists, and volunteers in conservation-related science.
- **Organized/co-chaired two symposia**:
    - "***Networks for Monitoring Landbird Migration***" at 3rd International Partners in Flight meeting (March 2002; Monterey, California).
    - "***Migration Across the Diverse Western Landscape: Recent Progress, the Importance of Riparian and Other Habitats, and Future Directions***" at 77th Cooper Ornithological Society meeting (June 2007; Moscow, Idaho).
- **Reviewer** for many journals including: The Auk, The Condor, Journal of Field Ornithology, Northwestern Naturalist, Ornitologia Neotropical, and Wilson Journal of Ornithology
- **Lead bird-watching field trips** for local birding clubs (Golden Eagle Audubon Society and Southwest Idaho Birder's Association) and help **compile the Boise Christmas Bird Count**
- Voting member of the **Idaho Bird Records Committee** (http://idahobirds.net/ibrc/ibrc.html)

CURRICULUM VITAE for MATTHEW J. GERMINO

USGS Forest and Rangeland Ecosystem Science Center
Great Basin Landscape Conservation Cooperative
Email: mgermino@usgs.gov, Ph: 208-426-3353
(Shortened version, September 2014)

EDUCATION

PhD Botany, 2000	University of Wyoming, Laramie
MS Botany, 1996	University of Wyoming, Laramie
BS Environmental Science, 1994	University of Massachusetts, Amherst

APPOINTMENTS

Supervisory Research Ecologist (GS 13/7)	2011-present, United States Geologic Survey Forest and Rangeland Ecosystem Science Center Snake River Field Station, Boise ID
Affiliate/Adjunct Professor	2011-present, Idaho State University, Boise State University, University of Idaho
Professor (Asst., T&P to Asso. then Full)	2001-2011 Department of Biological Sciences, Idaho State University, Pocatello ID
Postdoctoral	2000-2001, Montana State University
Research Associate	1998-2000, Wake Forest University, NC
GIS Specialist	1996-1998, University of Wyoming
Teaching Assistant	1994-1996 University of Wyoming
Research Assistant	1993 Hubbard Brook Ecosystem Study
Research Assistant	1992 USFS/Univ of Massachusetts Ozone Project

GRADUATE TEACHING (past, 500 or greater level is graduate, "g" denotes grad/undergrad crosslisting)

Field Ecology	BIOL 489g,	4 cr, Spring every year
Plant Form & Function	BIOL 408g,	3 cr, Fall alternating years, co-taught
Plant Physiology	BIOL 404gL,	4 cr, Fall every year
Topical Grad Seminars	BIOL 418g,692,	1-2 cr, Spring every year

Recent rotations included Plant Ecology (3 cr, BIOL 409g), Physiological Ecology (4 cr, BIOl 307), Environmental Physiology (3 cr, BIOL 607), GIS and remote sensing classes (variable credit). Ecotopic and graduate seminars offered on topic like Ecosystem Ecology, Fire Ecology, Ecohydrology, and Resource Ecology.

GRANTS

Competitive grants funded since 2006 (½ of grant support shown, total>$2M)

Germino MJ. Subalpine and Alpine Species Range Shifts with Climate Change. 2012. DOE PER, $120,000/3 yr to MJG ($650,000 total)

Germino MJ. Effects of Genotype and Management Treatments of Native and Invasive Herbs on Success of Sagebrush Restoration, 2013. US Fish and Wildlife Service, Great Basin Landscape Consevation Cooperative, $31,000/2 yr

Hardegree S, Abatazglou J, Brunson M, Germino MJ 2012. Weather data and forecasting applications for management of ecological site transitions. USDA AFRI Rangelands Program, $120,000/3yr to MJG, ($450,000 total)

Germino MJ. 2012. Sagebrush Ecosystems in a Changing Climate. Northwest Climate Science Center, $120,000/2 yr.

Germino MJ. 2011, 2012. Selecting sagebrush seed sources for restoration in a variable climate: ecophysiological evaluation of common gardens. Great Basin Native Plant Selection and Increase Project. $30,000/1yr + 47,000/2yr.

Germino MJ, Chambers J, Brown C. Exotic Bromus grasses in agroecosystems of the western US: REEnet synthesis of current and future invasions, impacts, and management USDA AFRI, $200,000/4 yr.

Germino MJ and others. 2008. Climate and water, Research Infrastructure Improvement Grant. $275,000/5 yr to MJG. NSF EPSCoR

Maschner H, Germino MJ, Rosentreter R, McCurry M. 2007. MRI: Acquisition of Mass Spectrometers and Related Equipment to Create the ISU Interdisciplinary Lab for Elemental and Isotopic Analysis (ILEIA), $587,410 ($350K to IRMS used by MJG)

Glenn N, Germino MJ. 2007. Data fusion for remote surveillance of wind erosion in semiarid landscapes. DOD EPSCOR. $360,000/3 yr (1/2 to MJG)

Germino MJ, Graumlich LJ, Littell J, Mantua N. 2007. Climatic and biotic co-limitation of conifer establishment at treelines: addressing uncertainty in bioclimatic model forecasts of forest change. DOE National Institute for Climate Change Research. $335,000/3 yr ($130K to MJG)

Germino MJ, Horton JL, Marshall JD, Huntly NJ, Inouye R. 2006. Land use effects on persistence of exotic forbs in sagebrush steppe: Are loss of foundation species and disruption of soil resource partitioning causal links? USDA NRI Biology of Weedy and Invasive Plants. $325,000/3 yr (current) ($245K to MJG)

Germino MJ. 2006-2008. Evapotranspiration of constructed sagebrush-steppe communities at INL. Stoller Corp/DOE, $80,000/3 yr

Germino MJ. 2006. Carbon balance of tree seedlings at treeline. Andrew Mellon Foundation, $50,000/2 yr.

PUBLICATIONS (*student or postdoctoral advisee)

59) Chambers JC, **Germino MJ**, Belnap J, Brown CS, Schupp EW, St. Clair SB, 2014. Plant Community Resistance to Exotic Bromus Species. In: Germino MJ, Chambers JC, Brown C (eds). Exotic brome grasses in arid and semi-arid ecoysstems of the Western US: Causes, consequences, and management implications. Springer. Accepted.

58) **Germino MJ,** Belnap J, Stark J, Rau B. 2014. Ecosystem impacts of exotic annual Bromus species. In: Germino MJ, Chambers JC, Brown C (eds). Exotic brome grasses in arid and semi-arid ecoysstems of the Western US: Causes, consequences, and management implications. Springer. Invited/in revision.

57) **Germino MJ,** Richardson BA, Lazarus B, Pendelton R, Pendelton B. 2014. Ecophysiology of Blackbrush. In: Esque T, Meyer S, Walker L (eds) *The blackbrush ecosystem: Shrubland stability in a changing world.* Springer Verlag. Accepted.

56) **Germino MJ,** Reinhardt K. 2014. Desert shrub responses to experimental modification of precipitation seasonality and soil depth: relationship to the two-layer hypothesis and ecohydrological niche. *Journal of Ecology*. 102:989-997

55) Chambers JC, Bradley BA, D'Antonio C, **Germino MJ**, Grace J, Hardegree SP, Miller RF, Pyke DP. 2014. Resilience to Stress and Disturbance, and Resistance to *Bromus tectorum* L. Invasion in Cold Desert Shrublands of Western North America. *Ecosystems.* 17:360-375

54) Richardson BA, Kitchen SG, Pendelton RL, Pendelton BK, **Germino MJ**, Rehfeldt GE, Meyer SE. 2014. Adaptive responses reveal contemporary and future ecotypes in a desert shrub. *Ecological Applications*. 24:413-427

53) Beever EA. Mattson BJ, **Germino MJ**, Post van der Burg M, Bradford JB, Brunson MW. 2014. Exploring successes and challenges of broad-scale conservation across the globe *Conservation Biology* 2:302-314

52) **Germino MJ**. 2014. Plants in Alpine Environments. In: "The Plant Sciences – Ecology and the Environment" (26 pages) editor: R Monson. Springer, www.springerreference.com/docs/html/chapterdbid/349825.html

51) Sorensen, P.O., **Germino, M.J**., Feris, K., 2013, Microbial community responses to 17 years of altered precipitation are seasonally dependent and coupled to co-varying effects of water content on vegetation and soil carbon. *Soil Biology and Biochemistry*, 64: 155-163

50) Wagenbrenner N, **Germino M**, Lamb B, Robichaud P, Foltz R. 2013. Wind erosion from a sagebrush steppe burned by wildfire: Measurements of PM10 and horizontal sediment flux. *Aeolian Research.* 10:25-36

49) Adams HD, **Germino MJ**, Breshears DD, Barron-Gafford DA, Guardiola-Claramonte M, Zou CB, Huxman TE. 2013. Nonstructural leaf carbohydrate dynamics of *Pinus edulis* during drought-induced tree mortality reveal role for carbon metabolism in mortality mechanism. *New Phytologist*. 197:1142-1151

48) Castanha C, Torn MS, **Germino MJ**, B. Weibel B, Kueppers ML. 2013: Conifer seedling recruitment across a gradient from forest to alpine tundra: effects of species, provenance, and site. *Plant Ecology & Diversity*, DOI:10.1080/17550874.2012.716087

47) Mitchell JJ, Glenn NF, Sankey TT, Derryberry DR, **Germino MJ**. 2013. Remote sensing of canopy nitrogen. *Remote Sensing of Environment* 124:217-223

47) Moyes A, **Germino MJ**, Castanha C, Kueppers L. 2012. Warming and the dependence of limber pine (Pinus flexilis) establishment on summer soil moisture within and above its current elevation range. *Oecologia* 171:271-282

45) Sankey J, **Germino MJ**, Sankey T, Hoover A .2012. Fire effects on the spatial patterning of soil properties in sagebrush steppe, USA: Meta-analysis. *International Journal of Wildland Fire* 21:545 - 556

44) Sankey J, **Germino M**J, Glenn N, Benner S. 2012. Bioavailable nutrients transported by wind in an eroding cold desert. *Aeolian Research. 5:17-27*

43) Hasselquist N, **Germino MJ**, SankeyJ, Glenn N, Ingram J. 2011. High potential for nutrient redistribution in aeolian sediment fluxes following wildfire in sagebrush steppe. *Biogeosciences* 8: 3649-3659

42) Sankey J, **Germino MJ**, Glenn NJ. 2012. Dust supply varies with sagebrush microsites and time since burning in experimental erosion events. *Journal of Geophysical Research-Biogeosciences* 117:1-13

41) Sankey J, Eitel J, Glenn N, **Germino MJ**, Vierling L. 2011. Quantifying relationships of burning, roughness, and potential dust emission with laser altimetry of soil surfaces at submeter scales. *Geomorphology* 117:1-13

40) Hoover A, **Germino MJ.** 2012. Post-fire, Resource-Island Effects on Bromus tectorum and Pseudoroegneria spicata: Evidence From a Common-Garden Study. *Rangeland Ecology and Management* 65:160-170
39) Reinhardt K, **Germino MJ**, Castanha C, Kueppers L. 2011. Provenance-level variation in mobile carbon pools corresponds to gas exchange, growth, and survival in *Pinus flexilis* seedlings from forest to alpine. *Tree Physiology* 31: 615-625
38) Wilcox B et al. including **Germino MJ.** 2011. Invasion of shrublands by exotic grasses: ecohydrological consequences in cold vs. warm deserts. *Ecohydrology* 5: 160-173
37) Hill J, **Germino MJ,** Alongi D. 2011. Carbon-use efficiency in green sinks is increased when a diversity of apoplastic sugars are available for uptake. Journal of Experimental Botany. 62: 2013-2022
36) Bansal S, Reinhardt K, **Germino MJ**. 2010. Linking carbon balance to establishment patterns: Comparison of whitebark pine and Engelmann spruce seedlings along an herb cover exposure gradient at treeline. *Plant Ecology*, accepted.
35) Bansal, S*, **Germino MJ.** 2010. Unique responses of respiration, growth, and non-structural carbohydrate storage in sink tissue of conifer seedlings to an elevation gradient at timberline. *Environmental and Experimental Botany*. In press.
34) Sankey J*, Glenn NF, **Germino MJ**, Gironella A, Thackray G. 2010. Relationships of aeolian erosion and deposition with LiDAR-derived landscape surface roughness following wildfire *Geomorphology* 119, 135-145
33) Debinski DD, Wickham H, Kindscher K, Caruthers JC, **Germino MJ**. 2010. Montane meadow change during drought varies with background hydrologic regime and plant functional group. *Ecology* 91: 1672-1681
32) Bansal S***, Germino MJ.** 2010. Variation in ecophysiological properties among conifers at an ecotonal boundary: comparison of establishing seedlings and established adults at timberline. *Journal of Vegetation Science* 21:133-142
31) Prevey J*, **Germino MJ**, Huntly N. 2010. Loss of foundation species increases population growth of exotic forbs in sagebrush steppe. Ecological Applications. 20: 1890-1902.
30) Prevey J*, **Germino MJ**, Huntly NJ, Inouye RS. 2010. Exotic plants increase and native plants decrease with loss of foundation species in sagebrush steppe. *Plant Ecology* 207:39-49.
29) Sankey J*, **Germino MJ,** Glenn NF. 2009. Relationships of post-fire aeolian transport to soil and atmospheric moisture, *Aeolian Research* 1: 75-85.
28) Norton J, Glenn NF, Germino MJ, Weber K, Seefeldt K. 2009. Relative suitability of indices derived from Landsat ETM+ and SPOT 5 for detecting fire severity in sagebrush steppe. *Int. J. Appl. Earth Observation and Geoinformation* 11: 360-367
27) Alongi-Johnson DA, Hill JP, **Germino MJ**. 2009. Opportunistic heterotrophy in gametophytes of the homosporous fern Ceratopteris richardii (Pteridaceae L.) and its ecophysiological and evolutionary implication. *Botany* 87: 1–8
26) Sankey J*, **Germino MJ,** Glenn NF. 2009. Aeolian sediment transport following wildfire in sagebrush steppe. *Journal of Arid Environments* 73: 912-919
25) Smith WK, **Germino MJ**, Johnson DM, Reinhardt K. 2009. The altitude of alpine treeline: a bellwether of climate change effects. *The Botanical Review* 75(2):163-190
24) Bansal S*, **Germino MJ.** 2009. Temporal variation of nonstructural carbohydrates in montane conifers: similarities and differences among developmental stages, species, and environmental conditions. *Tree Physiology* 29: 559-568
23) Bansal S*, **Germino MJ.** 2008. Carbon balance of conifer seedlings at timberline: relative changes in uptake, storage, and utilization. *Oecologia* 158: 217-227

22) Sankey TS, **Germino MJ**. 2008. Detection of juniper encroachment using remote sensing and GIS. *Rangeland Ecology and Management* 61: 359-464
21) Seefledt S, **Germino MJ**, DiChristina KM*. 2007. Prescribed fires have minor and transient effects on herbaceous vegetation cover and composition. *Applied Vegetation Science* 10: 249-256
20) DiCristina K, **Germino MJ**. 2006. Correlation of neighborhood relationships, carbon assimilation, and water status of sagebrush seedlings establishing after fire. *Western North American Naturalist* 66: 441-449
19) Maher E, **Germino MJ**. 2006. Microsite differentiation among conifer species during seedling establishment at alpine-treeline. *Ecoscience* 13: 334-341
18) Germino MJ, Hasselquist NJ, McGonigle TM, Smith WK, Sheridan P. 2006. Colonization of conifer seedling roots by fungal mycelium in an alpine-treeline ecotone: Relationships to microsite, developmental stage, and ecophysiology of seedlings. *Canadian Journal of Forest Research* 36: 901-909
17) Broderson C, **Germino MJ**, Smith WK. 2006. Photosynthesis during an episodic drought in *Abies lasiocarpa* and *Picea engelmannii* across an alpine treeline. *Arctic, Antarctic, and Alpine Research* 38: 34-41
16) Hill JP, **Germino MJ**. Wraith JM. Olson B, Swan M. 2006. Advantages in water relations contribute to greater photosynthesis in *Centaurea maculosa* compared to established grasses. *International Journal of Plant Sciences* 167: 269-277
15) Hill JP, **Germino MJ**. 2005. Coordinated variation in ecophysiological properties among life stages and tissue types in an invasive forb of shrub steppe. *Canadian Journal of Botany* 83: 1488-1495
14) Maher E, **Germino MJ**, Hasselquist NJ. 2005. Interactive effects of tree and herb cover on survivorship, physiology, and microclimate of conifer seedlings at the alpine-treeline ecotone. *Canadian Journal of Forest Research* 35: 567-574
13) Hasselquist NJ, **Germino MJ**, McGonigle TC, Smith WK. 2005. Variability of *Cenoccocum* infection and its ecophysiological significance for young conifers at alpine-treeline. *New Phytologist* 165: 867-873
12) Johnson DM, **Germino MJ**, Smith WK. 2004. Abiotic factors limiting photosynthesis in *Abies lasiocarpa* and *Picea engelmannii* seedlings below and above alpine timberline. *Tree Physiology* 24: 377-387
(11 Earlier publications)
(grey literature reports and proceedings papers, reviewed or not, are not listed here)

INVITED PRESENTATIONS (>150 contributed presentations at scientific society meetings not shown)

Richardson B, **Germino MJ.** 2014. Comparisons of contemporary and future predictions of the climate niche and ecological genetics of big sagebrush and blackbrush. Society for Ecological Restoration, Society of Ecological Restoration Joint Meeting of Pacific Northwest and Great Basin Chapters, Bend OR, Oct 6-10

Germino MJ. 2014. Sagebrush responses to shifting climate and fire disturbances: Basic insights for restoration. Society of Ecological Restoration Joint Meeting of Pacific Northwest and Great Basin Chapters, Bend OR, Oct 6-10

Germino MJ, Glenn NF. 2014. Wildfire size effects on site and soil stability: wind erosion in cold-desert rangelands. Large Fire Conference, Association for Fire Ecology. May 22, Missoula MT

Huber DP, Lohse K, **Germino MJ**. 2013. Climate Controls on Soil Hydrological and Nutrient Partitioning in Dryland Ecosystems. Chapman conference on Soil-mediated drivers of coupled biogeochemical and hydrological processes across scales. Tucson AZ. October 21-24

Germino MJ. 2013. Ecophysiology of blackbrush. 12th Biennial Conference of Science and Management on the Colorado Plateau. Flagstaff AZ. Sept 16-19.

Germino MJ. 2013. Nutrient fluxes and their relationship to ecosystem changes associated with pos-fire wind erosion and dust emission. 12th Biennial Conference of Science and Management on the Colorado Plateau. Flagstaff AZ. Sept 16-19.

Kueppers L, Moyes AB, **Germino** MJ, Torn MS. 2013. Responses of subalpine tree recruitment to warming within and above current altitudinal ranges. Ecological Society of America Annual Meeting. Minneapolis MN, Aug 4-9

Germino MJ. 2013. Can ecophysiology link pattern to process or molecules to landscapes for the study of treeline responses to climate? Ecological Society of America Annual Meeting. Minneapolis MN, Aug 4-9

Germino MJ, Richardson B, Lazarus B, Shaw N. 2013. Local ecophysiological adaptation evident in tetraploid but not diploid big sagebrush National Native Seed Conference, Santa Fe NM, April 8-11 [

Richardson BA, **Germino MJ,** Kitchen SG, Pendleton RL, Pendleton BK, Meyer SE. 2013. Climate-adapted populations of blackbrush (*Coleogyne ramosissima*). National Native Seed Conference, Santa Fe NM, April 8-11

Germino MJ, Svenson L, Reinhardt K (2013) Sagebrush responses to climate. Intermountain Native Plant Summit (7th annual) March 26-27, Boise

Germino MJ, Glenn NF, Hardy R, Miller S. 2013. "Dust, an emerging problem in the Great Basin: insights from 2013. Great Basin Consortium, 2nd annual meeting. Boise ID Jan 14-16, 2013

Previous invited presentations I delivered:

2012. Mountain West Water Institute Meeting, Idaho Falls,
2012. Plenary for Tri-State (ID-NV-NM) NSF EPSCoR annual meeting, Sun Valley
2012. Great Basin Restoration Initiative / Native Plant Program Annual Meeting, Salt Lake City UT
2011. American Geophysical Union Annual Meeting, San Francisco CA
2011. Department of Geological Sciences, Boise State University. Sept 23.
2011 Great Basin Consortium First Annual Meeting, Nov 2011, Reno NV (I was session organizer)
2011 Association for Fire Ecology Annual Meeting, Nov 2011, Snowbird UT (session organizer)
2011. USDA Investigators Conference, July 25, Washington DC
2011. Idaho Weed Association, Boise ID, Mar 20
2011. Great Basin Restoration Initiative / Native Plant Program Annual Meeting, Salt Lake City UT
2011. NSF EPSCoR Tri-State Meeting, Apr 14, Alburquerque NM
2011. Portneuf Watershed Parternship, ID Department of Environmental Quality Pocatello ID
2010. American Geophysical Union Annual Meeting. San Fransisco CA, Dec 10-15.
2010 Society of Range Management – Idaho Annual meeting on Sagebrush Steppe
2010 Ecological Society of America Annual Meeting, Pittsburg, PA, Aug 4-8
2010 The Future of High-Elevation Five-Needle White Pines in W North America, Missoula MT,
2010 16th Bi-annual Wildland Shrub Symposium, Logan UT, May 20th
2010 NSF EPSCoR ID-NV-NM joint meeting on water and climate, Lake Tahoe
2010. University of California, Merced.
2010. Department of Biology, Boise State University.
2010. Ecology and Evolution Department, University of Nevada, Reno
2009. Centro Investigaciones Ecosistemas Patagonia. Coyhaique, Chile,
2009. Restoring the West Conference, Logan UT, October 27-28.

2009. University of Sheffield, June 4, 2009.
2009. International Association for Landscape Ecology, Snowbird, UT,
2009. Idaho Native Plant Society, Idaho Museum of Natural History.
2008. Whitebark Pine Ecosystem Foundation Annual Meeting. Grand Targhee WY
2008. DOD Army Corps of Engineers Topographic Engineering Center, Alexandria VA.
2008. USDA NRI PI meeting, Milwaukee WI, August 6.
2008. Idaho State University, Department of Geosciences,
2008. Department of Ecology and Evolution, Iowa State University, Ames
2007. Idaho Weed Summit Keynote, Idaho State Department of Agriculture, Boise, October 3.
2007. University of Idaho, Moscow, October 15.
2007. Weed Science Society of America Annual Meeting. San Antonio TX. February 6
2007. Idaho Academy of Sciences Annual Meeting, Idaho Falls ID. April 21
2006. Environmental Sciences Department, Washington State University, Pullman, October 19.
2006. Univ of Wyo/NPS Research Station, AMK Ranch, Grand Teton National Park, WY, June 22.
2006. Intermountain Native Plant Society annual meeting. Boise ID, March 28.
2006. Geology Department, Boise State University. March 6.
2005. University of Texas, Arlington, April 20.
2004. Symposium on remote sensing and rangeland change. Idaho State University. October 7.
2004. Society for Ecological Restoration annual meeting, Victoria, BC. Aug 24-26.
2002,3. Idaho National Engineering and Environmental Lab, Idaho Falls ID, Feb 20, Nov 15.
2001. Ecology Department, Montana State University, Bozeman MT, March 8
2001. Department of Biology, Idaho State University, Pocatello ID, February 15
2000. Land Resources Department, Montana State University, Bozeman MT, May 8
2000. Station Alpine du Lautaret, Grenoble, France, August 31-September 2
1999. Ecological Society of America Annual Meeting, Spokane WA, August 8-12
1996. Department of Biology, Denver University, October 12

RESEARCH-RELATED SERVICE

Manuscript and proposal reviews

National Science Foundation, USDA NRI (now AFRI) Competitive Grants Program, DOE National Institute for Climate Change Research, Netherlands Organization for Scientific Research, Review for George Mendelez Wright NPS Scholarship program, 2009-present

Aeolian Research
Agroforestry Systems
American Journal of Botany
Arctic and Alpine Research
Australian Journal of Botany
Biol J of the Linnean Society
Botany
Canadian J Forest Research
Climate Change
Climate Change Biology
Diversity and Distributions
Ecohydrology
Ecological Applications
Ecological Monographs
Ecological Research
Ecology
Ecology and Evolution
Ecology Letters
Ecosphere
European J of Forest Research
Evolution
Forest Ecol and Management
Frontiers in Ecology
Functional Ecology
Global Ecology & Biogeography
International J of Plant Sciences
Invasive Plant Species Mgmt
Journal of Applied Ecology
Journal of Arid Environments
Journal of Ecology
J of Tropical Forest Science
Journal of Vegetation Science
New Phytologist
Northwest Science
Oecologia
Oikos
Plant Biology

Plant Ecology
Plant Ecology and Diversity
Plant Species Biology
Physical Geography
Rangeland Ecol & Mgmt
Restoration Ecology
Science of the Total Environment
Tree Physiology
Trees-Structure and Function
Western North Am. Naturalist

Editorial appointments, panel or society service

2014 Assisted with panel and reviewer selection, served panel, and reviewed proposals for the Great Basin Landscape Conservation Cooperative Science funding program, 2014
2014 Review Panel, University of Nevada, CABNR Hatch Grant Program, 2014
2013-present Editorial board, Rangeland Ecology and Management, 2013-presen
2013-present Editorial board, PLOS One, 2013-current
2011-13 Guest editor (subject/associate-level) for *Ecological Applications*, 2011, 2012, 2013
2011 Advisory Panelist, National Science Foundation, Division of Biology, Mar 2011
2011-14 Central Great Basin/Mojave REA review, Summer 2011.
Also: Lead participant in "Challenges and Opportunities Report for CBR REA, led Soils and Stability theme and co-led Plant Ecology theme, Jan-Sept 2014
2012-present Vice President for Society for Ecological Restoration Great Basin Chapter
2011-12 Northern Great Basin REA review, Dec 2011, Jan 2012.
2005-2006 Editorial review board for Tree Physiology
2008 USDA National Research Initiative, CSREES
2007-2011 On Coordinating Committee for Great Basin Research and Management Partnership
2010 Organized session on "Water and terrestrial ecosystems: reciprocity and feedbacks" for NSF EPSCoR NV/NM/ID meeting, Lake Tahoe NV, April 8th.
2010 Organized session with proceedings on "Wind Erosion in warm and cold desert shrublands: causes, consequences, and management implications" for the 16th Annual Wildland Shrub Symposium in Utah, May 18-20th.
2010 Co-organized session on ecology of reproduction and growth in five-needled pines for the High-Five Pine Meeting in Missoula MT, June 28-30th.
2010 Co-organized symposium on sagebrush ecology and management for Idaho meeting of Society of Range Management, Idaho Falls Nov 11-12th.

ADVISING OF GRADUATE STUDENTS

Advising graduate students, current:

Cassandra Gause, MS Biology candidate, Idaho State University, *Cheatgrass responses to climate variability.*

Martha Brabec, MS Biology candidate, Boise State University, *Intraspecific diversity of seedlings responses to climate, in big sagebrush following fire.*

Kellie Rey, MS Hydrosciences candidate, Boise State University, *Use of stable isotopes to partition evaporation and transpiration in semiarid rangelands*

Serving on graduate committees, current:

Xavier Gagne, MS Geology candidate, Boise State University, *Carbon and microelement variation under cheatgrass*

David Huber, PhD candidate, Idaho State University. *Ecohydrological and biogeochemical responses to climate change and invasive species in sagebrush steppe*

Patricia Xochi Campos, MS candidate, Boise State University. *Climate and plant community effects on patch-level nutrient exchanges in sagebrush steppe*

Alex Suazo, PhD Candidate in Ecology, University of Idaho, *Climate effects on rangeland vegetation*

Serving on graduate committees, past:

Masaru Takahashi, PhD candidate, Idaho State University. *Insect-plant interactions in sagebrush steppe*

Ryan Long, PhD candidate, Idaho State University. *Climate and habitat use of elk*

Ryan Bellmore, PhD Dec 2011, Idaho State University. *Ecology and aquatic-terrestrial interactions on dredged streams*

Service prior to February 2011

Graduate students advised (lead), Idaho State University:

Amber Hoover, MS 2010. *Relationships of plant communities, soil micro-topography, landscape aerodyanamic properties, and wind erosion in post-fire cold desert.* (Best Poster Award, Idaho State University Graduate Research Symposium, 2009)

Joel Sankey, PhD 2009. *Wind erosion of soil following wildfire in sagebrush steppe.* (Outstanding Graduate Student award for Idaho State University, 2010)

Judson Hill, MS 2009, *Contribution of flexibility in photosynthetic ecophysiology to carbon gain advantages in exotic forbs of sagebrush steppe.* (National Hispanic Scholar)

Sheel Bansal, PhD 2008. *Role of carbon balance during establishment of conifer trees in the timberline ecotone* (Outstanding Graduate Student award for Idaho State University, 2009)

Janet Prevey, MS 2008. *Linking ecophysiological differences between exotic and native plants to population dynamics of exotic species in disturbed sagebrush steppe.*
(Best oral presentation award, Utah State Graduate Research Symposium, April 2009)

Ryan Baum, MS 2005. *Disturbances increase variability in remotely sensed indices of vegetation in sagebrush steppe over the past ca. 20 years*.

Katherine DiChristina, MS 2004. *Effects of neighboring vegetation and soil moisture on establishment of mountain big sagebrush (Artemisia tridentata spp. vaseyana) seedlings after fire.* (Best Student Poster Award, Society for Range Management annual meeting, 2004)

Eliza Maher, MS 2004. *Effects of surrounding vegetation on establishment of conifer seedlings in alpine treeline ecotones of the Rocky Mountains*

Niles Hasselquist, MS 2004. *Interactions of fungal symbionts and conifer seedlings near alpine-treeline*

Graduate advisory committees served on, Idaho State University:

Larry Cook, PhD 2007. *Cesium uptake in plants of sagebrush steppe*

Chris Jenkins, PhD 2007. *Landscape disturbance, trophic interactions, and life history variation in Great Basin rattlesnakes*

Kim Gilliland, MS 2006. *Plant community responses to historic aleut village occupation in Alaska*

Nancy Hampton, PhD candidate, degree not awarded. 2004-2008. *Aggregation of the sagebrush defoliator moth in a highly connected landscape*

Karen Krause, MS candidate, degree not awarded. 2003-2006. *Forest fire effects on soil water content and conifer seedling establishment*

Jacob Mundt, MS 2004. *Detection of leafy spurge in Swan Valley IS using hyperspectral remote sensing with limited training data*

Nagendra Singh, MS 2005. *Development of a multitemporal data analysis approach for extracting information from medium resolution imagery: application for cheatgrass detection*

Jill Norris, MS 2006. *Development of a reliable remote sensing initial-assessment burn severity model*

Jeremiah Billa, MS Physics 2006. *Patterns of Radionuclide Deposition in Idaho*

Graduate advisory committee service to other Universities:

Sebastien Renard, PhD 2011, Universite' Laval, Quebec
Kea Woodruff, MS 2010, University of Idaho
Pat Sorensen, MS 2010, Boise State University
Jennifer Wolf, MS 2010, University of California

CURRICULUM VITAE

TODD E. KATZNER
Research Wildlife Biologist
Forest and Rangeland Ecosystem Science Center
U.S. Geological Survey
970 Lusk St., Boise, ID, 83706
E-mail: tkatzner@usgs.gov

CURRENT POSITIONS

Institution	Title	Year
U.S. Geological Survey	Research Wildlife Biologist	2014 – present
Forest and Rangeland Ecosystem Science Center, Snake River Field Station		

EDUCATION

Institution	Degree	Year Graduated
Arizona State University	Ph.D. (Biology)	May, 2003
Diss. title: *Ecology and behavior of four coexisting eagle species at Naurzum Zapovednik, Kazakhstan*		
The University of Wyoming	M.S. (Zool. & Phys.)	December, 1994
Thesis title: *Winter ecology of the pygmy rabbit (*Brachylagus idahoensis*) in Wyoming.*		
Oberlin College	B.A. (Biology)	May, 1991

COURSES TAUGHT

Courses	Capacity	Subjects covered	Institution
Conservation Ecology	Instructor/Lecturer	Multiple topics	West Virginia Univ. 2013, 2014
Stat. Method for Biol. Sci.	Lead Instructor	Introductory topics	Kostanay State Pedagog. Inst. 2013
Climate chg & Ecol syst.	Lead Instructor	Multiple topics	West Virginia University, 2012
Conservation Biology	Lead Instructor	Conservation Biology Seminar	University of Pittsburgh, 2009
Non-invasive mark-recap	Lead Instructor	Non-invasive mark-recapture	Duquesne University, PA, 2008, 2009
Mammalogy	Lead Instructor	All topics	Arizona State University, Sierra Anches Field Stn., 2002
Mammalogy	Lead Instructor	All topics	Coe College, 1995

GRANTS AND RESEARCH FUNDING

National Fish and Wildlife Foundation. 2014. California condor flight response in a variable meteorological and topographic environment. Co-PI with Jonathan Hall, Tricia Miller, Adam Duerr, David Brandes, Melissa Braham and Michael Lanzone. $150,000.

US Bureau of Land Management – California State Office. 2014. Golden eagle demography: genetic approaches to population biology in the face of renewable energy development in the California desert. *Grant modification.* Co-PI with Andrew DeWoody, Jacqueline Doyle. $144,598 (through Purdue University)

US National Park Service. 2014. Aerial surveys for golden eagles: identifying sources of bias and developing effective survey methods. $63,590

California Department of Fish and Wildlife. 2014. Movement ecology of California Condors within the DRECP area. $83,540. Co-PI with Adam Duerr, Jonathan Hall, Melissa Braham, Philip Turk & Tricia Miller.

Central Asian Regional Environmental Center/USAID. 2013. Fostering trans-boundary cooperation on small watercourses in central Asia. $180,500. Co-PI with Gerald Iwan.

American Eagle Foundation. 2013. Local and Migratory Movements of Upper Midwest Wintering Bald Eagles. $16,250. Co-PI with Trish Miller, Michael Lanzone and Adam Duerr.

US Fish and Wildlife Service. 2013. Lead (Pb) Isotope Ratios in Tissues of Golden Eagles in the Continental United States: An Investigation into Possible Sources of Contamination. $200,008. Co-PI with Alan Harmata & Marco Restani.

US Bureau of Land Management – California State Office. 2013. Golden eagle home range, habitat use, demography and renewable energy development in the California desert (*Grant Modification*). Co-PI with David Brandes,

Adam Duerr, Philip Turk, Tricia Miller and Michael Lanzone. $34,000.

US Bureau of Land Management – California State Office. 2012. Golden eagle demography: genetic approaches to population biology in the face of renewable energy development in the California desert. *Grant modification.* Co-PI with Andrew DeWoody, Jacqueline Doyle. $84,223, through Purdue University)

Virginia Department of Game and Inland Fisheries. 2013. Distribution, differentiation and hybridization of king and clapper rails in eastern Virginia. $419,368. Co-PI with Trish Miller, Adam Duerr, Jim Anderson, Amy Welsh, & Michael Lanzone.

Virginia Department of Game and Inland Fisheries. 2013. Surveys for peregrine falcons in Western Virginia. $76,483.

Virginia Department of Game and Inland Fisheries. 2013. Demography, population size and habitat use of eastern golden eagles in Virginia. $256, 046. Co-PI with Adam Duerr & Trish Miller.

Virginia Department of Game and Inland Fisheries. 2013. Assessing lead levels in avian scavengers in Virginia. Co-PI with Adam Duerr & Tricia Miller. $266,480.

Virginia Department of Game and Inland Fisheries. 2012. Bald eagle conservation and management in Virginia. Co-PI with Adam Duerr and Tricia Miller. $295,000.

US Bureau of Land Management – California State Office. 2012. Golden eagle demography: genetic approaches to population biology in the face of renewable energy development in the California desert. Co-PI with Andrew DeWoody, Jacqueline Doyle, Phil Turk, Adam Duerr, Tricia Miller, Michael Lanzone and David Brandes. $126,000 ($26,907 through WVU, $99,093 through Purdue University).

California Department of Fish and Game. 2012. Data collection and synthesis of current knowledge of golden eagles. Co-PI with Adam Duerr, Trish Miller, Phil Turk & David Brandes. $255,000.

US Bureau of Land Management – California State Office. Golden eagle home range, habitat use, demography and renewable energy development in the California desert (*Grant Modification*). Co-PI with David Brandes, Adam Duerr, Philip Turk, Tricia Miller and Michael Lanzone. $54,390.

RES America. 2012. Assessing Granite Wind for RES America. Co-PI with Trish Miller, Adam Duerr, and Phil Turk. $41,440.

USDA Forest Service, Northern Research Station. 2012. Avian response to fire. Co-PI with John Edwards & Tom Shuler. $15,000. (*continuation of previous award from 2011*).

WVU McIntyre-Stennis Program. 2011. Application of Novel Technologies and Approaches for Enhancing Wildlife Ecology and Conservation. $4,000 (year II).

International Association of Avian Trainers and Educators. 2012. Conservation ecology of the globally threatened red-footed falcon. Co-PI with Evgeny A. Bragin. $2,000.

Quebec Department of Wildlife and Natural Resources. 2012. Trapping and telemetry of golden eagles during winter in Pennsylvania. Co-PI with Tricia Miller & Michael Lanzone. $10,000.

US Bureau of Land Management – California State Office. 2011. Golden eagle home range, habitat use, demography and renewable energy development in the California desert. Co-PI with David Brandes, Adam Duerr, Philip Turk, Tricia Miller and Michael Lanzone. $321,054.

National Birds of Prey Trust. 2011. Conservation ecology of the globally threatened red-footed falcon (*Falco vespertinus*): migration, breeding and winter ecology (Year II). $6,166.

USDA Forest Service, Northern Research Station. 2011. Avian response to fire. Co-PI with John Edwards & Tom Shuler. $25,000.

WVU McIntyre-Stennis Program. 2011. Application of Novel Technologies and Approaches for Enhancing Wildlife Ecology and Conservation. $4,000.

Transportation Research Board of the National Academies. 2011. Pilot Test the Ecological Approaches to Environmental Protection Developed in Capacity Research Projects C06A and C06B. Co-PI with Jim Anderson, Walter Veselka, Michael Strager, Hodjat Ghadimi, Lian-Shin Lin, J. Todd Petty, Daniel Welsch, Todd Miller, Norse Angus, & Laura Conley-Reinhart 2011. $360,628.

National Birds of Prey Trust. Conservation ecology of the globally threatened red-footed falcon (*Falco verspertinus*): migration breeding and winter ecology. Co-PI with Evgeny Bragin. 2010. $7,725.

Virginia Department of Game and Inland Fisheries. Winter ecology and conservation of golden eagles in Virginia. Co-PI with Rob Brooks, Brady Porter, Mike Lanzone, Trish Miller & Maria Wheeler. 2010. $104,300.

US Department of Energy, 20% Wind by 2030: Overcoming the Challenges. Developing high-resolution spatial data of migration corridors for avian species of concern in regions of high potential wind development. Co-PI with Dave Brandes, Rob Brooks, Charles Maisonneuve, Andrew Mack, Trish Miller & Michael Lanzone. 2010. $193,000.

Kick Start Partnership Program. Keystone Innovation Zone Kick Start Grant. 2009. $5,000.

The Technology Collaborative. Development of a universal plug-and-play M2M platform. 2009. $150,000.

Civilian Research and Defense Foundation. Non-invasive ecology, monitoring and conservation of raptors in north-central Kazakhstan. Co-PI with Andrew DeWoody and Evgeny Bragin. 2009-2010. $45,000.

Idea Foundry. Transformation Fellowship Program to Cellular Tracking Technologies, LLC. $40,000.

Pennsylvania Wild Resource Conservation Program. Assessing Genetic Diversity of Pennsylvania's Eastern Golden Eagles: How Unique Are They? Co-PI with Brady Porter. 2008-2009. $33,958.

West Virginia State Cooperative Grant Program. Assessing Genetic Diversity of West Virginia's Eastern Golden Eagles: How Unique Are They? Co-Pi with Brady Porter. 2008-2009. $8,059.

Pennsylvania State Wildlife Grant Program. Assessing risks of wind energy development for a priority "umbrella" species: Pennsylvania's special responsibility for conservation of eastern golden eagles. Co-PI with Dave Brandes, Trish Miller, Robert Mulvihill, Michael Lanzone, 2008-2010. $70,000.

Innovation Works. Emerging Technology Assistance Program. Grant to Cellular Tracking Technologies, LLC, for product development. 2008. $25,000.

Quebec Department of Wildlife and Natural Resources. Telemetry, home range, migration and management of birds of prey in the context of wind energy development. 2008. $23,250.

Wild Bird Global Avian Influenza Network for Surveillance. Monitoring Avian Influenza within and across species in Kazakhstan. 2008. $50,661.

Alexandria Zoological Park. Support for white-tailed sea eagle research. 2008. $1,000.

Association of Zoos and Aquariums - Conservation Endowment Fund. Non-invasive genetic estimation of population size of critically endangered *Gyps* vultures in Asia. Co-PI with Yula Kapetanakos and Nancy Clum. 2007 - 2008. $22,765.

Allegheny Plateau Audubon Society. GPS Telemetry of golden eagles in Pennsylvania. Co-PI with Trish Miller, Dave Brandes, Robert Mulvihill, Michael Lanzone, 2008. $5,000

National Birds of Prey Trust. Molecular ecology and conservation of imperial eagles (*Aquila heliaca*) and white-tailed eagles (*Haliaeetus albicilla*) from Kazakhstan. Co-PI with Andrew DeWoody. 2007-2008. $31,000.

Pennsylvania State Wildlife Grant Program. Assessing conservation needs of eastern golden eagles in Pennsylvania. Co-PI with Dave Brandes, Trish Miller, Robert Mulvihill, Michael Lanzone, 2007-2008. $25,000.

Wild Bird Global Avian Influenza Network for Surveillance. Monitoring Avian Influenza within and across species in Kazakhstan. 2007. $48,360.

National Geographic Society - Committee for Research and Exploration. Non-invasive genetic monitoring of the endangered Eastern Imperial Eagle in Kazakhstan. Co-PI with Andrew DeWoody, Evgeny Bragin and Jamie Rudnick. 2006. $19,850.

Wildlife Conservation Society - International Programs. Ecology and conservation of a unique community of endangered eagles at the Naurzum Zapovednik, Kazakhstan. Co-PI with Evgeny A. Bragin. 2002: $4,845; 2003: $5,700; 2004: $6,270; 2005: $9,416; 2006: $4,840; 2007: $5,000.

Wildlife Conservation Society - International Programs. Status and conservation of vultures in south-eastern Kazakhstan. Co-PI with Sergei L. Sklyarenko. 2001-2002. $8,875; 2003: $5,300; 2004: $5,830; 2005: $5,744; 2006:$5,700; 2007: $5,000.

Wildlife Conservation Society - International Programs. Conservation and monitoring of vultures China. 2005:$5,625.

Graduate College and Department of Biology, Arizona State University. Travel grant. 2001: $1,000, 2002: $514

Wildlife Conservation Society - International Programs, Research Fellowship Program. Ecology and conservation of a unique community of endangered eagles at the Naurzum Zapovednik, Kazakhstan. Co-PI with Evgeny A. Bragin. 2000-2001. $11,650.

The Frank M. Chapman Memorial Fund, American Museum of Natural History. Integrating competition and predation in a unique community of endangered eagles in Kazakhstan. 2000. $2,000.

Northwest Airlines - Travel Support for Research. 2000. $125.

The Graduate College, Arizona State University. Graduate training in the biological sciences: preparing for the future. Co-PI with Dr. Thomas Dowling, Martin Gerrits, Lisa Dent, Jill Welter, Dr. Michael Moore and Dr. James Collins. 1999-2000. $5,880.

Northwest Airlines - Travel Support for Research. 1999. $125.

Biological Resources Division, US Geological Survey: Spatial and temporal relationships between habitats and primary prey of raptors in Kazakhstan. Co-PI with Andrew Smith. 1997-2000. $22,327.

World Nature Association Grant. Conservation alternatives for endangered species management at the Naurzum Zapovednik, Kazakhstan. 1997. $800.

The Frank M. Chapman Memorial Fund, American Museum of Natural History. Raptor conservation studies in a unique ecosystem in north-central Kazakhstan. 1997. $2,000.

The International Osprey Foundation Endowment Fund Grant. Raptor conservation studies in a unique ecosystem in

north-central Kazakhstan. 1997. $1,000.
Russian & East European Studies Consortium Travel Grant, Arizona State University. 1997. $500.
Hawk Mountain-Zeiss Raptor Research Award. Raptor conservation studies in a unique ecosystem in north-central Kazakhstan. 1997. $1,000.
Graduate Research Support Program, Arizona State University. Modeling predator-prey dynamics and their interaction with landscape level processes in a unique system in Kazakhstan. 1997. $2,000.
Hughes Student Research Grant, Oberlin College. 1991.

FOUNDATION AND PRIVATE DONOR FUNDING

2014: $55,500 (Kazakhstan programs, support for students *4)
2013: $63,300 (Grad student support *2, Research Support, Operating support – Avian Conservation Center of Appalachia, EGEWG support)
2012: $42,320 (Golden Eagle & General Research Support, Support for student education, Kazakhstan Programs)
2011: $25,850 (Golden Eagle Research Support, Research Support, Kazakhstan field station)
2010: $25,000 (Research support, Kazakhstan field station)
2009: $16,500 (Departmental research support, Kazakhstan field station, Urban peregrines)
2008: $20,500 (Departmental research support, Kazakhstan field station, Urban peregrines)
2007: $17,000 (Kazakhstan field station, Departmental research support, Urban peregrines)
2006: $5,000 (Kazakhstan field station)

PEER-REVIEWED PUBLICATIONS (last 10 years)

63. Bragin, E.A., S.L. Sklyarenko & **T.E. Katzner**. 2014. Book review: Birds of Central Asia. The Wilson Journal of Ornithology. 126(3): 614-620.
62. Berl, J. L., J.W. Edwards, J.S. Bolsinger & **T.E. Katzner**. 2014. Red-headed woodpecker nest survival in northern New York. Wilson Journal of Ornithology. *In press*.
61. Kapetanakos, Y.A., I.J. Lovette, **T.E. Katzner.** 2014. Development of microsatellite markers and a restriction endonuclease digest assay for non-invasive sampling of endangered Oriental White-rumped, Slender-billed and Red-headed Vultures. Conservation Genetics Resources. 6(3): 539 – 542. DOI 10.1007/s12686-014-0186-8.
60. Doyle, J.M., **T.E. Katzner**, P.H. Bloom, Y. Ji., B.K. Wijayawardena & J.A. DeWoody. 2014. The genome sequence of a widespread apex predator, the golden eagle (*Aquila chrysaetos*). PLoS ONE 9(4): e95599. doi:10.1371/journal.pone.0095599
59. Duerr, A.E., T. Miller, M. Lanzone, D. Brandes, J. Cooper, K. O'Malley, C. Maisonneuve, J. Tremblay, & **T. Katzner**. 2014. Stereotyped flight response of slope-soaring birds to seasonal variation in thermal generation. Functional Ecology. *In second revision.*
58. Gordon, I.J. D.M. Evans, T.W.J. Garner, **T. Katzner**, M.E. Gompper, R. Altwegg, T.A. Branch, J.A. Johonson & N. Pettorelli. 2014. Enhancing communication between conservation biologists and conservation practitioners: Letter from the Conservation Front Line. Animal Conservation. 17: 1-2. doi:10.1111/acv.12097.
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54. Pettorelli, N., D.M. Evans, T.W.J. Garner, T. Katzner, M.E. Gompper, R. Altwegg, T.A. Branch, J.A. Johnson, K. Acevedo-Whitehouse, L. DaVolls, E. Rantanen & I.J. Gordon. 2013. Addressing gender imbalances in *Animal Conservation*. Animal Conservation. *16:131-133. doi:10.1111/acv.12032.*
53. Al Hasani, I.K., J.F. Azar, K. Nishimura, Z.S. Amr & **T. Katzner**. 2012. Distribution, diet and winter ecology of the Imperial Eagle *Aquila heliacal* in Jordan. Vertebrate Zoology. 62(2): 273-280.
52. Latta, S.C., L.J. Musher, K.N. Latta & **T.E. Katzner**. 2013. Influence of human population size and the built environment on avian assemblages in urban green spaces. Urban Ecosystems. 16: 463 - 479. *doi: 10.1007/s11252-012-0282-z.*
51. Katzner, T.E. & N. J. Collar. 2013. Are insular populations of the Philippine falconet (*Microhierax erythrogenys*)

steps in a cline? The Condor, 115: 576 - 583.

50. Брагин Е.А., **Катцнер Т**., Брагин А.Е. 2012. Летние скопления крупных пернатых хищников и проблема оценки их численности// Труды Мензбировского орнитологического общества, том I: Материалы XIII Международной орнитологической конференции Северной Евразии. - Махачкала: АЛЕФ, С. 234-240. [Summer accumulations of birds of prey and the problem of estimating their number. Proceedings Menzbier Ornithological Society, Volume I: Proceedings of the XIII International Ornithological Conference of North Eurasia. - Makhachkala: Pp. 234-240]

49. Evans, D.M., P. Barnard, L.P. Koh, C.A. Chapman, R. Altwegg, T.W.J. Garner, M.E. Gompper, I.J. Gordon, **T.E. Katzner** & N. Pettorelli. 2012. Funding nature conservation: who pays?.*Animal Conservation.* 15: 215-216.

48. Bragin, E.A.& **T.E. Katzner**. 2012. Вторая находка гнезда лутка *Mergus albellus* в Наурзумском бору. *Русский орнитологический журнал*, Том 21, Экспресс-выпуск 743: 724-725. [Second nest record of Smew *Mergus albellus* in the Naurzum forest. *Russian Ornithological Journal, Express Issue*. 21(743):724-725].

47. Sklyarenko, S.L. & **T.E. Katzner**. 2012. Состояние популяций хищных птиц-падальщиков в Казахстане [The status of populations of vultures in Kazakhstan]. Орнитологический вестник Казахстана и Средней Азии.[Ornithological News of Kazakhstan and Middle Asia.] Volume 1. Almaty, 2012. 248 pp.

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43. Gordon, I.J., K. Acevedo-Whitehouse, R. Altwegg, T.W.J. Garner, M.E. Gompper, **T.E. Katzner**, N. Pettorelli & S. Redpath. 2012. What the 'food security' agenda means for animal conservation in terrestrial ecosystems. *Animal Conservation.* 15: 115-116.

42. Branch, T.A., J.D. Austin, K. Acevedo-Whitehouse, I.J. Gordon, M.E. Gompper, **T.E. Katzner** & N. Pettorelli. 2012. Fisheries conservation and management: finding consensus in the midst of competing paradigms. *Animal Conservation*. 15: 1-3.

41. Katzner, T.E., M. Wheeler, J.J. Negro, Y. Kapetanakos, J.A. DeWoody, M. Horvath & Irby Lovette. 2012. To pluck or not to pluck: scientific methodologies should be carefully chosen, not "one size fits all." *Journal of Avian Biology. 43: 15-17.*

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38. Katzner, T.E., J.D. Winton, F.A. McMorris & D. Brauning. 2012. Dispersal, band recovery and causes of death in a reintroduced and rapidly growing population of Peregrine Falcons. *Journal of Raptor Research*. 46(1): 75-83.

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33. Iverson, S., A. Gavrilov, **T. Katzner**, J. Takekawa, S. Newman, T. Miller, W. Hagemeijer, B. Sivananinthaperumal, T. Mundkur, C. DeMattos & L. Ahmed. 2010. Migratory movements of waterfowl in Central Asia: implications for avian influenza transmission by wild birds. *Ibis. 153: 279–292*

32. Pettorelli, N., I. J. Gordon, **T. Katzner**, M. E. Gompper, K. Mock, S. Redpath, T. W. J. Garner & R. Altwegg. 2010. Protected areas: the challenge of maintaining a strong backbone for conservation strategies worldwide. *Animal Conservation* 13: 333–334.

31. Jones, J.P.G., B. Collen, P. Baxter, P. Bubb, J. Illian, **T. Katzner**, A. Keane, J. Loh, E. McDonald-Madden, E. Nicholson, H. Pereira, H. Possingham, A. Pullin, A. Rodrigues, V. Ruiz-Gutierrez, M. Sommerville, E.J. Milner-Gulland. 2010. The 'why', 'what' and 'how' of global biodiversity indicators: looking beyond 2010. *Conservation Biology. 25(3): 450-457.*

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29. Blackburn, T.M., N. Pettorelli, **T. Katzner**, M. E. Gompper, K. Mock, T. W. J. Garner, R. Altwegg, S. Redpath & I. J. Gordon. 2010. Dying for conservation: eradicating invasive alien species in the face of opposition. *Animal Conservation. 13:227–228.*

28. Gordon, I.J., N. Pettorelli, **T. Katzner**, M. E. Gompper, K. Mock, S. Redpath, T. W. J. Garner & R. Altwegg. 2010. International year of biodiversity: missed targets and the need for better monitoring, real action and global policy. *Animal Conservation.* 13:113-114.

27. Penteriani, V., N. Pettorelli, I.J. Gordon, **T. Katzner**, K. Mock, S. Redpath, R. Altwegg & M.E. Gompper. 2010. New European Union fisheries regulations could benefit conservation of marine animals. *Animal Conservation.* 13:1-2.

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24. Miller, T.M., Brandes, D., Lanzone, M., Ombalski, D., Maisonneuve, C. and **T. Katzner**. 2009. Golden eagle migration and winter behavior in Pennsylvania. *In:* Majumdar, S.K*., ed.,* Avian Ecology and Conservation: A Pennsylvania Focus with National Implications. Pennsylvania Academy of Sciences. pp 111 - 125.

23. Rudnick, J.A., **T.E. Katzner**, and J.A. DeWoody. 2009. Genetic Analyses of Noninvasively Collected Feathers Can Provide Insights into Avian Demography and Behavior. *in:* Aronoff, J.B., *ed.* Handbook of Nature Conservation: Global, Environmental and Economic Issues. Nova Publishers. pp.181-197.

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21. Rudnick, J.A., **T.E. Katzner**, E.A. Bragin, and J.A. DeWoody. 2008. A non-invasive genetic evaluation of population size, natal philopatry, and roosting behavior of non-breeding eastern imperial eagles (*Aquila heliaca*) in central Asia. *Conservation Genetics* 9: 667–676.

20. Rudnick, J.A., **T.E. Katzner**, E.A. Bragin, and J.A. DeWoody. 2007. Species identification of birds through genetic analysis of naturally shed feathers. *Molecular Ecology Notes 7: 757–762.*

19. Ryabtsev, V. and **T. Katzner**. 2007. Severe declines of Eastern Imperial Eagle *Aquila heliaca* populations in the Baikal region, Russia: a modern and historical perspective. *Bird Conservation International* 17:197-209.

18. Katzner, T., E.J. Milner-Gulland and E. Bragin. 2007. Using modeling to improve monitoring of structured populations: are we collecting the right data? *Conservation Biology* 21(1): 241-252.

17. Kenward, R., **T. Katzner**, M. Wink, V. Marcström, S. Walls, M. Karlbom, R. Pfeffer, E. Bragin, K. Hodder, and A. Levin. 2007. Rapid sustainability modelling for raptors by radio-tagging and DNA-fingerprinting. *Journal of Wildlife Management* 71(1): 238-245.

16. Katzner, T., E. Bragin, S. Knick and A. Smith. 2006. Spatial structure in the diet of imperial eagles *Aquila heliaca* in Kazakhstan. *Journal of Avian Biology* 37: 594-600.

15. Katzner, T., E. Bragin and E.J. Milner-Gulland. 2006. Modelling populations of long-lived birds of prey for

conservation: a study of Imperial Eagles (*Aquila heliaca*) in Kazakhstan. *Biological Conservation* 132: 322-335.

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10. Busch, J.D., **T. Katzner**, E. Bragin and P. Keim. 2005. Tetranucleotide microsatellites for *Aquila* and *Haliaeetus* eagles. *Molecular Ecology Notes* 5:39-41.

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BOOKS, BOOK CHAPTERS, BOOK EDITING

5. Watson, J. 2011. 2nd Edition. The Golden Eagle. *T & A.D. Poyser.* **Contributing author/editor.**

4. Tingay, R.E. and **T.E. Katzner**, eds. 2010. The Eagle Watchers. *Cornell University Press.*

3. Katzner, T.E. and R. E. Tingay. 2010. Eagle Diversity, Ecology and Conservation. *In*. Tingay, R.E. and **T.E. Katzner**, eds. 2010. The Eagle Watchers. *Cornell University Press.*

2. Katzner, T.E. 2010. Eastern Imperial Eagle. *In*: Tingay, R.E. and **T.E. Katzner**, eds. 2010. The Eagle Watchers. *Cornell University Press.*

1. Katzner, T.E. 2008. Downward Spiral: Catastrophic Decline of South Asia's Vultures. pp. 139 – 145 *In:* Fern, E. & Redford, K. H., eds. *2008 – 2009 State of the Wild: a Global Portrait of Wildlife, Wildlands and Oceans.* Wildlife Conservation Society, New York, NY & Island Press, Washington DC.

CONFERENCE PROCEEDINGS & PUBLISHED REPORTS (last 10 years)

20. DRECP ISP. 2012. Final report: Independent science review for the California Desert Renewable Energy Conservation Plan (DRECP). [Abella, S., D. Bedford, T. Beedy, K. Berry, D. Cayan, L. DeFalco, S. Haase, **T. Katzner,** K. Nussear, S. Schwarzbach, W. Spencer, D. Stoms, J. Strittholt, , T. Weller, J. Yee]. Prepared for Renewable Energy Action Team for the California Desert Renewable Energy Conservation Plan. 82pp.

19. Bragin, E.A., T. Katzner & A.E. Bragin. 2012. Population size, age structure, mortality and spatial relations of the population of Imperial Eagle *Aquila heliaca* at forest patches of Kostanay Region. // Birds of Prey in the dynamic environment of the third Millenium: status and prospects. Proceeding of the 6th International Conference on Birds of Prey and Owls of Northern Eurasia. Kryvyi Rih, 27-30 September 2012. Pp.131-141.

18. **Katzner, T**., P. Turk, A. Duerr**,** D. Brandes, T. Miller, M. Lanzone. 2012. Golden Eagle Home Range, Habitat Use, Demography and Renewable Energy Development in the California Desert – Interim Report to the Bureau of Land Management, California State Office.

17. Брагин Е.А., **Катцнер Т.**, Брагин А.Е. 2012. Пространственные связи популяции орла-могильника *Aquila heliaca* островных лесов Костанайской области [The spatial relations of the Imperial Eagle Aquila heliaca population of forest patches of Kostanay Region]. Proceedings of the second international conference on biodiversity of Asian steppes. Kostanay, Kazakhstan, 5-6 June 2012.

16. **Katzner, T.E.** J.A.R. Ivy, E.A. Bragin, E.J. Milner-Gulland & J.A. DeWoody. 2012. How many eagles are at Naurzum? Proceedings of the second international conference on biodiversity of Asian steppes. Kostanay, Kazakhstan, 5-6 June 2012.

15. Maisonneuve, C., T. Miller, J.A. Tremblay, **T. Katzner**, M. Lanzone and D. Brandes. 2011. Differential vulnerability of Bald and Golden Eagles to wind turbine collision on breeding grounds in Québec. Proceedings of the Conference on Wind energy and Wildlife impacts, 2-5 May 2011, Trondheim, Norway.

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14. Tremblay, J.A., C. Maisonneuve, **T. Katzner**, T. Miller, M. Lanzone and D. Brandes. 2011. A case study of the interaction between landscape configuration and habitat use at a wind facility by golden eagles (*Aquila chrysaetos*). Proceedings of the Conference on Wind energy and Wildlife impacts, 2-5 May 2011, Trondheim, Norway. Roel May and Kjetil Bevanger (eds). NINA Report 693.
13. Maisonneuve, C., T. Miller, M. Lanzone, **T. Katzner.** 2009. Studies on threatened species of birds of prey and wind farms in eastern North America. Birds of Prey and Wind Farms: Analysis of Problems and Possible Solution. Documentation of an international workshop in Berlin, 21st and 22nd October 2008.
12. Sklyarenko, S. and T. Katzner. 2008. The black vulture, *Aegypius monachus*, in central Asia. Proceedings of the International Symposium on the Black Vulture *Aegypius monachus*. Cordoba, Spain.
11. Bragin, E.A., J. Rudnik, **T. Katzner**, A. DeWoody. 2008. New methods for raptors research: results of research on the imperial eagle in north Kazakhstan. Research and conservation of birds of prey of northern Eurasia. Materials of the 5th international conference on birds of prey of northern Eurasia. Ivanovo, 4-7 February 2008. Ivanovo State University Press. Edited by V.M.Galushin, V.N.Melnikov, A.I.Shretaikov, D.I.Chudnenko. 360 p. In Russian.
10. Bragin, A. **T. Katzner**, P. Sharpe, D. Garselon, A. E. Bragin. 2008. Results of research on imperial eagle migrations from northern Kazakhstan. Research and conservation of birds of prey of northern Eurasia. Materials of the 5th international conference on birds of prey of northern Eurasia. Ivanovo, 4-7 February 2008. Ivanovo State University Press. Edited by V.M.Galushin, V.N.Melnikov, A.I.Shretaikov, D.I.Chudnenko. 360 p. In Russian.
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8. Katzner, T., E.J. Milner-Gulland and E. Bragin. 2007. Using modeling to improve monitoring of eagles: are we collecting the right data? International Scientific Conference "Biological Diversity of Asian Steppe," Kostanay, Kazakhstan.

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5. Bragin, E. and **T. Katzner**. 2004. Population trends and nesting success of Imperial Eagle, Golden Eagle and White-tailed Sea Eagle in north-west Kazakhstan in 1990-2002.Pp. 551-556. *In:* Chancellor, R. D. & B.-U. Meyburg eds. Raptors Worldwide: Proceedings of the WWGBP - 6th World Conference on Birds of Prey and Owls, Budapest, Hungary.

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PAPERS PRESENTED, WORKSHOPS ATTENDED & SESSIONS ORGANIZED OR CHAIRED (last 10 years)

140. Mallon, J., **T. Katzner** and K. Bildstein. 2014. Non-migratory flight response explains inter-specific variation in soaring flight behavior of New World Vultures. Wilson Ornithological Society – Association of Field Ornithologists Annual Meeting, Newport, RI.
139. Wheeler, M., B Porter and **T. Katzner**. 2014. The genetics of conservation translocations: a tale of two eagles. Wilson Ornithological Society – Association of Field Ornithologists Annual Meeting, Newport, RI.
138. Slover, C. and **T. Katzner**. 2014. Whip-poor-wills are associated with the interface of forest-agriculture habitat in rural West Virginia. Wilson Ornithological Society – Association of Field Ornithologists Annual Meeting, Newport, RI.
137. Dennhardt, A., **T. Katzner**, A. Duerr, G. Merovich, and D. Brandes. 2014. Modeling Migration and Citizen-Science Data to Estimate Golden Eagle (*Aquila chrysaetos canadensis*) Abundance in Eastern North America: Are Present Estimates Too High or Low? Wilson Ornithological Society – Association of Field Ornithologists Annual Meeting, Newport, RI.
136. **Invited Expert.** 2014. American Wind Wildlife Institute Innovative Technologies Workshop. Charlotte, NC.
135. **Katzner, T.E.** 2014. Developing high-resolution spatial data of migration corridors for avian species of concern in regions of high potential wind development. US Department of Energy: Wind Power Peer Review,

Arlington, VA.

134. **Session Organizer**: Golden eagles in California and Nevada: Status, behavior and movements and protection. Desert Tortoise Council, 39th Annual Meeting & Symposium. Ontario, CA. Oral presentation.
133. Duerr, A.E., T.A. Miller, M. Braham & **T. Katzner**. 2014. Flight behavior of desert golden eagles. Desert Tortoise Council, 39th Annual Meeting & Symposium. Ontario, CA. Oral presentation.
132. **Katzner, T.E.**, A. Duerr, T. Miller & M. Braham. 2014. Movements of eagles in the California desert. Desert Tortoise Council, 39th Annual Meeting & Symposium. Ontario, CA. Oral presentation.
131. Doyle, J. **T. Katzner**, P. Bloom, Y. Ji., B. Wijayawardena & A. DeWoody. 2014. Genome sequence of a California golden eagle: foundation of a new tool for wildlife management. The Western Section of The Wildlife Society 2014 Annual Meeting. Reno, NV. Oral presentation.
130. Weldy, M. T. Miller, S.R. Wood, M. Strager & **T. Katzner**. 2014. Using public data and satellite imagery to construct natural resource management databases: wind turbine installations in Nevada and California. The Western Section of The Wildlife Society 2014 Annual Meeting. Reno, NV. Poster presentation.
129. **Katzner, T.,** D. Nelson, M. Braham, J. Doyle, P. Bloom, T. Miller, A. Duerr & A. DeWoody. 2014. Origins of eagles killed at the Altamont Pass Wind Resource Area. The Western Section of The Wildlife Society 2014 Annual Meeting. Reno, NV. Oral presentation.
128. Braham, M.,A. Duerr, T. Miller, M. Lanzone, D. Brandes & **T. Katzner**. 2014. Year-round home range of Mojave golden eagles: interpreting the scale of threat from renewable energy development. The Western Section of The Wildlife Society 2014 Annual Meeting. Reno, NV. Oral presentation.
127. **Katzner T**. & A. Duerr. 2014. Desert eagles and renewable energy. California – Nevada Golden Eagle Working Group Meeting. Reno, NV. Oral presentation.
126. Doyle JM, **Katzner TE**, Bloom PH, Ji Y, Wijayawardena BK, Nelson D and JA DeWoody. 2014. Genetic and genomic insights into the biology of the golden eagle. Purdue University Ecolunch, West Lafayette, Indiana. Oral presentation.
125. Workshop Organizer: Eastern Golden Eagle Working Group, Second Meeting. Sainte-Anne-des-Monts, Quebec, Canada, 10-13 July 2012.
124. Doyle JM, **Katzner TE**, Bloom PH, Ji Y, Wijayawardena BK and JA DeWoody. 2013. The genome sequence of a widespread apex predator, the golden eagle (*Aquila chrysaetos*). 11th Annual Ecological Genomics Symposium, Kansas City, Kansas. Oral presentation.
123. Behmke, S., J. Fallon, A. Duerr & T. Katzner. 2013. Chronic Lead Poisoning is Epidemic in Obligate Scavengers in Eastern North America. Worldwide Raptor Conference. Bariloche, Argentina. Oral presentation.
122. Dennhardt, A., T. Katzner, A. Duerr, G. Merovich & D. Brandes. 2013. Modeling Migration Counts to Estimate Abundance: a Population Estimate for Golden Eagles (*Aquila chrysaetos canadensis*) in eastern North America. Worldwide Raptor Conference. Bariloche, Argentina. Oral presentation.
121. Miller, T.A., R.P. Brooks, M.J. Lanzone, D. Brandes, C. Maisonneuve, J.A. Tremblay, J. Cooper, K. O'Malley, A.E. Duerr, T.E. Katzner. 2013. Biotic and Abiotic Factors Influencing Directness of Migratory Flight Paths of Golden Eagles (*Aquila chrysaetos*) in Eastern North America are Scale Dependent. Worldwide Raptor Conference. Bariloche, Argentina. Oral presentation.
120. Lanzone, M.J., P. J. Turk, T.A. Miller, A. Duerr, D. Brandes, J. Cooper, J. Tremblay, C. Maisonneuve, and T. Katzner. 2013. Subsidized Lift in Migratory Flight of Golden Eagles (*Aquila chrysaetos*). Worldwide Raptor Conference. Bariloche, Argentina. Oral presentation.
119. Nelson, D.M., **T. Katzner**, T.A. Miller, A.E. Duerr, J. Cooper, M. Lanzone, M. Wheeler, and D. Brandes. 2013. Assessing the movements and diets of golden eagles in eastern North America using stable isotope and telemetry data. Ecological Society of America annual meeting- Minneapolis, MN.
118. Slover, C. & **T. Katzner**. 2013. Impacts of prescribed burning on avian community structure in the central Appalachians. WVU-Davis College Graduate Student Research Symposium, Morgantown, WV
117. Dennhardt, A., **T. Katzner**, A. Duerr, G. Merovich & D. Brandes. 2013. Modeling migratory flight routes of Golden Eagles (Aquila chrysaetos) in variable meteorological and topographic landscapes. WVU-Davis College Graduate Student Research Symposium, Morgantown, WV
116. Chidester, R., Turk, P., **Katzner, T.**, Duerr, A., Miller, T., and Lanzone, M. 2013. `Using a Logistic Model to Assess Misclassification of Predicted Flight of Golden Eagles. Poster, Spring Banquet of the Pittsburgh Chapter of the American Statistical Association, Pittsburgh, PA.
115. Katzner, T., P. Turk, A. Duerr, T. Miller, M. Lanzone, J. Cooper, D. Brandes, C. Maisonneuve & J. Tremblay. 2013. Subsidized lift in migratory flight of golden eagles. Wilson Ornithological Society Annual Meeting, Williamsburg, VA.

114. Duerr, A., T. Miller, M. Lanzone, D. Brandes, J. Cooper, K. O'Malley, C. Maisonneuve, J. Tremblay & **T. Katzner**. 2013. Meteorological drivers of soaring migratory flight of golden eagles in eastern North America. Wilson Ornithological Society Annual Meeting, Williamsburg, VA.

113. Dennhardt, A., T. Katzner, A. Duerr, G. Merovich & D. Brandes. 2013. Modeling migratory flight routes of raptors in variable meteorological and topographic landscapes. Wilson Ornithological Society Annual Meeting, Williamsburg, VA.

112. Wheeler, M., B. Porter & **T. Katzner**. 2013. The genetic impact of translocations and reintroductions: a tale of two eagles. Wilson Ornithological Society Annual Meeting, Williamsburg, VA.

111. Slover, C. & **T. Katzner**. 2013. Impacts of prescribed burning on avian community structure in the central Appalachians. Wilson Ornithological Society Annual Meeting, Williamsburg, VA. *poster presentation.*

110. Katzner, T.E., A.E. Duerr, T.A. Miller, M.J. Lanzone, D. Brandes & P. Turk. 2012. Monitoring Seasonal Movements and Ranging Behavior Of Golden Eagles in the Context of Energy Development. California-Nevada Golden Eagle Working Group Symposium: distribution, abundance, and population status of golden eagles in California and Nevada, Sacramento, CA.

109. Katzner, T.E., A.E. Duerr, D. Brandes, T.A. Miller, M.J. Lanzone, C. Maisonneuve, J.A. Tremblay, R.Mulvihill, G. Merovich, K. O'Malley, J. Cooper. 2012. Meteorological and topographic drivers of migratory flight of golden eagles: implications for wind energy development. Oral Presentation. National Wind Coordinating Collaborative Research Meeting. Denver, CO, USA.

108. Miller, T.A., R.P. Brooks, M.J. Lanzone, D. Brandes, C. Maisonneuve, J.A. Tremblay, J. Cooper, K.O'Malley, A.E. Duerr, **T.E. Katzner.** 2012. Competing resource selection modeling predicts risk for preventing and mitigating impacts to flying birds from industrial wind energy developments. Oral Presentation. National Wind Coordinating Collaborative Research Meeting. Denver, CO, USA.

107. Duerr, Adam E., T.A. Miller, M.J. Lanzone, D. Brandes, J. Cooper, C. Maissoneuve, J. Tremblay, P. Turk, K. O'Malley, R.P. Brooks, **T. Katzner.** 2012. Golden eagles in eastern North America: Population status and habitat use relative to wind energy development. The Wildlife Society 19th Annual Conference. Portland OR. 17 October.

106. Kapetanakos, Y., **T. Katzner**, & I. Lovette. 2012. Filling in the gaps: using non-invasive genetic mark-recapture to develop a comprehensive demographic assessment of critically endangered vultures in Cambodia. North American Ornithological Conference, Vancouver, BC, 14-18 August 2012.

105. Miller, T., R. Brooks, **T. Katzner**, M. Lanzone, C. Maisonneuve, J. Tremblay, J. Cooper & K. O'Malley. 2012. Seasonal and intraspecific drivers of movement ecology of a migratory avian predator. North American Ornithological Conference, Vancouver, BC, 14-18 August 2012.

104. Duerr, A.E., T. Miller, M. Lanzone, D. Brandes, J. Cooper, K. O'Malley, C. Maisonneuve, J. Tremblay & **T.Katzner**. 2012. Weather drives migratory flight behavior of golden eagles: implications for understanding wind-wildlife interactions and climate change effects oKn migratory behavior. North American Ornithological Conference, Vancouver, BC, 14-18 August 2012.

103. Katzner, T., D. Brandes, T. Miller, M. Lanzone, C. Maisonneuve, J. Tremblay, B. Mulvihill & G. Merovich. 2012. Topography drives migratory flight altitude of golden eagles: implications for wind energy development. North American Ornithological Conference, Vancouver, BC, 14-18 August 2012.

102. Wheeler, M., **T. Katzner** & B. Porter. 2012. Assessing the genetic diversity and distinctiveness of eastern North American golden eagles: long-term conservation impacts of exotic introductions on a small native population. North American Ornithological Conference, Vancouver, BC, 14-18 August 2012.

101. Tremblay, J. C. Maisonneuve, **T. Katzner**, T. Miller, M. Lanzone, D. Brandes. 2012. A case study of the interaction between landscape configuration and habitat use at a wind facility by golden eagles (*Aquila chrysaetos*). North American Ornithological Conference, Vancouver, BC, 14-18 August 2012.

100. Workshop Organizer: Eastern Golden Eagle Working Group, Second Meeting. Sainte-Anne-des-Monts, Quebec, Canada, 10-13 July 2012.

99. Брагин Е.А., **Катцнер Т.**, Брагин А.Е. 2012. Пространственные связи популяции орла-могильника *Aquila heliaca* островных лесов Костанайской области [The spatial relations of the Imperial Eagle Aquila heliaca population of forest patches of Kostanay Region]. Second international conference on biodiversity of Asian steppes. Kostanay, Kazakhstan, 5-6 June 2012.

98. Katzner, T.E. J.A.R. Ivy, E.A. Bragin, E.J. Milner-Gulland & J.A. DeWoody. 2012. How many eagles are at Naurzum? Second international conference on biodiversity of Asian steppes. Kostanay, Kazakhstan, 5-6 June 2012. *Plenary session.*

97. Katzner, T.E, D. Brandes, T.A. Miller, M. Lanzone, C. Maisonneuve, J.Tremblay, R. Mulvihill & G. Merovich.

2012. Topography drives migratory flight altitude of golden eagles: implications for on-shore wind energy development. Northeastern Association of Fish and Wildlife Agencies Annual Meeting, Charleston, WV.

96. Katzner, T., B.W. Smith, T. A. Miller, D. Brandes, J. Cooper, M. Lanzone, D. Brauning, C. Farmer, S. Harding, D. Kramar, C. Koppie, C. Maisonneuve, M. Martell, E..K. Mojica, C. Todd, J.A. Tremblay, M. Wheeler, D.F. Brinker, T.E. Chubbs, R. Gubler, K. O'Malley, S. Mehus, B. Porter, R.P. Brooks, B.D. Watts & K.L. Bildstein. 2012. Status, biology and conservation priorities for North America's eastern Golden Eagle (*Aquila chrysaetos*) population. Northeastern Association of Fish and Wildlife Agencies Annual Meeting, Charleston, WV.

95. Miller, T.A., M. Lanzone, R.P. Brooks, J. Cooper, P.J. Turk, **T.E. Katzner**, C. Maisonneuve & J.A. Tremblay. 2012. Seasonal variation in home range size and movement patterns of golden eagles (*Aquila chrysaetos*) in eastern North America. Northeastern Association of Fish and Wildlife Agencies Annual Meeting, Charleston, WV.

94. Duerr, A.E., T.A. Miller, M. Lanzone, D. Brandes, K. O'Malley, C. Maisonneuve, J. Tremblay & **T. Katzner**. 2012. Flight speed during migration: is using slope soaring faster than gliding between thermals? Northeastern Association of Fish and Wildlife Agencies Annual Meeting, Charleston, WV.

93. Sklyarenko, S. & **T. Katzner.** 2011. Status of populations of vultures in Kazakhstan. International ornithological conference devoted to centerary of birth of M.N. Korelov, Almaty, Kazakhstan. [In Russian, given as Состояние популяций хищных птиц-падальщиков в Казахстане. Международная орнитологическая конференция, посвященная 100-летию со дня рождения М.Н. Корелова].

92. Participant: American Wind Wildlife Institute, Eagle Workshop. 2011. Hosted by USFWS Mountain and Prarie Office, Region 6, Denver, Colorado, USA.

91. Katzner, T., T. Miller, D. Brandes, J. Cooper, A. Duerr, M. Lanzone, C. Maisonneuve, J. Tremblay, R. Brooks, P. Turk & K. O'Malley. 2011. High frequency GPS telemetry to evaluate migration and habitat use of raptors relative to wind development. The Wildlife Society's 18th Annual Conference, Kona, Hawaii.

90. Katzner, T., B.W. Smith, T. A. Miller, D. Brandes, J. Cooper, M. Lanzone, D. Brauning, C. Farmer, S. Harding, D. Kramar, C. Koppie, C. Maisonneuve, M. Martell, E..K. Mojica, C. Todd, J.A. Tremblay, M. Wheeler, D.F. Brinker, T.E. Chubbs, R. Gubler, K. O'Malley, S. Mehus, B. Porter, R.P. Brooks, B.D. Watts & K.L. Bildstein. 2011. Status, biology and conservation priorities for North America's eastern Golden Eagle (*Aquila chrysaetos*) population. Raptor Research Foundation 2011 Annual Meeting, Duluth ,MN.

89. Maisonneuve, C., J. Tremblay, T. Miller, **T. Katzner**, M. Lanzone, D. Brandes. 2011. Variation in home range sizes of golden eagles (*Aquila chrysaetos canadensis*) breeding in Quebec. Raptor Research Foundation 2011 Annual Meeting, Duluth ,MN.

88. Miller, T., M. Lanzone, D. Brandes, C. Maisonneuve, J. Cooper, K. O'Malley, R. Brooks & **T. Katzner**. 2011. Characteristics of spring migration of golden eagles (*Aquila chrysaetos*) through eastern North America, as determined by GPS-GSM and conventional satellite telemetry. Raptor Research Foundation 2011 Annual Meeting, Duluth ,MN.

87. Miller, T., M. Lanzone, **T. Katzner**, P. Turk, D. Brandes. C. Maissoneuve, J. Tremblay, J. Cooper. K. O'Malley & R.P. Brooks. 2011. Striking a balance: Modeling migration of golden eagles (*Aquila chrysaetos*) through wind energy developments of the Central Appalachian Mountains, USA. Raptor Research Foundation 2011 Annual Meeting, Duluth, MN. *Student presentation award winner.*

86. Brandes, D., C. Maisonneuve, J. Tremblay, T. Miller, **T. Katzner**, & M. Lanzone. 2011. Influence of high-latitude warming on fall migration timing of eastern golden eagles (*Aquila chrysaetos*). Raptor Research Foundation 2011 Annual Meeting, Duluth, MN.

85. Cooper, J., T. Miller, **T. Katzner**, M. Lanzone, D. Kramar, K. O'Malley, C. Maisonneuve, & J. Tremblay. 2011. Winter ranging behavior of golden eagles (*Aquila chrysaetos*) in the central Appalachian Mountains. Raptor Research Foundation 2011 Annual Meeting, Duluth ,MN.

84. Wheeler, M., B. Porter & **T. Katzner**. 2011. Assessing the genetic diversity and distinctness of eastern North American golden eagles. Raptor Research Foundation 2011 Annual Meeting, Duluth ,MN.

83. Duerr, A., T. Miller, M. Lanzone, J. Cooper, P. Turk & **T. Katzner**. 2011. High frequency GPS-GSM telemetry to measure migration speed: do golden eagles migrate faster when using orographic or thermal lift? Raptor Research Foundation 2011 Annual Meeting, Duluth ,MN.

82. Lanzone, M., C. Halverson, T. Miller, P. Turk, D. Brandes & **T. Katzner**. 2011. High-frequency GPS-GSM telemetry provides new insights into raptor behavior and ecology. Raptor Research Foundation 2011 Annual Meeting, Duluth ,MN.

81. Session chair: Conservation of Vultures Around the World**.** Workshop on the future of vultures in Israel and the

Middle East. 19-22 September 2011, Kfar Blum, Hula Valley, Israel.

80. Katzner, T. Y. Kapetanakos, I. Lovette, S. Sklyarenko, H. Rainy & B. Pech. 2011. Non-invasive monitoring to estimate demography of vultures in central & south Asia. Workshop on the future of vultures in Israel and the Middle East. 19-22 September, Kfar Blum, Hula Valley, Israel.

79. Miller, T., M. Lanzone, P. Turk, D. Brandes. C. Maissoneuve, J. Tremblay, J. Cooper. K. O'Malley. **T. Katzner**, R.P. Brooks. 2011. Striking a balance: Modeling migration of golden eagles (*Aquila chrysaetos*) through wind energy developments of the Central Appalachian Mountains, USA. Spatial Ecology and Conservation Conference, Birmingham, UK.

78. Katzner, T., T. Miller, M. Lanzone, D. Brandes, R. Brooks, J. Cooper, C. Maisonneuve, J. Tremblay, K. O'Malley. 2010. Golden Eagles and Wind Energy in Eastern North America. U.S. Fish and Wildlife Service, Northeast Region Biologists Conference, 15-18 Feb, Baltimore, MD.

77. Katzner, T. 2010. Demography of eastern golden eagles: population estimation for the past and present. Hawk Mountain Sanctuary, Kempton, PA.

76. Workshop Organizer: Eastern Golden Eagle Working Group, First Meeting. Hawk Mountain Sanctuary, 17-19 November 2010, Kempton, PA.

75. Katzner, T., T. Miller, M. Lanzone, D. Brandes, R. Brooks, J. Cooper, C. Maisonneuve, J. Tremblay, K. O'Malley. 2010. Interactions between migratory birds of prey and wind turbines: insights from novel high frequency gps-gsm telemetry. NWCC Wind Wildlife Research Meeting, Denver, CO.

74. Tremblay, J., C. Maisonneuve. **T. Katzner**, T. Miller, M. Lanzone, & D. Brandes. 2010. A case study of the interaction between landscape configuration and visits of a wind facility by Golden Eagles (*Aquila chrysaetos*). NWCC Wind Wildlife Research Meeting, Denver, CO.

73. Maisonneuve, C., J. Tremblay, **T. Katzner**, T. Miller, M. Lanzone & D. Brandes. 2010. Influence of landscape configuration on wind facility frequentation by Golden eagles - A case study. Raptor Research Foundation Annual Meeting, Ft. Collins, CO.

72. Katzner, T. T. Miller, M. Lanzone, D. Brandes, & R. Brooks. 2010. Threats to migrating raptors from development of wind energy: Golden eagles as an umbrella species for conservation. Ecological Society of America, Annual Conference, Pittsburgh, PA.

71. Session Moderator: Movement and Migration. The 6th International Conference on Asian Raptors, ARRCN. Ulaanbaatar, Mongolia.

70. Katzner, T. 2010. Marking and tracking methods for birds of prey: why do it and what options are available. The 6th International Conference on Asian Raptors, ARRCN. Ulaanbaatar, Mongolia.

69. Katzner, T., T. Anderson, T. Miller & M. Lanzone. 2010. High frequency gps-gsm telemetry for study of movement ecology of raptors. The 6th International Conference on Asian Raptors, ARRCN. Ulaanbaatar, Mongolia.

68. Katzner, T., T. Miller, M. Lanzone, D. Brandes, & R. Brooks. 2010. Threats to migrating golden eagles from development of wind energy. Wilson Ornithological Society 2010 Annual Meeting, Geneva, NY.

67. Brandes, D., G. Bohrer, J. Mandel, **T. Katzner**, T. Miller, M. Lanzone, C. Maisonneuve, and J. Tremblay. 2010. Raptor migration by computer – using modeling and satellite tracking data to fill in the gaps. 2010 Conference of the Hawk Migration Association of North America, Duluth, MN.

66. Anderson, T., C. Halverson, **T. Katzner**, M. Lanzone & T. Miller. 2010. High frequency GPS-GSM telemetry data to delineate flight strategies of migratory birds: an example with golden eagles. Bird Migration and Global Change: Second Conference. Algeciras, Spain.

65. Session Moderator: Eagle population monitoring and field research. 2009. Third Annual Conference of the Eagle Conservation Alliance, Ainsa, Spain.

64. Miller, T., D. Brandes, M. Lanzone, D. Ombalski, C. Maisonneuve, R.P. Brooks and **T. Katzner**. 2009. Flight behavior of migrating golden eagles in the eastern USA: insights from high-frequency telemetry. Third Annual Conference of the Eagle Conservation Alliance, Ainsa, Spain.

63. Lanzone, M., C. Halverson and **T. Katzner**. 2009. High frequency GSM telemetry for tracking eagles. Third Annual Conference of the Eagle Conservation Alliance, Ainsa, Spain.

62. Session Moderator: General Session. Raptor Research Foundation 2009 Annual Conference, Pitlochry, Scotland.

61. Brandes, D., **T. Katzner**, T. Miller and M. Lanzone. 2009. Simulation of golden eagle (*Aquila chrysaetos*) migration pathways through the central Appalachians. Raptor Research Foundation 2009 Annual Conference, Pitlochry, Scotland.

60. Miller, T., D. Brandes, M. Lanzone, D. Ombalski, C. Maisonneuve, R.P. Brooks and **T. Katzner**. 2009. Modeling migratory flight characteristics of eastern North American golden eagles (*Aquila chrysaetos*) using high-

frequency telemetry data. Raptor Research Foundation 2009 Annual Conference, Pitlochry, Scotland.

59. Lanzone, M., C. Halverson and **T. Katzner**. 2009. Development of a high-frequency GSM telemetry device for tracking raptors. Raptor Research Foundation. 2009 Annual Conference, Pitlochry, Scotland.

58. Jackson, D.S., J.A.R.Ivy, E.A. Bragin, A. DeWoody & **T. Katzner**. 2009. Variation in offspring sex ratio of the sexually dimorphic, long-lived eastern imperial eagle. Raptor Research Foundation 2009 Annual Conference, Pitlochry, Scotland.

57. Miller, T., M. Lanzone, C. Maisonneuve, A. Mack, R.P. Brooks and **T. Katzner**. 2009. Multi-scale application of a common hydrological measure to migratory flight paths obtained from satellite and high frequency GSM telemetry. American Ornithologists Union, Philadelphia, PA.

56. Participant: "Scaling biodiversity monitoring from the local to the global." 2009. Hosted by Centre for Population Biology, Imperial College London. Ascot, UK.

55. Kapetanakos, Y. and **T. Katzner**. 2009. DNA barcoding is for the birds: using an old technique in new situations: a case study for Asian vultures. Wilson Ornithological Society & Association of Field Ornithologists, 2009 Joint Annual Conference, Pittsburgh, PA. 2006-2009.

54. Miller, T., M. Lanzone, R. Brooks and **T. Katzner**. 2009. Flight characteristics of golden eagles (*Aquila chrysaetos*) migrating through eastern North America as determined by GPS telemetry. Wilson Ornithological Society & Association of Field Ornithologists, 2009 Joint Annual Conference, Pittsburgh, PA. 2006-2009.

53. Lanzone, M., C. Halverson, and **T. Katzner.** 2009. A high frequency GSM telemetry device for tracking wildlife. Wilson Ornithological Society & Association of Field Ornithologists, 2009 Joint Annual Conference, Pittsburgh, PA. 2006-2009.

52. Maisonneuve, C., T.A. Miller, M.J. Lanzone, and **T.E. Katzner**. 2008. Studies on threatened species of birds of prey and wind farms in eastern North America. Nature and Biodiversity Conservation Union. International Workshop on Birds of Prey and Wind Farms. Berlin, Germany.

51. Miller, T.A., C. Maisonneuve and **T.E. Katzner** 2008. Determining where, in eastern North America, there is the greatest potential for conflict between Golden Eagles and wind power development. Wind Wildlife Research Meeting VII. Milwaukee, WI.

50. Katzner, T.E., J. Ibaňez, N. Collar. 2008. Ecology and conservation status of the Philippine eagle: a species in need of landscape scale conservation. Setting landscape conservation targets and promoting them through compatible land use in the Philippines. Conservation International (CI) and World Agroforestry Centre (ICRAF) Philippines Project Meeting, Los Baňos, Philippines.

49. Participant: Setting landscape conservation targets and promoting them through compatible land use in the Philippines. 2008. Conservation International (CI) and World Agroforestry Centre (ICRAF) Philippines Project Meeting, Los Baňos, Philippines.

48. Participant: Defying Extinction: Philippine Eagle Action Plan National Workshop" 2008. Tagaytay, Philippines. Co-hosted by Philippines Protected Areas and Wildlife Bureau and the Philippine Eagle Foundation.

47. Bragin, E.A., J. Rudnik, **T. Katzner**, A. DeWoody. 2008. New methods for raptors research: results of research on the imperial eagle in north Kazakhstan. 5th international conference on birds of prey of northern Eurasia. Ivanovo, Russia.

46. Bragin, A., **T. Katzner**, P. Sharpe, D. Garcelon, A. E. Bragin. 2008. Results of research on imperial eagle migrations from northern Kazakhstan. 5th international conference on birds of prey of northern Eurasia. Ivanovo, Russia.

45. Rudnick, J.A., **T.E. Katzner**, E.A. Bragin, and J.A. DeWoody. 2007. A noninvasive genetic evaluation of population size and natal philopatry of non-breeding eastern imperial eagles (*Aquila heliaca*) in Kazakhstan. Conservation Genetics Symposium, New York, NY.

44. Session Moderator: Sampling and Techniques. 2007 Joint Conference of the Raptor Research Foundation and the Hawk Migration Association of North America, Fogelsville, PA.

43. Brandes, D., **T. Katzner**, T. Miller, M. Lanzone, K. Bildstein and D. Ombalski. 2007. A terrain-based dynamic model for simulating raptor migration through the Appalachians. 2007 Joint Conference of the Raptor Research Foundation and the Hawk Migration Association of North America, Fogelsville, PA.

42. Miller, T., D. Brandes, M. Lanzone, D. Ombalski, R. Mulvihill, R. Brooks and **T. Katzner**. 2007. Flight characteristics of golden eagles (*Aquila chrysaetos*) migrating through eastern North America as determined by GPS telemetry. 2007 Joint Conference of the Raptor Research Foundation and the Hawk Migration Association of North America, Fogelsville, PA.

41. Lanzone, M., T. Miller, D. Brandes, D. Ombalski, R. Mulvihill and **T. Katzner**. 2007. Golden eagle (*Aquila chrysaetos*) wintering behavior in the Appalachian Mountains of eastern North America using GPS satellite

telemetry. 2007 Joint Conference of the Raptor Research Foundation and the Hawk Migration Association of North America, Fogelsville, PA.

40. Katzner, T.E., J. Rudnick, E.A. Bragin and J.A. DeWoody. 2007. What you see isn't always what you get: how accurate are counts of raptors and how many non-breeders are really out there? 2007 Joint Conference of the Raptor Research Foundation and the Hawk Migration Association of North America, Fogelsville, PA.

39. Katzner, T.E., J. Rudnick, E.A. Bragin, J.A. DeWoody and E.J. Milner-Gulland. 2007. New approaches to monitoring eagles: collecting the most appropriate data & doing it without disturbing the birds. 2nd Annual meeting of the Eagle Conservation Alliance. Puebla, Mexico.

38. Katzner, T., E.J. Milner-Gulland and E. Bragin. 2007. Using modeling to improve monitoring of eagles: are we collecting the right data? International Scientific Conference "Biological Diversity of Asian Steppe," Kostanay, Kazakhstan.

37. Terraube, J., B. Arroyo, F. Mougeot and **T. Katzner.** 2006. Reproductive and trophic ecology of Pallid Harriers in north Kazakhstan: implications for population dynamics and conservation. 9th Congress on Spanish Harriers. Castuera, Extramadura, Spain.

36. Sklyarenko, S. and **T. Katzner**. 2006. Status and distribution of black vulture, Eurasian griffon vulture and Himalayan griffon vulture in central Asia. Conference on Ornithological Research in Northern Eurasia. Stavropol, Russia.

35. Rudnick, J.A., **T.E. Katzner**, E.A. Bragin, and J.A. DeWoody. 2005. A Noninvasive Investigation of Juvenile Population Size and Natal Philopatry in the Eastern Imperial Eagle. Conservation Genetics Symposium, Pacific Grove, CA.

34. Poulakakis, N., Mantziou, G., Antoniou, A., Parmakelis, A., Skartsi, T., Vasilakis, D., Elorriaga, J., de la Puente, J., Gavashelishvili, A., Ghasabian, M, **Katzner, T.**, McGrady, M. Batbayar, N., Fuller, M, and Natsagdorj, T. 2005 Using microsatellite markers to infer the genetic structure of *Aegypius monachus* (Aves:Accipitridae). International Conference on Conservation and Management of Vulture Populations, Thessaloniki, Greece.

33. Katzner, T., E.J. Milner-Gulland and E. Bragin. 2005. Using modeling to improve monitoring of birds: are we collecting the right data? Wilson Ornithological Society - Association of Field Ornithologists 2005 Joint Meeting. Beltsville, MD.

32. Rudnick, J. **T. Katzner**, O.E. Rhodes, Jr., J.A. DeWoody. 2004.Non-invasive Monitoring of an Eastern Imperial Eagle Population in Kazakhstan. Society for Conservation Biology Conference, New York, NY.

31. Galushin, V., **T. Katzner** and S. Sklyarenko. 2004. The black vulture in Russia and Kazakhstan. International Symposium on the Black Vulture *Aegypius monachus*. Cordoba, Spain.

30. Katzner, T., E. Bragin, E.J. Milner-Gulland. 2004. Using modelling to improve monitoring of raptors in forest-steppe: an example with Imperial Eagles (*Aquila heliaca*) in Kazakhstan. International Symposium on Ecology and Conservation of Steppe-Land Birds, Lleida, Spain.

29. Rudnick, J. **T. Katzner**, O.E. Rhodes, Jr., J.A. DeWoody. 2004. Non-invasive monitoring of an Imperial Eagle population in Kazakhstan. 2004 Meeting of the Indiana Chapter of The Wildlife Society, Bloomington, IN, U.S.A. *Poster presentation*.

28. Rudnick, J.A., **T.E. Katzner**, E.A. Bragin, and J.A. DeWoody. 2004. Non-invasive Monitoring of an Eastern Imperial Eagle Population in Kazakhstan. Midwest Fish and Wildlife Conference Indianapolis, IN.

(27 earlier entries)

<u>INVITED SYMPOSIA (last 10 years)</u>

69. Katzner, T.E. 2014. Golden eagles in the Appalachians. Atlantic Flyway Council 2014 Summer Meeting, Charleston, WV.

68. Katzner T.E. 2014. Golden eagles and wind energy in the Appalachians. West Virginia State Parks Superintendents Annual Meeting, Chief Logan State Park, WV.

67. Katzner, T.E. 2013. California eagle research: behavior, in-season movements, territory size and non-invasive monitoring. DRECP Golden Eagle Monitoring Plan Meeting, Sacramento, CA.

66. Katzner, T.E. 2013. Conservation ecology of West Virginia's golden eagles and the threat from renewable energy development. Department of Biology, West Virginia University, Morgantown, WV.

65. Katzner, T.E. 2013. Movement ecology of golden eagles and renewable energy development in the central Appalachians. University of Maryland, Center for Environmental Sciences, Appalachian Laboratory, Frostburg, MD.

64. Katzner, T.E. 2013. Interactions between development of renewable energy and migration of birds of prey in the central Appalachian Mountains. West Virginia Wind Forum, Davis, WV.

63. Katzner, T.E., J. Rodrigue, K. O'Malley & C. Waggy. 2013. Golden eagle movement and abundance in West Virginia. WVDNR Wildlife Resources Workshop, Stonewall Resort, WV.

62. Katzner, T.E., J. Rodrigue, K. O'Malley & C. Waggy. 2013. Camera trapping to estimate abundance and occupancy of golden eagles (and other species?) in West Virginia. Cooperative WV DNR/Forest Service Stamp Meeting, Greenbank, WV.

61. Katzner, T.E. 2013. Conservation ecology of golden eagles and the threat from renewable energy development. Oberlin College, Oberlin, OH.

60. Katzner, T.E. 2013. Conservation of North American golden eagles: movement ecology and renewable energy development. University of North Texas. Denton, TX.

59. Katzner, T.E. A.E. Duerr & T.A. Miller. 2013. Measuring and understanding relationships of desert eagles to the environment and to renewable energy development: context and preliminary interpretation. Desert Tortoise Council 38th Annual Symposium, Las Vegas, NV.

58. Katzner, T.E. 2013. Conservation of North American golden eagles: movement and behavior in the face of renewable energy development. Department of Forestry and Natural Resources, Purdue University, IN.

57. Katzner, T.E. 2012. Golden eagles & wind energy in eastern North America: new threats along historical migration routes. Eastern Massachusetts Hawkwatch Annual Meeting Plenary Speaker, Bedford, MA.

56. Katzner, T.E. 2012. Golden eagles & wind energy in eastern North America: new threats along historical migration routes. Sharon Audubon Society, Sharon, CT.

55. Katzner, T.E. 2012. Understanding Movement Ecology and Risk Assessment for Golden Eagles and Wind Energy in Eastern North America. Department of Biology, University of Pittsburgh, Pittsburgh, PA.

54. Katzner, T.E. 2012. Status and ecology of the golden eagle in West Virginia. 55th Annual Joint Reservoir Management Meeting. Chief Logan State Park, WV.

53. Katzner, T.E. 2011. Golden eagles & wind energy in eastern North America: new threats along historical migration routes. USFWS Science Seminar Series, USFWS Region 5 regional offices, Hadley, MA.

52. Katzner, T.E. 2011. West Virginia's Golden Eagles and Wind Energy: new threats along historical migration routes. Mountaineer Audubon Society, Morgantown, WV.

51. Katzner, T. 2011. Status, conservation and demography of eastern golden eagles in West Virginia. WVDNR-USFS Stamps Meeting, Blackwater State Park, Davis, WV.

50. Katzner, T. 2011. Non-invasive demography of central Asian eagles. WVU – International Research Symposium, Morgantown, WV.

49. Katzner, T.E. 2011. Conservation and Ecology of Eagles around the World. Three Rivers Bird Club, Pittsburgh, PA.

48. Miller, T.M., M. Lanzone, D. Brandes, **T. Katzner.** 2011. Golden Eagle Research Project. Pennsylvania Society for Ornithology. Annual Meeting, Bedford, PA.

47. Katzner, T.E. 2011. West Virginia's Golden Eagles and Wind Energy: new threats along historical migration routes. Maurice Brooks Lecture, Morgantown WV.

46. Katzner, T.E. 2011. Conservation and Ecology of Eagles around the World. The Wildlife Society, WVU Student Chapter, Morgantown, WV.

45. Katzner, T.E. 2011. Asian vulture decline: addressing the world's greatest modern ornithological conservation catastrophe. Linn County Community Connections Speaker, Cedar Rapids, IA.

44. Katzner, T.E. 2011. Golden Eagles and Wind Energy in Eastern North America. Coe College Department of Biology, Cedar Rapids, IA.

43. Katzner, T.E. 2011. Conservation and Ecology of Eagles around the World. International Association of Avian Trainers and Educators, Annual Conference, Pittsburgh, PA, 17 Feb 2011. *Keynote address.*

42. Katzner, T.E. 2011. Asian vulture decline: addressing the world's greatest modern ornithological conservation catastrophe. Wildlife & Fisheries Seminiar, Division of Forestry & Natural Resources, West Virginia University, Morgantown, WV.

41. Katzner, T.E. 2010. Golden eagles and wind energy: siting wind power for improved conservation management. Delaware Valley Ornithological Club, Philadelphia, PA.

40. Katzner, T.E. 2010. Golden eagles and energy development in the central Appalachians: application of novel high frequency GSM telemetry for predictive modeling. US Forest Service, Parsons, WV.

39. Katzner, T.E. 2010. Developing best practices for siting wind turbines: utility grade wind energy and soaring birds of prey. Pennsylvania Game Commission, Wind Energy Cooperator's Meeting, Harrisburg, PA.

38. Katzner, T.E. 2010. Eagle conservation ecology across two continents. West Virginia University Division of Forestry and Natural Resources, Morgantown, WV.

37. Katzner, T.E. 2010. Non-invasive approaches to demography of rare and endangered species. Smithsonian Conservation Biology Institute, Front Royal, VA.

36. Katzner, T.E. 2010. Non-invasive approaches to demography of rare and endangered species. Department of Biology, Indiana University of Pennsylvania, Indiana, PA.

35. Maisonneuve, C., J. A. Tremblay, T. Miller, D. Brandes, M. Lanzone, and **T. Katzner**. 2009. L'utilisation de la télémétrie satellitaire pour intégrer les besoins des oiseaux de proie dans le développement éolien. (The use of satellite telemetry to integrate the needs of birds of prey in the wind energy development) University of Québec at Rimouski.

34. Katzner, T.E. 2009. Eagles and Vultures in Asia: Non-invasive demography of threatened & endangered species. Birding and Ornithology Club, University of Pittsburgh, Pittsburgh, PA.

33. Katzner, T.E., Y. Kapetanakos, I. Lovette, S. Sklyarenko & N. Clum. 2009. Asian vulture decline: addressing the world's greatest modern ornithological conservation catastrophe. Delaware – Otsego Audubon Society, Oneonta, NY.

32. Katzner, T.E. 2009. Non-invasive demography of threatened & endangered vultures and eagles. Department of Biology, Hartwick College, Oneonta, NY.

31. Katzner, T.E., D. Brandes, M. Lanzone, C. Maisonneuve, T. Miller and D. Ombalski. 2009. Migrating eagles and wind turbines: filling the information void. Biology Department, State University of New York, College at Oneonta, Oneonta, NY.

30. Katzner, T.E., D. Brandes, M. Lanzone, C. Maisonneuve, T. Miller and D. Ombalski. 2009. Sustainable energy and wildlife: research for coexistence. Sigma Xi Society, Alcoa Inc., Chapter.

29. Katzner, T.E., D. Brandes, M. Lanzone, C. Maisonneuve, T. Miller and D. Ombalski. 2009. Eagles and falcons in Pennsylvania: research and natural history for conservation. Point Park University, Pittsburgh PA.

28. Katzner, T.E. 2009. Migrating Eagles and Wind Turbines: Filling the Information Void. The Pennsylvania State University, New Kensington Campus.

27. Brandes, D., **Katzner, T.,** Miller, T., Lanzone, M., and D. Ombalski. 2009. Appalachian wind energy and raptors: moving forward in a data vacuum. Appalachian Laboratory, University of Maryland Center for Environmental Science.

26. Katzner, T.E. 2008. Migrating Eagles and Wind Turbines: Filling the Information Void. Hawk Mountain Sanctuary Association, Kempton, PA.

25. Katzner, T.E. 2008. Counting accurately from afar: non-invasive approaches to demography of rare and endangered species. The University of Pittsburgh Pymatuning Laboratory of Ecology, Linesville, PA

24. Katzner, T.E. 2008. Migrating Eagles and Wind Turbines: Conflict Potential in an Information Void. Pennsylvania Society of Ornithology Annual Meeting, Pittsburgh, PA.

23. Katzner, T.E. 2008. Human population density: impacts on biodiversity. Lessons from a cross continental evaluation. Invited Plenary Speaker, Wildlife Conservation Society of the Philippines, Baybay City, Philippines.

22. Katzner, T.E. 2008. Migrating Eagles and Wind Turbines: Resolving Conflict in an Information Void. University of Pittsburgh, Honors College, Pittsburgh, PA.

21. Katzner, T.E. 2008.Research and conservation medicine: present and future perspectives from a field biologist. University of Pennsylvania, College of Veterinary Medicine, Philadelphia, PA.

20. Katzner, T.E. 2008. Non-invasive sample collection provides new insight to demographics of rare and endangered species. National Museum of the Philippines, Manila, Philippines.

19. Katzner, T.E. 2008. Conservation ecology at arm's length: non-invasive approaches to demography of rare and endangered species. Department of Biology, University of the Philippines – Diliman, Manila, Philippines.

18. Katzner, T.E. 2007. Conservation ecology at arm's length: non-invasive approaches to demography of rare and endangered species. Department of Biology, Westminster College, New Wilmington PA.

17. Katzner, T.E. 2007. Conservation ecology at arm's length: non-invasive approaches to demography of rare and endangered species. Odum School of Ecology, University of Georgia, Athens, GA.

16. Katzner, T.E. 2006. Non-invasive population studies of threatened raptors. Pennsylvania Society of Ornithology Annual Meeting, Powdermill Nature Reserve, PA.

15. Katzner, T.E. 2006. Conservation ecology at arm's length: non-invasive demography of rare and endangered species. Department of Biological Sciences. Duquesne University, Pittsburgh, PA.

14. Katzner, T.E. 2005. Ecology and conservation of eagles and vultures in central Asia: non-invasive approaches to the study of rare and endangered species. Vermont Institute of Natural Sciences, Queche, VT.

13. Katzner, T.E. 2005. Conservation ecology at arm's length: non-invasive demography of rare and endangered

species. Department of Biology Seminar. University of Pittsburgh, Pittsburgh, PA.

12. Katzner, T.E. 2005. Spatial structure in diet of Imperial Eagles (*Aquila heliaca*) in Kazakhstan and its relation to their demography. Coe College Wilderness Field Station, Ely, MN.

11. Katzner, T.E. 2005. Conservation of imperial eagles in Kazakhstan: can we use modeling to assess and improve our monitoring? Ecology & Evolution Seminar. University of Pittsburgh, Pittsburgh, PA.

10. Katzner, T.E. 2004. Does predator diet impact demography? An example from a population of imperial eagles in Kazakhstan. Ecology and Evolution Seminar. Imperial College London at Silwood Park, UK.

9. Katzner, T.E. 2004. Is coexistence of eagles in Kazakhstan mediated by competition? Unidad de Biología Aplicada, Estación Biológica de Doñana, Sevilla, Spain.

(8 earlier entries)

EDITORIAL AND REVIEWING ACTIVITY

Advisory Board: Animal Conservation (2013 – present)

Editor: Animal Conservation (2007 - 2013)

Handling Editor: Conservation Biology (2013 – present)

Review Panel: U.S. National Science Foundation (2010)

Book reviews: Yale University Press (2008)

Review Board (grants): National Birds of Prey Trust (2005-present)

Review Panel: Association of Zoos and Aquariums Conservation Endowment Grant Program (AZA-CEF; 2008)

Editorial Board: Animal Conservation (2005 - 2006)

Editor and compiler: Reports of the Workshop "Conservation of *Gyps* vultures in Asia." North American Ornithological Conference (2002)

Editor and compiler: Reports of the Workshop "Indian griffon vultures and their problems." 4th Eurasian Congress on Raptors (2001)

Reviewing (2014): Conservation Leadership Program (5), Conservation Biology (1), Grinnell Research Award, Cooper Ornithological Society (*3); Wilson Ornithological Society/Association of Field Ornithologists Travel Award (*10), Book Chapter (Conservation Behavior), PLoSOne, Oikos, Journal of Raptor Research (*2), Biological Conservation (*2), Journal of Applied Ecology, Ibis, Western Birds, Global Ecology and Conservation

Reviewing (2013): The Auk, APLU Board of Natural Resources, Grinnell Research Award, Cooper Ornithological Society (*6); Acta Zoologica Academiae Scientiarum Hungaricae (*3), Animal Conservation, Canadian Field Naturalist, Wildlife Biology, Civilian Defense Research Foundation, Peer Review – USFWS Eagle Fatality Model, American Wind Wildlife Institute – Expert Panel; PLoS One (*2), National Birds of Prey Trust (*16), Journal of Applied Ecology, Wildlife Conservation Society of the Philippines, Journal of Raptor Research

Reviewing (2012): National Geographic Society, Virginia Department of Game and Inland Fisheries Bald Eagle Management Guidelines, Small Grants Committee of Biological Field Station of KPGI, Kazakhstan (*7), Bird Study/Ringing & Migration (*2), Mike Madders Field Research Award (*2), Oryx, Journal of Raptor Research (*2), The Wildlife Society Bulletin (*2), American Association of Zoos and Aquaria, Conservation Endowment Fund (AZA-CEF; *3), Canadian Journal of Zoology (*2), National Birds of Prey Trust (*22), Save Our Species (SOS) Grants of IUCN, Animal Conservation, Pittsburgh Zoo and PPG Aquarium - PPG Sustainability Fund (*7), Conservation Leadership Program (CLP; *5), Wilson Ornithological Society – Student Travel Grants (*11), Journal of Field Ornithology

Reviewing (2011): International Foundation for Science (IFS), Save Our Species, IUCN Conservation Grants (*4), The Auk, Conservation Biology, Methods in Ecology and Evolution, American Institute of Biological Sciences: USFWS Population Status of Golden Eagles in North America, Mike Madders Field Research Award (*2), Conservation Leadership Program (*7), Ornitología Neotropical, USGS External Peer Review, Forktail; American Zoological and Aquarium Association Conservation Endowment Grant Program (AZA-CEF; *4), The Wildlife Society: USFWS Draft Land-based Wind Turbine Guidelines, Ibis (*2), Journal of Raptor Research, National Birds of Prey Trust (*17)

Reviewing (2010): American Institute of Biological Sciences: USFWS Bald and Golden Eagle Protection Act Standards for Review of Wind Energy Projects, Proceedings of the Royal Society, B: Biology, Forktail (*2), European Journal of Wildlife Research, Ibis (*2), U.S. National Science Foundation, The Auk, Animal Conservation, Basic and Applied Ecology (*2), Forest Ecology and Management, Acta Zoologica Bulgaria (*2), National Birds of Prey Trust (*4), Oryx (*2), Journal of Raptor Research (*2). American Zoological and Aquarium Association Conservation Endowment Grant Program (AZA-CEF; 6),

Reviewing (2009): U.S. National Science Foundation (2), The Auk, International Foundation for Science, American Zoological and Aquarium Association Conservation Endowment Grant Program (AZA-CEF; 6), Biological Conservation, Journal of Raptor Research, Acta Zoologica Bulgaria (*2), National Birds of Prey Trust.

Reviewing (2008): The Auk, Journal of Wildlife Management, Ibis, The Condor, Oryx (2), Ornis Fennica, Biological Conservation, Journal of Raptor Research (3), Journal of Mammalogy, Ardea, Mongolian Journal of Biology, Oecologia, Pittsburgh Zoo Conservation Fund Grant Program, American Zoological and Aquarium Association Conservation Endowment Grant Program (AZA-CEF; 5), Wildlife Conservation Society Research Fellowship Program (2), International Foundation for Science (Research Grants)

Reviewing (2007): Ecology, Ecological Applications, Conservation Biology, Oryx, Journal of Avian Biology, Ibis, Journal of Applied Ecology, Journal of Raptor Research, ActionBioscience.org, American Institute of Biological Sciences, Wildlife Conservation Society of the Philippines Proceedings, BP Conservation Leadership Program Grant, Association of Zoos and Aquariums Conservation Endowment Grant Program (AZA-CEF; 3), Wildlife Conservation Society - International Research Fellowship Program (2), BP Conservation Leadership Program Grant, Federal Recovery Plan for the Washington Pygmy Rabbit

Reviewing (2006): Journal of Applied Ecology, Biological Conservation (2), Bird Conservation International (2), Ecography (2), Ibis (2), Oryx (2), Animal Conservation, Journal of Raptor Research, Belgian Journal of Zoology , Vulture News, BP Conservation Leadership Program Grant, American Zoological and Aquarium Association Conservation Endowment Grant Program (AZA-CEF; 3), International Foundation for Science (Research Grants), Wildlife Conservation Society, International Research Fellowship Program,

Reviewing (2005): Journal of Applied Ecology, Animal Conservation, Journal of Raptor Research, Ostrich: the African Journal of Ornithology, Vulture News, American Zoological and Aquarium Association Conservation Endowment Grant Program (AZA-CEF; 3), BP Conservation Leadership Program Grant, International Foundation for Science (Research Grants)

Reviewing (2004): Animal Conservation, Journal of Mammalogy, Condor, Oryx, Vulture News, Mongolian Journal of Biology, Wildlife Conservation Society - International Research Fellowship Program

Reviewing (2003): Oryx, Journal of Raptor Research, Conference Proceedings: 6th World Conference on Birds of Prey and Owls, Budapest, Hungary, Wildlife Conservation Society - International Research Fellowship Program

Reviewing (other): Action Plan: Pallid Harriers, BirdLife International (2002), Proceedings of the Workshop on Golden Eagles at the 1999 Raptor Research Foundation Meeting (2001), Journal of Field Ornithology (2000), Journal of Raptor Research. (1999), Journal of Mammalogy (1998), Washington State Recovery Plan for the Pygmy Rabbit (1995)

Language Editing: Acta Theriologica Sinica (2005)

Text Editor: A birdwatching guide to Georgia. Gavashelishvili et al. 2005.

Text Editor: The Naurzum State Nature Reserve. E. Bragin, 2005

POSTDOCTORAL BIOLOGISTS AND GRADUATE STUDENTS SUPERVISED

Postdoc/Biologists	Research Topic	Institution
Jonathan Hall	Human dimensions of conservation biology 2012 – present	West Virginia University Morgantown, WV
Tricia Miller	Golden & bald eagle ecology & conservation 2012 – present	West Virginia University Morgantown, WV
Adam Duerr	Golden eagle movement & conservation 2011 – present	West Virginia University Morgantown, WV
Melissa Braham	Eagle movement & conservation 2012 – present	West Virginia University Morgantown, WV

Grad. Students	Degree & Research Topic	Institution
Mark Paulson	M.S. (expected 2017) *Golden eagle surveys in Alaska*	West Virginia University Morgantown, WV
Camille Concepcion	Ph.D. (expected 2016) *Movement ecology of Philippine raptors*	West Virginia University Morgantown, WV
Bethany Drahota	M.S. (expected 2016, PCMI degree) *Bald eagle distribution & management*	West Virginia University Morgantown, WV
Julie Mallon	M.S. (expected 2015) *Flight behavior of American vultures*	West Virginia University Morgantown, WV
Sirimgul Zarapova	Ph.D. (delayed)	Institute of Zoology

	Seasonal bird migration	Almaty, Kazakhstan
Shannon Behmke	M.S. (expected 2014; PCMI degree)	West Virginia University
	New world vulture environmental toxicology	Morgantown, WV
Christina Slover	M.S. (expected 2014)	West Virginia University
	Impact of fire on Fernow breeding birds	Morgantown, WV
Andrew Dennhardt	M.S. (2014)	West Virginia University
	Golden eagle pop. size estimate & movement	Morgantown, WV
Joshua Daniel	M.S. (expected 2014)	West Virginia University
	Black bear home range & habitat use	Morgantown, WV
Yula Kapetanakos	Ph.D. (expected 2014)	Cornell University
	Non-invasive demography of Asian vultures	Ithaca, NY
Maria Wheeler	Ph.D. (2014)	Duquesne University
	Population genetics of US golden eagles	Pittsburgh, PA
Almat Abayev	Ph.D. (delayed)	Institute of Zoology
	Migration of birds of prey	Almaty, Kazakhstan
Trish Miller	Ph.D. (2012)	The Pennsylvania State University
	Golden eagle migration & wind power	State College, PA
Michelle Losee	Ph.D. (expected 2016)	Antioch New England
	Golden eagle density & distribution in AZ	Keene, NH
Gretchen Nareff	Ph.D. (expected 2016)	West Virginia University
	Cerulean warbler ecology & distribution	Morgantown, WV
Jacob Berl	M.S. (2013)	West Virginia University
	Ecology of red headed woodpeckers	Morgantown, WV
Glenna Schmid	M.S. (2012)	West Virginia University
	Aging birds via Pentosodine	Morgantown, WV
Crissa Cooey	Ph.D. (expected 2015)	West Virginia University
	Pentosidine aging & cormorant management	Morgantown, WV
Jesse Fallon	Ph.D. (expected 2015)	Virginia Tech
	Physiological injury to birds from oil spills	Blacksburg, VA
Jennifer Gabel	Ph.D. (2007)	Duquesne University
	Gene flow & frag. anal. of Cherokee Darter	Pittsburgh, PA

Steven Knick

Present Position (since 1990): Supervisory Research Ecologist
U.S. Geological Survey, Forest and Rangeland Ecosystem Science Center, 970 Lusk Boise, ID 83706; Phone: (208) 426-5208; email: steve_knick@usgs.gov

Education

B.S. Wildlife Ecology, 1977, University of Minnesota, St. Paul, MN

M.S. Wildlife Biology, 1980, Washington State University, Pullman, WA Thesis: Factors influencing low density bobcat populations in southeastern Washington.

Ph.D. Zoology, 1987, University of Montana, Missoula, MT Dissertation: Ecology of bobcats in southeastern Idaho.

Publications

Knick, S. T., S. E. Hanser, and M. Leu. 2014. Ecological scale of bird community response to pinyon-juniper removal. Rangeland Ecology and Management 67:*in press*

Knick, S. T., M. Leu, J. T. Rotenberry, S. E. Hanser, and K. A. Fesenmyer. 2014. Diffuse migratory connectivity in two species of shrubland birds: evidence from stable isotopes. Oecologia 174:595-608. DOI 10.1007/s00442-013-2791-8

Knick, S. T., S. E. Hanser, and K. L. Preston. 2013. Modeling ecological minimum requirements for distribution of greater sage-grouse leks: implications for population connectivity across their western range, U.S.A. Ecology and Evolution 3:1539-1551. DOI: 10.1002/ece3.557

Fesenmyer, K. A., and S. T. Knick. 2011. Seasonal movements and environmental triggers to fall migration of sage sparrows. Wilson Journal of Ornithology 123:803-807.

Meinke, C. W., S. T. Knick, and D. A. Pyke. 2009. Prioritizing sagebrush ecosystems in the Intermountain West (U.S.A) for restoration. Restoration Ecology 17:652-659.

Aldridge, C. L., S. E. Nielsen, H. L. Beyer, M. S. Boyce, J. W. Connelly, S. T. Knick, and M. A. Schroeder. 2008. Range-wide patterns of greater sage-grouse persistence. Diversity and Distributions 14:983-994.

Knick, S. T., J. T. Rotenberry, and M. Leu. 2008. Habitat, topographical, and geographical components structuring bird communities. Ecography 31:389-400.

Leu, M., S. E. Hanser, and S. T. Knick. 2008. The human footprint in the west: a large-scale analysis of human impacts. Ecological Applications 18:1119-1139.

Rotenberry, J. T., K. L. Preston, and S. T. Knick. 2006. GIS-based niche modeling for mapping species' habitat. Ecology 87:1458-1464.

Katzner, T. E., E. A. Bragin, S. T. Knick, and A. T. Smith. 2006. Spatial structure in diet of imperial eagles (*Aquila heliaca*) in Kazakhstan. Journal of Avian Biology 37:594-600.

Katzner, T., E. Bragin, S. Knick and A. Smith. 2005. Relationship between demographics and dietary specificity of Imperial Eagles in Kazakhstan. Ibis 147:576-586.

Knick, S. T., A. L. Holmes, and R. F. Miller. 2005. The role of fire in shaping avian communities in sagebrush ecosystems. Studies in Avian Biology 30:63-75.

Pyke, D. A., and S. T. Knick. 2005. Plant invaders, global change, and landscape restoration. African Journal of Range and Forage Science 22:75-83.

Katzner, T. E., E. A. Bragin, S. T. Knick, and A. T. Smith. 2003. Species coexistence mediated by intraspecific interactions: evidence from a multi-species assemblage of eagles in central Asia. Condor 105:538-551.

Knick, S. T., D. S. Dobkin, J. T. Rotenberry, M. A. Schroeder, M. W. Vander Haegen, and C. Van Riper III. 2003. Teetering on the edge or too late? Conservation and research issues for avifauna of sagebrush sagebrush habitats. Condor 105:611-634.

Knick, S. T., and J. T. Rotenberry. 2002. Effects of habitat fragmentation on passerine birds breeding in Intermountain shrubsteppe. Studies in Avian Biology 25:130-140.

Knick, S. T., and J. T. Rotenberry. 2000. Ghosts of habitats past: contribution of landscape change to current habitats used by shrubland birds. Ecology 81:220-227.

Knick, S. T. 1999. Requiem for a sagebrush ecosystem? Northwest Science 73:47-51.

Knick, S. T., and J. T. Rotenberry. 1999. Spatial distribution of breeding passerine bird habitats in a shrubsteppe region of southwestern Idaho. Studies in Avian Biology 19:104-111. Invited

Rotenberry, J. T., and S. T. Knick. 1999. Multiscale habitat associations of the sage sparrow: implications for conservation biology. Studies in Avian Biology 19:95-103. Invited

Knick, S. T., and J. T. Rotenberry. 1998. Limitations to mapping habitat use areas in changing landscapes using the Mahalanobis distance statistic. Journal of Agricultural, Biological, and Environmental Statistics 3:311-322. Invited

Knick, S. T., and D. L. Dyer. 1997. Spatial distribution of black-tailed jackrabbit habitat determined by GIS in southwestern Idaho. Journal of Wildlife Management 61:75-85.

Knick, S. T., and J. T. Rotenberry. 1997. Landscape characteristics of disturbed shrubsteppe habitats in southwestern Idaho. Landscape Ecology 12:287-297.

Knick, S. T., J. T. Rotenberry, and T. J. Zarriello. 1997. Supervised classification of Landsat thematic mapper imagery in a semiarid rangeland by nonparametric discriminant analysis. Photogrammetric Engineering and Remote Sensing 63:79-86.

Marzluff, J. M., S. T. Knick, M. S. Vekasy, L. S. Shueck, and T. J. Zarriello. 1997. Spatial use patterns and habitat selection of golden eagles. Auk 114:673-687.

Van Horne, B., R. E. Schooley, S. T. Knick, G. S. Olson, and K. P. Burnham. 1997. Use of burrow entrances to indicate densities of Townsend's ground squirrels. Journal of Wildlife Management 61:92-101.

Knick, S. T., and J. T. Rotenberry. 1995. Landscape characteristics of fragmented shrubsteppe habitats and breeding passerine birds. Conservation Biology 9:1059-1071.

Knick, S. T., E. C. Hellgren, and U. S. Seal. 1993. Hematologic, biochemical, and endocrine characteristics of bobcats during a lagomorph decline in southeastern Idaho. Canadian Journal of Zoology 71:1448-1453.

Knick, S. T. 1990. Ecology of bobcats relative to exploitation and a prey decline in southeastern Idaho. Wildlife Monograph 108. 42pp.

Garner, G. W., S. T. Knick, and D. C. Douglas. 1990. Seasonal movements of adult female polar bears in the Bering and Chukchi Seas. International Conference on Bear Research and Management 8:219-226.

Knick, S. T., and W. Kasworm. 1989. Shooting mortality in small populations of grizzly bears. Wildlife Society Bulletin 17:11-15.

Laundré, J. W., T. D. Reynolds, S. T. Knick, and I. J. Ball. 1987. Accuracy of daily point relocations in assessing real movement of radiomarked animals. Journal of Wildlife Management 51:937-940.

Knick, S. T., and T. N. Bailey. 1986. Long distance movements by two bobcats from southeastern Idaho. American Midland Naturalist 116:222-223.

Knick, S. T., J. D. Brittell, and S. J. Sweeney. 1985. Population characteristics of bobcats in Washington state. Journal of Wildlife Management 48:721-728.

Knick, S. T., S. J. Sweeney, J. R. Alldredge, and J. D. Brittell. 1984. Autumn and winter food habits of bobcats in Washington state. Great Basin Naturalist 44:70-74.

Knick, S. T., and L. D. Mech. 1980. Sleeping distances in wild wolf packs. Behavioral and Neural Biology 28:507-511.

Mech, L. D., and S. T. Knick. 1978. Sleeping distances in wolf pairs in relation to the breeding season. Behavioral Biology 23:521-525.

Books

Knick, S. T., and J. W. Connelly (editors). 2011. Greater sage-grouse: ecology and conservation of a landscape species and its habitats. Studies in Avian Biology 38. University of California Press, Berkeley, CA. (Wildlife Publications Award, Outstanding Edited Book. The Wildlife Society 2012)

Knick, S. T., and J. W. Connelly. Greater sage-grouse and sagebrush: an introduction to the landscape. Pp. 1-9.

Knick, S. T. Historical development, principal federal legislation, and current management of sagebrush habitats: implications for conservation. Pp 13-31.

Miller, R. F., S. T. Knick, D. A. Pyke, C. W. Meinke, S. E. Hanser, M. J. Wisdom, and A. L. Hild. Characteristics of sagebrush habitats and limitations to long-term conservation. Pp. 145-184.

Knick, S. T., S. E. Hanser, R. F. Miller, D. A. Pyke, M. J. Wisdom, S. P. Finn, E. T. Rinkes, and C. J. Henny. Ecological influence and pathways of land use in sagebrush. Pp. 203-251.

Knick, S. T., and S. E. Hanser. Connecting pattern and process in greater sage-grouse population and sagebrush landscapes. Pp. 383-405.

Johnson, D. H., M. J. Holloran, J. W. Connelly, S. E. Hanser, C. L. Amondson, and S. T. Knick. Influences of environmental and anthropogenic features on greater sage-grouse populations, 1997-2007. Pp. 407-450.

Wisdom, M. J., C. W. Meinke, S. T. Knick, and M. A. Schroeder. Factors associated with extirpation of sage-grouse. Pp. 451-472.

Hanser, S. E., and S. T. Knick. Greater sage-grouse as an umbrella species for shrubland passerine birds: a multiscale assessment. Pp. 473-487

Connelly, J. W., S. T. Knick, et al. Conservation of greater sage-grouse: a synthesis of current trends and future management. Pp. 549-563.

Hanser, S. E., M. Leu, S. T. Knick, and C. L. Aldridge (editors). 2011. Assessment of threats to sagebrush habitats and associated species of concern in the Wyoming Basins. Allen Press, Lawrence, KS.

Knick, S. T. et al. Introduction: the Wyoming Basins Ecoregional Assessment. Pp. 1-9.

Finn, S. P., and S. T. Knick. Changes to the Wyoming Basins landscape from oil and natural gas development. Pp. 69-87.

Knick, S. T. et al. Management considerations. Pp. 387-409.

Conservation Assessment

Connelly, J. W., S. T. Knick, M. A. Schroeder, and S. J. Stiver. 2004. Range-wide conservation assessment for greater sage-grouse and sagebrush habitats. Western Association of Fish and Wildlife Agencies, Cheyenne, WY. (available online at http://sagemap.wr.usgs.gov).

Invited Papers and Book Chapters

Wisdom, M. J., M. M. Rowland, L. H. Suring, L. Schueck, C. W. Meinke, and S. T. Knick. 2005. Evaluating species of concern at regional scales. Pp. 5-74 *in* Wisdom, M. J., M. M. Rowland, and L. H. Suring (editors). Habitat threats in the sagebrush ecosystem: methods of regional assessment and applications in the Great Basin. Alliance Communications Group, Lawrence, KA.

Wisdom, M. J., M. M. Rowland, L. H. Suring, L. Schueck, C. W. Meinke, S. T. Knick, and B. C. Wales. 2005. Habitats for groups of species. Pp. 205-231 *in* Wisdom, M. J., M. M. Rowland, and L. H. Suring

(editors). Habitat threats in the sagebrush ecosystem: methods of regional assessment and applications in the Great Basin. Alliance Communications Group, Lawrence, KS.

Knick, S. T., and M. R. Fuller. 2003. Radical changes in a sagebrush landscape: the role of exotic cheatgrass in disrupting a system. Pp. 54-56 *in* Dombeck, M., C. Wood, and J. Williams (editors). From conquest to conservation: our public land legacy. Island Press, Covelo, CA.

Rotenberry, J. T., S. T. Knick, and J. E. Dunn. 2002. A minimalist approach to mapping species' habitat: Pearson's planes of closest fit. Pp. 281-289 *in* J. M. Scott, P. J. Heglund, M. Morrison, M. Raphael, J. Haufler, B. Wall, and F. B. Samson (editors). Predicting species occurrences: issues of scale and accuracy. Island Press. Covello, CA. Invited

Marzluff, J. M., J. J. Millspaugh, and S. T. Knick. 2001. High tech behavioral ecology: modeling the distribution of animal activities to better understand wildlife space use and resource selection. Pp.309-326 *in* J. J. Millspaugh and J. M. Marzluff (editors). Radiotracking and animal populations. Academic Press, San Diego, CA. Invited

Knick, S. T., J. T. Rotenberry, and B. Van Horne. 2000. Effects of disturbance on shrub steppe habitats and raptor prey in the Snake River Birds of Prey National Conservation Area, Idaho. Pp. 98-99 *in* P. G. Entwistle, A. M. DeBolt, J. H. Kaltenecker, and K. Steenhof (compilers). Proceedings: sagebrush steppe ecosystems symposium. Bureau of Land Management Publication No. BLM/ID/PT-001001+1150, Boise, ID.

Knick, S. T. 1996. New concepts in landscape ecology for managing wildlife on rangelands. Pages 18-24 *in* W. D. Edge and S. L. Olson Edge (editors). Proceedings of sustaining rangeland ecosystems symposium. Oregon St. Univ. Press, Corvallis, OR.

Rotenberry, J. T., and S. T. Knick. 1995. Evaluation of bias in roadside point-count censuses of passerines in shrubsteppe and grassland habitats. Pages 99-101 *in* C. J. Ralph, J. R. Sauer, and S. Droege, (editors). Proceedings of the symposium on monitoring bird population trends by point counts. Nov. 6-7, 1991, Beltsville, MD. USDA For. Serv. Gen. Tech. Report PSW-GTR. Albany, CA: Pacific Southwest Research Station.

Knick, S. T., J. T. Rotenberry, and T. J. Zarriello. 1992. Use of satellite imagery to detect changes in vegetation communities in the Snake River Birds of Prey Area, southwestern Idaho. Pages 97-105 *in* R. Herrmann (editor). Managing water resources during global change. Proc. 28th American Water Resources Association.

Knick, S. T. 1989. Bobcat *Felis rufus*. Pages 125-126 *in* T. W. Clark, A. H. Harvey, R. D. Dorn, D. L. Genter, and C. Groves (editors). Rare, sensitive, and threatened species of the greater Yellowstone ecosystem. Northern Rockies Conservation Cooperative.

Brittell, J. D., S. J. Sweeney, and S. T. Knick. 1979. Washington bobcats: diet, population dynamics, and movements. Pages 107-110 *in* P.C. Escherich and L. G. Blum (editors). Proc. 1979 bobcat research conference. Nat. Wildl. Fed. Sci. and Tech. Ser. 6. 137pp.

Other Papers

Knick, S. T., J. T. Rotenberry, and B. A. Hoover. 2000. Simulating fire spread and shrubland dynamics in a semiarid rangeland of southwestern Idaho using GIS and remotely sensed data. Page 110 *in* Neuenschwander, L. F., K. C. Ryan, and G. E. Golberg (editors). Proceedings-Joint Fire Science Conference and Workshop. Crossing the millennium: integrating spatial technologies and ecological principles for a new age in fire management. Vol. 2. University of Idaho, Moscow, ID.

U.S. Department of the Interior. 1998. Review panel report on the Intermountain Greenstripping Research Program. (Lead author).

U.S. Department of the Interior. 1996. Effects of military training and fire in the Snake River Birds of Prey National Conservation Area. BLM/IDARNG Research Project Final Report. U.S. Geol. Surv.,

Biol. Res. Div., Snake River Field Sta., Boise, ID 130pp. (Principal authors: K. Steenhof and S. T. Knick.)

Knick, S. T., and J. T. Rotenberry. 1995. Habitat relationships and breeding passerine birds on the Snake River Birds of Prey Area. U.S. Bur. Land Manage, Idaho Tech. Bull. No. 95-5.

Knick, S. T. 1989. Grizzlies of the Selkirks. Idaho Wildlife 9:4-7.

Knick, S. T. 1987. What do the bobcats do when the jackrabbits are gone? Idaho Wildlife 7:1417.

Presentations (2004 to present)

Knick, S. T., and S. E. Hanser. 2014. Local and landscape determinants of juniper treatment success in establishing sagebrush bird communities. July. Western Association of Fish and Wildlife Agencies, San Antonio, TX.

Hanser, S. E., and S. T. Knick. 2014. Fall habitat selection and migratory pathways of sagebrush-obligate passerines in the intermountain west. September. American Ornithological Union/Cooper Society, Estes Park, CO.

Knick, S. T., and S. E. Hanser. 2014. Local and landscape determinants of juniper treatment success in establishing sagebrush bird communities. June. Western Governors Association, Colorado Springs, CO.

Knick, S. T. 2014. Maximizing minimums: mapping basic requirement for greater sage-grouse. January. Webinar.

Knick, S. T. 2014. Sagebrush and sage-grouse landscape management: minimums and maximums. November. International Sage-grouse Forum, Salt Lake City, UT.

Knick, S. T., and D. E. Naugle. 2014. Tying it all together to conserve sage-grouse long-term: Range-wide connectivity study. May. Sage-grouse Initiative, Annual Meeting, Twin Falls, ID.

Knick, S. T., and S. E. Hanser. 2014. Bird community response to juniper removal. I. Stability, shock, and reality. March. The Wildlife Society, Northwest Chapter, Boise, ID.

Knick, S. T., and S. E. Hanser. 2014. Ecological scale of bird community response to pinyon-juniper removal. October. Society for Ecological Restoration, Bend, OR.

Hanser, S. E., and S. T. Knick. 2014. Bird response to juniper removal. II. Winners and losers. March. The Wildlife Society, Northwest Chapter, Boise, ID.

Pyke, D. A., S. T. Knick, J. C. Chambers, M. Pellant, J. L. Beck, E. W. Schupp, and P. S. Doescher. 2014. Restoration of greater sage-grouse habitat: a framework for landscape and site-specific decisions. August. Ecological Society of America, Sacramento, CA.

Knick, S. T., M. Leu, J. T. Rotenberry, S. E. Hanser, and K. A. Fesenmyer. 2013. Diffuse migratory connectivity in two species of shrubland birds: evidence from stable isotopes. August. Joint AOU/COS Meetings, Chicago, IL.

Hanser, S. E., S. T. Knick, and M. Leu. 2013. Migratory pathways of sagebrush-obligate passerines in the Intermountain West. August. Joint AOU/COS Meetings, Chicago, IL.

Isdell, R., Leu, M., Knick, S., Hanser, S., Rotenberry, J. 2013. Factors influencing shrubland bird habitat use on the wintering grounds in the southwestern U.S. March. Wilson Ornithological Society. Williamsburg, VA.

Knick, S. T., and J. C. Freemuth. 2012. If we know everything we need to know to conserve sage-grouse, why aren't we doing it? Idaho Chapter, The Wildlife Society, Boise, ID.

Knick, S. T. 2012. Landscape influence on gene flow in greater sage-grouse: conservation actions through cores and corridors. Western Association of Fish and Wildlife Agencies, Kona, HI.

Knick, S. T., S. E. Hanser, and K. L. Preston. 2012. Modeling ecological minimum requirements for greater sage-grouse across their western range, U.S.A. Pacific Northwest Climate Science Conference, Boise, ID.

Knick, S. T., S. E. Hanser, and K. L. Preston. 2012. Modeling ecological minimum requirements for greater sage-grouse across their western range, USA. Western Sage and Columbian Sharp-tailed Grouse Conference, Steamboat Springs, CO.

Preston, K. L., S. E. Hanser, R. F. Johnson, and S. T. Knick. 2012. Using ecological minimum requirements to model greater sage-grouse habitat across their western range, U.S.A. North American Ornithological Congress, Vancouver, BC.

Hanser, S.E., Knick, S.T., and Leu, M. 2012. Resistance and resilience of bird communities to pinyon-juniper removal by prescribed fire. Society for Range Management, Spokane, WA.

Knick, S.T., Hanser, S.E., and Leu, M. 2012. Multiscale costs and benefits of prescribed fire on bird communities in pinyon-juniper woodlands. Oregon Natural Desert Association, Bend, OR.

Knick, S. T. 2011. Greater sage-grouse. A landscape species and its habitat. Association of Fish and Wildlife Agencies, Omaha, NE.

Knick, S. T. 2011. Conservation issues for greater sage-grouse. Approaches to prioritize management. Great Basin Science Delivery Project. Webinar.

Knick, S. T. 2011. Are we getting what we expect? Short-term response by bird communities to treatments in pinyon-juniper woodlands. International Fire Science Association. Webinar.

Knick, S. T., S. E. Hanser, and M. Leu. 2011. Short-term response by bird communities to pinyon-juniper removal by prescribed fire. Association of Fire Ecologists, Park City, UT.

Knick, S. T. 2010. Science, sage-grouse, and public land policy. Idaho Environmental Forum, Boise, ID.

M. Leu, C. L. Aldridge, S. E. Hanser, S. T. Knick, and S. E. Nielson. 2010. Distribution of sagebrush associated bird species in the Wyoming Basin: influence of anthropogenic land-use patterns, and habitat and abiotic factors. American Ornithological Union Annual Meeting. February. San Diego, CA.

Finn, S. P., and S. T. Knick. 2010. Energy development-induced landcover change in western Wyoming: using spatiotemporal reconstructions to inform future landscapes. March. Wildlife conservation and energy development in the northwest. Idaho Chapter, The Wildlife Society, Boise, ID.

Knick, S. T., and S. E. Hanser. 2009. Connecting pattern and process in greater sage-grouse populations and sagebrush landscapes. The Wildlife Society, Monterey, CA.

Knick, S. T., and M. Leu. 2009. The distribution of woodland-sagebrush avian communities in the Intermountain West. Ecological Society of America, Albuquerque, NM.

M. Leu, S. Knick, S. Hanser, K. Fesenmyer, and J. Rotenberry. 2009. Wintering ecology of shrubland birds on DoD installations: linking landscape and habitat. Dept. of Defense Sustaining Military Readiness Meeting. July. Phoenix, AZ.

Fesenmyer, K. A., and S. T. Knick. 2008. Behavior, movement, habitat use, and mortality of sage sparrows during the fall migratory period: a telemetry study. August. International Ornithological Congress, Portland, OR. Presented

Hanser, S. E., M. Leu, C. L. Aldridge, M. M. Rowland, S. E. Nielson, and S. T. Knick. 2008. The effects of anthropogenic features and habitat on greater sage-grouse habitat use in the Wyoming Basins. International Ornithological Congress, Portland, OR. Presented

Knick, S. T. 2008. Why should we connect sage-grouse habitats. Nevada Conservation Area Design. May. Reno, NV. INVITED

Knick, S. T., and S. E. Hanser. 2008. Connectivity in sagebrush landscapes: the influence of habitat pattern on process in greater sage-grouse populations. Nevada Conservation Area Design. May. Reno, NV. INVITED

Knick, S. T. The role of habitat disturbance in driving sagebrush steppe bird dynamics: sparrows and sage-grouse. October. USGS Wildlife Program Review, Reston, VA. INVITED

S. E. Hanser, M. Leu, C. L. Aldridge, M. Rowland, S. E. Nielson, and S. T. Knick. 2008. The effects of anthropogenic features and habitat of Greater Sage-Grouse habitat use in the Wyoming Basins. American Ornithological Union Annual Meeting. August. Portland, OR.

Leu, M., S. Knick, S. Hanser, K. Fesenmyer, and J. Rotenberry. 2007. Migratory connectivity between breeding and wintering populations of shrubsteppe sparrows using stable isotopes. Cooper Ornithological Society, Moscow, ID.

Hanser, S. E., and S. T. Knick. 2007. Greater sage-grouse as an umbrella species for shrubland passerine birds: a multi-scale approach. Cooper Ornithological Society, Moscow, ID. Invited

Fesenmyer, K., S. T. Knick, M. Leu, and S. Hanser. 2007. Predicting migratory pathways of shrubland birds using GIS cost-path analysis. Cooper Ornithological Society, Moscow, ID.

Knick, S. T. 2007. Sagebrush steppe restoration from an ecological perspective: what is success and how will we know it? Restoring the West Conference. Utah State University, Logan, UT. Invited Plenary

Knick, S. T., and S. E. Hanser. 2007. Sagebrush steppe restoration and shrubland obligate birds. Restoring the West Conference. Utah State University, Logan, UT. Invited

Leu, M., S. Hanser, and S. Knick. 2006. The human footprint model in western landscapes. Balancing Energy Development and Raptor Conservation in the Western United States: Promoting Partnerships in Research, Monitoring, and Management. Invited

Preston, K. L., J. T. Rotenberry, and S. T. Knick. 2006. GIS-based niche modeling as a tool for multispecies conservation planning. Society for Conservation Biology.

Knick, S. T., J. W. Connelly, M. A. Schroeder, and S. J. Stiver. 2005. Range-wide conservation assessment of greater sage-grouse and sagebrush habitats. Western Governors Association, Reno, NV. Invited

Knick, S. T., J. T. Rotenberry, and R. Sallabanks. 2005. Conserving birds in shrubland ecosystems: fitting the many pieces together in a very large and difficult puzzle. The Wildlife Society. Madison, WI.. Invited

Leu, M., S. Hanser, and S. Knick. 2005. Using a human footprint model to predict exotic plant invasion. Ecology and Management of Pinyon-Juniper and Sagebrush Communities. Invited

Meinke, C. W., and S. T. Knick. 2005. Prioritizing restoration of sagebrush systems in the Intermountain West. The Wildlife Society, Idaho Chapter, Boise, ID.

Aldridge, C. L., S. E. Nielsen, H. L Beyer, M. S. Boyce, S. T. Knick, M. A. Schroeder, and J. W. Connelly. 2004. Range-wide patterns of sage-grouse extirpation: lessons from the past, predictions for the future. The Wildlife Society, Calgary, ALB.

Knick, S. T., M. Leu, and T. R. Loveland. 2004. Effect of multiscale habitat change on populations of birds breeding in sagebrush habitats. The Ecological Society of America, Portland, OR.

Leu, M., S. Hanser, and S. Knick. 2004. The human footprint in the west: a large-scale analysis of human impacts. The Ecological Society of America, Portland, OR.

Finn, S., T. Rinkes, and S. Knick. 2004. Impact of energy development on sagebrush ecosystems. The Ecological Society of America, Portland, OR.

Graduate Student Advising

Boise State University

MS advisor, Bruce Schoeberl, Thesis: Influence of fragmentation on shrubsteppe-obligate passerines. 2003

Committee member, 5 MS students

University of Idaho

PhD committee, Joseph Holbrook. Current

David S. Pilliod

USGS Forest and Rangeland Ecosystem Science Center
Snake River Field Station
970 Lusk Street
Boise, ID 83706
208-426-5202 (office) 208-475-3808 (home)
Email: dpilliod@usgs.gov

EDUCATION

1995-2001	Ph.D. Ecology	Idaho State University, Pocatello, ID
1987-1991	B.A. Biology	University of California, Santa Cruz, CA

PROFESSIONAL EXPERIENCE

2011-present Affiliate Assistant Professor, Ecology Department, Montana State University, Bozeman, MT

2008-present Adjunct Graduate Faculty, Department of Biological Sciences, Boise State University, Boise, ID

2006-present Supervisory Research Ecologist, US Geological Survey, Forest and Rangeland Ecosystem Science Center, Boise, ID

2004-2006 Assistant Professor and Museum Curator of Herpetology, Department of Biological Sciences, College of Science and Mathematics, California Polytechnic State University, San Luis Obispo, CA

2003-2006 Affiliate Faculty, College of Forestry and Conservation, University of Montana

2002-2004 Post-doctoral Research Ecologist, USDA Forest Service, Aldo Leopold Wilderness Research Institute, Rocky Mountain Research Station, Missoula, MT

2001-2002 Post-doctoral Research Associate, US Geological Survey, Amphibian Research and Monitoring Initiative under contract with the University of Montana

2000-2001 Research Assistant, Idaho GAP Analysis Project, Idaho State University

GRADUATE LEVEL TEACHING EXPERIENCE

California Polytechnic State University San Luis Obispo

BIO427: Wildlife Management
BIO470: Conservation Biology
BIO471: Exercises in Conservation Biology
BIO590: Graduate Seminar: Fire Ecology

Idaho State University

BIO425: Human Anatomy
BIO425L: Human Anatomy Lab
BIO470: Graduate Seminar: Perspectives on Amphibian Declines

GRANTS, CONTRACTS, AND AWARDS

2014 Confederated Tribes of the Colville Reservation. "Scientific support of the Chief Joseph Hatchery Program" $42,609. (PI: Pilliod)

2014 Portland Water Bureau. "Salmon redd identification using eDNA" $21,950. (PI: Pilliod)

2014 State of Idaho Military Division . "Range and training land analysis data management and reporting" $36,394. (PIs: Zarriello, Pilliod)
2014 U.S. Fish and Wildlife Service. "Columbia spotted frog habitat and population trends analysis" $25,000. (PI: Pilliod)
2014 U.S. Fish and Wildlife Service. "Automated Pattern Recognition as a Non-invasive Method for Capture-Recapture Population Studies of Chiricahua Leopard Frogs (*Lithobates chiricahuensis*)" $16,850. (PI: Pilliod)
2014 U.S. Geological Survey. "SageSuccess: Sagebrush restoration for sage-grouse habitat needs" $128,375 (PIs: Pilliod, Bradford, Duniway, Germino, Manier, Pyke)
2013 Bureau of Land Management. "Land treatment digital library data analysis and reporting" $1.4M (PI: Pilliod)
2013 Idaho Department of Fish and Game. "Status and trends of Columbia Spotted Frog populations and habitats in the Owyhees" $16,000. (PI: Pilliod)
2012 Bureau of Land Management. "Forecasting insect community responses to changes in land management and climate in Upper Columbia Basin sagebrush steppe" $281,370. (PIs: Pilliod, Rohde)
2012 Bureau of Land Management National Landscape Conservation System. "Effects of herbicide applications for shrubland habitat restoration on ground-dwelling and pollinator insect communities on the Morley Nelson Snake River Birds of Prey National Conservation Area" $32,000. (PI: Pilliod)
2012 Bureau of Land Management Idaho State Office. "Grazing Database" $16,000. (PI: Pilliod)
2012 Confederated Tribe of the Colville Reservation. "Landscape-level assessment of spring chinook distribution throughout the Okanogan basin using environmental DNA" $43,000. (PIs: Pilliod, Laramie)
2012 State of Idaho Military Division. "Reptile occupancy and abundance monitoring on the Idaho National Guard Orchard Training Area" $40,000. (PIs: Cossel, Pilliod)
2012 Wyoming Department of Transportation. "Evaluation of a wetland mitigation site: amphibian population dynamics" $86,852. (PIs: Muths, Pilliod, Corn, Hossack)
2011 Joint Fire Science Program. "Quantifying and predicting fuels and the effects of reduction treatments along successional and invasion gradients in sagebrush habitats" $546,723. (PIs: Shinneman, Pilliod, Arkle)
2011 USGS Amphibian Research and Monitoring Initiative. "Detecting amphibian species using environmental DNA from filtered water samples" $48,769. (PIs: Pilliod, Waits, Goldberg, Arkle)
2010 USDA Payette National Forest. "Monitoring stream biota and habitats after Meadow Creek stream restoration in the Stibnite Mine tailings area and effects of prescribed fire in the Bald Hill Fuels Treatment project area" $80,833. (PI: Pilliod)
2010 Great Basin Landscape Conservation Cooperative. "Tools for monitoring Great Basin wildlife species across altered landscapes: Research in support of Great Basin LCC" $30,600.
2009 Bureau of Land Management. "A centralized digital library of BLM land treatment legacy" $1.4M (PI: Pilliod)
2009 Joint Fire Science Program. "Fire rehabilitation effectiveness: A chronosequence approach for the Great Basin" $1.1M (PIs: Pyke, Pilliod, Brooks, Chambers, Grace)

2008 Joint Fire Science Program. "Feasibility of a chronosequence approach to identifying post-fire effectiveness of seeding non-forested rangelands" $97,066. (PIs: Pyke, Brooks, Chambers, Pilliod, Wirth)

2008 Joint Fire Science Program. "Cumulative effects of fire and fuels management on stream water quality and ecosystem dynamics" $316,765. (PIs: Pilliod and Arkle)

2008 USGS Amphibian Research and Monitoring Initiative, Research Grant Program. "Automated amphibian digital identification system." $66,596. (PI: Pilliod)

2006 USDA Payette National Forest. "Monitoring stream biota and habitats after Meadow Creek stream restoration in the Stibnite Mine tailings area." $27,059. (PI: Pilliod, 2006, 2008)

2006 USDA Forest Service Rocky Mountain Research Station. "Post-fire recovery in stream ecosystems." $10,000. (PI: Pilliod)

2005 Joint Fire Science Program. Funding extension for project "Effects of prescribed and wildland fire on aquatic ecosystems in western forests." $75,038. (PIs: Pilliod, Bury, and Corn)

2005 USGS Amphibian Research and Monitoring Initiative, Research Grant Program. "Monitoring amphibians in Idaho on U.S. Forest Service lands: the importance of landscape connectivity for amphibian conservation." $225,996. (PIs: Klaver, Pilliod, and others).

2004 U.S. Fish and Wildlife Service. Contract for authoring and editing book *Habitat Management Guidelines for Amphibians and Reptiles in the Pacific Northwest Region*. $20,000. (PIs: Wind and Pilliod)

2004 USGS Fire Science Program. "Effects of prescribed fire on stream ecosystems." $18,308. (PI: Pilliod)

REFEREED PUBLICATIONS

Arkle, R.S., D.S. **Pilliod**, S.E. Hanser, M.L. Brooks, J.C. Chambers, J.B. Grace, K.C. Knutson, D.A. Pyke, J.L. Welty, and T.A. Wirth. 2014. Quantifying restoration effectiveness using multi-scale habitat models: implications for sage-grouse in the Great Basin. Ecosphere 5(3):31. http://dx.doi.org/10.1890/ES13-00278.1

Knutson, K.C., D.A. Pyke, T.A. Wirth, R.S. Arkle, D.S. **Pilliod**, M.L. Brooks, J.C. Chambers, J.B. Grace. 2014. Long-term effects of seeding after wildfire on vegetation in Great Basin shrubland ecosystems. Journal of Applied Ecology. doi: 10.1111/1365-2664.12309

Pilliod, D.S., C.S. Goldberg, R.S. Arkle, and L.P. Waits. 2014. Factors influencing detection of eDNA from a stream-dwelling amphibian. *Molecular Ecology Resources* 9: doi-10.1111/1755-0998.12159.

Hossack, B.R., M.J. Adams, C.A. Pearl, K. Wilson, E.L. Bull, K. Lohr, D. Patla, D.S. **Pilliod**, J. Jones, K. Wheeler, S. McKay, P.S. Corn. 2013. Roles of patch characteristics, drought frequency, and restoration in driving long-term trends of a widespread amphibian. *Conservation Biology* 27:1410-1420.

Pilliod, D.S., and R.S. Arkle. 2013. Performance of quantitative sampling methods across gradients of cover in Great Basin plant communities. *Rangeland Ecology and Management* 66:634-647.

Pilliod, D.S., C.S. Goldberg, R.S. Arkle, and L.P. Waits. 2013. Estimating occupancy and abundance of stream amphibians using environmental DNA from filtered water samples. *Canadian Journal of Fisheries and Aquatic Sciences* 70: 1123-1130.

Pilliod, D.S., J.L. Welty, and R. Stafford. 2013. Terrestrial movement patterns of western pond turtles (*Actinemys marmorata*) in central California. *Herpetological Conservation and Biology* 8: 207-221.

Pilliod, D.S., R.S. Arkle, and B.A. Maxell. 2013. Persistence and extirpation in invaded landscapes: patch characteristics and connectivity determine effects of non-native predatory fish on native salamanders. *Biological Invasions* 15:671-685.

Arkle, R.S., D.S. **Pilliod**, and J.L. Welty. 2012. Pattern and process of prescribed fires influence effectiveness at reducing wildfire severity in dry coniferous forests. *Forest Ecology and Management* 276:174-184.

Jain, T.B., D.S**. Pilliod**, R.T. Graham, L.B. Lentile, and J.E. Sandquist. 2012. Index for characterizing post-fire soil environments in temperate coniferous forests. *Forests* 3:445-466.

Goldberg, C.S., D.S. **Pilliod**, R.S. Arkle, and L.P. Waits. 2011. Molecular detection of vertebrates in stream water- a demonstration using Rocky Mountain tailed frogs and Idaho giant salamanders. *PLoS ONE* 6: e22746. doi:10.1371/journal.pone.0022746.

Hossack, B.R., and D.S. **Pilliod.** 2011. Amphibian responses to wildfire in the western United States- Emerging patterns from short-term studies. *Fire Ecology* 7: 129-144.

Muths, E., R.D. Scherer, and D.S. **Pilliod.** 2011. Compensatory effects of recruitment and survival when amphibian populations are perturbed by disease. *Journal of Applied Ecology* 48:873-879.

Arkle, R.S. and D.S. **Pilliod**. 2010. Prescribed fires as ecological surrogates for wildfires: a stream and riparian perspective. *Forest Ecology and Management* 259: 893-903.

Arkle, R.S., D.S. **Pilliod**, and K. Strickler. 2010. Fire, flow, and dynamic equilibrium in stream macroinvertebrate communities. *Freshwater Biology* 55:299-314.

Murphy, M.A., R. Dezzani, D.S. **Pilliod**, and A. Storfer. 2010. Landscape genetics of high mountain frog metapopulations. *Molecular Ecology* 19:3634-3649.

Pilliod, D.S., B.R. Hossack, P.F. Bahls, E.L. Bull, P.S. Corn, G. Hokit, B.A. Maxell, J.C. Munger, and A. Wyrick. 2010. Nonnative salmonids affect amphibian occupancy at multiple spatial scales. *Diversity and Distributions* 16:959-974.

Pilliod, D.S., E. Muths, R.D. Scherer, P.E. Bartelt, P.S. Corn, B.A. Hossack, B. Lambert, R. McCaffrey, and C. Gaughan. 2010. Effects of amphibian chytrid fungus on individual survival probability in wild boreal toads. *Conservation Biology* 24:1259-1267.

Shive, J.P., D.S. **Pilliod,** and C.R. Peterson. 2010. Hyperspectral analysis of Columbia spotted frog habitat. *Journal Wildlife Management* 74:1387-1394.

Stone, K**.,** D.S., **Pilliod**, K. Dwire, C.C. Rhoades, S.P.Wollrab, and M.K. Young. 2010. Fuel reduction management practices in riparian areas of the western USA. *Environmental Management* 46:91-100.

Pilliod, D.S. and E. Wind. 2009. Northwest partners in amphibian and reptile conservation. In: Olson, D.H. (coord. ed.), Herpetological conservation in northwestern North America. *Northwestern Naturalist* 90: 80-81.

Jain, T.B., W. Gould, R.T. Graham, D.S**. Pilliod**, L.B. Lentile, and G. Gonzalez. 2008. A soil burn severity index for understanding soil-fire relations in tropical forests. *Ambio* 37:563-568.

Muths, E., D.S. **Pilliod,** and L. Livo. 2008. Distribution and environmental limitations of an amphibian pathogen in the Rocky Mountains, USA. *Biological Conservation* 141:1484-1492.

Petrisko, J.E., C.A. Pearl, D.S. **Pilliod**, P.P. Sheridan, C.F. Williams, C.R. Peterson, and R.B. Bury. 2008. *Saprolegniaceae* identified on amphibian eggs throughout the Pacific Northwest, USA, by internal transcribed spacer sequences and phylogenetic analysis. *Mycologia* 100:171-180.

Karraker, N.E., D.S. **Pilliod**, E.L. Bull, P.S. Corn, L.V. Diller, L.A. Dupuis, M.P. Hayes, B.R. Hossack, G.R. Hodgson, E.J. Hyde, K. Lohman, B.R. Norman, L.M. Ollivier, C.A. Pearl, C.R. Peterson. 2006. Taxonomic variation in oviposition by tailed frogs (*Ascaphus* spp.). *Northwestern Naturalist* 87:87-97.

Hossack, B.R., P.S. Corn, and D.S. **Pilliod**. 2005. Lack of significant changes in the herpetofauna of Theodore Roosevelt National Park, North Dakota, since the 1920s. *American Midland Naturalist* 154:423-432.

Funk, W.C., M.S. Blouin, P.S. Corn, B.A. Maxell, D.S. **Pilliod**, S. Amish, and F.W. Allendorf. 2005. Population structure of Columbia spotted frogs (*Rana luteiventris*) is strongly affected by the landscape. *Molecular Ecology* 14:483-496.

Dunham, J.B., D.S. **Pilliod**, and M.K. Young. 2004. Assessing the consequences of nonnative trout in headwater ecosystems in western North America. *Fisheries* 29:18-26.

CONFERENCE PRESENTATIONS

Invited Addresses

2014 Pilliod, D.S. Will environmental DNA analysis revolutionize understanding of species distributions and biodiversity? Department of Biological Sciences, Montana State University, Bozeman, MT, 9 April.

2014 Pilliod, D.S. Best field practices for collection of environmental DNA samples. USGS Webinar Series, 3 April.

2014 Pilliod, D.S. Applications of environmental DNA for monitoring aquatic organisms. Idaho Chapter and Northwest Section of The Wildlife Society, Boise, ID, 5 March.

2012 Pilliod, D.S. Using environmental DNA from filtered water samples to detect Rocky Mountain Tailed Frogs and Idaho Giant Salamanders. Idaho Department of Environmental Quality Water Quality Meeting, Boise, ID, 9 February.

2012 Pilliod, D.S., R.S. Arkle, C. Goldberg, L. Waits. Molecular detection of amphibian species using environmental DNA. Idaho Partners for Amphibian and Reptile Conservation, Boise, ID, 6 March.

2012 Pilliod, D.S. Why are low-severity prescribed fires still effective at reducing severity of future wildfires? Fire Lab Seminar Series, Missoula, MT, 1 March.

2012 Pilliod, D.S. Evaluating historic seeding treatments in western grasslands and shrublands using the Land Treatment Digital Library, Society for Range Management, Spokane, WA, 29 January.

2010 Pilliod, D.S. Land treatment legacy: advantages and challenges of knowing where and how vegetation was manipulated on public lands. Alternative Management Strategies in Big Sagebrush Steppe: Perspectives, Opportunities and Supporting Evidence session, Idaho Chapter of the Society for Range Management, Idaho Falls, ID, 10-12 November.

2010 Pilliod, D.S., Welty, J. Archiving Legacy Data from Land Treatment Projects: Applications for Management and Science. Eastern Nevada Landscape Coalition, Ely, NV, 10-11 June.

2010 Pilliod, D.S. Monitoring wildlife responses to restoration projects. Emerging Conservation Challenges session, Society for Northwestern Vertebrate Biology, Medford, OR, 23-26 February.

2009 Are prescribed fires ecological surrogates for wildland fires? a stream perspective. National Interagency Fire Center, Boise, ID, 18 March.

2008 Mountain-climbing frogs and tree-climbing salamanders. Idaho Herpetological Society, Boise, ID, 16 March.

2007 Interactions of upland, riparian, and instream disturbances on stream biota. Interrelationships between fire, aquatic and terrestrial fauna, and conservation planning session, USFS Region 4 Integrated Resources Workshop, Ogden, UT, 28 February.

2006 A frogs-eye view of heterogeneous landscapes. Presentation at Department of Biology seminar series, Humboldt State University, Arcata, CA. 7 April.

2006 The role of introduced trout as amphibian predator and disease vector in the northwest. Presentation at special session on Perspectives, Fieldwork, and Ecology of the Pacific Northwest at Society for Northwestern Vertebrate Biology meeting, Olympia, WA, 28 March.

2005 Conservation biology of amphibians: How bad is it and what can be done? Presentation to Central Coast Biological Society, San Luis Obispo, CA, 20 October.

2005 Tailed frog responses to burn severity in the Bitterroot Mountains. Presentation to Regional Training Academy, US Forest Service Region 1, Missoula, MT, 24 March.

2005 Conserving amphibian habitats in montane environments: a case study on Columbia spotted frogs (*Rana luteiventris*). Presentation at special session on Herpetofauna Habitat Conservation and Management at joint meeting of Society for Northwestern Vertebrate Biology and Oregon Chapter The Wildlife Society, 24 February, Corvallis, OR.

2005 Effects of burn severity on stream amphibian populations. Presentation at special session on Wildlife and Fire at joint meeting of Society for Northwestern Vertebrate Biology and Oregon Chapter The Wildlife Society, Corvallis, OR, 24 February.

2004 How are forest-dwelling amphibians coping with the recent wildfires in the northern Rockies? Keynote address at Idaho Herpetological Society annual meeting, Boise, ID, 13 November.

2004 Wildfire effects on stream communities in Idaho. Department of Biology seminar series, Boise State University, Boise, ID, 12 November.

2004 Effects of wildland fire on stream ecosystems. Presentation to USFS Region 1 Watersheds, Wildlife, and Fisheries Resources Program, Missoula, MT, 9 July.

2004 Fish issues in wilderness: wild or not? Panel discussion at special session: Conservation at the Crossroads, Missoula, MT, 23 April.

2004 Habitat management guidelines for amphibians and reptiles. Presentation at special session on Partners for Amphibian and Reptile Conservation session at Society for Northwestern Vertebrate Biology, Ellensburg, WA, 26 March.

2004 Effects of wildland fires on stream amphibian populations in the greater Northwest. Presentation at special session on Fire and Fuel Reduction Effects on Wildlife at Society for Northwestern Vertebrate Biology, Ellensburg, WA, 26 March.

Contributed Papers and Posters (Senior Author only)

2013 Pilliod, D.S. and J. Welty. Land Treatment Digital Library. Great Basin Consortium Conference, University of Nevada, Reno, NV, 9-10 December.

2013 Pilliod, D.S., Goldberg, C.S., Arkle, R.S., Waits, L.P. Successes and challenges of using eDNA to monitor amphibians in high-gradient streams. Society for Conservation Biology: International Congress for Conservation Biology.

2013 Pilliod, D.S., Olson, D.H. Reptile species richness and (climate change) vulnerability across Northwestern North America. Society for Northwest Vertebrate Biology 2013 Annual Meeting.

2012 Pilliod, D.S., Welty, J. Effects of land treatments on subsequent wildfire and vegetation state transitions in the Great Basin. International Fire Management and Ecology Congress, Portland, OR, 3-7 December.

2012 Pilliod, D.S. Automated pattern recognition program for leopard frogs. World Congress of Herpetology, Vancouver, BC, 8-13 August.

2012 Pilliod, D.S. and R.D. Scherer. The demography of sources and sinks in an amphibian metapopulation. Society for Northwestern Vertebrate Biology, Hood River, OR, 22 March.

2012 Pilliod, D.S., R.S. Arkle, C. Goldberg, L. Waitts. Molecular detection of amphibian species using environmental DNA. Northwest Partners for Amphibian and Reptile Conservation, Hood River, OR, 20 March.

2012 Pilliod, D.S. and R.D. Scherer. The demography of sources and sinks in an amphibian metapopulation. Idaho Chapter of The Wildlife Society, Boise, ID, 3 March.

2011 Pilliod, D.S., R.S. Arkle, and J.L. Welty. Spring-ignited prescribed fires reduce the severity of subsequent wildfire in central Idaho. Association of Fire Ecology, Interior West. Snowbird, UT, 6-9 November.

2011 Pilliod, D.S. Introducing an automated pattern recognition program for leopard frogs. Paper presented at Annual meeting Society for Northwestern Vertebrate Biology and Washington Chapter of The Wildlife Society, Gig Harbor, WA, 22-25 March.

2011 Pilliod, D.S. Rocky Mountain Tailed Frog responses to disturbance and restoration. Paper presented at Annual meeting Society for Northwestern Vertebrate Biology and Washington Chapter of The Wildlife Society, Gig Harbor, WA, 22-25 March.

2011 Pilliod, D.S., R.S. Arkle, and T.R. Kulp. Stream ecosystem responses to restoration at the Stibnite Mine, Idaho. Poster presented at 9th Biennial USGS Pacific Northwest Science Conference "Interdisciplinary Approaches to Regional Science", Vancouver, WA, 1-3 March.

2010 Pilliod, D.S. and R.S. Arkle. Can remaining fishless lakes maintain native amphibians in the northern Rocky Mountains? Paper presented at National Conservation Training Center Webinar, 27-28 October.

2010 Pilliod, D.S. and J. Welty. Availability of land treatment data for time-series investigations of vegetation responses to climate. Poster presented at Climate Change in the Great Basin and Mojave Desert Workshop, Las Vegas, NV, 20-22 April.

2010 Pilliod, D.S. Movement patterns of western pond turtles on the Carrizo Plain Ecological Reserve, California. Paper presented at Society for Northwestern Vertebrate Biology, Medford, OR, 23-26 February.

2010 Pilliod, D.S. and J. Welty. Land Treatment Digital Library: A dynamic system to enter, store, retrieve, and analyze Federal land-treatment data. Poster presented at Society for Range Management, Denver, CO, 8-11 February.

2009 Pilliod, D.S. and J. Welty. Land Treatment Digital Library: A dynamic system to enter, store, retrieve, and analyze Federal land-treatment data. Poster presented at Restoring the West Conference, Logan, UT, 27-28 October.

2009 Pilliod, D.S., E. Muths, and R.D. Scherer. 2009. Survival with disease: effects of the amphibian chytrid fungus on toad populations. Paper presented at Annual Meeting of the Society of Northwestern Vertebrate Biology, Stevenson, WA, 18-21 February.

2008 Pilliod, D.S. and R.S. Arkle. Are prescribed fires ecological surrogates for wildland fires? A stream perspective. Paper presented at Idaho Chapter of The Wildlife Society, Boise, ID, 5 March.

2008 Pilliod, D.S. and R.S. Arkle. Are prescribed fires ecological surrogates for wildland fires? A stream perspective. Paper presented at Society Northwestern Vertebrate Biology, Missoula, MT, 27 February.

2007 Pilliod, D.S. Amphibian diseases in the Northwest. Paper presented at Idaho Herpetological Society, Boise, ID, 3 November.

2007 Pilliod, D.S., E. Muths, and L.J. Livo. Spatial distribution of the amphibian chytrid fungus at boreal toad breeding sites in the Rocky Mountains, USA. Paper presented at OR/WA Chapter of The Wildlife Society, Pendleton, OR, 12-13 April.

2006 Pilliod, D.S., R. Arkle, R.B. Bury, T. Jain, and J. Evans. Fire in riparian forests: effects on stream amphibian reproduction in the Northwest, USA. Paper presented at International Society of Fire Ecology and Management, San Diego, CA, 7 November.

2006 Pilliod, D.S. Effects of non-native fish on amphibian reproduction and occupancy at multiple spatial scales. Paper presented at Idaho Chapter of The Wildlife Society, Boise, ID, 7-8 March.

2005 Pilliod, D.S. R. Arkle, P.S. Corn, and R.B. Bury. Effects of prescribed and wildand fire on stream ecosystems in western forests. Poster presented at annual meeting Joint Fire Sciences Program, San Diego, CA, 1 November.

2004 Pilliod, D.S. and others. The role of nonnative fishes on amphibian distributions in the northern Rocky Mountains. Paper presented at Joint Meeting of Ichthyologists and Herpetologists, Norman, Oklahoma, 26-31 May.

2004 Pilliod, D.S., P.S. Corn, and R.B. Bury. Effects of prescribed and wildand fire on stream ecosystems in western forests. Paper presented at annual meeting Joint Fire Sciences Program, Phoenix, AZ, 6-8 April.

RESEARCH RELATED SERVICE

I served as a professional reviewer of research grant proposals for the Joint Fire Science Program Research Grants (2009), M.J. Murdock Charitable Trust for Undergraduate Research (2010), Joint Fire Science Program Graduate Research Innovation Grants (2013), and Department of Defense Legacy Research Proposals (2014).

I am a reviewer and referee for 29 different scientific journals.

I was co-chair and served on the Joint National Steering Committee for Partners for Amphibian and Reptile Conservation (2009-2013). I was Curator of Herpetology at the California Polytechnic State University Museum (2005-2007). I served as the Vice-President (Inland Region) for the Society for Northwestern Vertebrate Biology (2003-05) and Board of Advisors for the scientific journal Herpetological Conservation and Biology since its inception in 2006.

GRADUATE STUDENTS

ADVISOR

2014 Ashley Rohde. MS Biology, Boise State University. Influence of wildfire disturbance and post-fire seeding on vegetation and insects in sagebrush habitats.

2013 Matthew Laramie. MS Biology, Boise State University. Distribution of chinook salmon (*Oncorhynchus tshawytscha*) in Upper-Columbia River Sub-basins from environmental DNA analysis.

2009 Jackie Hancock. MS Biological Sciences, California Polytechnic State University. Arroyo toad (*Bufo californicus*) life history, population status, population threats, and habitat assessment of conditions at Fort Hunter Liggett, Monterey County, California.

2008 Jenny Morris. MS Biological Sciences, California Polytechnic State University. Interactions between invasive and native amphibians in the Tassajara Creek watershed.

2007 Robert Arkle. MS Biological Sciences, California Polytechnic State University. The ecological complexity of terrestrial-aquatic linkages: fire and flow disturbance in mountain stream communities.

COMMITTEE MEMBER

2015 Terra Gleeson. MS Biology, Boise State University. The spatial and temporal effects of prey availability on American kestrel reproductive success.

2014 Erin Kenison. MS Biological Sciences, Montana State University. Predator-prey interactions between introduced trout and long-toed salamanders and ways to mitigate nonconsumptive effects

2010 Oksana Kelly. PhD Engineering and Applied Science, Idaho State University. Automated digital individual identification system with an application to the northern leopard frog *Lithobates pipiens*.

2009 Brian Dugas. MS Agriculture, California Polytechnic State University. Spatial, seasonal, and size-dependent variation in the diet of Sacramento pike minnow in the main stem of Chorro Creek, Central Coast California.

2006 Jennifer Moonjian. MS Biological Sciences, California Polytechnic State University. A current distribution and a dietary analysis of San Joaquin kit fox in San Luis Obispo County.

2006 Michael Sauer. MS Biological Sciences, California Polytechnic State University. Airborne hyperspectral remote sensing of salt marsh vegetation in Morro Bay, California.

2005 Erica Lindgren. MS Biological Sciences, California Polytechnic State University. Nest survivorship of two Neotropical migratory birds in a mature riparian forest and an adjacent restored site.

DOUGLAS J. SHINNEMAN
U.S. Geological Survey
Forest and Rangeland Ecosystem Science Center
970 Lusk St., Boise, ID 83706 USA
Voice: (208) 426-5206
Fax: (208) 426-5210
dshinneman@usgs.gov

EDUCATION

Ph.D., Botany, The University of Wyoming (2006)
M.A., Geography, Natural Resource Management Emphasis, The University of Wyoming
B.S., Social Science, Michigan State University, East Lansing, MI

PROFESSIONAL EXPERIENCE

2009-present Supervisory Research Fire Ecologist, U.S. Geological Survey – Forest & Rangeland Ecosystem Science Center, Boise, ID.
2006-2009 Postdoctoral Ecologist/Applied Scientist, The Nature Conservancy / U.S. Forest Service Northern Research Station, Grand Rapids, MN.
2002-2005 Research Assistant, University of Wyoming, Laramie, WY.
1998-2002 Executive/Science Director, Southern Rockies Ecosystem Project, Denver, CO.
1996-1998 Information Manager, Colorado Natural Heritage Program, Fort Collins, CO.

RECENT FUNDING RECEIVED

Shinneman, D., T. Link, K. Kavanagh, E. Strand, S. McIlroy, S. Powell, R. Scheller, J. Campbell, D. Marks, D. Seyfried, A. Winstral. 2014. *Projecting climate change effects on aspen distribution and productivity in the central and northern Rockies by coupling hydrological and landscape-disturbance models*. USDI Northwest Climate Science Center. $476,295

Brooks, M., D. Shinneman. 2014. *Wildfire patterns and interactions with vegetation within the range of the sage grouse.* U.S. Geological Survey. $132,784.

Shinneman, D. 2012 & 2014. *Quantifying post-fire recovery of sagebrush steppe ecosystems in the Northern Columbia Basin.* USDI Bureau of Land Management. $102,997 (2012); $102,996 (2014).

Shinneman, D. 2012. *West-Wide Ponderosa Pine Genetics Study: Haplotype Environmental Envelop Development.* USDI Bureau of Land Management. $25,244.

Shinneman, D., D. Pilliod, R. Arkle, N. Glenn. 2011. *Quantifying and predicting fuels and the effects of reduction treatments along successional and invasion gradients in sagebrush habitats.* Joint Fire Sciences Program. $546,723.

Shinneman, D. 2010/11. *Potential influence of climate change on fire regimes and forest composition in the Border Lakes Region: implications for long-term carbon sequestration and forest management.* U.S. Forest Service Northern Research Station. $50,172.

Earnst, S., D. Shinneman, P. Weisberg, J. Yang. 2009. *Quantifying vulnerability of quaking aspen woodlands and associated bird communities to global climate change in the northern Great Basin.* U.S. Geological Survey National Climate Change and Wildlife Science Center. $857,652.

Shinneman, D. 2009. *Modeling climate change effects on future forest fire regimes in the Intermountain West.* U.S. Geological Survey. $45,480.

Fraver, S., J. Bradford, B. Palik, D. Shinneman. 2008. *Effects of blowdown, salvage logging, and wildfire on regeneration and fuel characteristics in Minnesota's forests.* Joint Fire Sciences Program. $180,714.

Palik, B., D. Shinneman. 2007. *Modeling forest conditions and fire risk in the Border Lakes Region of northern Minnesota and northwestern Ontario*. U.S. Forest Service, National Fire Plan. $75,135.

PEER-REVIEWED PUBLICATIONS (2004-PRESENT)

Gustafson, E.J. and **D.J. Shinneman**. (Accepted). Approaches to modeling landscape-scale drought-induced forest mortality. *In* A. H. Perera, B. R. Sturtevant, and L. Buse, editors. Modeling Forest Landscape Disturbances. Springer, New York.

Yang, J., P.J. Weisberg, **D.J. Shinneman,** T.E. Dilts, S.L. Earnst, and R.M. Scheller. (In review). Fire modulates climate change response of aspen across topoclimatic gradients in a semi-arid montane landscape. Landscape Ecology.

Shinneman, D.J., W.L. Baker, P.C. Rogers, and D. Kulakowski. 2013**.** Fire regimes of quaking aspen in the Mountain West. Forest Ecology and Management 299:22-34.

Shinneman, D. J., B. J. Palik, and M. W. Cornett. 2012. Can landscape-level ecological restoration influence fire risk? A spatially-explicit assessment of a northern temperate-southern boreal forest landscape. Forest Ecology and Management 274:126-135.

Sturtevant, B. R., B. R. Miranda, D. J. Shinneman, E. J. Gustafson, and P. T. Wolter. 2012. Comparing modern and presettlement forest dynamics of a subboreal wilderness - Does spruce budworm enhance fire risk? Ecological Applications 22:1278-1296.

Bradford, J. B., S. Fraver, A. Milo, A.W. D'Amato, B. Palik, and **D.J. Shinneman**. 2012. Effects of multiple interacting disturbances and salvage logging on forest carbon stocks. Forest Ecology and Management **267**:209-214.

Fraver, S., T. Jain, J.B. Bradford, A.W. D'Amato, D. Kastendick, B. Palik, **D. Shinneman**, and J. Stanovick. 2011. The efficacy of salvage logging in reducing subsequent fire severity in conifer-dominated forests of Minnesota, USA. Ecological Applications **21**:1895-1901.

Rickenbach, M., L.A. Schulte, D.B. Kittredge, W.G. Labich, and **D.J. Shinneman**. 2011. Cross-boundary cooperation: A mechanism for sustaining ecosystem services from private lands. Journal of Soil and Water Conservation 66:91A-96A.

Shinneman, D.J., M.W. Cornett, and B.J. Palik. 2010. Simulating restoration strategies for a southern boreal forest landscape with complex land ownership patterns. Forest Ecology and Management 259:446-458.

Sharik, T.L., W. Adair, F.A. Baker, M. Battaglia, E.J. Comfort, A.W. D'Amato, C. Delong, R.J. DeRose, M.J. Ducey, M. Harmon, L. Levy, J. A. Logan, J. O'Brien, B.J. Palik, S.D. Roberts, P.C. Rogers, **D.J. Shinneman**, T. Spies, S.L. Taylor, C. Woodall, and A. Youngblood. 2010. Emerging themes in the ecology and management of North American forests. International Journal of Forestry Research 2010, Article ID 964260:11 Pages.

Shinneman, D., B. Miller, and K. Kunkal. 2010. The natural landscape of the Southern Rockies. Pages 161-184 *in*: Reading, R.P., B. Miller, A.L. Masching, R. Edward, M.K. Phillips, Eds. Awakening spirits: Restoration of wolves in the Southern Rockies. Fulcrum Publishing, Golden, CO.

Gosnell, H., and **D. Shinneman**. 2010. The Human Landscape. Pages 79-100 *in*: Reading, R.P., B. Miller, A.L. Masching, R. Edward, M.K. Phillips, Eds. Awakening spirits: Restoration of wolves in the Southern Rockies. Fulcrum Publishing, Golden, CO.

Shinneman, D.J., and W.L. Baker. 2009. Environmental and climatic variables as potential drivers of post-fire cover of cheatgrass (*Bromus tectorum*) in seeded and unseeded semiarid ecosystems. International Journal of Wildland Fire 18:191-202.

Shinneman, D.J., and W.L. Baker. 2009. Historical fire and multidecadal drought as context for piñon-juniper woodland restoration in western Colorado. Ecological Applications 19:1231-1245.

Sturtevant, B.R., R.M. Scheller, B.R. Miranda, **D. Shinneman**, and A. Syphard. 2009. Simulating dynamic and mixed-severity fire regimes: A process-based fire extension for LANDIS-II. Ecological Modelling 220:3380-3393.

Bauer, M., B. Loeffelholz, and **D. Shinneman**. 2009. Border Lakes land-cover classification. Research Map NRS-1. U.S. Department of Agriculture, Forest Service, Northern Research Station, Newtown Square, PA. 14 p. [DVD, booklet, and printed map included].

Shinneman, D.J., W.L. Baker, and P. Lyon. 2008. Ecological restoration needs derived from reference conditions for a semi-arid landscape in Western Colorado, USA. Journal of Arid Environments 72:207-227.

Baker, W.L., and **D.J. Shinneman**. 2004. Fire and restoration of piñon-juniper woodlands in the western United States: a review. Forest Ecology and Management 189:1-21.

PRESENTATIONS, SEMINARS, AND WORKSHOPS

Shinneman, D.J., M. Brooks, J.R. Matchett. Jul 2014. Wildfire patterns and interactions with vegetation within the range of the sage grouse. Sagebrush Restoration/Rehabilitation Science Coordination in the Great Basin, Washington, D.C.

Shinneman, D.J., D. Pilliod, R.A. Arkle, N. Glenn, S. McIlroy. May 2014. Assessing fuel loads across successional and invasion gradients in degraded sagebrush landscapes. Large Wildland Fires: Social, Political and Ecological Effects. Missoula, Montana.

Anderson, Kyle, N.F. Glenn, L.P. Spaete, D.J. Shinneman, R.S. Arkle, D.S. Pilliod, S.K. McIlroy. May 2014. Using terrestrial laser scanning to model fuel characteristics in shrub-steppe. Large Wildland Fires: Social, Political and Ecological Effects. Missoula, Montana.

Shinneman, D.J., Mar 2014. Fire regimes of quaking aspen in the Intermountain West. Fire, Historical Change, and Resilience Management in Quaking Aspen Webinar co-hosted by the Western Aspen Alliance and Utah State University Forestry Extension.

Germino, M.J., M. Brabec, A. Halford, B. Richardson, D. Shinneman, W. Davidson. Dec 2013. Post-fire sagebrush establishment across the landscape: experimental tests to inform restoration success. Great Basin Consortium Conference, Reno, NV.

Shinneman, D. Nov 2013. Fire ecology in a rapidly changing world: dynamic science for a critical mission. USGS Northwest Region Science and Management Meeting, Boise, ID.

Shinneman, D.J. Jan 2013. Modeling fire regimes and forest change in the Border Lakes Region. Lakes States Fire Science Consortium Webinar.

Earnst, S., D. Shinneman, J. Yang, P. Weisberg, K. Glueckert, S. McIlroy, K. Brodhead. Oct 2012. Modeling potential effects of climate change on aspen and associated bird communities. Pacific Northwest Climate Science Conference, Boise, ID

Shinneman, D.J., W.L. Baker, D. Kulakoski, P. Rogers. Jun 2012. Fire regimes of quaking aspen in the Intermountain West. Western Aspen Alliance Symposium - Aspen Resilience in Quaking Aspen: restoring ecosystem processes through applied science. DeBeque, CO.

Shinneman, D.J., J. Yang, P. Weisberg, S. Earnst, R. Scheller. Apr 2012. Vulnerability of aspen and associated bird communities to climate change in the northern Great Basin. U.S.-International Association for Landscape Ecology Annual Symposium, Newport, RI.

Shinneman, D.J., S. Earnst, P. Weisberg, J. Yang. Nov 2011.Vulnerability of aspen and associated bird communities to climate change. Great Basin Consortium Meeting. Reno, NV.

Shinneman, D.J. Oct 2011. Piñon-Juniper Restoration Ecology: Important considerations for biomass harvesting in the Southwest. Restoring the West Conference 2011: Sustaining Forests, Woodlands, & Communities Through Biomass Use. Utah State University, Logan, UT.

Shinneman, D.J. Mar 2011. Disturbance drivers and interactions: Key areas of research for ecological restoration. Dept. of Wildland Resources, Seminar Utah State University, Logan, UT.

Earnst, S.L., D.J. Shinneman, P.J. Weisberg, J. Yang. Oct 2010. Vulnerability of quaking aspen and avian communities to global climate change. Restoring the West: Managing Plant and Animal Conflicts. Utah State University, Logan, UT.

Shinneman, D.J. Mar 2010 Fire ecology and management: Complexity, changing environments and challenges ahead. U.S. Department of Interior - Spotlight on Science, Portland, OR.

Shinneman, D.J. Mar 2010. Fire ecology and management: Complexity, changing environments and challenges ahead. Boise State University, Department of Geosciences Seminar, Boise, ID.

Shinneman, D., S. Earnst, P. Weisberg, J. Yang. Feb 2010. Quantifying vulnerability of quaking aspen woodlands & associated bird communities to global climate change in the northern Great Basin. National Climate Change and Wildlife Science Center, Workshop on Downscaled Climate Model Data, Raleigh, NC.

Shinneman, D.J. Feb 2010. Fire ecology of sagebrush ecosystems. Boise State University, Department of Biological Sciences, seminar, Boise, ID.

Shinneman, D.J. Nov 2009. Fire Ecology & Management: Complexity, changing environments and challenges ahead. Boise State University, Department of Biology Seminar, Boise, ID.

Dunn, L., D. Shinneman. Feb 2009. Post-blowdown salvage logging impacts on fuel loads and fire severity in jack pine stands. The future of fire and wind in northern Minnesota Forests: Lessons learned from the 1999 blowdown. University of Minnesota, Cloquet Forestry Center. Cloquet, MN.

Shinneman, D.J., M. Cornett, B. Palik. Dec 2008. Modeling forest restoration strategies and assessing fire risk for the Border Lakes Region (Minnesota, USA; Ontario, Canada). CFANS Solution-Driven Science Symposium: Challenges and Opportunities for the 21st Century: Northern Forests in a Changing Environment, University of Minnesota, St. Paul, MN.

Shinneman, D., B. Palik, M. Cornett. Aug 2008. The Border Lakes Project: A "natural" collaboration between The Nature Conservancy & the USFS Northern Research Station. USFS Northern Research Station. St. Paul, MN.

Shinneman, D., M. Cornett, B. Palik. Apr 2008. Modeling ecological restoration and fuels reduction strategies for the forests of the Border Lakes Region. 23rd Annual Landscape Ecology Symposium: Landscapes Patterns and Processes, Madison, WI.

Sturtevant, B.R., B. Miranda, D.J. Shinneman, E.J. Gustafson. Apr 2008. Simulated interactions between spruce budworm and fire: comparing the past and the future. 23rd Annual Landscape Ecology Symposium: Landscapes patterns and Processes, Madison, WI.

Shinneman, D.J. Jan 2008. Variables influencing post-fire cover of cheatgrass (*Bromus tectorum*) in seeded and unseeded semi-arid ecosystems in western Colorado. Association for Fire Ecology - Fire in the Southwest: Integrating Fire into Management of Changing Ecosystems, Tucson, AZ.

Shinneman, D., M. Cornett, B. Palik. Jan 2008. Modeling ecological restoration strategies for the forests of the Border Lakes Region. 6th Annual Forest and Wildlife Research Review, Duluth, MN.

Baker, W.L., D.J. Shinneman, H.L. Getz, P. Lyon. Sep 2007. Fire, drought, grazing, and restoration across an old growth pinyon-juniper/sagebrush landscape in western Colorado. Plant Community Restoration Workshop, Grand Junction, CO.

Shinneman, D.J. Jun 2007. Modeling the effects of disturbance regimes in the Border Lakes Region. Minnesota Forest Resource Council Meeting, Duluth, MN.

Shinneman, D.J. May 2007. Using GIS and modeling to examine forest change in the Border Lakes Region. Guest lecture at Itasca Community College, Grand Rapids, MN.

Shinneman, D.J. Mar 2007. Modeling the effects of disturbance regimes in the Border Lakes Region. Department of Forest Resources Seminar, University of Minnesota, St. Paul, MN.

Sturtevant, B.R., B.R. Miranda, D.J. Shinneman, R.M. Scheller. Oct 2006. A Canadian Fire Module for LANDIS-II. LANDIS-II Workshop, Madison, WI.

Baker, W.L., D.J. Shinneman, H.L. Getz, P. Lyon. Apr 2006. Fire, drought, grazing, and restoration across an old growth piñon-juniper/sagebrush landscape in western Colorado. University of Nevada, Reno.

Lytle, D.E., D.J. Shinneman, M.W. Cornett, B.J. Palik. Mar 2006. The Border Lakes Partnership: Interagency collaboration on desired future conditions in a landscape of international significance. Sustainable Natural Resources management: Defining our Legacy. The 1st Minnesota Natural Resources Conference, Brainerd, MN.

Shinneman, D.J., W.L. Baker. Apr 2005. Stand age structure and disturbance dynamics of a piñon-juniper woodland landscape in western Colorado. Association of American Geographers Annual Meeting, Denver.

GRADUATE STUDENT COMMITTEE MEMBER

M.S. Thesis Committee. Anderson, K. (presently). Vegetation measurements in sagebrush steppe using terrestrial laser scanning. Dept. of Geosciences, Idaho State University.

Ph.D. Dissertation Committee. (presently). The Influence of Environmental Gradients, Treatment History, Grazing, and Post-fire Rehabilitation Seed Selection on *Bromus tectorum* Invasion and Fire Regimes. Forest, Rangeland, and Fire Sciences, University of Idaho.

M.S. Thesis Committee. Gardner, R. 2010-2013. Linking pattern and process: aspen clonal diversity and landscape history. Dept. of Wildland Resources, Utah State University.

M.S. Thesis Committee. Weppner, K. 2010-2012. Climate drivers and landscape response: Holocene fire, vegetation and erosion in a semiarid ecosystem, City of Rocks National Reserve, Idaho. Hydrologic Sciences, Boise State University.

CURRICULUM VITAE

DAVID L. ANDERSON
208-362-3716 • danderson@peregrinefund.org

EDUCATION

Ph.D., Biological Sciences.
Louisiana State University, Department of Biological Sciences, Baton Rouge, Louisiana.
Dissertation Focus: Structure and organization of avian assemblages in forest canopies.

M.S., Raptor Biology.
Boise State University, Department of Biology & Raptor Research Center, Boise, Idaho.
Thesis: Raptor Diversity in the Río Plátano Biosphere Reserve, Honduras

B.S., Wildlife Management, 1991.
Humboldt State University, College of Natural Resources, Arcata, California.

Peace Corps volunteer, 1991-1993.
Wildlands Promoter, Sierra de Agalta National Park, Honduras

CURRENT POSITION

DIRECTOR, GYRFALCON AND TUNDRA CONSERVATION PROGRAM. • The Peregrine Fund, Boise, Idaho. 2012 to present.

PREVIOUS POSITIONS IN WILDLIFE MANAGEMENT AND CONSERVATION

WILDLIFE TECHNICIAN • *Idaho Department of Fish and Game.* 2001-2003
Deer Parks Wildlife Mitigation Unit, Menan, Idaho.

APPOINTMENTS WITH FEDERAL AND STATE AGENCIES, NON-PROFITS

Idaho Department of Fish and Game, Nampa.	2000
Oregon Department of Fish and Wildlife, Roseburg.	1994
Institute for Wildlife Studies, Arcata, California.	1991, 1994, 1996
US Forest Service – California, Montana, and Arizona.	1987, 1989, 1990
Humboldt State University, Arcata, California.	1986, 1988
California Department of Fish and Game, Rancho Cordova.	1986

PROTECTED AREAS SPECIALIST • *Peace Corps*. 1991-1993
Sierra de Agalta National Park, Honduras.

PREVIOUS ECOLOGICAL FIELD RESEARCH

AVIAN ECOLOGY IN FOREST CANOPIES • *Louisiana State University*. 2004 -
Baton Rouge, Louisiana/Pico Bonito National Park, Honduras.
DISTRIBUTION AND ECOLOGY OF THE HONDURAN EMERALD • *Louisiana State University*. 2007 -
CERULEAN WARBLER MIGRATION ECOLOGY • *Louisiana State University*. 2005 to 2007

DIURNAL RAPTOR DISTRIBUTION AND ECOLOGY • *The Peregrine Fund.* 1999
Boise, Idaho/Tawahka Biosphere Reserve, Honduras.
RAPTOR DIVERSITY AND LANDSCAPE HETEROGENEITY • *Department of Biology, Boise State University.* 1995-1998
Boise, Idaho/Río Plátano Biosphere Reserve, Honduras.

GRANTS

Mohamed Bin Zayed Conservation Trust. • 2014. $320,000. Funds for Gyrfalcon and Tundra Ecology in a Changing World.

Loacker Foundation. • 2014. $50,000. Funds for Gyrfalcon research and conservation in western Alaska

Trust for Mutual Understanding. • 2014. $20,000. Travel funds for Russian Scientists to the first international meeting of the Tundra Conservation Network, Boise, Idaho.

Conservation of the Honduran Emerald (*Amazilia luciae*) in Santa Barbara, Honduras. • 2009. $300,000. Funds obtained for Empresa Propietaria de la Red Eléctrica.

Structure and composition of canopy bird assemblages in lowland rainforests. *Ph.D. dissertation fieldwork. 2006-2007.* $24,650 received from USAID, Cleveland Metroparks Zoo, USFWS Neotropical Migratory Bird Conservation Act, LSU Museum of Natural Science, Global Forest Science, Eagle Optics, and The Explorers Club.

Cerulean Warbler Migration Ecology. • *Co-principle investigator with Melinda Welton. 2005-2007.* >$40,000 received from The Nature Conservancy, US Fish and Wildlife Service Neotropical Migratory Bird Conservation Act, The American Bird Conservancy, Lyndhurst Foundation, Tucker Foundation, Linnaean Society of London, the Birder's Exchange, and Optics for the Tropics.

Avian diversity in the Río Plátano Biosphere Reserve • *M.S. fieldwork in Honduras 1996-1997.* $11,000 from Lincoln Park Zoo Scott Neotropic Fund, American Bird Conservancy, Hawk Mountain, BSU Raptor Research Center, and The Peregrine Fund.

PUBLICATIONS

Peer Reviewed –

Anderson, D. L. 2014. *Amazilia luciae*, species account. Neotropical Birds on-line. Cornell Lab of Ornithology. doi: http://neotropical.birds.cornell.edu/portal/species/overview?p_p_spp=252731

Bennett, R. E., I. Zuniga, M. Bonta, **D. L. Anderson**, S. McCann, L. Herrera. 2014. First nest record of Red-throated Caracara (*Ibycter americanus*) for Middle America. Wilson Journal of Ornithology 126:389-392.

Anderson, D. L., and L. N. Naka. 2011. Comparative structure and organization of canopy bird assemblages in Honduras and Brazil. Condor 113:7-23.

Anderson, D. L., P. R. House, R. E. Hyman, R. Steiner, H. R. Hawkins, S. Thorn, M. J. Rey, M. R. Espinal, and L. E. Marineros. 2010. Rediscovery of the Honduran Emerald *Amazilia luciae* in western Honduras: insights on the ecology, distribution, and conservation status of a 'Critically Endangered' hummingbird. Bird Conservation International 20:255-262.

Anderson, D. L. 2009. Ground versus canopy methods for the study of birds in tropical forest canopies: implications for ecology and conservation. Condor 111:226-237.

Shoch, D. S., and **Anderson D. L.** 2007. Status of tern colonies in the Honduras Bay Islands. Waterbirds 50:403-411.

Anderson, D. L., D. A. Wiedenfeld, M. J. Bechard, and S. J. Novak. 2004. Avian diversity in the Moskitia region of Honduras. Ornitologia Neotropical 15:447-442.

Thorstrom, R., R. Watson, A. Baker, S. Ayers, and **D. L. Anderson**. 2002. Preliminary ground and aerial surveys for Orange-breasted Falcons in Central America. Journal of Raptor Research 36:39-44.

Anderson, D. L. 2001. Landscape heterogeneity and diurnal raptor diversity in Honduras: The role of indigenous shifting cultivation. Biotropica 33:511-519.

Anderson, D. L. 2000. Notes on the breeding, distribution, and taxonomy of the Ocellated Poorwill (*Nyctriphynus ocellatus*) in Honduras. Ornitologia Neotropical 11:233-238.

McCarthy, T. J., **D. Anderson**, and G. Cruz D. 1999. Tree sloths (Mammalia: *Xenartha*) in Nicaragua and Honduras, Central America. Southwestern Naturalist 44:410-414.

Anderson, D. L., M. Bonta, and P. Thorn. 1998. New and noteworthy bird records from Honduras. Bulletin British Ornitholological Club 118:178-183.

Invited Chapter –

Anderson, D. L., and C. Devenish. 2009. Honduras. Pp. 255-260 *in* C. Devenish, D. F. Díaz Hernandez, R. P. Clay, I. Davidson, and I. Yépez Zabala [Eds.], Important bird areas of the Americas – Priority sites for biodiversity conservation. BirdLife International, Quito, Ecuador.

SELECTED TALKS

Anderson, D. L. 2009. Comparative structure and organization of canopy bird assemblages in Honduras and Brazil: an ecological perspective. Oral presentation, American Ornithologist's Union annual meeting, Philadelphia, Pennsylvania.

Anderson, D. L. 2008. Ground-based vs. canopy-based methods: lessons for the study of canopy birds in lowland tropical forests. Oral presentation, American Ornithologist's Union, Cooper Ornithological Society, and Society of Canadian Ornithologists Joint Meeting, Portland, Oregon.

Anderson, D. L., and M. J. Welton. 2008. Migration stopover of the Cerulean Warbler (*Dendroica cerulea*) in northern Middle America. Poster, Wilson Ornithological Society and Association of Field Ornithologists Joint Meeting, Mobile, Alabama.

Welton, M. J., **D. L. Anderson**, T. Beachy, and G. Colorado. 2008. Cerulean Warbler migration stopover ecology. Oral presentation, III Cerulean Warbler summit, Bogotá, Colombia.

Melhman, D., M. Welton, **D. L. Anderson**, G. Colorado, P. Hamel, M. I. Moreno, and P. Salaman. 2006. An examination of the migration routes and stopover ecology of the Cerulean Warbler (*Dendroica cerulea*). Oral presentation, IV North American Ornithological Conference, Veracruz, Mexico.

STUDENTS MENTORED

Bryce Robinson. 2013 to present. M.Sc. Student in Raptor Biology, Boise State University. Thesis committee co-Chair.

Jilma Rachel Guinea. 2014. Undergraduate enrolled in NSF program Research Experiences for Undergraduates. Boise State University, Raptor Biology Program. Mentor on project "Characteristics of reproductive habitat for Harpy Eagles in Darién Province, Panama."

CHRISTOPHER J. W. MCCLURE, PH.D.
5668 West Flying Hawk Lane – Boise, Idaho 83709
cmcclure@peregrinefund.org
www.chrimcc.wix.com/cjwm

EDUCATION

INSTITUTION AWARDED	DEGREE	MAJOR	DATE
Auburn University	Ph.D.	Biology	5/2012
University of Georgia	B.S.	Environmental Economics and Management	5/2005

SELECTED EXPERIENCE

EMPLOYER	POSITION	DATES
The Peregrine Fund	Director of American Kestrel Partnership and Quantitative Ecologist	1/2014-Present
Sound Science, LLC	Ecological Consulting Associate	3/2013-Present
Boise State University	Postdoctoral Research Associate	3/2012-12/2013
Consolidated Resources, LLC	Statistical Consultant	4/2011-3/2012
Greenspace Group, LLC	GIS Consultant	4/2011-3/2012
Auburn University	Graduate Research Assistant	5/2007-8/2010

GRADUATE LEVEL TEACHING EXPERIENCE

INSTITUTION	CLASSES	YEARS
Auburn University	Lecturer: Habitat Assessment and Analysis (Graduate Level)	2009

GRANTS

AMOUNT	GRANT	YEAR
$159,000	National Science Foundation—IOS (Co PI, Pending)	2014
$600,000	National Science Foundation—CNH (Senior Personnel)	2014
$95,000	National Park Service CESU Grant (Co PI)	2013
$57,500	National Park Service CESU Supplement (Collaborator)	2013
$6,000	American Philosophical Society	2013
$20,000	National Park Service CESU Supplement (Collaborator)	2012
$200	American Ornithologists' Union Marcia Brady Tucker Travel Award	2011
$250	Auburn University Student Travel Award	2010
$600	Association of Field Ornithologists Student Travel Award	2010
$69,000	National Institutes of Health (Collaborator)	2009
$200	American Ornithologists' Union Marcia Brady Tucker Travel Award	2009
$1,200	Birmingham Audubon Society Walter F. Coxe Research Award	2008

PUBLICATIONS

28. Kroschel, W.A., W.B. Sutton**, C.J.W. McClure**, and T.K. Pauley. Decline of the Cheat Mountain Salamander over a 32-year Period and the Potential Influence of Competition from Sympatric Species. Journal of Herpetology. in press
27. **McClure, C.J.W,** and G.E. Hill. The Rusty Blackbird. In E. Soehren (ed). Alabama Wildlife, Volume 1. University of Alabama Press. in press
26. de J. Vargas González, J., F. H. Vargas, D. Carpio, and **C.J.W. McClure.** 2014. Vegetation characteristics in nesting sites of the Harpy Eagle (Harpia harpyja) in Darien, Panama. Ornithologia Neotropical. 25: 207–218
25. Steen, D.A., J. C. Godwin, **C.J.W. McClure**, and M. Barbour. 2014.Informing management of endemic habitat specialists: Multi-scale habitat selection of the Red Hills Salamander. Journal of Wildlife Management. 78(3): 463–470.
24. Steen, D.A., **C.J.W. McClure**, J.C. Brock, D.C. Rudolph, J.B. Pierce, J.R. Lee, W.J. Humphries, B.B. Gregory, W.B. Sutton, L.L. Smith, D.L. Baxley, D.J. Stevenson, and C. Guyer. Copperheads are common when kingsnakes are not: relationships between the abundances of a predator and one of their prey. Herpetologica. 70(1): 69–76 .
23. Steen, D.A, **C.J.W. McClure**, J.C. Brock, D.C. Rudolph, J.B. Pierce, J.R. Lee, W.J. Humphries, B.B. Gregory, W.B. Sutton, L.L. Smith, D.L. Baxley, D.J. Stevenson, and C. Guyer. 2014. Snake co-occurrence patterns are best explained by habitat and hypothesized effects of interspecific interactions. Journal of Animal Ecology. 83: 286–295
22. **McClure, C.J.W.,** H.E. Ware, J. Carlisle, G. Kaltenecker, and J. R. Barber. 2013. An experimental investigation into the effects of traffic noise on distributions of birds: Avoiding the phantom road. Proceedings of the Royal Society of London: B. 280: 20132290.
21. **McClure, C.J.W.**, B.W. Rolek, G.E. Hill. 2013. Seasonal use of habitat by shrubland birds in a southeastern national forest. Wilson Journal of Ornithology.125(4): 731-743
20. Steen, D.A., **C.J.W. McClure**, and S.P. Graham.2013. Relative influence of weather and season on anuran calling activity. Canadian Journal of Zoology. 91: 462–467
19. Estep, L. K., **C. J. W. McClure**, P. Vander Kelen, N. D. Burkett-Cadena, S. Sickerman, J. Hernandez, J. Jinright, B. Hunt, J. Lusk, and V. Hoover. 2013. Risk of exposure to Eastern Equine Encephalomyelitis Virus increases with the density of Northern Cardinals. PLoS ONE 8:e57879.
18. Burkett-Cadena, N.D, **C.J.W. McClure**, L.K Estep, G.E. Hill, T.R. Unnasch, and M.D. Eubanks. 2013. Hosts or habitats: What drives the spatial distribution of mosquitoes? Ecosphere. 4(2): art30.
17. Steen, D. A., **C. J. W. McClure**, L. L. Smith, B. J. Halstead, C. K. Dodd, Jr., W. B. Sutton, J. R. Lee, D. L. Baxley, W. J. Humphries, and C. Guyer. 2013. The effect of coachwhip presence on body size of North American racers suggests competition between these sympatric snakes. Journal of Zoology. 289 (2):86–93.
16. McDonald, K.W., **C.J.W. McClure**, B.W. Rolek, G.E. Hill. 2012. Bird diversity shifts north with global warming. Ecology and Evolution. 2(12):3052–3060.
15. **McClure, C.J.W.**, B.W. Rolek, G.E. Hill. 2012. Predicting occupancy of wintering migratory birds: Is microhabitat information necessary? Condor. 114(3):482–490

14. **McClure, C.J.W**., G.E. Hill. 2012. Dynamic versus static occupancy: How stable are habitat associations through a breeding season? Ecosphere. 3(7):60.
13. Steen, D.A., M. Baragona, **C.J.W. McClure**, and L.L.Smith. 2012. Population structure and morphology of a small population of Loggerhead Musk Turtles (Sternotherus minor minor) in Okaloosa County, Florida. Florida Field Naturalist. 40(2):47–55
12. Steen, D.A., **C.J.W. McClure**, J.C. Brock, D.C. Rudolph, J.B. Pierce, J.R. Lee, W.J. Humphries, B.B. Gregory, W.B. Sutton, L.L. Smith, D.L. Baxley, D.J. Stevenson, and C. Guyer. 2012. Landscape level influences of terrestrial snake occupancy within the southeastern United States. Ecological Applications. 22(4): 1084–1097
11. Estep, L.K., **C.J.W. McClure**, N.D. Burkett-Cadena, H.K. Hassan, T.R. Unnasch, and G.E. Hill. 2012. Developing models for the forage ratios of Culiseta melanura and Culex erraticus based on characteristics of avian hosts. Journal of Medical Entomology. 49(2):378–387
10. **McClure, C.J.W.**, L.K. Estep, and G.E. Hill. 2012. Effects of species ecology and urbanization on the accuracy of a cover-type model: A test using GAP analysis. Landscape and Urban Planning. 105 (4): 417–424
9. **McClure, C.J.W.**, B.W. Rolek, K. McDonald, G.E. Hill. 2012. Climate change and the decline of a once common bird. Ecology and Evolution. 2(2): 370–378
8. **McClure, C.J.W.**, L.K. Estep, and G.E. Hill. 2011. Using public land cover data to determine habitat associations of birds in Tuskegee National Forest, Alabama. Southern Journal of Applied Forestry 25(4): 199–209
7. Balenger, S.L., **C.J.W. McClure**, and G.E. Hill. 2011. Primer design and transcript quantification of a highly multiplexed RT-PCR for a non-model avian species. Molecular Ecology Resources. 12(1): 116–122
6. **McClure, C. J. W.**, N. D. Burkett-Cadena, R. Ligon, and G. E. Hill. 2011. Actual or perceived abundance? Interpreting annual survey data in the face of changing phenologies. Condor 113(3): 490–500
5. **McClure, C.J.W.**, L.K. Estep, and G.E. Hill. 2011. A multi-scale analysis of competition between House Finches and House Sparrows in the Southeast US. Condor 113(2): 462–468
4. Estep, L.K., **C.J.W. McClure**, N.D. Burkett-Cadena, T.L. Hicks, H.K. Hassan, G.E. Hill, and T.R. Unnasch. 2011. A multi-year study of mosquito feeding patterns on avian hosts in a southeastern focus of eastern equine encephalitis virus. American Journal of Tropical Medicine & Hygiene 84(5): 718–726
3. Burkett-Cadena, N.D., **C.J.W. McClure**, R.A. Ligon, S.P. Graham, C. Guyer, G.E. Hill, S.S. Ditchkoff, M.D. Eubanks, H.K.Hassan, and T.R. Unnasch. 2011. Host reproductive phenology drives seasonal patterns of host use in mosquitoes. PLoS ONE 6(3): e17681
2. **McClure, C.J.W.** and D.A. Steen. 2010. Geographic Distribution: Hemidactylus turcicus. Herpetological Review 41:512
1. Jacob, B., N.D. Burkett-Cadena, J. Luvall, S. Parcak, **C.J.W. McClure**, L.K. Estep, G.E. Hill, E. Cupp, R. Novak, and T. Unnasch. 2010. Developing GIS-based eastern equine encephalitis vector-host models in Tuskegee, Alabama. International Journal of Health Geographics. 9:12.

SELECTED PRESENTATIONS

McClure, C.J.W., H.E. Ware, J. Carlisle, G. Kaltenecker, and J. R. Barber. An experimental investigation into the effects of traffic noise on distributions of birds: Avoiding the phantom road. Presented at 131st Stated Meeting of the American Ornithologists' Union. Chicago, IL. August 14, 2013.

McClure, C.J.W., B.W. Rolek, K. McDonald, G.E. Hill. Effects of weather and climate on the breeding distribution of the Rusty Blackbird. Presented at 129th Stated Meeting of the American Ornithologists' Union. Jacksonville, FL. July 28, 2011

McClure, C.J.W., B.W. Rolek, K. McDonald, G.E. Hill. Effects of weather and climate on the breeding distribution of the Rusty Blackbird. Southeast Ecology and Evolution Conference. Auburn, AL. March 26, 2011

McClure, C. J. W., N. D. Burkett-Cadena, R. Ligon, and G. E. Hill. Interpreting Breeding Bird Survey data in the face of climate change (poster). Presented at the annual meeting of the Association of Field Ornithologists. Ogden, UT. August 13, 2010

McClure, C.J.W., L.K. Estep, and G.E. Hill. Habitat associations of birds in Tuskegee National Forest, AL. Presented at 128th Stated Meeting of the American Ornithologists' Union. San Diego, CA, February 9, 2010

McClure, C.J.W., L.K. Estep, and G.E. Hill. Are House Finches responsible for the decline of House Sparrows in the Southeast US? Presented at 127th Stated Meeting of the American Ornithologists' Union. Philadelphia, PA, August 14, 2009

MENTORING EXPERIENCE (AT BOISE STATE UNIVERSITY)

STUDENT STATUS	ROLE	# STUDENTS	YEAR
Master's	Committee Member	3	Current
REU	Co-advisor	1	2014
Master's	Committee Member	1	2013

Richard T. Watson, Ph.D.

Current Position

Vice President and International Programs Director, The Peregrine Fund

5668 West Flying Hawk Lane, Boise, ID 83709, USA. Tel: 208-362-3716,
Fax: 208-362-2376, E-mail: rwatson@peregrinefund.org. Responsible for design, implementation, and management of The Peregrine Fund's raptor research and conservation projects worldwide.

Professional Preparation

Post-doctoral Fellow, Ecophysiology, Desert Ecological Research Unit, Namibia, 1986-1988.
Ph.D., Raptor Ecology, University of the Witwatersrand, South Africa, 1980-1986.
B.Sc., Marine Zoology, Honors, *Summa Cum Laude*, University College of North Wales, Bangor, United Kingdom, 1976-1979.

Appointments

2007-Present: Vice President, The Peregrine Fund.
1998-Present: International Programs Director, The Peregrine Fund.
1992-2007: Africa Programs Director, The Peregrine Fund.
1990-Present: Adjunct Faculty, Boise State University, Idaho State University.
1990-2000: Madagascar Project Director, The Peregrine Fund.
1988-1989: Avian Ecology Consultant, Hawk Watch International, Connecticut Audubon Society, and School for Field Studies.

Recent Collaborators

James Belthoff, Boise State University; Mark Fuller, US Geological Survey; Martin Gilbert, Wildlife Conservation Society; Rhys Green, University of Cambridge; Jeff Johnson, University of North Texas; David Mindell, California Academy of Sciences; J. Lindsay Oaks, Washington State University, School of Veterinary Medicine; Patricia Parker, University of Missouri—St Louis; Mark Pokras, Tufts University School of Veterinary Medicine; Ruth Tingay, Natural Resources, UK.

Program and Administrative Experience

Dr. Watson has worked for The Peregrine Fund since 1990, initially to establish the Madagascar Project to study and conserve three of the world's most endangered birds of prey. This work lead to the rediscovery of two of these species (thought by some to be extinct) and the establishment of an 810 square mile national park, Madagascar's largest, to protect their rain forest habitat. It also led to the

establishment of an innovative community-based conservation project to protect wetlands essential for the endangered Madagascar Fish-Eagle. This project now serves as a model for others in Madagascar.

Dr. Watson developed a position as Program Director for Africa, establishing and supervising new projects throughout Africa. This included Bearded Vulture reintroduction to Kenya, Cape Vulture conservation in South Africa, raptor conservation and local capacity building in Zimbabwe, Kenya and Ethiopia, and Crowned Eagle conservation in Ivory Coast. He also supervises U.S. and local graduates at Masters and Ph.D. levels and is adjunct faculty at Boise State and Idaho State Universities.

In 1998 Dr. Watson was appointed as The Peregrine Fund's International Program Director, responsible for all programs and projects outside of the United States. Work involves designing new projects, proposal preparation, establishing projects in country, hiring and training staff, supervision of projects and studies including objectives, methods, analysis and presentation, as well as project financial affairs, and presenting results to donors and The Peregrine Fund's Board. In 2000 he formed and led the team that in 2003 discovered the fatal effects of diclofenac on South Asian vultures. In 2007 he led the team that demonstrated that lead (Pb) from hunters' bullets contaminates venison prepared by professional butchers and puts consumers at risk of lead exposure. In 2008 he convened the international conference on lead (Pb) from spent ammunition effects on wildlife and humans. In 2011 he convened the international conference on Gyrfalcons and Ptarmigan in a changing world to investigate the effects of climate change on this Arctic predator-prey system. He currently supervises 18 projects on three continents. Dr. Watson was appointed to The Peregrine Fund's Board of Directors as Vice President in 2007.

Graduate Students

1. Yozora Tadehara, M.Sc. 2011-present. Candidate, Boise State University. Saker Falcon home range variation in an artificial grid of nest boxes in Mongolia.

2. Ruth Tingay, Ph.D. 2005, University of Nottingham, United Kingdom. Historical distribution, contemporary status and cooperative breeding in the Madagascar Fish Eagle: implications for conservation. 392 pp.

3. Nyambayar Batbayar, M.Sc., 2004, Boise State University. Ecology and conservation of the Cinereous Vulture in Mongolia.

4. Sarah Karpanty, Ph.D., 2003, University of New York, Stony Brook. Behavioral and ecological interactions of raptors and lemurs in southeastern Madagascar: A multiple predator approach. 287 pp.

5. Suzanne Schultz, Ph.D., 2003, University of Liverpool, United Kingdom. Ecology of Crowned Eagles in Ivory Coast.

6. Laura Estep, Fulbright Scholar, 2001, Eckerd College. Population viability analysis of the Madagascar Fish Eagle.

7. Munir Virani, Ph.D., 1999, University of Leicester, United Kingdom. Augur Buzzard ecology.

8. Ruth Tingay, M.Sc., 1999, University of Nottingham, United Kingdom. Role of extra-pair birds in the breeding of Madagascar Fish Eagles.

9. Lily-Arison René de Roland, Ph.D., 1999, University of Antananarivo, Madagascar. Ecology of rain forest *Accipiters* in Madagascar.

10. Simon Rafanomezantsoa, DEA (M.Sc. equivalent), 1998, University of Antananarivo, Madagascar. Natal dispersal by Madagascar Fish Eagles.

11. Lakew Berhanu, M.Sc., 1998, Durrell Institute for Conservation and Ecology, University of Kent, United Kingdom. Raptor conservation in Ethiopia.

12. René Land, Watson Scholar, 1997, Tufts University. Organochlorine pesticide contamination of Madagascar Fish Eagle prey.

13. Zarasoa, DEA (M.Sc. equivalent), 1996, University of Antananarivo, Madagascar. Forest regeneration and impacts of people in the Madagascar Fish Eagle conservation area.

14. James Berkelman, Ph.D., 1996, Virginia State University. Habitat requirements of the Madagascar Fish Eagle.

15. Stefania Strzalkowska, M.Sc., 1995, Idaho State University. Avian monitoring on Masoala Peninsula, Madagascar.

16. Lily Arison René de Roland, DEA (M.Sc. equivalent), 1995, University of Antananarivo, Madagascar. Biology of Frances' Sparrowhawk.

17. Suzanne Razafindramanana, DEA (M.Sc. equivalent), 1995, University of Antananarivo, Madagascar. Breeding biology of the Madagascar Fish eagle.

18. Munir Virani, M.Sc., 1994, University of Leicester, United Kingdom. Sokoke Scops Owl ecology.

19. James Berkelman, M.Sc., 1993, Boise State University. Ecology of the Madagascar Buzzard.

Publications

Dr. Watson has authored or co-authored 130 scientific and technical publications since 1983.

First or Sole Authorship

1. **Watson, R.T.,** C., McClure, H. Vargas, and J.P. Jenny. Submitted. Trial restoration of the Harpy Eagle, a large, long-lived tropical forest eagle. Journal of Raptor Research.

2. **Watson, R.T.,** T. Cade, W.G. Hunt, M. Fuller, and E. Potapov (Eds.). **2011**. Gyrfalcons and ptarmigan in a changing world. Volumes I and II. The Peregrine Fund, Boise, Idaho, USA. 800 pp. http://www.peregrinefund.org/subsites/conference-gyr/proceedings/index.html

3. **Watson, R.T. 2011.** Lead fragments from spent ammunition in hunter-killed game animals: The source of lead exposure and its effects in California Condors. **[**Bleifragmente von Jagdgeschossen in erlegten Wildtieren: Die Quelle der Bleivergiftungen und ihre Auswirkungen auf den Kalifornischen Kondor.] Pp. 86-97 in Krone, O. (ed). Bleivergiftungen bei Greifvögeln. Leibniz-Institut für Zoo- und Wildtierforschung (IZW), Berlin.

4. **Watson, R.T. 2011.** Primary prevention of lead exposure from ingested spent ammunition: Solutions on behalf of California Condors and human health. [Vorbeugung von Bleivergiftungen: Lösungsansätze bezogen auf den Kalifornischen Kondor und die menschliche Gesundheit.] Pp. 114-121 in Krone, O. (ed). Bleivergiftungen bei Greifvögeln. Leibniz-Institut für Zoo- und Wildtierforschung (IZW), Berlin.

5. **Watson, R.T. 2010.** The Bateleur. *In* Tingay, R., and Katzner, T. (Eds.), The Eagle Watchers. Cornell University Press, Ithaca, New York.

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UNIVERSITY OF IDAHO

SUBJECT

Online, Master of Public Administration

APPLICABLE STATUTE, RULE, OR POLICY

Idaho State Board of Education Governing Policies & Procedures, Section III.G; Section V.R.3.a.x

BACKGROUND/DISCUSSION

The Department of Political Science currently offers the Master of Public Administration degree to residential students at the University of Idaho (UI), and this will not change. The UI intends to reach more place-bound practitioners by also offering the program through distance delivery. The program trains practitioners for local governments and has a secondary focus on small, rural communities and economic development to better serve Idaho. The UI proposes expanding the program through online delivery.

The objectives of the program are to provide training and continuing education for practitioners in Idaho's local governments and beyond. Students in the program will gain analytical and methodological skills that will contribute to effective decision making in local governments, gain broader and timely knowledge and skills in human resource management and government budgeting, gain expanded knowledge and appreciation for economic development programming in small governments, and gain expanded knowledge and appreciation for problems of rural communities.

The program is designed for in-service students; that is, students currently employed in either the public or private sector. Students must meet University of Idaho requirements for graduate admissions. However, the program, per accrediting agency guidelines, is open to all students with a bachelor's degree from an accredited college or university. The students will complete a 3-hour course – POLS 559 Field Based Research – that will serve as the program capstone. There is no thesis option.

The Master of Public Administration is a general management degree that emphasizes public management and policy. As a general management degree, like the Master of Business Administration, it provides training that is appropriate for the private sector, especially in functions that are compliance oriented, such as human resources management, auditing, regulatory compliance, etc. According to the Idaho Department of Labor, by 2020 management positions will increase by 13.7%, business and financial operations positions by 14%, community and social service positions by 16.9%, life, physical, and social science positions by 9.2%.

IMPACT

The UI proposes to charge each student a fee of $7,500 per year consistent with Board Policy V.R.3.a. Students will not be charged the UI's per credit online course fee (currently $35.00). This is a substantial discount from the regular graduate tuition and fees and is a strong incentive for students to join the program. All students will be enrolled full-time (9 credits per semester).

The request to establish a unique fee structure will allow students who are employed to have a clear flat rate amount for their degree. An amount that is both market competitive and fair can help students and their employers plan for both the time and money required to complete the program. Given the focus on a student population that will be largely from rural areas the availability and affordability of such a degree offers a truly valuable and unique opportunity for a population that may otherwise never pursue a graduate degree.

The funds would be used to support the delivery of the program, including instruction, technology, course development (shifting to distance delivery), marketing, and support for faculty involved in the program to engage in continuous professional development ensuring students in the program are receiving a high quality education and engaging with excellent faculty.

ATTACHMENTS

Attachment 1 – Program Proposal Page 5

STAFF COMMENTS AND RECOMMENDATIONS

The University of Idaho anticipates a cohort enrollment of 25 students initially with a new cohort to begin every fall. By year two, the UI projects a continuous enrollment of 50 students. If for some reason that projection is not met, the UI still plans to have the program available online to students.

The UI requests approval to assess an online program fee consistent with Board Policy V.R.3.a.(x) at $7,500 per year for students taking a nine-credit load. Based on the information provided in the proposal, staff finds that the request to assess the online program fee meets policy requirements.

Consistent with Board Policy III.Z, the Master of Public Administration is a statewide program responsibility for Boise State University (BSU). BSU's program focuses on General Public Administration, Environmental & Natural Resource Policy and Administration, and State & Local Government Policy and Administration; while the UI program focuses on small, rural, and remote local governance. Because the UI proposes to expand their existing MPA program to online delivery, Board Policy III.Z, does not apply. This policy is currently not "applicable to programs for which 90% or more of all activity is required or completed online". Staff would note that BSU is developing an online Master of Public Administration with an international focus in the future.

The following represents graduate Public Administration programs being offered by public postsecondary institutions:

Institution	Program Title	CIP Code	Degree Level	Location	Regional/ Statewide	Method of Delivery
BSU	Public Administration Emphases in: General Public Administration, Environmental & Natural Resource Policy & Admin., State and Local Govt. Policy & Admin.	44.0401	M.P.A.	Boise	Statewide	Traditional
UI	Public Administration	44.0401	M.P.A.	Moscow	Regional	Traditional
ISU	Political Science- Public Administration	45.1101	M.P.A.	Pocatello	Regional	Traditional

The proposal went through the program review process and was recommended for approval by the Council on Academic Affairs and Programs (CAAP) on January 14, 2016.

Board staff recommends approval.

BOARD ACTION

I move to approve the request by University of Idaho to offer the Master of Public Administration through distance delivery and to assess on online program fee in the amount of $7,500 per year; for 9 credits per semester.

Moved by _____ Seconded by _____ Carried Yes _____ No _____

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Institutional Tracking No. FS-16-024

UCC-16-022f

Idaho State Board of Education

Proposal for **Graduate and Doctoral** Degree Program

Date of Proposal Submission:	October 2015
Institution Submitting Proposal:	University of Idaho
Name of College, School, or Division:	College of Letters, Arts, and Social Sciences
Name of Department(s) or Area(s):	Department of Political Science

Program Identification for Proposed New, Modified, or Discontinued Program:

Title:	Online Master of Public Administration Program			
Degree:	Master of Public Administration			
Method of Delivery:	Distance Delivered			
CIP code (consult IR /Registrar)	44.0401			
Proposed Starting Date:	Fall 2016			
Indicate if the program is:	X	Regional Responsibility		Statewide Responsibility

Indicate whether this request is either of the following:

- [ ] New Graduate Program
- [ ] New Doctoral Program
- [ ] New Off-Campus Graduate Program
- [ ] New Off-Campus Doctoral Program
- [ ] Contract Program/Collaborative
- [X] Expansion of an Existing Graduate/Doctoral Program (new learning modality)
- [ ] Consolidation of an Existing Graduate/Doctoral Program
- [ ] Discontinuation of an existing Graduate/Doctoral Program

Andrew E. Kent 12/14/15

College Dean (Institution) Date

Vice President for Research **(as applicable)** Date

Graduate Dean **(as applicable)**

Academic Affairs Program Manager Date

12-14-15

Chief Fiscal Officer (Institution) Date

Chief Academic Officer, OSBE Date

Chief Academic Officer (Institution) Date

SBOE/OSBE Approval Date

President Date

March 16, 2012
Page 1

Before completing this form, refer to Board Policy Section III.G., Program Approval and Discontinuance. This proposal form must be completed for the creation of each new program and each program discontinuation. All questions must be answered.

1. **Describe the nature of the request.** Will this program be related or tied to other programs on campus? Please identify any existing program, option that this program will replace. *If this is request to discontinue an existing program, provide the rationale for the discontinuance. Indicate the year and semester in which the last cohort of students was admitted and the final term the college will offer the program. Describe the teach-out plans for continuing students.*

   The Department of Political Science currently offers the Master of Public Administration degree at the University of Idaho. The program trains practitioners for local governments and has a secondary focus on small, rural communities and economic development to better serve Idaho. We propose expanding the program through online delivery. Our intention is to reach more place-bound practitioners in Idaho's local governments.

2. **List the objectives of the program.** The objectives should address specific needs the program will meet. They should also identify and the expected student learning outcomes and achievements. *This question is not applicable to requests for discontinuance.*

   The objectives of the program are to provide training and continuing education for practitioners in Idaho's local governments. Dr. Brian Ellison has interviewed city supervisors throughout the state that have asked for more training and development for town employees. Students in the program will gain analytical and methodological skills that will contribute to effective decision making in local governments, gain broader and timely knowledge and skills in human resource management and government budgeting, gain expanded knowledge and appreciation for economic development programming in small governments, and gain expanded knowledge and appreciation for problems of rural communities.

3. **Briefly describe how the institution will ensure the quality of the program** (i.e., program review). Will the program require specialized accreditation (it is not necessary to address regional accreditation)? If so, please identify the agency and explain why you do or do not plan to seek accreditation. *This question is not applicable to requests for discontinuance.*

   The Network of Schools of Public Policy, Affairs, and Administration (NASPAA) accredits Master of Public Administration programs. NASPAA provides model curriculums, assessment tools, a seven-year accreditation review process, and other academic and administrative resources for MPA programs. We intend to seek NASPAA accreditation for the online program.

4. **List new courses that will be added to your curriculum specific for this program.** Indicate number, title, and credit hour value for each course. Please include course descriptions for new and/or changes to courses. *This question is not applicable to requests for discontinuance.*

   POLS 504 (3 credit hours): Problems in Rural Governance. This course focuses on special problems that are unique to communities and towns in rural environments. These include issues related to communication, political participation, economic and social resiliency, grant writing, education, economic development, and others.

   All additional courses needed to complete the program have been prepared for distance delivery. The periodicity with which these courses would be offered via distance delivery will be responsive to the curricular needs of the students who matriculate through the distance program.

   Special Note: A research project is currently underway that will develop the information needed to support this course and the program. The project focuses on the issues and needs faced by Idaho's rural and remote communities, and surveys public employees in 200 towns and 44 counties. A secondary objective of the project is develop a number of pedagogical resources for the program that directly reflect problems and needs in Idaho.

5. Please provide the program completion requirements to include the following and attach a typical curriculum to this proposal as Appendix A. *For discontinuation requests, will courses continue to be taught?*

Credit hours required:	30 credit hours
Credit hours required in support courses:	3 credit hours
Credit hours in required electives:	No electives
Credit hours for thesis or dissertation:	3 Field Research
Total credit hours required for completion:	36 credit hours

6. Describe additional requirements such as preliminary qualifying examination, comprehensive examination, thesis, dissertation, practicum or internship, some of which may carry credit hours included in the list above. *This question is not applicable to requests for discontinuance.*

The program is designed for in-service students; that is, students currently employed in either the public or private sector. Students must meet University of Idaho requirements for graduate admissions. But the program, per accrediting agency guidelines, is open to all students with a bachelor's degree from an accredited college or university. The students will complete a 3-hour course – POLS 559 Field Based Research – that will serve as the program capstone. There is not a thesis option.

7. Identify similar programs offered within Idaho or in the region by other colleges/universities. *If the proposed request is similar to another state program, provide a rationale for the duplication.*

Degrees/Certificates offered by school/college or program(s) within disciplinary area under review

Institution and Degree name	Level	Specializations within the discipline (to reflect a national perspective)	Specializations offered within the degree at the institution
BSU	MPA	Public Administration	General PA, Environment and Natural Resources, State and Local Government
CSI			
CWI			
EITC			
ISU	MPA	Public Administration	State, Local and Nonprofit Administration, Environmental Administration, Public Health Administration
LCSC			
NIC			
UI	MPA	Public Administration	Local Government: No MPA program in the state or the nation focuses on rural and remote local governance.

8. **Describe the methodology for determining enrollment projections.** If a survey of student interest was conducted, attach a copy of the survey instrument with a summary of results as **Appendix B**. *This question is not applicable to requests for discontinuance.*

The program will be limited to cohorts of 25 students; a new cohort will begin every fall. This means that by year two the program will have a continuous enrollment of 50 students. Since this will be the only MPA program in the US with a rural local governance focus, we believe that expanding to other Rocky Mountain States with similar demographics will support our enrollment projections.

9. **Enrollment and Graduates.** Using the chart below, provide a realistic estimate of enrollment at the time of program implementation and over three year period based on availability of students meeting the criteria referenced above. Include part-time and full-time (i.e., number of majors or other relevant data) by institution for the proposed program, last three years beginning with the current year and the previous two years. Also, indicate the projected number of graduates and graduation rates.

Discontinuations. Using the chart below include part-time and full-time (i.e., number of majors or other relevant data) by institution for the proposed discontinuation, last three years beginning with the current year and previous two years. Indicate how many students are currently enrolled in the program for the previous two years, to include number of graduates and graduation rates.

Institution	Relevant Enrollment Data			Number of Graduates			Graduate Rate
	Current	Year 1 Previous	Year 2 Previous	Current	Year 1 Previous	Year 2 Previous	
BSU	62	49	49	21	20	22	
ISU	19	16	18	9	5	5	
LCSC							
UI	7	9	14	2	7	8	
CSI							
CWI							
EITC							
NIC							

Special Note: Prior to Fall 2013 there was no active effort to recruit or maintain students in the MPA program due to lack of personnel. A new chair of political science was hired in Fall 2013 who built an MPA Advisory Committee and redesigned, in partnership with several local governments in Idaho, the MPA program. Curriculum changes for the MPA program with a local focus were completed in AY 2014-2015. The first semester of the redesigned MPA program is Fall 2015.

10. **Will this program reduce enrollments in other programs at your institution?** If so, please explain.

No. The online MPA program will be delivered to place bound, in service students. The on-campus MPA program is designed to serve pre-service students; that is, students without work experience and that require an internship for program completion.

11. Provide verification of state workforce needs such as job titles requiring this degree. Include State and National Department of Labor research on employment potential.

Using the chart below, indicate the total projected job openings (including growth and replacement demands in your regional area, the state, and nation. Job openings should represent positions that require graduation from a program such as the one proposed. Data should be derived from a source that can be validated and must be no more than two years old. T*his question is not applicable to requests for discontinuance*.

The Master of Public Administration is a general management degree that emphasizes public management and policy. As a general management degree, like the Master of Business Administration, it provides training that is appropriate for the private sector, especially in functions that are compliance oriented, such as human resources management, auditing, regulatory compliance, etc. According to the Idaho Department of Labor, by 2020 management positions will increase by 13.7%, business and financial operations positions by 14%, community and social service positions by 16.9%, life, physical, and social science positions by 9.2%.

	Year 1	Year 2	Year 3
Local (Regional)	121	146	161
State	1020	1122	1234
Nation	5119	5631	6194

a. Describe the methodology used to determine the projected job openings. If a survey of employment needs was used, please attach a copy of the survey instrument with a summary of results as **Appendix C.**

Estimates are based on data from the Idaho Department of Labor (https://idahoworks.gov/ada/skillmatch/jobseeker_sm/jbs_searchresults_dsp.cfm?searchForm=true) and the web site Monster (http://www.monster.com). Job categories were based upon the US Department of Labor's categories that relate to job positions that usually require an MPA. The positions are: local government analyst, program coordinator, program assistant/manager, policy analyst, statistician, research associate, marketing/PA specialist, and city manager/administrative officer.

b. Describe how the proposed change will act to stimulate the state economy by advancing the field, providing research results, etc.

The program is specifically designed to help local government practitioners enhance and develop their skills in economic development.

c. Is the program primarily intended to meet needs other than employment needs, if so, please provide a brief rationale?

The primary goal of this program is to provide education that would serve employment and professional development needs of currently employed individuals.

12. Will any type of distance education technology be utilized in the delivery of the program on your main campus or to remote sites? Please describe. *This question is not applicable to requests for discontinuance.*

The proposal is for an on-line Master of Pubic Administration program. The technology and training needed to support the program is current at the University of Idaho.

13. Describe how this request is consistent with the State Board of Education's strategic plan and institution's role and mission. *This question is not applicable to requests for discontinuance.*

The On-line MPA program is in direct support of the SBOE strategic plan in that: 1) A Well Educated Citizenry – it provides more access to Idaho citizens to opportunity in higher education; and 2) Innovation and Economic Development – it improves innovation and creativity, promotes economic growth, increases efficiency.

14. Describe how this request fits with the institution's vision and/or strategic plan. *This question is not applicable to requests for discontinuance.*

Goals of Institution Strategic Mission	Proposed Program Plans to Achieve the Goal
Teaching and Learning	The online MPA program gives the university the opportunity to meet critical objective in teaching and learning: expanding professional education, developing increased opportunities for underserved communities, and increasing access to local learners.
Scholarly and Creative Activity	Increasing Interdisciplinary Scholarship: Public administration is the interdisciplinary study of government. We are also building this program on an empirical foundation that is lacking in public administration in the nation.
Outreach and Engagement	The redesign of the Master of Public Administration program was based on an outreach model. We have local government partners associated with the program that have pledged internship and scholarship support. In that context, the MPA online proposal is intended to help the University of Idaho, CLASS, and the Department provides meaningful outreach to Idaho's towns.
Community Culture	One of the most interesting findings from current scholarship on local government is that cultural tolerance has a significant impact on economic development; that is, the more culturally tolerant the community the more economically successful. That message will be built in to the coursework for this program.

15. Is the proposed program in your institution's Five-Year plan? Indicate below. *This question is not applicable to requests for discontinuance.*

Yes ____ No _X__

If not on your institution's Five-Year plan, provide a justification for adding the program.

The Master of Public Administration program is well established at the University of Idaho. The request is to offer the program online. Hence it would not appear on the institution's five-year plan.

16. Explain how students are going to learn about this program and where students are going to be recruited from (i.e., within institution, out-of-state, internationally). *For requests to discontinue a program, how will continuing students be advised of impending changes and consulted about options or alternatives for attaining their educational goals?*

The program will be marketed through direct contact with local governments, county governments, and the University of Idaho Extension Offices. Students will come from local municipal and county government across Idaho.

17. In accordance with Board Policy III.G., an external peer review is required for any new doctoral program. Attach the peer review report as **Appendix D**.

N/A

18. Program Resource Requirements. Using the ***Excel spreadsheet*** provided by the Office of the State Board of Education indicate all resources needed including the planned FTE enrollment, projected revenues, and estimated expenditures for the first three fiscal years of the program. Include reallocation of existing personnel and resources and anticipated or requested new resources. Second and third year estimates should be in constant dollars. Amounts should reconcile budget explanations below. If the program is contract related, explain the fiscal sources and the year-to-year commitment from the contracting agency(ies) or party(ies). Provide an explanation of the fiscal impact of the proposed discontinuance to include impacts to faculty (i.e., salary savings, re-assignments).

a. Personnel Costs

Faculty and Staff Expenditures
Project for the first three years of the program the credit hours to be generated by each faculty member (full-time and part-time), graduate assistant, and other instructional personnel. Also indicate salaries. After total student credit hours, convert to an FTE student basis. Please provide totals for each of the three years presented. Salaries and FTE students should reflect amounts shown on budget schedule.

Name, Position & Rank	Annual Salary Rate	FTE Assignment to this Program	Projected Student Credit Hours	FTE Students
Brian Ellison, Professor	$109,278	2 courses/yr.	750	83
Manoj Shrestha, Associate Professor	$ 59,202	2 courses/yr.	750	83
Juliet Carlisle, Assistant Professor	$ 58,282	1 course/yr.	375	42
New PA Faculty Member 1	$70,000	2 courses/yr.	750	83
New PA Faculty Member 2 (year 2)	$70,000	2 courses/yr.	500	56
Patrick Wilson, Professor	$80,479.30	1 course/yr.	375	42
UI Faculty Member		1 course/yr	375	42
Practitioner		1 course/yr.	375	42
Field Based Research	$4,000	1 course/yr.	300	33

Project the need and cost for support personnel and any other personnel expenditures for the first three years of the program.

Administrative Expenditures
Describe the proposed administrative structure necessary to ensure program success and the cost of that support. Include a statement concerning the involvement of other departments, colleges, or other institutions and the estimated cost of their involvement in the proposed program

Name, Position & Rank	Annual Salary Rate	FTE Assignment to this Program	Value of FTE Effort to this Program
Brian Ellison, Chair, Professor, Director	$109,278	.10	10,700

Two new tenure track professors of public administration will be required to deliver the program. One will be hired in year 1, and the second will be hired in year 2. In addition, a 0.25 FTE temporary lecturer (adjunct faculty) will be required for field based research, and 0.1 FTE effort of the Director is included for program administration and oversight.

b. Operating Expenditures

Briefly explain the need and cost for operating expenditures (travel, professional services, etc.)

There will be costs for faculty members to receive online course development training. Those will be minimal after the program begins. There may also some travel costs, membership dues to NASPAA (after accreditation), and some recruiting materials.

In addition, the program will incur a liability to other UI units for not charging the per credit online course fee. This expense is included in the budget, calculated at the current $35.00 per credit rate times 18 credits per academic year for the specified number of students.

c. Capital Outlay

None

(1) Library resources

(a) Evaluate library resources, including personnel and space. Are they adequate for the operation of the present program? If not, explain the action necessary to ensure program success.

The library at the University of Idaho provides excellent resources for study and research in public administration. It provides support to the current MPA program on campus.

(b) Indicate the costs for the proposed program including personnel, space, equipment, monographs, journals, and materials required for the program.

Library faculty estimates that personnel support for the program will be $2,000 annually.

(c) For off-campus programs, clearly indicate how the library resources are to be provided.

University libraries across the country are increasingly providing materials in a digital format. Students in the on line program can search the library for materials, which will be delivered digitally. It should be noted that on campus students receive materials in the same way.

(2) Equipment/Instruments

Describe the need for any laboratory instruments, computer(s), or other equipment. List equipment, which is presently available and any equipment (and cost), which must be obtained to support the proposed program.

None.

d. Revenue Sources

(1) If funding is to come from the reallocation of existing state appropriated funds, please indicate the sources of the reallocation. What impact will the reallocation of funds in support of the program have on other programs?

There will be no reallocation of existing state appropriations. An initial startup allocation will be provided internally, and thereafter the revenue generated by the program will be sufficient to cover expenses.

We propose a different funding plan. The SBOE has given institutions permission to set unique fee schedules for programs that are entirely distance delivered. For the online MPA, we propose to charge each student a fee of $7,500 per year, and students would not be charged the UI's per credit online course fee (currently $35.00). This is a substantial discount from the regular graduate tuition and fees and is a strong incentive for students to join the program. All students will be enrolled full-time (9 credits per semester).

(2) If the funding is to come from other sources such as a donation, indicate the sources of other funding. What are the institution's plans for sustaining the program when funding ends?

N/A

(3) If an above Maintenance of Current Operations (MCO) appropriation is required to fund the program, indicate when the institution plans to include the program in the legislative budget request.

N/A

(4) Describe the federal grant, other grant(s), special fee arrangements, or contract(s) to fund the program. What does the institution propose to do with the program upon termination of those funds?

There are no grants, special fees, or contracts needed to fund the program.

(5) Provide estimated fees for any proposed professional or self-support program.

There are no other fees associated with this program.

APPENDIX A

POLITICAL SCIENCE AND PUBLIC AFFAIRS RESEARCH GRADUATE DEGREE PROGRAMS

Candidates must fulfill the requirements of the College of Graduate Studies and of the Department of Political Science and Public Affairs Research. See the College of Graduate Studies section for the general requirements applicable to each degree.

Master of Arts. Major in Political Science. General College of Graduate Studies M.A. requirements for application must be followed. Applicants must also submit three letters of recommendation and a 300-500 word statement of purpose directly to the Department of Political Science.

Master of Public Administration. Major in Public Administration. The Martin School and the Department of Political Science at the University of Idaho offers the Master of Public Administration (MPA) degree for students interested in careers in the governance and management of local governments and communities. Students can expect to leave the program with intellectual and analytical skills, and the practical experience needed to enhance their ability to serve local governments and communities. The program is public service oriented, and is delivered in partnership with communities in Idaho and Washington.

Practitioner involvement in this program provides students with a more relevant and practical education than that found in more traditional programs. Academic faculty members work closely with local government professionals to deliver courses and professional development opportunities. In addition to internships, all students are required to complete a practicum designed to deliver the skills needed in professional communication and employment.

The program requires 36 hours of coursework and offers two tracks. The internship track is designed for students who have little or no public administration experience while the in-service track is designed for working professionals who seek to strengthen their leadership skills. Internship track students complete a 3 to 6-hour internship to gain hands-on experience in the governance of local government and communities. In-service students must complete 3 hours of PolS 559 Field Based Research in lieu of the internship.

Both tracks share a core curriculum of 18 hours:

PolS 555 Seminar in Administrative Theory (3 cr)

PolS 557 Governmental Budgeting (3 cr)

PolS 558 Research Methods for Local Government and Community Administration (3 cr)

PolS 560 Public Administration Practicum (3 credits taken 1 credit per semester)

PolS 572 Local Government Politics and Administration (3 cr)

PolS 575 Public Personnel Administration (3 cr)

Students will then develop their specific interests in local government by choosing 12 to 15 hours of elective courses in consultation with and approval of their advisor. These courses may be chosen in alignment with the bioregional planning and community design graduate program, or other UI graduate programs.

Although no specific undergraduate preparation is required for the MPA, applicants must have a 3.0 GPA and GRE General Test Scores that are no more than five years old. Three letters of recommendation are also required. Students with a lower GPA may, on occasion, be admitted provisionally.

PROGRAM RESOURCE REQUIREMENTS

Indicate all resources needed including the planned FTE enrollment, projected revenues, and estimated expenditures for the first three fiscal years of the program. Include reallocation of existing personnel and resources and anticipated or requested new resources. Second and third year estimates should be in constant dollars. Amounts should reconcile subsequent pages where budget explanations are provided. If the program is contract related, explain the fiscal sources and the year-to-year commitment from the contracting agency(ies) or party(ies). Provide an explanation of the fiscal impact of the proposed discontinuance to include impacts to faculty (i.e., salary savings, re-assignments).

I. PLANNED STUDENT ENROLLMENT

	FY	2017	FY	2018	FY	2019	Cumulative Total	
	FTE	Headcount	FTE	Headcount	FTE	Headcount	FTE	Headcount
A. New enrollments	25	25	50	50	75	75	150	150
B. Shifting enrollments	0	0	0	0	0	0	0	0

II. REVENUE

	FY	2017	FY	2018	FY	2019	Cumulative Total	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
1. Appropriated (Reallocation)							$0.00	$0.00
2. Appropriated (New)							$0.00	$0.00
3. Federal							$0.00	$0.00
4. Tuition	$187,500.00		$375,000.00		$562,500.00		$1,125,000.00	$0.00
5. Student Fees							$0.00	$0.00
6. Other (Specify)							$0.00	$0.00
Total Revenue	$187,500.00		$375,000.00		$562,500.00		$1,125,000.00	$0.00

Ongoing is defined as ongoing operating budget for the program which will become part of the base.
One-time is defined as one-time funding in a fiscal year and not part of the base.

III. EXPENDITURES

	FY	2017	FY	2018	FY	2019	Cumulative Total	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
A. Personnel Costs								
1. FTE	1.35		2.35		2.35		6.05	0.00
2. Faculty	$70,000.00		$140,000.00		$140,000.00		$350,000.00	$0.00
3. Administrators	$10,928.00		$10,928.00		$10,928.00		$32,784.00	$0.00
4. Adjunct Faculty	$4,000.00		$4,000.00		$4,000.00		$12,000.00	$0.00
5. Instructional Assistants							$0.00	$0.00
6. Research Personnel							$0.00	$0.00
7. Support Personnel							$0.00	$0.00
8. Fringe Benefits	$26,837.00		$48,957.00		$48,957.00		$124,751.00	$0.00
9. Other:							$0.00	$0.00
Total FTE Personnel and Costs	$111,765.00	$0.00	$203,885.00	$0.00	$203,885.00	$0.00	$519,535.00	$0.00

	FY	2017	FY	2018	FY	2019	Cumulative Total	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
B. Operating Expenditures								
1. Travel	$1,000.00		$1,000.00		$1,000.00		$3,000.00	$0.00
2. Professional Services							$0.00	$0.00
3. Other Services	$1,000.00		$500.00		$500.00		$2,000.00	$0.00
4. Communications							$0.00	$0.00
5. Utilities							$0.00	$0.00
6. Materials and Supplies	$2,000.00		$2,000.00		$2,000.00		$6,000.00	$0.00
7. Rentals							$0.00	$0.00
8. Repairs & Maintenance							$0.00	$0.00
9. Materials & Goods for Manufacture & Resale							$0.00	$0.00
10. Miscellaneous: Online course fee for students	$15,750.00		$31,500.00		$47,250.00		$94,500.00	$0.00
Total Operating Expenditures	$19,750.00	$0.00	$35,000.00	$0.00	$50,750.00	$0.00	$105,500.00	$0.00

	FY	2017	FY	2018	FY	2019	Cumulative Total	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
C. Capital Outlay								
1. Library Resources	$2,000.00		$2,000.00		$2,000.00		$6,000.00	$0.00
2. Equipment							$0.00	$0.00
Total Capital Outlay	$2,000.00	$0.00	$2,000.00	$0.00	$2,000.00	$0.00	$6,000.00	$0.00
D. Capital Facilities Construction or Major Renovation	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
E. Indirect Costs (overhead)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
TOTAL EXPENDITURES:	$133,515.00	$0.00	$240,885.00	$0.00	$256,635.00	$0.00	$631,035.00	$0.00
Net Income (Deficit)	$53,985.00	$0.00	$134,115.00	$0.00	$305,865.00	$0.00	$493,965.00	$0.00

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UNIVERSITY OF IDAHO

SUBJECT

University of Idaho, College of Law, Creation of a Master of Laws (LL.M.) Degree

APPLICABLE STATUTE, RULE, OR POLICY

Idaho State Board of Education Governing Policies & Procedures, Section III.G.3.c.i.

BACKGROUND/DISCUSSION

The University of Idaho, College of Law seeks to launch a Master of Laws (LL.M.) degree program in August 2016. The LL.M. degree would offer students four curricular emphasis areas, three of which mirror the curricular strengths of the J.D. program and one focused on educating international students with a first degree in law in their home country. The LL.M. degree is the first non-J.D. program proposed at the University of Idaho, College of Law.

The LL.M. degree will start with four emphasis areas that align with the J.D. curricular strengths at the College of Law: Democracy, Justice & the American Legal System; Natural Resources & Environmental Law (NREL); Business Law & Entrepreneurship (BLE); and Litigation and Alternative Dispute Resolution (LADR). The LL.M. is a graduate law degree, and all incoming students would be required to have a first degree in law (in the United States that is a J.D. degree, but in many others it is a Bachelor's degree). The LL.M. program will primarily recruit lawyers from foreign countries and provide approximately 9 to 12 months of instruction in Moscow at the University of Idaho.

The College of Law seeks to create the LL.M. degree as part of the university's strategic vision for the future of the law school statewide. As the College develops locational offerings in Boise, this is an effort to ensure that the Moscow location continues to have a robust and important role. One of the benefits of creating an LL.M. program based in Moscow is that the UI will ensure a diverse learning environment for students college-wide. The LL.M. program will supplement the thriving J.D. program and help the College meet its dual campus objectives. Additionally, the perspective these students will bring to the classroom and co-curricular life will enrich the experience of all students at the College. The UI expects that in creating this program it will bring a stronger focus to global ways of thinking about law and legal systems, a needed perspective for students entering an increasingly global practice of law. The LL.M. degree is one part of the university's increased efforts to internationalize educational offerings. Other efforts on the horizon include study abroad and exchange opportunities. Lastly, the LL.M. and J.D. students will create a dynamic student body that learns and grows with one another as students and then alumni. Having a diverse, international alumni body will help the College of Law long term from many standpoints, including in branding, development, enroLL.Ment, and employer relations.

The creation of the LL.M. degree proposal and curriculum has gone through the regular College and University programmatic processes, receiving endorsement. The American Bar Association is making an acquiescence decision at a late January meeting. It is anticipated that the result of that review will be favorable.

IMPACT

The goal of the program initially is to offer an intellectually stimulating Master of Laws degree for international students with a first degree of law in their home country. Students can take the degree and perspective they've gained back to their home countries to advance themselves professionally and encourage cross-border understanding. The curriculum will give students a solid introduction to the American legal system and prepare students to sit for a bar exam in a number of states, if interested. If students are not interested in sitting for a bar exam in another state, they can enroll in the LL.M. degree to study one of the curricular strength areas.

The goals for the program will be achieved through an integration of the LL.M. students into a number of J.D. courses and the offering of two specialized courses geared to their specific needs. The Dean and faculty director have experience working with international students and will ensure the high quality of the program meets the needs of our students.

The College stands to benefit financially from the impact of this second degree offering as well as contribute to the University's overall goal to increase enrollment.

LL.M. students will pay the current non-resident tuition and fees rate, the same as J.D. students from out-of-state or abroad. This rate includes a College of Law professional fee, which will apply to LL.M. students as well.

ATTACHMENTS

Attachment 1 – Program Proposal Page 5

STAFF COMMENTS AND RECOMMENDATIONS

The UI anticipates initial enrollment to be 5-10 students in the first two years with enrollment increasing by the fourth year of the program to approximately 10-15 students annually. The UI provides that if the program grows beyond those projections, they will reevaluate to determine whether additional faculty and staff resources are needed or if there is interest in growing the program.

Consistent with Board Policy III.Z, the University of Idaho (UI) has the statewide program responsibility for the J.D. Law program. Currently the LL.M. is not listed in this capacity. In view of that, the UI has expressed interest in adding the LL.M. degree as a statewide program responsibility. Because the statewide program list is in Board Policy III.Z, the proposed update would require policy amendments for Board approval. Staff will work with the UI to consider this request.

The proposal went through the program review process and was recommended for approval by the Council on Academic Affairs and Programs (CAAP) on January 14, 2016.

Board staff recommends approval.

BOARD ACTION

I move to approve the request by the University of Idaho to offer a Master of Laws (LL.M.) degree starting in Summer 2016.

Moved by _____ Seconded by _____ Carried Yes _____ No _____

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FS-16-025

Institutional Tracking No. _____

UCC-16-020a

Idaho State Board of Education

Proposal for **Graduate and Doctoral** Degree Program

Date of Proposal Submission:	October 13, 2015
Institution Submitting Proposal:	University of Idaho
Name of College, School, or Division:	College of Law
Name of Department(s) or Area(s):	

Program Identification for Proposed New, Modified, or Discontinued Program:

Title:	Master of Laws (LL.M.)		
Degree:	Master of Laws (LL.M.)		
Method of Delivery:	Live, in person		
CIP code (consult IR /Registrar)	22.0101		
Proposed Starting Date:	Summer 2016 (for Fall 2016 enrollment of the first students)		
Indicate if the program is:		Regional Responsibility	Statewide Responsibility

Indicate whether this request is either of the following:

- [X] New Graduate Program
- [ ] New Doctoral Program
- [ ] New Off-Campus Graduate Program
- [ ] New Off-Campus Doctoral Program
- [ ] Contract Program/Collaborative
- [ ] Expansion of an Existing Graduate/Doctoral Program
- [ ] Consolidation of an Existing Graduate/Doctoral Program
- [ ] Discontinuation of an existing Graduate/Doctoral Program

College Dean (Institution)	12/14/15 Date	Vice President for Research **(as applicable)**	Date
Graduate Dean **(as applicable)**		Academic Affairs Program Manager	Date
Chief Fiscal Officer (Institution)	12-14-15 Date	Chief Academic Officer, OSBE	Date
Chief Academic Officer (Institution)	Date	SBOE/OSBE Approval	Date
President	Date		

March 16, 2012
Page 1

UCC-16-020a

Before completing this form, refer to Board Policy Section III.G., Program Approval and Discontinuance. This proposal form must be completed for the creation of each new program and each program discontinuation. All questions must be answered.

1. **Describe the nature of the request.** Will this program be related or tied to other programs on campus? Please identify any existing program, option that this program will replace. *If this is request to discontinue an existing program, provide the rationale for the discontinuance. Indicate the year and semester in which the last cohort of students was admitted and the final term the college will offer the program. Describe the teach-out plans for continuing students.*

The proposed Master of Laws (LL.M.) degree is tied to the Juris Doctor (J.D.) degree at the College of Law in that every class but two needed to operate the LL.M. is already offered regularly through the J.D. curriculum.

The LL.M. program will operate closely parallel to the existing J.D. program. For example, an LL.M. student will take the same Business Organizations course as the J.D. students. All of the classes in the LL.M. program will be shared with the J.D. program except two new courses called Introduction to American Law and Legal Education, and Legal Writing and Research for LL.M. Students. They will be new courses taught initially as 901 seminars. The Introduction course will be required for all international students in the LL.M. program and the Legal Writing course will be required for all students in the Democracy, Justice & American Legal System emphasis. The integration of the LL.M. students into the J.D. classroom environment for all other courses allows for the efficient allocation of law school resources to the new program. The integration also provides the opportunity to reap the educational benefits of direct interaction between J.D. and LL.M. students studying in the same academic environment.

2. **List the objectives of the program.** The objectives should address specific needs the program will meet. They should also identify and the expected student learning outcomes and achievements. *This question is not applicable to requests for discontinuance.*

The LL.M. degree will start with four emphasis areas that align with our J.D. curricular strengths at the College of Law: Democracy, Justice & the American Legal System; Natural Resources & Environmental Law (NREL); Business Law & Entrepreneurship (BLE); and Litigation and Alternative Dispute Resolution (LADR). The LL.M. is a graduate law degree, and all incoming students would be required to have a first degree in law (in this country that is a J.D. degree, but in many others it is a Bachelor's degree). The LL.M. program will primarily recruit lawyers from foreign countries and provide approximately 9 to 12 months of instruction in Moscow at the University of Idaho.

This degree will provide significant value to the LL.M. students that enroll. The goal of the program is to strengthen the foreign lawyers' knowledge of various aspects of American law,

especially for those seeking to sit for a bar exam in states that permit it. For foreign and domestic students looking to specialize in one of our J.D. emphasis areas, the program allows them to chart out a focused area of study in the field of their choice. For international lawyers, this knowledge and the accompanying degree are designed to advance the careers of lawyers working abroad or doing business with American companies, governments, and organizations. The degree also prepares recipients to participate in rule of law development efforts in their home countries.

It is expected that most LL.M. degree recipients will return to influential legal, academic, and business positions in their home countries after completion of their study. The degree affiliation of these lawyers with the University of Idaho and their experience living in Idaho could play a positive role in their encouraging future foreign investment in this state, tourism, and greater diplomatic understanding. The LL.M. degree also qualifies some of the graduates to hold positions in the judiciary and certain government legal positions, another potential point of influence and connection for the University and state internationally. The graduates of our LL.M. program also support the University of Idaho's internationalization efforts and offer the College of Law an immediate international network of alumni.

3. **Briefly describe how the institution will ensure the quality of the program** (i.e., program review). Will the program require specialized accreditation (it is not necessary to address regional accreditation)? If so, please identify the agency and explain why you do or do not plan to seek accreditation. *This question is not applicable to requests for discontinuance.*

The American Bar Association is the accrediting body for law schools nationwide. The College of Law is required to receive the ABA's acquiescence in order to start an LL.M. program. The acquiescence process takes just a couple of months and does not require a site inspection. The ABA primarily wants to ensure that "the additional degree program will not detract from a law school's ability to maintain a sound J.D. degree program."

In addition to the quality assessment of the program by the ABA, the College of Law will ensure the quality of the program through the admissions process. To be considered for the LL.M. program, an applicant must have a J.D. (Juris Doctor) from an accredited U.S. law school or a first law degree (J.D., LL.B. or the equivalent) from a foreign law school. Admission to the LL.M. program is competitive. In evaluating applications, the Committee takes into consideration the applicant's grades and rank in his or her law school and other university studies, letters of recommendation, occupational interests, professional and personal accomplishments, and other factors. The program is designed for intellectually curious and thoughtful candidates who come from a variety of legal systems and backgrounds and who have demonstrated an intent to return to their country to contribute to academia or the legal profession. The College is equally interested in applicants pursuing careers in law teaching and research, government service, the judiciary, international organizations, non-governmental organizations and private practice.

The following items are required as part of the application process:

- Non-refundable $50 application fee
- LL.M. Application (through LSAC or in hard copy directly)

- Law School Admission Council Credential Assembly Service (CAS) Report (if applying through LSAC, if not then all materials should be sent directly to the College of Law)
- Transcripts from former institutions indicating an already awarded Bachelor's degree in law
- CV/Resume
- Personal Statement - Not to exceed 3 pages and includes your reasons for wanting to study law and your reasons for wanting to study law at the University of Idaho.
- Letters of Recommendation - At least 2 are required and it is strongly recommended that at least one letter come from a post-secondary professor whose class you have taken if possible.
- A detailed addendum of explanation if any question on the CHARACTER AND FITNESS section is answered "Yes."
- An Employment Addendum if Question 16 is answered "No."
- A TOEFL, IELTS or other score if you were educated outside of the U.S., your native language is not English, and you have received no educational instruction in English.

An Admissions Committee made up of faculty and staff at the College of Law will review the above materials to determine admission into the LL.M. program.

4. **List new courses that will be added to your curriculum specific for this program.** Indicate number, title, and credit hour value for each course. Please include course descriptions for new and/or changes to courses. *This question is not applicable to requests for discontinuance.*

All of the classes in the LL.M. program will be shared with the J.D. program except two new courses called Introduction to American Law and Legal Education, and Legal Writing and Research for LL.M. Students. They will be new courses taught initially as 901 seminars. The Introduction course will be required for all international students in the LL.M. program and the Legal Writing course will be required for all students in the Democracy, Justice & American Legal System emphasis.

5. **Please provide the program completion requirements to include the following and attach a typical curriculum to this proposal as Appendix A.** *For discontinuation requests, will courses continue to be taught?*

Credit hours required:	2 credits
Credit hours required in support courses:	
Credit hours in required electives:	22 credits
Credit hours for thesis or dissertation:	
Total credit hours required for completion:	24 credits

6. **Describe additional requirements such as preliminary qualifying examination, comprehensive examination, thesis, dissertation, practicum or internship, some of which may carry credit hours included in the list above.** *This question is not applicable to requests for discontinuance.*

The LL.M. program is primarily geared to foreign lawyers, thus the students will likely all be international. If students are interested, they may arrive earlier than the start of this course and access the University of Idaho's American Language and Culture Program. Applicants must receive a satisfactory score on the TOEFEL, IELTS or other English language proficiency exam, but the opportunity to participate in the American Language and Culture Program will be made available to all as English will be their second language. The University's English language satisfaction options are as followed:

- TOEFL: 550 on the paper test or 79 on the internet test
- IELTS: Minimum score of 6.5
- UI American Language and Culture Program: With a Level 6 Pass
- Earned degree at an accredited institution OR successfully completed upper level college courses, both taught and evaluated in English

7. **Identify similar programs offered within Idaho or in the region by other colleges/universities.** *If the proposed request is similar to another state program, provide a rationale for the duplication.*

Degrees/Certificates offered by school/college or program(s) within disciplinary area under review

Institution and Degree name	Level	Specializations within the discipline (to reflect a national perspective)	Specializations offered within the degree at the institution
BSU			
CSI			
CWI			
EITC			
ISU			
LCSC			
NIC			
UI			

No other program exists in Idaho either at a public or private institution. There are no similar programs in the region either (within 250 miles of Moscow). Gonzaga University used to have an LL.M. but now will recognize 30 credits of foreign coursework to the J.D. degree instead. The J.D. degree is the only option at Gonzaga. The University of Montana, Seattle University, and Concordia University also do not have LL.M. degrees. Lewis and Clark has LL.M. degrees in Animal Law and Environmental Law. Willamette has LL.M degrees in Dispute Resolution, Transnational Law and a General concentration geared toward international students. The University of Washington has numerous LL.M. degrees in a variety of subjects. UW and Willamette thus appear to be the closest regional competitor with an LL.M. degree emphasis focused on international students. UW currently charges out of state and international students

$45,024 per year and Willamette charges $39,355. Our current out of state and international student tuition is $30,010, making us the most cost-conscious choice.

Looking a bit farther away, the University of Oregon has LL.M. concentrations in Environmental and Natural Resources Law, Business Law and American Law, but Eugene is 450 plus miles away from Moscow. Just a bit further away, the University of Utah offers an Environmental and Natural Resources LL.M. and Brigham Young University has an LL.M. in American Law for international students. Given the focus of the former and the religious affiliation of the latter, these two programs also do not seem to be much in the way of competition for students.

8. **Describe the methodology for determining enrollment projections.** If a survey of student interest was conducted, attach a copy of the survey instrument with a summary of results as **Appendix B**. *This question is not applicable to requests for discontinuance.*

The law school anticipates that initial enrollment in the program will be modest and will grow as the reputation of the program spreads internationally. The College of Law anticipates an initial enrollment of 5 to 10 LL.M. students in the first couple of years with enrollment increasing by the fourth year of the program to approximately 10 to 15 students annually. If interest in the program grows beyond those projections, the College will reevaluate whether additional faculty and staff resources are needed to handle the growth and whether we want to increase at all.

The estimates for the number of students to enroll come from the law school's study of other LL.M. programs at American law schools. Typically the LL.M. programs at schools with J.D. degree programs of approximately 300 to 400 students will enroll 10 to 20 students in their LL.M. program each year. The law school will initially reallocate administrative time of the Deans to launch the program by traveling to countries in Asia, Europe, and Latin America to establish relationships with potential students. Deans Adams and Dodge have run programs like this at other institutions and are familiar with the avenues to recruit potential students. The LSAC also now runs an LL.M. Credential Service, which allows law schools to generate reports of potential LL.M. students and market to them electronically. Significant in person travel will be needed at first, but as the program grows the travel will phase into a regular pattern

9. **Enrollment and Graduates.** Using the chart below, provide a realistic estimate of enrollment at the time of program implementation and over three year period based on availability of students meeting the criteria referenced above. Include part-time and full-time (i.e., number of majors or other relevant data) by institution for the proposed program, last three years beginning with the current year and the previous two years. Also, indicate the projected number of graduates and graduation rates.

   Discontinuations. Using the chart below include part-time and full-time (i.e., number of majors or other relevant data) by institution for the proposed discontinuation, last three years beginning with the current year and previous two years. Indicate how many students are currently enrolled in the program for the previous two years, to include number of graduates and graduation rates.

Institution	Relevant Enrollment Data			Number of Graduates			Graduate Rate
	Current (2016)	Year 1 Previous (2017)	Year 2 Previous (2018)	Current	Year 1 Previous	Year 2 Previous	
BSU							
ISU							
LCSC							
UI	5	8	10				
CSI							
CWI							
EITC							
NIC							

10. **Will this program reduce enrollments in other programs at your institution?** If so, please explain.

The J.D. program's enrollment will not be impacted by the addition of an LL.M. program. The JD program courses are not impacted with the addition of an LL.M. program. There is space available in nearly every class. JD enrollment is a separate process for a different type of applicant. The LL.M. program requires a first law degree in your home country where the JD program is the first law degree in this country. So they are two different populations of potential students. If anything, having a more diverse and internationally minded student body could increase enrollment in the J.D. program in that it is attractive to some applicants.

11. **Provide verification of state workforce needs such as job titles requiring this degree.** Include State and National Department of Labor research on employment potential.

Using the chart below, indicate the total projected job openings (including growth and replacement demands in your regional area, the state, and nation. Job openings should represent positions which require graduation from a program such as the one proposed. Data should be derived from a source that can be validated and must be no more than two years old. T*his question is not applicable to requests for discontinuance*.

	Year 1	Year 2	Year 3
Local (Regional)	0	0	0
State			

Nation			

a. Describe the methodology used to determine the projected job openings. If a survey of employment needs was used, please attach a copy of the survey instrument with a summary of results as **Appendix C.**

The LL.M. program is focused on international students who plan to return to their home countries. Under the F-1 visa regulations, students must intend to return after the program but are given up to 12 months of optional practical training to work legally in the United States.

b. Describe how the proposed change will act to stimulate the state economy by advancing the field, providing research results, etc.

It is expected that most LL.M. degree recipients will return to influential legal, academic, and business positions in their home countries after completion of their study. The degree affiliation of these lawyers with the University of Idaho and their experience living in Idaho could play a positive role in their encouraging future foreign investment in this state, tourism, and greater diplomatic understanding. The graduates of our LL.M. program also support the University of Idaho's internationalization efforts and offer the College of Law an immediate international network of alumni. The benefits of internationalization through the LL.M. also include increased scholarly opportunities for faculty on the international level.

c. Is the program primarily intended to meet needs other than employment needs, if so, please provide a brief rationale.

The primary needs met are for students who will take the LL.M. degree to their home country and enjoy the professional benefit of an advanced law degree received in the United States. While those students are enrolled, the University and College benefit from their presence and engagement on campus and in the classroom.

12. Will any type of distance education technology be utilized in the delivery of the program on your main campus or to remote sites? Please describe. *This question is not applicable to requests for discontinuance.*

The College of Law maintains locations in Moscow and Boise. Students in the LL.M. program may enroll in courses taught in Boise via distance education to Moscow. All of those courses are taught live and interactive, like a traditional classroom environment, except that the professor is in the other location. All that said, all of the required courses are currently taught live in Moscow. Only optional elective courses for the degree might employ this method of delivery.

13. Describe how this request is consistent with the State Board of Education's strategic plan and institution's role and mission. *This question is not applicable to requests for discontinuance.*

The addition of an LL.M. program is consistent with the following State Board of Education and University of Idaho strategic plan goals:

SBOE Goal 1: A Well Educated Citizenry, Objective D Quality Education and UI Goal 1: Teaching and Learning, Objective A and B - The LL.M. program will also be a significant benefit to our approximately 350 J.D. students. Our J.D. students will have the opportunity to meet

experienced lawyers from other countries, learn about the system of laws in those countries, and expand their knowledge of other cultures and legal systems. In an increasingly global legal market it is imperative that American law students gain exposure to and knowledge of legal systems throughout the world.

SBOE Goal 2: Innovation and Economic Development, Objective 3 Economic Growth and UI Goal 3: Outreach and Engagement Objective B – The LL.M. program will bring a new population of international students to the University and state. These students live in Idaho for a year, pay tuition, and contribute to the overall economy. The connections formed through this economic growth can lead to individual and institutional partnerships that bring Idaho to the attention of people worldwide.

UI Goal 4: Community & Culture, Objective A – Because the LL.M. program is focused on international students, the University stands to benefit from their uniquely diverse contributions in and out of the classroom. This program helps the University build on the recruitment of a diverse student body and strategically assists with the President's stated desire for more international students on campus.

14. Describe how this request fits with the institution's vision and/or strategic plan. *This question is not applicable to requests for discontinuance.*

Goals of Institution Strategic Mission	Proposed Program Plans to Achieve the Goal
Goal 1: Teaching and Learning	Program students are already attorneys and the LL.M. degree will enhance their learning of the US legal system while contributing to J.D. students' exposure to global legal concepts.
Goal 3: Outreach and Engagement	Program will permit the University and College to increase international connections through students and eventually alums.
Goal 4: Community and Culture	Program will recruit international students to enroll at UI thus increasing the diversity of the student body and contributing to the international student population.

15. Is the proposed program in your institution's Five-Year plan? Indicate below. *This question is not applicable to requests for discontinuance.*

Yes _X_ No _____

If not on your institution's Five-Year plan, provide a justification for adding the program.

16. Explain how students are going to learn about this program and where students are going to be recruited from (i.e., within institution, out-of-state, internationally). *For requests to discontinue a program, how will continuing students be advised of impending changes and consulted about options or alternatives for attaining their educational goals?*

The College of Law will take J.D. promotional pieces and emails, like the viewbook and prospective student emails, and repurpose them with LL.M. specific information. The primary recruiting tool will be an LL.M. viewbook about the College, Moscow, and the degree program. The LL.M. CRM resource will also be used to communicate with prospective students electronically.

A complete plan, similar to what is done for the J.D. program, will be developed in fall 2015. Recruiting events around the world are available through EducationUSA, QS World Grad School Fair, embassy presentations, online college fairs, and more. The College will also maximize our recruiting efforts by making sure COGS and IPO have materials about the LL.M. program for when they do international recruitment. Efforts will be made to use faculty relationships to schedule campus visits to present to undergraduate law students abroad.

17. In accordance with Board Policy III.G., an external peer review is required for any new doctoral program. Attach the peer review report as **Appendix D**.

Not applicable.

18. **Program Resource Requirements.** Using the ***Excel spreadsheet*** provided by the Office of the State Board of Education indicate all resources needed including the planned FTE enrollment, projected revenues, and estimated expenditures for the first three fiscal years of the program. Include reallocation of existing personnel and resources and anticipated or requested new resources. Second and third year estimates should be in constant dollars. Amounts should reconcile budget explanations below. If the program is contract related, explain the fiscal sources and the year-to-year commitment from the contracting agency(ies) or party(ies). Provide an explanation of the fiscal impact of the proposed discontinuance to include impacts to faculty (i.e., salary savings, re-assignments).

a. Personnel Costs

Faculty and Staff Expenditures

Project for the first three years of the program the credit hours to be generated by each faculty member (full-time and part-time), graduate assistant, and other instructional personnel. Also indicate salaries. After total student credit hours, convert to an FTE student basis. Please provide totals for each of the three years presented. Salaries and FTE students should reflect amounts shown on budget schedule.

Name, Position & Rank	Annual Salary Rate	FTE Assignment to this Program	Projected Student Credit Hours	FTE Students
Jeffrey Dodge, Associate Dean and Associate Clinical Professor of Law	$118,000	10% time	2	10
Temp. Lecturer - Legal Writing & Research to	$6,000	1 3 credit class	3	8-10

LLM Students				

Project the need and cost for support personnel and any other personnel expenditures for the first three years of the program.

Administrative Expenditures

Describe the proposed administrative structure necessary to ensure program success and the cost of that support. Include a statement concerning the involvement of other departments, colleges, or other institutions and the estimated cost of their involvement in the proposed program

Name, Position & Rank	Annual Salary Rate	FTE Assignment to this Program	Value of FTE Effort to this Program
Carole Wells, Director of Admissions	$65,000	5% time	Handles the administrative aspects of the application process.
Cindy Hollenbeck, Marketing & Communications Manager	$45,000	5% time	Handles the marketing and communications collateral development.

b. Operating Expenditures

Briefly explain the need and cost for operating expenditures (travel, professional services, etc.)

No additional operating expenditures are needed to run this program beyond an approximate $15,000 annual travel budget to recruit internationally for the program.

c. Capital Outlay

(1) Library resources

(a) Evaluate library resources, including personnel and space. Are they adequate for the operation of the present program? If not, explain the action necessary to ensure program success. The LL.M. program will draw upon the already existing law libraries in Moscow and Boise for resources. No additional resources will be needed to support the program.

(b) Indicate the costs for the proposed program including personnel, space, equipment, monographs, journals, and materials required for the program. No additional costs are needed for the LL.M. program.

(c) For off-campus programs, clearly indicate how the library resources are to be provided.

(2) Equipment/Instruments

Describe the need for any laboratory instruments, computer(s), or other equipment. List equipment, which is presently available and any equipment (and cost) which must be obtained to support the proposed program. No additional costs are needed for the LL.M. program.

d. Revenue Sources

(1) If funding is to come from the reallocation of existing state appropriated funds, please indicate the sources of the reallocation. What impact will the reallocation of funds in support of the program have on other programs?

No additional costs are needed for the LL.M. program. Current College of Law resources will be used to start and maintain the program except for the addition of a part time, temporary instructor (adjunct) to teach the legal writing and research course.

(2) If the funding is to come from other sources such as a donation, indicate the sources of other funding. What are the institution's plans for sustaining the program when funding ends?

Not applicable.

(3) If an above Maintenance of Current Operations (MCO) appropriation is required to fund the program, indicate when the institution plans to include the program in the legislative budget request.

Not applicable.

(4) Describe the federal grant, other grant(s), special fee arrangements, or contract(s) to fund the program. What does the institution propose to do with the program upon termination of those funds?

Not applicable.

(5) Provide estimated fees for any proposed professional or self-support program.

LL.M. students will pay the current non-resident tuition and fees rate, the same as J.D. students from out of state or abroad. That rate includes a College of Law professional fee, which will apply to LL.M. students as well. The rates are broken down and included in the budget spreadsheet.

ATTACHMENT A
CURRICULUM DETAILED ON PAGES 5 to 8

March 9, 2015 – Revised April 13, 2015 – Approved by College of Law Faculty May 6, 2015

To: College of Law Curriculum Committee and Faculty

From: Mark Adams, Dean and Professor of Law and Jeffrey A. Dodge, Associate Dean for Students & Administration and Associate Clinical Professor of Law

Subject: Proposal to Establish an LL.M. Degree

The University of Idaho College of Law administration proposes the creation of an LL.M. (Masters of Law) degree program to begin in Summer 2016. The LL.M. degree will start with four emphasis areas that align with our J.D. curricular strengths at the College of Law: Democracy, Justice & the American Legal System; Natural Resources & Environmental Law (NREL); Business Law & Entrepreneurship (BLE); and Litigation and Alternative Dispute Resolution (LADR). The LL.M. is a graduate law degree, and all incoming students would be required to have a first degree in law, in this country that is a J.D. degree, but in many others it is a Bachelors degree. The LL.M. program will primarily recruit lawyers from foreign countries and provide approximately 9 to 12 months of instruction in Moscow at the University of Idaho.

Ideal Proposal Time Frame

- March 9, 2015 – Proposal to the Chair of the College of Law Curriculum Committee
- March 2015 – Curriculum Committee Reviews Proposal at Two Meetings
- April 1, 2015 – Proposal Memo Discussed at the College of Law Faculty Meeting and Voted On (if ready)
- May 6, 2015 – Proposal Memo Voted on by College of Law Faculty (if not in April)
- May 2015 – Complete Idaho State Board of Education Proposal for Graduate and Doctoral Degree Form (Attachment A) and Baccalaureate and Graduate Degree Programs Budget Template (Attachment B) to Reflect Faculty Approval; Submit SBOE Forms to the Provost's Office; and Begin ABA Acquiescence Questionnaire to Start a Non-J.D. Degree (Attachment C)
- Summer 2015 – Develop Marketing Materials for Use After ABA and SBOE Approvals
- July 2015 – ABA Acquiescence Questionnaire Due to the ABA
- September 2015 – UCC and Faculty Senate Approval
- September 2015 – ABA Accreditation Committee Meeting to Review for Acquiescence
- December 2015 – Proposal Before the State Board of Education for Approval
- January to May 2016 – Attend Recruiting Events, Initiate Marketing and Process Applications; Enroll Students and Issue Student Visa Documents
- August 2016 – Enroll First Class of LL.M. Students

Justification

This degree will provide significant value to the LL.M. students that enroll. The goal of the program is to strengthen the foreign lawyers' knowledge of various aspects of American law, especially for those seeking to sit for a bar exam in states that permit it. For foreign and

domestic students looking to specialize in one of our J.D. emphasis areas, the program allows them to chart out a focused area of study in the field of their choice. For international lawyers, this knowledge and the accompanying degree are designed to advance the careers of lawyers working abroad or doing business with American companies, governments, and organizations. The degree also prepares recipients to participate in rule of law development efforts in their home countries. A thesis option will provide an opportunity for LL.M. recipients to prepare for academic positions, but is not required nor available for every emphasis.

The LL.M. program will also be a significant benefit to our approximately 350 J.D. students. Our J.D. students will have the opportunity to meet experienced lawyers from other countries, learn about the system of laws in those countries, and expand their knowledge of other cultures and legal systems. In an increasingly global legal market it is imperative that American law students gain exposure to and knowledge of legal systems throughout the world.

The LL.M. program will operate closely parallel to the existing J.D. program. For example, an LL.M. student will take the same Business Organizations course as the J.D. students. All of the classes in the LL.M. program will be shared with the J.D. program except two new courses called Introduction to American Law and Legal Education and Legal Writing and Research for LL.M. Students. They will be new courses taught initially as 901 seminars. The Introduction course will be required for all international students in the LL.M. program and the Legal Writing course will be required for all students in the Democracy, Justice & American Legal System emphasis. The integration of the LL.M. students into the J.D. classroom environment for all other courses allows for the efficient allocation of law school resources to the new program. The integration also provides the opportunity to reap the educational benefits of direct interaction between J.D. and LL.M. students studying in the same academic environment.

It is expected that most LL.M. degree recipients will return to influential legal, academic, and business positions in their home countries after completion of their study. The degree affiliation of these lawyers with the University of Idaho and their experience living in Idaho could play a positive role in their encouraging future foreign investment in this state, tourism, and greater diplomatic understanding. The graduates of our LL.M. program also support the University of Idaho's internationalization efforts and offer the College of Law an immediate international network of alumni. (See Attachment D - LSAC data that shows the gender and county of origin for fall 2013 applied and enrolled LL.M. students)

Competition

There are no similar programs in the state or local region (within 250 miles of Moscow). Gonzaga University used to have an LL.M. but now will recognize 30 credits of foreign coursework to the J.D. degree instead. The J.D. degree is the only option at Gonzaga. The University of Montana, Seattle University, and Concordia University also do not have LL.M. degrees. Lewis and Clark has LL.M. degrees in Animal Law and Environmental Law. Willamette has LL.M degrees in Dispute Resolution, Transnational Law and a General concentration geared toward international students. The University of Washington has numerous LL.M. degrees in a variety of subjects. UW and Willamette thus appear to be the closest regional competitor with an LL.M. degree emphasis focused on international students. UW currently charges out of state and international students $45,024 per year and Willamette charges $39,355. Our current out of state and international student tuition is $30,010, making us the most cost conscious choice.

Looking a bit farther away, the University of Oregon has LL.M. concentrations in Environmental and Natural Resources Law, Business Law and American Law, but Eugene is 450 plus miles away from Moscow. Just a bit further away, the University of Utah offers an Environmental and Natural Resources LL.M. and Brigham Young University has an LL.M. in American Law for international students. Given the focus of the former and the religious affiliation of the latter, these two programs also do not seem to be much in the way of competition for students.

Program Demand and Productivity
The law school anticipates that initial enrollment in the program will be modest and will grow as the reputation of the program spreads internationally. The College of Law anticipates an initial enrollment of 5 to 10 LL.M. students in the first couple of years with enrollment increasing by the fourth year of the program to approximately 10 to 15 students annually. If interest in the program grows beyond those projections, the College will reevaluate whether additional faculty and staff resources are needed to handle the growth and whether we want to increase at all.

The estimates for the number of students to enroll come from the law school's study of other LL.M. programs at American law schools. Typically the LL.M. programs at schools with J.D. degree programs of approximately 300 to 400 students will enroll 10 to 20 students in their LL.M. program each year. The law school will initially reallocate administrative time of the Deans to launch the program by traveling to countries in Asia, Europe, and Latin America to establish relationships with potential students. Deans Adams and Dodge have run programs like this at other institutions and are familiar with the avenues to recruit potential students. The LSAC also now runs an LL.M. Credential Service, which allows law schools to generate reports of potential LL.M. students and market to them electronically. Significant in person travel will be needed at first, but as the program grows the travel will phase into a regular pattern.

Administration & Faculty
The administrators involved are: Dean, Associate Dean for Students & Administration, Associate Dean for Faculty, Assistant to the Deans, Director of Admissions, Director of Academic Success, and Assistant Dean for Career Development. It is currently expected that the Associate Dean for Students & Administration will serve as the Faculty Director of the LL.M. program and lead the recruitment and enrollment strategies. The Associate Dean role will be reviewed to permit the addition of these responsibilities. Advising of the students will fall to faculty the students are working with to meet their curricular goals in emphasis areas. The Faculty Director, with the support and assistance of interested faculty, will teach the introductory course in an intensive fashion in August before schools starts each year. The administration will evaluate how best to offer Legal Writing and Research for LL.M. students with the faculty resources available or a qualified adjunct professor.

Application for Admission Requirements
To be considered for the LL.M. program, an applicant must have a J.D. (Juris Doctor) from an accredited U.S. law school or a first law degree (J.D., LL.B. or the equivalent) from a foreign law school. Admission to the LL.M. program is competitive. In evaluating applications, the Committee takes into consideration the applicant's grades and rank in his or her law school and other university studies, letters of recommendation, occupational interests, professional and personal accomplishments, and other factors. The program is designed for intellectually curious and thoughtful candidates who come from a variety of legal systems and backgrounds and who

have demonstrated an intent to return to their country to contribute to academia or the legal profession. The College is equally interested in applicants pursuing careers in law teaching and research, government service, the judiciary, international organizations, non-governmental organizations and private practice.

The following items are required as part of the application process:

- Non-refundable $50 application fee
- LL.M. Application (through LSAC or in hard copy directly)
- Law School Admission Council Credential Assembly Service (CAS) Report (if applying through LSAC, if not then all materials should be sent directly to the College of Law)
- Transcripts from former institutions
- CV/Resume
- Personal Statement - Not to exceed 3 pages and includes your reasons for wanting to study law and your reasons for wanting to study law at the University of Idaho.
- Letters of Recommendation - At least 2 are required. You may choose whomever you wish to write on your behalf. However, it is strongly recommended that at least one letter come from a post-secondary professor whose class you have taken if possible.
- A detailed addendum of explanation if any question on the CHARACTER AND FITNESS section is answered "Yes."
- An Employment Addendum if Question 16 is answered "No."
- A TOEFL, IELTS or other score if you were educated outside of the U.S., your native language is not English, and you have received no educational instruction in English.
- Thesis Proposal (Optional) – Include a summary of the type of research you hope to complete at the University of Idaho. The proposal should indicate if there are faculty you hope to work with on the research.

Bar Examination Opportunities for Graduates
This program is intended to give foreign lawyers knowledge of American law that will enhance their careers in their home country. The degree program's emphasis on Democracy, Justice & the American Legal System will be marketed as a track that would allow students to take a bar exam and become licensed to practice law in the U.S. The other emphasis areas will not qualify students. While Idaho is not a state they would be able to practice in, there are other states, like New York and California, that would recognize this degree as qualifying for the bar examination. The College of Law will provide career counseling, resume review, and guidance to LL.M. students as they pursue their degree and prepare to return to their home country.

Curriculum
To earn the LL.M. degree, students will be required to successfully complete a minimum of 24 credits and maintain a 2.0 or higher. The students will begin with a late summer course called Introduction to American Law and Legal Education (2 credits). The 24-credit requirement is in line with other LL.M. programs around the country. If students are interested, they may arrive earlier than the start of this course and access the University of Idaho's American Language and Culture Program. Applicants must receive a satisfactory score on the TOEFEL, IELTS or other English language proficiency exam, but the opportunity to participate in the American Language and Culture Program will be made available to all as English will be their second language. The University's English language satisfaction options are as followed:

- TOEFL: 550 on the paper test or 79 on the internet test
- IELTS: Minimum score of 6.5
- UI American Language and Culture Program: With a Level 6 Pass
- Earned degree at an accredited institution OR successfully completed upper level college courses, both taught and evaluated in English

The Introduction to American Law and Legal Education course will introduce the LL.M. students to the various structures and sources of American law. This will include topics such as: the civil law and common law systems, the United States Constitution, the branches of government, statutes, and regulations, and the expectations at U.S. law schools. The course will draw on the rich resources of our faculty, local attorneys, and regional court systems through guest speakers and field trips.

The LL.M. students will otherwise be able to enroll in classes already offered at the law school to complete their remaining 24 credits. The rules for an F-1 student visa require they be enrolled full time. The students who enroll in, for example, the summer of 2016 are thus expected to complete the program in May 2017.

The law school will also offer a limited number (maximum 5) of LL.M. students the option of completing a thesis project. An applicant for the LL.M. program will have to apply to be admitted to the program under the "thesis option." This will give the law school the ability to assess whether the student has the ability to complete a substantial written project during the academic year. A faculty member would need to agree in advance to work on the thesis paper with the student over the year, so a thesis plan is expected at the time of application. The faculty advisor for the thesis will guide the LL.M. students in the development of their topic, help them to identify other faculty members that may provide assistance, and monitor the student's progress towards completion of the thesis. Students in the thesis option will be required to enroll in a 2-credit directed study course in the spring, which will count toward the 24 credits need to receive the LL.M. degree.

Finally, the law school will provide additional opportunities for LL.M. students to learn about the American legal system through invitations to events such as faculty colloquia and symposia, conferences, court hearings, Bellwood and more.

Emphasis Curriculum

The LL.M. degree will have four curricular emphasis areas to start and can be added to over time. Aside from the Democracy, Justice & the American Legal System emphasis, the curriculum will line up with the expectations of students in the J.D. emphasis areas, but be compressed to account for the short time frame students are enrolled in the LL.M. All international students, regardless of emphasis area, must take Introduction to American Law and Legal Education (2 credits). The emphasis area requirements then split off as followed. As a note of caution, at the time this memo was prepared this portion had not been vetted by the emphasis area faculty, but is being sent to them for review and feedback. Below is a first attempt to translate the emphasis expectations in the J.D. program to a one-year LL.M. degree. Students who need to complete a substantial writing paper or thesis can do so in a paper course or under the supervision of a faculty member in a directed study.

Democracy, Justice & the American Legal System
In this emphasis area, students are required to take the following classes:

- Legal Writing and Research for LL.M. Students (2 or 3 credit separate writing course)
- Professional Responsibility

While it is recommended they take as many of these courses as possible, students must also complete at least six credits of bar exam-tested coursework in the following subjects:

- Advanced Torts
- Business Associations
- Civil Procedure I & II
- Conflict of Laws
- Constitutional Law I & II
- Contracts
- Criminal Law
- Criminal Procedure
- Evidence
- Family Law
- Native American Law*
- Property
- Property Security
- Sales
- Torts

*Native American Law can satisfy requirements for the LL.M. degree, but cannot be counted by students seeking to sit for a bar exam.

Natural Resources and Environmental Law
In this emphasis area, students are required to take the following classes:

- Administrative Law
- Environmental Law or Introduction to Natural Resources Law

Students are also expected to take at least 10 credits of natural resources and environmental law courses from the following list:

- Environmental Law
- Environmental Policy
- Interdisciplinary Methods in Water Resources
- International Environmental and Water Law
- Introduction to Natural Resources Law
- Land Use Law and Planning
- Law, Science, and the Environment
- Lawyering Process
- Native American Natural Resource Law
- Natural Resource Law Seminar
- Water Law I
- Water Law II
- Water Law Practicum
- Water and Energy Policy Seminar
- Wildlife Law and Policy
- Up to 3 credits may be satisfied by non-law graduate courses with approval of both the NREL LL.M. emphasis advisor

Business Law and Entrepreneurship
In this emphasis area, students are required to take the following classes:

- Business Associations
- Contracts

- Property Security or Sales

Students are also expected to take 9 credits of additional business law and entrepreneurship courses from the following list:

- Accounting for Lawyers
- Administrative Law
- Advanced Torts
- Antitrust
- Bankruptcy
- Consumer Law
- Copyrights
- Corporate Taxation
- Cyberlaw
- Introduction to Intellectual Property
- Mass Media Law
- Negotiable Instruments
- Partnership & LLC Taxation
- Patents
- Property Security (if not taken as a required course)
- Real Estate Transactions
- Sales (if not taken as a required course)
- Securities Regulation
- Suretyship and Guaranty
- Taxation
- Trademarks & Trade Dress
- White Collar Crime
- Workplace Law

Litigation and Alternative Dispute Resolution
In this emphasis area, students who want a general law focus are required to take the following classes:

- Administrative Law
- Negotiation and Appropriate Dispute Resolution
- Civil Mediation or Family Mediation

Students must then take at least 6 additional credits from the list below:

- Constitutional Law I
- Constitutional Law II
- Evidence
- Lawyering Process
- Remedies

In this emphasis area, students who want a criminal law focus are required to take the following classes:

- Criminal Law
- Criminal Procedure
- Negotiation and Appropriate Dispute Resolution
- Civil Mediation or Family Mediation

Students must then take at least 3 additional credits from the list below:

- Advanced Criminal Procedure
- Advanced Topics in Criminal Procedure
- Constitutional Law I
- Constitutional Law II
- Evidence
- White Collar Crime

In this emphasis area, students who want a family law focus are required to take the following classes:

- Family Law
- Negotiation and Appropriate Dispute Resolution
- Family Mediation

Students must then take at least 7 additional credits from the list below:

- Children and the Law
- Community Property
- Wills, Trusts & Estates
- Constitutional Law II
- Domestic Violence and the Law

Students in this emphasis area are required to compete in either the mediation or negotiation intermural competition held annually.

Grading
Unlike many of the J.D. students, English will not be the first language of LL.M. students. They also will not have an advanced understanding of the common law system as they usually come from civil law countries. The legal writing and research skills in those countries are markedly different. It is very common for LL.M. students to be more direct than analytical. Their writing is more about the rule and conclusion then articulating the issue and applying the facts. Civil law systems are, in short, more focused on the rules then the argument. These facts, coupled with the reality that LL.M. students are here to learn more about the common law systems, develop their legal English skills, and grow academically in a shorter time than J.D. students, it is important for their grading assessment to also be different and not directly comparative. We suggest we grade LL.M. students with the following guidance:

A – Very Good – Excellent Performance
B - Good – Performance Above Average
C - Pass – Performance Worthy of Credit
D or F – Fail – Performance Unworthy of Credit

It is important to note that because LL.M. and J.D. students are not comparable in terms of performance in classes, they will not be ranked together either. LL.M. students will not have a class rank, just a GPA and their degree.

Recruiting and Marketing Strategy
The College of Law will take J.D. promotional pieces and emails, like the viewbook and prospective student emails, and repurpose them with LL.M. specific information. The primary recruiting tool will be an LL.M. viewbook about the College, Moscow, and the degree program. The LL.M. CRM resource will also be used to communicate with prospective students electronically.

A complete plan, similar to what is done for the J.D. program, will be developed in summer 2015. Recruiting events around the world are available through EducationUSA, QS World Grad School Fair, embassy presentations, online college fairs, and more. The College will also maximize our recruiting efforts by making sure COGS and IPO have materials about the LL.M. program for when they do international recruitment. Efforts will be made to use faculty relationships to schedule campus visits to present to undergraduate law students abroad.

Enrollment Goals & Credit Hours
Below is a breakdown of the anticipated enrollment in the LL.M. program and the anticipated credit hours needed to support the program each year. The number of credit hours are being provided to show that the impact of these additional students on the seats in classes. In spring 2015 alone, the capacity in University of Idaho College of Law classes was well over 1,000 hours in Moscow.

Year	Enrollment	Annual Credit Hours
2016-17	5	120
2017-18	10	240
2018-19	10	240
2019-20	15	360
2020-21	15	360

Budget Considerations
For the most part, operating the LL.M. program utilizes the resources already available through our J.D. program. The following details the known costs to initiate such a program:

ABA Application for Acquiescence - $6,000
Marketing Materials – Design, Print & Mail - $10,000
Recruitment Abroad - $15,000 the first year and $10,000 annually thereafter
Library Resources - $2,000
General Supplies and Materials - $2,000

The above costs do not include faculty or staff labor to recruit, enroll and support the new LL.M. program. On the revenue side, each international student pays out of state tuition, which this year is $30,010. Many schools offer nominal scholarships to show interest in their admitted students, but with our lower tuition, we may not have to. For each student we enroll, we get their total professional fee, approximately $85K for 10 students and they will go into our overall enrollment, helping our centrally allocated budget. If we only enroll five students in the initial year of the program, our revenue will still exceed our expenses. When we are able to enroll closer to 10 students each year (more or less in some years) the financial gain will far exceed the expenses needed to maintain the program. Operating the LL.M. program will thus not take away financially or resource wise from the J.D. program.

College of Law

Proposed Catalog Changes

Effective Term (unless otherwise noted) = Summer 2016

1. Create the following program

Master of Law (LL.M.)

Required course work includes the College of Law requirements and the following:

Law 857 Introduction to American Law and Legal Education (2 cr)

And one of the following emphases:

A. Democracy, Justice & the American Legal System

Law 856 Legal Writing and Research for LL.M. Students (3 cr)
Law 962 Professional Responsibility (3 cr)

Bar exam-tested Electives (6 cr):
Law 805 Civil Procedure and Introduction to Law (3 cr)
Law 806 Civil Procedure II (3 cr)
Law 807 Property (4 cr)
Law 809 Torts (4 cr)
Law 812 Criminal Law (3 cr)
Law 813 Contracts (4 cr)
Law 816 Constitutional Law I (4 cr)
Law 851 Advanced Torts (2-3 cr)
Law 905 Constitutional Law II (3 cr)
Law 919 Business Associations (4 cr)
Law 924 Sales (3 cr)
Law 925 Property Security (3 cr)
Law 949 Native American Law (3 cr)*
Law 950 Evidence (3 cr)
Law 953 Criminal Procedure (3 cr)
Law 960 Conflict of Laws (2 cr)
Law 963 Family Law (3 cr)

Courses to total 24 credits for this degree

B. Natural Resources and Environmental Law

Law 907 Administrative Law (3 cr)

One of the following (3 cr):
Law 947 Environmental Law (3 cr)
Law 948 Introduction to Natural Resources Law (3 cr)

Natural Resources and Environmental Law Electives (10 cr):
Law 855 Water Law Practicum (2-3 cr)
Law 906 Natural Resources Law Seminar (3 cr)
Law 934 Land-Use Law and Planning (3 cr)

Law 937 Wildlife Law and Policy (3 cr)
Law 938 International Environmental and Water Law (3 cr)
Law 939 Law, Science, and the Environment (2 cr)
Law 942 Water Law I (1-2 cr)
Law 946 Water and Energy Policy Seminar (2 cr)
Law 947 Environmental Law (3 cr)
Law 948 Introduction to Natural Resources Law (3 cr)
Law 951 Environmental Policy (3 cr)
Law 969 Water Law II (2 cr)
Law 971 Lawyering Process Seminar (2 cr)
Law 979 Native American Natural Resource Law (3 cr)
WR 506 Interdisciplinary Methods in Water Resources (3 cr)
Up to 3 credits may be satisfied by non-law graduate courses with approval of both the NREL LL.M. emphasis advisor

Courses to total 24 credits for this degree

C. Business Law and Entrepreneurship

Law 813 Contracts (4 cr)
Law 919 Business Associations (4 cr)

One of the following (3 cr):
Law 924 Sales (3 cr)
Law 925 Property Security (3 cr)

Business Law and Entrepreneurship Electives (9 cr):
Law 851 Advanced Torts (2-3 cr)
Law 854 Corporate Taxation (2-3 cr)
Law 903 Introduction to Intellectual Property (3 cr)
Law 907 Administrative Law (3 cr)
Law 908 Workplace Law (4 cr)
Law 910 Antitrust (3 cr)
Law 911 Principles of Suretyship (2 cr)
Law 918 Cyberlaw (2-3 cr)
Law 920 Securities Regulation (3 cr)
Law 921 Accounting for Lawyers (2 cr)
Law 922 Trademarks and Trade Dress (2 cr)
Law 923 Negotiable Instruments, Bank Collections and Deposits, and Other Payment Systems (3 cr)
Law 924 Sales (3 cr)
Law 925 Property Security (3 cr)
Law 926 Bankruptcy (3 cr)
Law 927 Partnership and LLC Taxation (2-3 cr)
Law 930 Taxation (3-4 cr)
Law 931 Patents (2 cr)
Law 980 Copyrights (2-3 cr)
Law 984 Real Estate Transactions (2-3 cr)
Law 989 Mass Media Law (2 cr)
Law 990 Consumer Law (3 cr)
Law 992 White Collar Crime (3 cr)

Courses to total 24 credits for this degree

D. Litigation and Alternative Dispute Resolution

One of the following tracks:

General Track
Law 907 Administrative Law (3 cr)
Law 917 Negotiation and Appropriate Dispute Resolution (3 cr)

One of the following (3 cr):
Law 912 Civil Mediation (2 cr)
Law 913 Family Mediation (2 cr)

Litigation and Alternative Dispute Resolution Electives (6 cr):
Law 816 Constitutional Law I (4 cr)
Law 905 Constitutional Law II (3 cr)
Law 950 Evidence (3 cr)
Law 971 Lawyering Process Seminar (2 cr)
Law 952 Remedies (3 cr)

Criminal Law Track
Law 812 Criminal Law (3 cr)
Law 917 Negotiation and Appropriate Dispute Resolution (3 cr)
Law 953 Criminal Procedure (3 cr)

One of the following (3 cr):
Law 912 Civil Mediation (2 cr)
Law 913 Family Mediation (2 cr)

Criminal Law Elective (3 cr):
Law 816 Constitutional Law I (4 cr)
Law 901 Advanced Criminal Procedure (3 cr)
Law 901 Advanced Topics in Criminal Procedure (3 cr)
Law 905 Constitutional Law II (3 cr)
Law 950 Evidence (3 cr)
Law 992 White Collar Crime (3 cr)

Family Law Track
Law 913 Family Mediation (2 cr)
Law 917 Negotiation and Appropriate Dispute Resolution (3 cr)
Law 963 Family Law (3 cr)

Family Law Electives (7 cr):
Law 905 Constitutional Law II (3 cr)
Law 941 Wills, Estates, and Trusts (3 cr)
Law 945 Community Property (2 cr)
Law 964 Children and the Law (2-3 cr)
Law 995 General Practice/Domestic Violence & Sexual Assault Clinic (1-3 cr, max 6)

Students are required to compete in either the mediation or negotiation intermural competition held annually.

Courses to total 24 credits for this degree

**Law 949 Native American Law (3 cr) can satisfy requirements for the LL.M. degree, but cannot be counted by students seeking to sit for a bar exam.*

Program Resource Requirements. Indicate all resources needed including the planned FTE enrollment, projected revenues, and estimated expenditures for the first three fiscal years of the program. Include reallocation of existing personnel and resources and anticipated or requested new resources. Second and third year estimates should be in constant dollars. Amounts should reconcile subsequent pages where budget explanations are provided. If the program is contract related, explain the fiscal sources and the year-to-year commitment from the contracting agency(ies) or party(ies). Provide an explanation of the fiscal impact of the proposed discontinuance to include impacts to faculty (i.e., salary savings, re-assignments).

I. PLANNED STUDENT ENROLLMENT

	FY	2016	FY	2017	FY	2018	Cumulative Total	
	FTE	Headcount	FTE	Headcount	FTE	Headcount	FTE	Headcount
A. New enrollments	5	5	8	8	10	10	23	23
B. Shifting enrollments	0	0	0	0	0	0	0	0

II. REVENUE

	FY	2016	FY	2017	FY	2018	Cumulative Total	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
1. Appropriated (Reallocation)							$0.00	$0.00
2. Appropriated (New)							$0.00	$0.00
3. Federal							$0.00	$0.00
4. Tuition		$111,130.00		$177,808.00		$222,260.00	$0.00	$511,198.00
5. Student Fees		$45,040.00		$72,064.00		$90,080.00	$0.00	$207,184.00
6. Other (Specify)							$0.00	$0.00
Total Revenue	$0.00	$156,170.00	$0.00	$249,872.00	$0.00	$312,340.00	$0.00	$718,382.00

Ongoing is defined as ongoing operating budget for the program which will become part of the base.
One-time is defined as one-time funding in a fiscal year and not part of the base.

III. EXPENDITURES

	FY 2016		FY 2017		FY 2018		Cumulative Total	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
A. Personnel Costs								
1. FTE							0.00	0.00
2. Faculty							$0.00	$0.00
3. Administrators	11800		11800		11800		$35,400.00	$0.00
4. Adjunct Faculty	6000		6000		6000		$18,000.00	$0.00
5. Instructional Assistants							$0.00	$0.00
6. Research Personnel							$0.00	$0.00
7. Support Personnel	5500		5500		5500		$16,500.00	$0.00
8. Fringe Benefits	5884.8		5884.8		5884.8		$17,654.40	$0.00
9. Other:							$0.00	$0.00
Total FTE Personnel and Costs	$29,184.80	$0.00	$29,184.80	$0.00	$29,184.80	$0.00	$87,554.40	$0.00

INSTRUCTION, RESEARCH, AND STUDENT AFFAIRS
FEBRUARY 18, 2016

	FY		FY		FY		Cumulative Total	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
B. Operating Expenditures								
1. Travel		$15,000.00		$10,000.00		$10,000.00	$0.00	$35,000.00
2. Professional Services							$0.00	$0.00
3. Other Services							$0.00	$0.00
4. Communications		$5,000.00		$5,000.00	$2,000.00		$2,000.00	$10,000.00
5. Utilities							$0.00	$0.00
6. Materials and Supplies		$2,000.00					$0.00	$2,000.00
7. Rentals							$0.00	$0.00
8. Repairs & Maintenance							$0.00	$0.00
9. Materials & Goods for Manufacture & Resale							$0.00	$0.00
10. Miscellaneous - Scholarships		$25,000.00		$25,000.00		$30,000.00	$0.00	$80,000.00
Total Operating Expenditures	$0.00	$22,000.00	$0.00	$15,000.00	$2,000.00	$10,000.00	$2,000.00	$47,000.00

INSTRUCTION, RESEARCH, AND STUDENT AFFAIRS
FEBRUARY 18, 2016

	FY		FY		FY		Cumulative Total	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
C. Capital Outlay								
1. Library Resources		$2,000.00					$0.00	$2,000.00
2. Equipment							$0.00	$0.00
Total Capital Outlay	$0.00	$2,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
D. Capital Facilities Construction or Major Renovation								
E. Indirect Costs (overhead)								
TOTAL EXPENDITURES:	$29,184.80	$24,000.00	$29,184.80	$15,000.00	$31,184.80	$10,000.00	$89,554.40	$47,000.00
Net Income (Deficit	-$29,184.80	$132,170.00	-$29,184.80	$234,872.00	-$31,184.80	$302,340.00	-$89,554.40	$671,382.00

Applications by Law School Region as of 17AUG2015

ATTACHMENT B(2)

LLM Applications as of 17 August 2015		
Law School Region	Number	Pct Chg from Prev Year
Far West (FW)	6,813	+0.53%
Great Lakes (GL)	4,390	+2.05%
Midsouth (MS)	6,372	+7.27%
Midwest (MW)	637	+27.15%
Mountain West (MT)	273	-4.21%
New England (NG)	3,168	+9.92%
Northeast (NE)	9,625	+1.02%
Northwest (NW)	595	+14.64%
South Central (SC)	961	+3.56%
Southeast (SE)	1,214	+38.11%
TOTAL	34,048	+4.63%

ATTACHMENT B(3)

Gender and First Law Degree Country 2013 Report

COUNTRY	GENDER	APPLICANTS	MATRICULANTS
Afghanistan	Male	1	0
Albania	Female	2	0
Albania	Male	4	0
Algeria	Male	1	0
Argentina	Female	14	2
Argentina	Male	18	5
Armenia	Female	5	2
Armenia	Male	2	0
Australia	Female	57	14
Australia	Male	45	7
Austria	Female	7	1
Austria	Male	5	1
Azerbaijan	Female	2	1
Azerbaijan	Male	2	1
Bahrain	Female	1	0
Bangladesh	Female	2	0
Bangladesh	Male	4	0
Barbados	Female	4	0
Belarus	Female	5	1
Belarus	Male	2	1
Belgium	Female	25	12
Belgium	Male	31	14
Benin	Female	1	0
Benin	Male	1	0
Bolivia	Female	4	1
Bolivia	Male	3	3
Bosnia and Herzegovina	Female	2	0
Brazil	Female	134	46
Brazil	Male	118	46
Bulgaria	Female	2	0
Bulgaria	Male	1	1
Burkina Faso	Male	2	0
Burundi	Female	1	0
Burundi	Male	2	0
Cambodia	Female	3	0
Cameroon	Female	6	2
Cameroon	Male	24	10
Canada	Female	48	8
Canada	Male	38	7
Chad	Male	1	1
Chile	Female	20	6
Chile	Male	67	16
China	Female	882	338
China	Male	367	147
Colombia	Female	53	11
Colombia	Male	43	11
Congo	Male	1	0
Congo Democratic Republic of the	Female	1	0

ATTACHMENT B(3)

Gender and First Law Degree Country 2013 Report

COUNTRY	GENDER	APPLICANTS	MATRICULANTS
Congo Democratic Republic of the	Male	3	1
Costa Rica	Female	7	2
Costa Rica	Male	3	1
Cote d Ivoire	Male	2	1
Croatia	Female	1	1
Croatia	Male	2	0
Czech Republic	Female	2	1
Czech Republic	Male	1	0
Denmark	Female	3	0
Denmark	Male	4	2
Dominican Republic	Female	15	5
Dominican Republic	Male	8	2
Ecuador	Female	8	1
Ecuador	Male	21	8
Egypt	Female	7	1
Egypt	Male	18	4
El Salvador	Male	4	2
Eritrea	Female	1	0
Eritrea	Male	2	1
Estonia	Female	1	0
Ethiopia	Female	11	0
Ethiopia	Male	15	4
Finland	Female	4	2
Finland	Male	2	1
France	Female	128	45
France	Male	72	25
Gambia	Male	1	0
Georgia	Female	4	0
Georgia	Male	7	0
Germany	Female	45	14
Germany	Male	60	19
Ghana	Female	6	0
Ghana	Male	11	1
Greece	Female	14	3
Greece	Male	18	6
Guatemala	Female	2	2
Guatemala	Male	6	1
Haiti	Female	1	0
Haiti	Male	2	0
Honduras	Male	1	0
Hong Kong	Female	10	3
Hong Kong	Male	7	0
Hungary	Female	5	2
Hungary	Male	2	0
Iceland	Female	5	3
Iceland	Male	3	1
India	Female	214	49
India	Male	120	26

ATTACHMENT B(3)

Gender and First Law Degree Country 2013 Report

COUNTRY	GENDER	APPLICANTS	MATRICULANTS
Indonesia	Female	11	3
Indonesia	Male	26	8
Iran, Islamic Republic of	Female	26	9
Iran, Islamic Republic of	Male	18	3
Iraq	Female	1	1
Iraq	Male	13	3
Ireland	Female	14	7
Ireland	Male	12	1
Israel	Female	31	14
Israel	Male	32	9
Italy	Female	32	10
Italy	Male	50	18
Jamaica	Female	3	0
Jamaica	Male	2	0
Japan	Female	85	32
Japan	Male	216	105
Jordan	Female	6	1
Jordan	Male	14	1
Kazakhstan	Female	7	2
Kazakhstan	Male	5	1
Kenya	Female	8	1
Kenya	Male	6	0
Korea, Democratic Republic of (North)	Female	1	0
Korea, Republic of (South)	Female	97	31
Korea, Republic of (South)	Male	181	97
Kosovo	Male	1	0
Kuwait	Female	4	0
Kuwait	Male	2	0
Kyrgyzstan	Female	1	0
Kyrgyzstan	Male	3	1
Lebanon	Female	8	2
Lebanon	Male	13	5
Lesotho	Female	1	0
Liberia	Female	3	0
Liberia	Male	6	3
Libya	Female	1	0
Libya	Male	1	0
Lithuania	Female	2	0
Lithuania	Male	1	0
Luxembourg	Female	1	1
Macao	Female	6	2
Macao	Male	3	2
Macedonia, The Former Yugoslav Republic Of	Female	3	1
Macedonia, The Former Yugoslav Republic Of	Male	1	0
Malawi	Female	1	0
Malawi	Male	1	0
Malaysia	Female	2	1
Malaysia	Male	1	1

ATTACHMENT B(3)

Gender and First Law Degree Country 2013 Report

COUNTRY	GENDER	APPLICANTS	MATRICULANTS
Malta	Male	1	0
Mexico	Female	75	27
Mexico	Male	111	34
Moldova, Republic of	Female	4	1
Moldova, Republic of	Male	1	0
Mongolia	Female	3	0
Mongolia	Male	6	1
Morocco	Male	1	1
Nepal	Male	4	0
Netherlands	Female	8	2
Netherlands	Male	9	2
New Zealand	Female	6	3
New Zealand	Male	10	3
Nicaragua	Female	1	0
Nicaragua	Male	1	1
Niger	Male	1	0
Nigeria	Female	68	14
Nigeria	Male	63	13
Norway	Female	5	3
Norway	Male	1	0
Oman	Male	1	1
Pakistan	Female	5	1
Pakistan	Male	17	0
Panama	Female	7	4
Panama	Male	11	4
Papua New Guinea	Female	1	0
Papua New Guinea	Male	1	0
Paraguay	Female	4	3
Paraguay	Male	4	1
Peru	Female	29	7
Peru	Male	24	10
Philippines	Female	20	4
Philippines	Male	23	8
Poland	Female	11	2
Poland	Male	7	1
Portugal	Female	7	2
Portugal	Male	5	1
Qatar	Female	3	1
Qatar	Male	2	1
Romania	Female	9	2
Romania	Male	4	1
Russian Federation	Female	66	28
Russian Federation	Male	25	4
Rwanda	Male	1	0
Saudi Arabia	Female	76	17
Saudi Arabia	Male	204	39
Senegal	Male	2	0
Serbia	Female	2	1

ATTACHMENT B(3)

Gender and First Law Degree Country 2013 Report

COUNTRY	GENDER	APPLICANTS	MATRICULANTS
Serbia	Male	4	1
Singapore	Female	6	1
Singapore	Male	2	1
Slovakia	Female	2	0
Slovakia	Male	3	0
Slovenia	Female	1	0
Slovenia	Male	1	0
South Africa	Female	33	5
South Africa	Male	15	1
Spain	Female	28	5
Spain	Male	21	8
Sri Lanka	Male	1	0
Sudan	Male	3	0
Swaziland	Male	1	0
Sweden	Female	14	6
Sweden	Male	7	2
Switzerland	Female	40	12
Switzerland	Male	46	16
Syrian Arab Republic	Female	3	0
Syrian Arab Republic	Male	1	0
Taiwan	Female	72	25
Taiwan	Male	61	17
Tajikistan	Male	1	0
Tanzania, United Republic of	Female	2	0
Tanzania, United Republic of	Male	4	0
Thailand	Female	65	21
Thailand	Male	37	13
Togo	Male	1	0
Tunisia	Female	1	0
Turkey	Female	37	9
Turkey	Male	22	4
Uganda	Female	12	1
Uganda	Male	4	0
Ukraine	Female	22	4
Ukraine	Male	9	3
United Arab Emirates	Female	4	0
United Arab Emirates	Male	8	3
United Kingdom	Female	211	54
United Kingdom	Male	159	39
United States of America/Territories	Female	520	116
United States of America/Territories	Male	812	183
Uruguay	Female	3	1
Uruguay	Male	2	0
Uzbekistan	Female	2	1
Uzbekistan	Male	8	0
Venezuela, Bolivarian Republic of	Female	11	2
Venezuela, Bolivarian Republic of	Male	15	4
Vietnam	Female	7	1

ATTACHMENT B(3)

Gender and First Law Degree Country 2013 Report

COUNTRY	GENDER	APPLICANTS	MATRICULANTS
Vietnam	Male	3	1
Zambia	Male	1	0
Zimbabwe	Male	1	0
Total		**7215**	**2140**

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UNIVERSITY OF IDAHO

SUBJECT

Online, Bachelor of Science in Sociology, Criminology emphasis

APPLICABLE STATUTE, RULE, OR POLICY

Idaho State Board of Education Governing Policies & Procedures, Section III.G.3.c.i.(1)

BACKGROUND/DISCUSSION

The University of Idaho, College of Letters, Arts, and Social Sciences proposes to establish a distance delivered Bachelor's degree in Sociology with an emphasis in Criminology ("soc-crim"). While the University of Idaho currently offers a B.A./B.S. degree in soc-crim to residential students, and this will not change, there is regional and state-level demand for a distance-delivered criminology program among three groups: (1) *Adult learners and criminal justice professionals* looking to advance their careers by earning a Bachelor's degree; (2) *Students with an Associate of Arts in Criminal Justice* who would like to finish a Bachelor's degree; and, (3) *Place-bound students in Idaho and beyond* but whose life circumstances prevent them from attending school.

Offering the sociology-criminology emphasis via distance delivery expands the availability of one of the most popular majors on campus. In practical terms it will also serve an identified need for citizens employed in law enforcement and correctional agencies and place-bound students who would like to finish their degrees or build off of their Associates degree.

The curriculum is already developed and currently being delivered face to face. The majority of the courses required for the degree are already available in an online format. There are several additional existing courses in the curriculum that would be developed for distance delivery by the time of offering the emphasis via distance.

The Bureau of Labor Statistics (BLS) estimates that protective services jobs (e.g., jobs in law enforcement, corrections, and other justice-related services) will grow by 7.9% in the U.S. between 2012-2022 with approximately 1.1 million job openings created through growth and replacement needs. Labor market growth in protective services industry jobs is projected to be slightly stronger in Idaho. In 2012, there were 12,958 protective service jobs in Idaho with a projected 10-year growth estimate of 9.8% over ten years (to 14,222 jobs). The BLS estimates that Idaho will see an average of 506 yearly job openings in this field due to occupational growth and replacement.

IMPACT

The attached program proposal includes a detailed budget for adding this delivery modality and engaging a new population of individuals in pursuing a college education. There is no need to develop new curriculum, only to create the materials that would be congruent with distance delivery technologies. The funding requested would also allow for the program to grow to serve distance students across the state and region.

ATTACHMENTS

Attachment 1 – Program Proposal Page 3

STAFF COMMENTS AND RECOMMENDATIONS

Currently Board Policy III.G, requires public postsecondary institutions to submit a proposal if they are transitioning an existing program to an online format for approval.

Per Board Policy III.Z, no institution is assigned the statewide program responsibility for the Bachelor of Science in Sociology with an emphasis in Criminology.

The proposal went through the program review process and was recommended for approval by the Council on Academic Affairs and Programs (CAAP) on January 14, 2016.

Staff recommends approval.

BOARD ACTION

I move to approve the request by the University of Idaho to offer the Bachelor of Science with a major of Sociology, Criminology emphasis through distance delivery.

Moved by _____ Seconded by _____ Carried Yes _____ No _____

Institutional Tracking No. FS-16-020

UCC-16-022b

Idaho State Board of Education

Proposal for **Baccalaureate** Degree Program

Date of Proposal Submission:	September 2015
Institution Submitting Proposal:	University of Idaho
Name of College, School, or Division:	CLASS
Name of Department(s) or Area(s):	Sociology and Anthropology

Program Identification for Proposed New, Modified, or Discontinued Program:

Title:	Sociology, Criminology emphasis			
Degree:	BS			
Method of Delivery:	Distance delivered			
CIP code (consult IR /Registrar)	45.1101			
Proposed Starting Date:	Fall 2016			
Indicate if the program is:	x	Regional Responsibility		Statewide Responsibility

Indicate whether this request is either of the following:

- [ ] New Program/major
- [ ] New Off-Campus Instructional Program
- [ ] Contract Program/Collaborative
- [ ] Consolidation of an Existing Program
- [ ] Expansion of an Existing Program
- [ ] Discontinuance of an Existing Program
- [x] Other : Adding delivery modality

Andrew E. Kunz 12/14/15

College Dean (Institution) Date

Vice President for Research **(as applicable)** Date

Graduate Dean **(as applicable)**

State Administrator, SDPTE **(as applicable)** Date

12-14-15

Chief Fiscal Officer (Institution) Date

Academic Affairs Program Manager Date

Chief Academic Officer (Institution) Date

Chief Academic Officer, OSBE Date

President Date

SBOE/OSBE Approval Date

March 16, 2012
Page 1

Before completing this form, refer to Board Policy Section III.G., Program Approval and Discontinuance. This proposal form must be completed for the creation of each new program. All questions must be answered.

1. **Describe the nature of the request.** Will this program be related or tied to other programs on campus? Please identify any existing program, option that this program will replace. *If this is request to discontinue an existing program, provide the rationale for the discontinuance. Indicate the year and semester in which the last cohort of students was admitted and the final term the college will offer the program. Describe the teach-out plans for continuing students.*

   This is a proposal to establish a distance delivered bachelor's degree in sociology with an emphasis in criminology ("soc-crim"). While the University of Idaho currently offers a B.A./B.S. degree in soc-crim to residential students, there is potentially regional and state-level demand for a distance delivered criminology degree among three groups: (1) *Adult learners and criminal justice professionals* looking to advance their careers by earning a bachelor's degree; (2) *Students with an A.A. in criminal justice* who would like to finish a bachelor's degree; and, (3) *Place-bound students in Idaho and the Pacific Northwest with affective ties to the University of Idaho* but whose life circumstances prevent them from attending school in Moscow, Idaho. It will not replace any existing program.

2. **List the objectives of the program.** The objectives should address specific needs the program will meet. They should also identify the expected student learning outcomes and achievements. *This question is not applicable to requests for discontinuance.*

   Offering the sociology-criminology emphasis via distance delivery expands the availability of one of the most popular majors on campus. In practical terms it will also serve an identified need for citizens employed in Idaho's law enforcement and correctional agencies and place-bound students who would like to finish their degrees or build off of their Associates degree. Learning outcomes for the program are the same as identified for students pursing a sociology degree and particularly align with University learning outcomes #1 (learn and integrate), #2 (think and create) and #5 (practice citizenship)

3. **Briefly describe how the institution will ensure the quality of the program** (i.e., program review). Will the program require specialized accreditation (it is not necessary to address regional accreditation)? If so, please identify the agency and explain why you do or do not plan to seek accreditation. *This question is not applicable to requests for discontinuance.*

   The distance program will not require specialized accreditation. There is no nationally or regionally recognized body that accredits Soc/crim programs. Program evaluation would be conducted as part of regular departmental review of majors and minors.

4. **List new courses that will be added to your curriculum specific for this program.** Indicate number, title, and credit hour value for each course. Please include course descriptions for new and/or changes to courses. *This question is not applicable to requests for discontinuance.*

   New courses will not be added to the curriculum, what is being created is the distance delivery of existing courses. List below identifies existing courses that will need to be developed for distance delivery.

1	SOC411	Social Data Analysis
2	SOC331	Criminological Theory
3	SOC 311	Development of Social Theory
4	SOC332	Punishment & Society
5	SOC334	Police and Social Control
6	SOC420	Sociology of Law

7	SOC439	Inequalities in the Justice System
8	SOC330	Juvenile Delinquency
9	SOC427	Racial and Ethnic Relations
10	SOC335	Terrorism, Justice, and Society
11	SOC336	Comparative Justice Systems
12	SOC427	Racial and Ethnic Relations
13	SOC333	White Collar Crime
14	SOC338	Regulation of Vice

5. **Please provide the program completion requirements, to include the following and attach a typical four-year curriculum to this proposal as Appendix A.** *For discontinuation requests, will courses continue to be taught?*

Credit hours required	36
Credit hours in institutional general education or core curriculum:	32
Credit hours in required electives:	52
Total credit hours required for degree program:	120

6. **Describe additional requirements such as comprehensive examination, senior thesis or other capstone experience, practicum, or internship, some of which may carry credit hours included in the list above.** *This question is not applicable to requests for discontinuance.*

Senior Capstone is required for the degree. The capstone is Soc. 401 Justice Policy issues

7. **Identify similar programs offered within Idaho or in the region by other colleges/universities.** If the proposed request is similar to another state program, provide a rationale for the duplication.

There are currently no other public or non-profit universities in Idaho that that offer a completely distance delivered bachelor's degree in criminology or criminal justice.

Degrees/Certificates offered by school/college or program(s) within disciplinary area under review

Institution and Degree name	Level	Specializations within the discipline (to reflect a national perspective)	Specializations offered within the degree at the institution
BSU	AA, BA, BS, MA	Criminal justice	
CSI	AA	Criminal Justice	
CWI	AA	Criminal Justice	
EITC		None	
ISU	AA/Cert	Criminal justice	
LCSC	BA, BS	Justice Studies	
NIC	AA	Criminal Justice	

UI	BA,BS	Sociology-Criminology	

8. **Describe the methodology for determining enrollment projections.** If a survey of student interest was conducted, attach a copy of the survey instrument with a summary of results as **Appendix B.** *This question is not applicable to requests for discontinuance.*

Enrollment projections are based on two methodologies. First, an online survey of 20 police and correctional agencies/divisions in the state. Second, in-depth interviews with the criminal justice program coordinators at each of the state's community colleges. Information in Appendix B summarizes the findings

9. **Enrollment and Graduates.** Using the chart below, provide a realistic estimate of enrollment at the time of program implementation and over three year period based on availability of students meeting the criteria referenced above. Include part-time and full-time (i.e., number of majors or other relevant data) by institution for the proposed program, last three years beginning with the current year and the previous two years. Also, indicate the number of graduates and graduation rates.
Discontinuations. Using the chart below include part-time and full-time (i.e., number of majors or other relevant data) by institution for the proposed discontinuation, last three years beginning with the current year and previous two years. Indicate how many students are currently enrolled in the program for the previous two years to include number of graduates and graduation rates.

Institution	Relevant Enrollment Data			Number of Graduates			Graduate Rate
	Current	Year 1 Previous	Year 2 Previous	Current (2014)	Year 1 Previous	Year 2 Previous	
BSU							
ISU							
LCSC							
UI	148	152	152	26	44	27	
CSI							
CWI							
EITC							
NIC							

Note: graduation numbers are for soc/crim only. All soc. Majors graduating during the same time period are 59, 79, 67.

10. **Will this program reduce enrollments in other programs at your institution?** If so, please explain.

No, the expectation is that by offering the degree via distance delivery we are making the program available to new audiences that cannot otherwise be served.

11. **Provide verification of state workforce needs such as job titles requiring this degree.** Include State and National Department of Labor research on employment potential.

The Bureau of Labor Statistics (BLS) estimates that protective services jobs (e.g., jobs in law enforcement, corrections, and other justice-related services) will grow by 7.9% in the U.S. between 2012-2022 with approximately 1.1 million job openings created through growth and replacement needs. Labor market growth in

protective services industry jobs is projected to be slightly stronger in Idaho. In 2012, there were 12,958 protective service jobs in Idaho with a projected 10-year growth estimate of 9.8% over ten years (to 14,222 jobs). The BLS estimates that Idaho will see an average of 506 yearly job openings in this field due to occupational growth and replacement.

Using the chart below, indicate the total projected job openings (including growth and replacement demands in your regional area, the state, and nation. Job openings should represent positions which require graduation from a program such as the one proposed. Data should be derived from a source that can be validated and must be no more than two years old. T*his question is not applicable to requests for discontinuance*.

	Year 1	Year 2	Year 3
Local (Regional)	Not available	Not available	Not available
State	506	506	506
Nation	110,000	118,690	128,067

a. Describe the methodology used to determine the projected job openings. If a survey of employment needs was used, please attach a copy of the survey instrument with a summary of results as **Appendix C.**

   Estimates are based on Bureau of Labor Statistics, *Employment by major occupational group, 2012 and projected 2022*. Retrieved from: http://www.bls.gov/emp/ep_data_occupational_data.htm and Idaho Department of Labor, *Idaho 2012-2022 Long Term Occupational Projections*. Retrieved from: http://lmi.idaho.gov/projections.

b. Describe how the proposed change will act to stimulate the state economy by advancing the field, providing research results, etc.

   The proposed change provides enhanced opportunities for people throughout the state to either further their education or complete degrees. Such opportunities contribute to the Board of Education's goal of raising the percentage of Idahoans completing their college degree.

c. Is the program primarily intended to meet needs other than employment needs, if so, please provide a brief rationale.

   The proposed change is intended to meet employment needs but it is also intended to provide learning opportunities for place-bound citizens in an area of considerable student demand.

12. **Will any type of distance education technology be utilized in the delivery of the program on your main campus or to remote sites? Please describe**. *This question is not applicable to requests for discontinuance.*

The proposed program is distance-education delivery. The University of Idaho uses the Blackboard (BbLearn) course management system for distance delivered courses. It is accessible to students who have access to the internet

13. Describe how this request is consistent with the State Board of Education's strategic plan and institution's mission, core themes, and primary emphasis areas. *This question is not applicable to requests for discontinuance.*

The proposed program contributes to the university's mission through expanded delivery of a degree program that is of value to the state's citizens and contributes to goals 1, 2 and 3 in the strategic plan. It is a program that that makes access to our sociology/criminology degree available to citizens throughout the state, training students for careers in law enforcement, corrections, and other justice-related fields.

14. **Describe how this request fits with the institution's vision and/or strategic plan.** *This question is not applicable to requests for discontinuance.*

Goals of Institution Strategic Mission	Proposed Program Plans to Achieve the Goal
Goal 1 objective A, build adaptable curricula	Program is creating new delivery of curricula to reach a broader segment of Idaho's population. Proposal makes a high demand program available to a significant place-bound population
Goal 2, Objective B: Strengthen Partnerships	A distance program will build connections with many law enforcement agencies in the state needing additional training for employees as well as foster connections with community colleges throughout the state.

15. **Is the proposed program in your institution's 5-year plan? Indicate below.** *This question is not applicable to requests for discontinuance.*

Yes ____ No _x_

If not on your institution's 5-year plan, provide a justification for adding the program.
This is not a new program request. It is a request to add program modality.

16. **Explain how students are going to learn about this new program and where students are going to be recruited from (i.e., within institution, out-of-state, internationally).** *For requests to discontinue program, how will continuing students be advised of impending changes and consulted about options or alternatives for attaining their educational goals?*

Students will be recruited to the program from two places, the state's community college system and through the state's law enforcement and correctional agencies. As noted above faculty have already been in contact with both entities. As program is implemented there will be an accompanying advertising campaign specifically targeting those audiences.

17. Program Resource Requirements. Using the ***Excel spreadsheet*** provided by the Board office indicate all resources needed including the planned FTE enrollment, projected revenues, and estimated expenditures for the first three fiscal years of the program. Include reallocation of existing personnel and resources and anticipated or requested new resources. Second and third year estimates should be in constant dollars. Amounts should reconcile budget explanations below. If the program is contract related, explain the fiscal sources and the year-to-year commitment from the contracting agency(ies) or party(ies). Provide an explanation of the fiscal impact of the proposed discontinuance to include impacts to faculty (i.e., salary savings, re-assignments).

a. Personnel Costs

Faculty and Staff Expenditures
Project for the first three years of the program the credit hours to be generated by each faculty member (full-time and part-time), graduate assistant, and other instructional personnel. Also indicate salaries. After total student credit hours, convert to an FTE student basis. Please provide totals for each of the three years presented. Salaries and FTE students should reflect amounts shown on budget schedule.

Year 1

Name, Position & Rank	Annual Salary Rate	FTE Assignment to this Program	Projected Student Credit Hours	FTE Students
New assistant professor	62,000	1.0	270	18
New assistant professor	62,000	1.0	270	18

Year 2

Name, Position & Rank	Annual Salary Rate	FTE Assignment to this Program	Projected Student Credit Hours	FTE Students
New assistant professor	62,000	1.0	540	38
New assistant professor	62,000	1.0	540	38

Year 3

Name, Position & Rank	Annual Salary Rate	FTE Assignment to this Program	Projected Student Credit Hours	FTE Students
New assistant prof	62,000	1.0	594	42
New assistant prof	62,000	1.0	594	42

Project the need and cost for support personnel and any other personnel expenditures for the first three years of the program.

Administrative Expenditures

Describe the proposed administrative structure necessary to ensure program success and the cost of that support. Include a statement concerning the involvement of other departments, colleges, or other institutions and the estimated cost of their involvement in the proposed program

Half time program manager/advisor will work with department faculty to manage the advising/support needs of the added students in the program.

Name, Position & Rank	Annual Salary Rate	FTE Assignment to this Program	Value of FTE Effort to this Program
Half time advisor	20,000	.5	100%

b. Operating Expenditures

Briefly explain the need and cost for operating expenditures (travel, professional services, etc.)

Travel funding will support faculty and/or advisor travel to community colleges throughout the state, both for ongoing recruitment and to continue to build at seamless 2+2 transition. It is also expected that travel will periodically be necessary to visit law enforcement and correctional agencies.

Materials funding will support/develop advertising and promotional materials for the program.

Additional support for program development can be covered by the web fees generated by the courses being

offered. Given the scope of the expansion it is expected that there will be unanticipated expenses associated with starting such a program.

c. Capital Outlay

(1) Library resources

(a) Evaluate library resources, including personnel and space. Are they adequate for the operation of the present program? If not, explain the action necessary to ensure program success.

$2000.00 is requested as ongoing support for the program and increased student demand for access to online resources.

(b) Indicate the costs for the proposed program including personnel, space, equipment, monographs, journals, and materials required for the program.

(c) For off-campus programs, clearly indicate how the library resources are to be provided.

Through online access to journals

(2) Equipment/Instruments

Describe the need for any laboratory instruments, computer(s), or other equipment. List equipment, which is presently available and any equipment (and cost) which must be obtained to support the proposed program.

Funds are requested to purchase laptop computers for the two faculty and staff/advisor.

d. Revenue Sources

(1) If funding is to come from the reallocation of existing state appropriated funds, please indicate the sources of the reallocation. What impact will the reallocation of funds in support of the program have on other programs?

There will be no reallocation of existing state appropriations. An initial startup allocation will be provided internally, and thereafter the revenue generated by the program will be sufficient to cover expenses.

Students will be charged the regular distance tuition and fees as approved by the SBOE annually. In addition, students will pay the regular $35.00 per credit online course fee.

(2) If the funding is to come from other sources such as a donation, indicate the sources of other funding. What are the institution's plans for sustaining the program when funding ends?

There will be no funding from other sources.

(3) If an above Maintenance of Current Operations (MCO) appropriation is required to fund the program, indicate when the institution plans to include the program in the legislative budget request.

N/A

(4) Describe the federal grant, other grant(s), special fee arrangements, or contract(s) to fund the program. What does the institution propose to do with the program upon termination of those funds?

N/A

(5) Provide estimated fees for any proposed professional or self-support program.

N/A

Appendix A: Sociology Curriculum/Criminology Emphasis

Sociology (B.A. or B.S.)

Required course work includes the university requirements (see regulation J-3), the general requirements for either the B.A. or B.S. degree and the following courses (electives must be approved by the student's advisor):

Anth 100 Introduction to Anthropology (3 cr)

Soc 101 Introduction to Sociology (3 cr)

Soc 311 Development of Social Theory (3 cr)

Two of the following (6 cr):

Soc 411 Quantitative Social Science Methods (3 cr)

Soc 413 Qualitative Social Science Methods (3 cr)

Stat 251 Statistical Methods (3 cr)

Related fields (e.g. anthropology, economics, environmental science, geography, history, political science, psychology, statistics, and women's and gender studies) (12 cr)*

One of the following (3 cr):

Soc 423 Sociology of Prosperity: Social Class and Economics in the 21st Century (3 cr)

Soc 424 Sociology of Gender (3 cr)

Soc 427 Racial and Ethnic Relations (3 cr)

Soc 439 Inequalities in the Justice System (3 cr)

One of the following (3 cr):

Soc 340 Social Change & Globalization (3 cr)

Soc 341 Science, Technology, and Society (3 cr)

Soc 343 Power, Politics, and Society (3 cr)

Soc 465 Environment, Policy, and Justice (3 cr)

*Note: Must be approved by student’s advisor

Select one of the following emphases:

A. Criminology

Soc 260 Intro to Deviance and Crime (3 cr)

Soc 331 Criminology Theory (3 cr)

Soc 461 Capstone: Justice Policy Issues (3 cr)

One of the following (3 cr):

PolS 467 Constitutional Law (3 cr)

PolS 468 Civil Liberties (3 cr)

PolS 469 The Judicial Process (3 cr)

Soc 420 Sociology of Law (3 cr)

Selected upper-division emphasis electives (12 cr):

Soc 315 Community Service Learning (1-4 cr, max 4)**

Soc 325 Family, Violence, and Society (3 cr)

Soc 330 Juvenile Delinquency (3 cr)

Soc 332 Sociology of Punishment (3 cr)

Soc 333 Elite and White Collar Crime (3 cr)

Soc 334 Police and Social Control (3 cr)

Soc 335 Terrorism, Society and Justice (3 cr)

Soc 336 Comparative Criminal Justice Systems (3 cr)

Soc 337 Violence and Society (3 cr)

Soc 338 Regulation of Vice (3 cr)

Soc 339 Crime and the Media (3 cr)

Soc 344 Urban Sociology (3 cr)

Soc 345 Extremism and American Society (3 cr)

Soc 403 Workshop (cr arr)

Soc 404 Special Topics (cr arr)

Soc 420 Sociology of Law (3 cr)

Soc 439 Inequalities in the Justice System (3 cr)

Soc 450 Dynamics of Social Protest (3 cr)

Soc 465 Environment, Policy, and Justice (3 cr)

Soc 498 Internship (1-6 cr, max arr)**

Soc 499 Directed Study (cr arr)**

Courses to total 120 credits for this degree

**Note: A maximum of 3 credits may be earned in Soc 315, Soc 498, and Soc 499, respectively

Appendix B: survey data summary

In order to estimate the level of demand for a distance delivered criminology degree program, sociology faculty distributed a brief online survey to a purposive sample of twenty police and correctional agencies/divisions in Idaho. Eleven of the twenty agencies completed the survey (55% response rate).

The first section of the survey asked the respondents about their agency's education-related hiring requirements and support for higher education. Eight of the eleven respondents indicated that only a high school diploma or its equivalent is required for newly hired officers (see Table 1). Many of the agencies, however, reported that their department encourages its officers to complete additional education beyond the minimum standards (8 of 11). Just under half of the agencies provide direct financial benefits (e.g., tuition reimbursement) to officers who pursue education beyond the minimum requirements. In addition, several respondents from departments that do not offer direct financial incentives indicated that their agencies provide strong indirect incentives, such as giving officers with four-year degrees extra points on competitive promotional exams, which makes it more likely that they will achieve higher salaries through promotion.

Table 1: Agency Support for Continuing Officer Education

Question	Number	Percent
What are the minimum educational requirements to be hired as a sworn officer in your department (excluding P.O.S.T. certification)?		
High School Diploma	8	73%
Associate of Arts (60 credit hours)	3	27%
Bachelor's Degree	0	0%
Does your department encourage its officers to complete additional education beyond the minimum hiring requirements?		
Yes	8	73%
No	3	27%
Does your department offer financial incentives for officers or staff to pursue additional education beyond the minimum hiring requirements?		
Yes	4	36%
No	7	64%

The second section of the survey included several questions that were designed to allow us to generate rough estimates of the number of officers who might be interested in taking distance delivered criminology courses. The first question in this section asked the respondents to estimate number of officers in their department who might be interested in taking distance delivered classes. The second question asked them to report the total number of officers working for their department. Altogether, the respondents reported that the agencies employed a total of 2,560 officers (see Table 2). At the same time, the respondents estimated that 443 officers across the

eleven agencies would be interested in taking distance delivered classes in criminology, resulting in an estimated 17% of the officers working for the responding agencies who might be interested in enrolling in a distance delivered criminology program. If we project that percentage on to the Idaho's population of 12,958 individuals working in the State's protective services occupations, then we can estimate that approximately 2,203 individuals working in this field in Idaho may consider enrolling in a distance delivered program in criminology. Of course, that figure is a rough estimate and only represents a possible pool of individuals who might be interested in enrolling in a distance criminology program. However, if marketing and outreach efforts can draw in 2% of that pool on a yearly basis, then the distance program could expect to enroll a minimum of 44 criminal justice professionals per year in the program.

In their written comments at the end of the survey, several respondents indicated that two common barriers prevent officers from enrolling in university programs. First, their non-traditional work schedules make it difficult to enroll in traditional or blended classes. Second, several respondents noted that distance classes tend to be too expensive. We believe that these issues create an opportunity for the University of Idaho. First, the current per credit cost for the UI is lower for in-state students than our potential market competitors. Second, the distance soc-crim program will build in the flexibility that working criminal justice professionals need to complete their degrees.

Table 2: Agency Estimates for Officers Interested in Taking Distance Delivered Classes

Estimates	Number
Total number of officers working for the eleven responding agencies/divisions?	2,560
Estimated number of officers interested in taking online criminology classes?	443
***Estimated* percentage of officers interested in taking online criminology classes?**	**17%**
Total Idaho employment in protective services occupations (2012)	12,958
***Estimated* number of individuals working in Idaho's protective services occupations that may consider enrolling in an online criminology program**	**2,203**

The final section of the agency survey asked the respondents to identify the types of courses and skills that officers might look for in a distance delivered criminology program. Overall, the respondents indicated that the classes and skills that officers are looking for as similar to the classes and skills already emphasized in the residential soc-crim program. For example, the most commonly mentioned classes included juvenile delinquency, policing, corrections, constitutional law, criminal law, and deviance (see Table 3). In addition, the kinds of skills most frequently mentioned by the respondents are the same types of skills that the residential program currently emphasizes (i.e., critical thinking, writing, problem-solving, and communication skills) and which will be built into the

distance delivered degree. Taken as a whole, this indicates to us that the distance criminology program will have the characteristics that should be attractive to criminal justice professionals looking to complete a four-year degree.

Table 3: Reported Desired Classes and Skills Training in a Four-Year Criminology Program

Desired Classes	Desired Skills
Juvenile Justice*	Critical Thinking
Policing*	Communication/Verbal Skills
Constitutional Law*	Writing
Criminal Law*	Problem Solving
Research/Crime Analysis*	Research and Analysis Skills
Corrections*	Leadership Skills
Deviance*	
Drugs/Alcohol/Vice Crime*	
Leadership	
Mental Health and Crime	
Interpersonal Communication	
Cultural Competency	
Conflict Management	

Table Notes: An asterisk indicates a class already offered through the UI's residential criminology program.

Interviews with Community College Criminal Justice Program Coordinators

One of the other important potential sources of demand for a distance delivered criminology program in the Idaho comes from students enrolled in two-year criminal justice programs who would like to complete a four-year degree. To gauge the potential market demand among Idaho community college students, sociology faculty completed phone interviews with the faculty coordinators for the criminal justice programs at Idaho's three community colleges—the College of Western Idaho (CWI), the College of Sothern Idaho (CSI), and the Northern Idaho College (NIC).

All three coordinators were strongly supportive of the idea of a four-year criminology program at the University of Idaho and each coordinator indicated that they believed there would be strong demand among their students for the program. After consulting with their respective offices for institutional research, the coordinators provided the following figures. There are over 1,000 students enrolled in two-year criminal justice programs in the state (485 at CWI, 290 at CSI and 240 at NIC). A little over 100 students graduated out of these programs in 2014 (50 at CWI, 30 at CSI and 23 at NIC). Each college contact estimated that about one-half (50%) of all students were interested in a 4-year distance program in criminology, criminal justice or justice studies. From this estimate, we can roughly infer that an additional 50 graduates from a 2-year program in the state would be interested in a distance 4-year degree program in 2014.

PROGRAM RESOURCE REQUIREMENTS

Indicate all resources needed including the planned FTE enrollment, projected revenues, and estimated expenditures for the first three fiscal years of the program. Include reallocation of existing personnel and resources and anticipated or requested new resources. Second and third year estimates should be in constant dollars. Amounts should reconcile subsequent pages where budget explanations are provided. If the program is contract related, explain the fiscal sources and the year-to-year commitment from the contracting agency(ies) or party(ies). Provide an explanation of the fiscal impact of the proposed discontinuance to include impacts to faculty (i.e., salary savings, re-assignments).

I. PLANNED STUDENT ENROLLMENT

	FY	2017	FY	2018	FY	2019	Cumulative Total	
	FTE	Headcount	FTE	Headcount	FTE	Headcount	FTE	Headcount
A. New enrollments	38	50	76	100	84	110	198	260
B. Shifting enrollments	0	0	0	0	0	0	0	0

budgeting assumptions: Student count based on 60 percent full time students (12 credits) and 40 percent part time students (6 credits)

II. REVENUE

	FY	2017	FY	2018	FY	2019	Cumulative Total	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
1. Appropriated (Reallocation)							$0.00	$0.00
2. Appropriated (New)							$0.00	$0.00
3. Federal							$0.00	$0.00
4. Tuition	$267,540.00		$535,080.00		$588,588.00		$1,391,208.00	$0.00
5. Student Fees	$27,300.00		$54,600.00		$60,060.00		$141,960.00	$0.00
6. Other (Specify)*	$33,600.00		$67,200.00		$73,920.00		$174,720.00	$0.00
Total Revenue	$328,440.00	$0.00	$656,880.00	$0.00	$722,568.00	$0.00	$1,707,888.00	$0.00

Distance Tuition Rates used: 3185 FT & 318.50 per credit

**Distance education fee $35.00/credit. Bugeting assumptions based on 60 percent full time students (12 cr.) and 40 percent part time students (6 cr.)*

Ongoing is defined as ongoing operating budget for the program which will become part of the base.

One-time is defined as one-time funding in a fiscal year and not part of the base.

III. EXPENDITURES

	FY	2017	FY	2018	FY	2019	Cumulative Total	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
A. Personnel Costs								
1. FTE	2.0		2.0		2.0		6.00	0.00
2. Faculty	$124,000.00		$124,000.00		$124,000.00		$372,000.00	$0.00
3. Administrators							$0.00	$0.00
4. Adjunct Faculty							$0.00	$0.00
5. Instructional Assistants							$0.00	$0.00
6. Research Personnel							$0.00	$0.00
7. Support Personnel	$20,000.00		$20,000.00		$20,000.00		$60,000.00	$0.00
8. Fringe Benefits	$47,024.00		$47,024.00		$47,024.00		$141,072.00	$0.00
9. Other:							$0.00	$0.00
Total FTE Personnel and Costs	$191,024.00	$0.00	$191,024.00	$0.00	$191,024.00	$0.00	$573,072.00	$0.00

support personnel: 1/2 time advisor/program manager for online students

	FY	2017	FY	2018	FY	2019	Cumulative Total	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
B. Operating Expenditures								
1. Travel	$5,000.00		$5,000.00		$5,000.00		$15,000.00	$0.00
2. Professional Services							$0.00	$0.00
3. Other Services							$0.00	$0.00
4. Communications							$0.00	$0.00
5. Utilities							$0.00	$0.00
6. Materials and Supplies	$3,000.00		$3,000.00		$3,000.00		$9,000.00	$0.00
7. Rentals							$0.00	$0.00
8. Repairs & Maintenance							$0.00	$0.00
9. Materials & Goods for Manufacture & Resale							$0.00	$0.00
10. Miscellaneous							$0.00	$0.00
Total Operating Expenditures	$8,000.00	$0.00	$8,000.00	$0.00	$8,000.00	$0.00	$24,000.00	$0.00

	FY	2017	FY	2018	FY	2019	Cumulative Total	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
C. Capital Outlay								
1. Library Resources	$2,000.00		$2,000.00		$2,000.00		$6,000.00	$0.00
2. Equipment	$0.00	$4,500.00	$0.00		$0.00		$0.00	$4,500.00
Total Capital Outlay	$2,000.00	$4,500.00	$2,000.00	$0.00	$2,000.00	$0.00	$6,000.00	$4,500.00
D. Capital Facilities Construction or Major Renovation	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
E. Indirect Costs (overhead)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
TOTAL EXPENDITURES:	$201,024.00	$4,500.00	$201,024.00	$0.00	$201,024.00	$0.00	$603,072.00	$4,500.00
Net Income (Deficit)	$127,416.00	-$4,500.00	$455,856.00	$0.00	$521,544.00	$0.00	$1,104,816.00	-$4,500.00