



MS in Natural Resources

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June 29, 2023

MS-NR Course Descriptions

BIO 511 Ecological conservation

Ecological concepts in the conservation and management of natural resources, plant and animal population, and ecological processes. Reading, discussing and comprehension of primary literature and technical reports. Field experience in study design, sampling, and management techniques.

BIO 501 Graduate Study

Effective sourcing, use, and interpretation of literature. Scientific methodology, writing, and review of research ethics. Development of a research plan. Prerequisite: graduate standing.

BIO 535 Advanced Data Analysis

Data analysis is an extremely crucial component of any scientific discipline, but proper data analysis in the environmental sciences is particularly vital. Scientific observations of the natural world are inherently fraught with complexity, variability, and a high degree of uncertainty. Consequently, effective statistical analyses must be applied with a thorough understanding of the pros and cons of each approach. This course aims to provide you with a broad overview of both traditional and modern statistical approaches commonly used to address the special needs of ecological data sets.

BIO 510* Current Issues, 1 credit hour

* Students must take Current Issues 3 different terms for a total of 3 credit hours.

Students will discuss weekly student and faculty speakers, primary literature, and Ted Talks.

This course is designed to expose students to a number of scientific research areas. In this course, students learn about current issues in science, critically evaluate primary literature and scientific presentations, and present research to their peers.

BIO 595 Graduate Research/Thesis (2 credits per term*)

*Students must take BIO 595 in 5 different terms, for a total of 10 credit hours. Prerequisite: BIO 501.

This course is required for the Master of Science degree in Natural Resources or Biomedical Science. The purpose of these courses is to complete thesis. Based upon the thesis proposal and thesis work completed in Graduate Studies (BIO 501), students should be undertaking this class to complete their thesis research and writing as well defending their theses.

BIO 526 - Evolutionary Biology

An overview of evolutionary biology as the discipline uniting all of the life sciences. Reading and discussion of scientific papers to explore the dynamic aspects of evolutionary biology. Principles of population genetics, paleontology, and systematics; application of evolutionary thinking in disciplines such as developmental biology, ecology, microbiology, molecular biology, and human medicine.

BIO 546 - Conservation Biology

Study of global patterns and threats to biodiversity. In-depth focus on ecosystem services, habitat fragmentation, design of conservation reserves, conservation funding and politics, and understanding and communicating of climate change.

CHEM 565 – Fate & Transport of Pollutants

Mass balance. The use of equilibrium and chemical kinetics in the modeling of pollutant transport in water, soil, and air. Mixing zone analysis, the use of Darcy's law, flow nets, and the Gaussian Plume approximation. Discussion, development and use of selected modeling scenarios.

BIO 521 Fire Ecology

Wildland fire is a critical issue across communities of the western U.S. right now. It is a complex issue that integrates a wide range of challenges from unwanted destruction of valuable natural resources to the critical *positive ecological* role of fire in forests, rangeland and other ecosystems and habitats. Managing wildland fire has become even more complicated over the past several decades with expanding wildland-urban and rural interface and the use of prescribed fire as a management.

ENV 534 Advanced Data Analysis 1

Data analysis is an extremely crucial component of any scientific discipline, but proper data analysis in the environmental sciences is particularly vital. Scientific observations of the natural world are inherently fraught with complexity, variability, and a high degree of uncertainty. Consequently, effective statistical analyses must be applied with a thorough understanding of the pros and cons of each approach. This course aims to provide you with a broad overview of both traditional and modern statistical approaches commonly used to address the special needs of ecological data sets.

ENV 559 Ichthyology

Diversity of fish and exposure to the taxonomy, form and function, distribution, natural history, ecology, economic importance, and management of fish.

ENV 565 - Ecological Resto. & Monitoring

Principles and practices of ecological restoration, including ecosystem assessment; evaluation; and restoration, planning, design, implementation, and monitoring. Labs including fields visits and evaluation of local restoration projects.

ENV 560 Risk Management and Wilderness First Aid

This course will focus on the administrative elements necessary to design and implement safe and effective environmental education programs. Students will receive their Wilderness First Aid (WFA) certification as part of this course.

ENV 566 Environmental Education

This course explores the field of environmental education through the lens of the North American Association of Environmental Education Guidelines for Excellence. Students will produce standards aligned outdoor lessons utilizing backwards design and implementing pedagogy for a diverse range of learners. These lessons will include formative and summative assessment techniques for evaluation of the experience.

ENV 569 - Treatment Wetlands

Treatment wetland features; biological, chemical, and physical properties. Planning, design, and performance assessment principles for municipal, agricultural and stormwater treatment wetlands. Considers vegetation and microbiology, aerobic and anaerobic biogeochemistry, hydraulics and treatment efficiencies. Local case studies.

ENV 585 – Ecoregional Management

Ecoregional studies around the world, and Environmental Protection Agency, Bureau of Land Management, and Nature Conservancy involvement in and utilization of Ecoregional studies. These studies consider similar ecosystems spanning multiple Federal and state resource management agencies, nearby North American countries, and selected other countries. Their designation is meant to serve as a spatial framework for research, assessment, and monitoring of ecosystems and ecosystem components.

ENV 584 – Sustainable Human Ecology

This course combines two distinct and overlapping disciplines - Human Ecology and Sustainability. While the former is relatively easily defined, the latter is not. At the heart of this course is an exploration and realistic discussion of who we are as a species, what it means to be human over the past 300,000 years, how we got to be where we are today, evolutionarily, ecologically, culturally, technologically, and how we can move forward in a way that supports and promotes the health of all living communities and the planet which we share.

GIS 526 - Geospatial Vector Analysis II

Advanced geospatial analysis. Extensive use and creation of relationship classes. Extensive use of sub types, domains, validation rules, and cardinalities. Use and creation of networks for geospatial analysis. Routing. Conflation. Quantitative assessment of geographic patterns and distributions.

GIS 532 - Customizing the GIS Environ II

Advanced mobile GIS data collection techniques. GIS server environment. Hosting features and geoprocessing services. Server site configuration and administration. Developing mobile and serving GIS applications.

GIS 546 - GIS Database Development

Advanced geodatabase design. Study, use, design, and creation of data models. Design and creation of user interfaces for data entry. Capstone experience for the GIS option.

GME 525 - Remote Sensing

Topics in remote sensing and photogrammetry include learning classic digital image processing techniques. Digital surface modeling using terrestrial and aerial LiDAR, and semi-global matching image processing. Students use softcopy image processing software.



Proposal for a New Academic Program

Institution: Oregon Institute of Technology

College/School: College of Health, Arts, and Sciences

Department/Program Name: Natural Science

Degree and Program Title: MS Natural Resources

1. Program Description

- a. Proposed Classification of Instructional Programs (CIP) number.

03.0101 Natural Resource/Conservation, General

- b. Brief overview (1-2 paragraphs) of the proposed program, including its disciplinary foundations and connections; program objectives; programmatic focus; degree, certificate, minor, and concentrations offered.

Our world, locally and globally, faces unprecedented environmental challenges. In the Klamath Basin alone, we are faced with managing millions of acres of private, state, and federal lands to reduce catastrophic wildfire risk, maintain biodiversity, and produce valuable natural resources. Furthermore, many federal and state natural resource agencies such as the US Forest Service have an aging workforce that is retiring and many agencies and offices have significant vacancies. These agencies and others are now seeking to recruit and retain the next generation of natural resource management and environmental science practitioners while increasing age, gender, ethnic, and cultural diversity (Seitz, et al. 2012).

Here in the Klamath Basin, we face many of the biggest environmental and natural resource management challenges other groups of people are facing across the country and around the world. For example, issues of catastrophic wildfire in Oregon and California mirror those in Australia and Europe while environmental and sociopolitical issues of drought and water resource use, access, and availability here are akin to those in Israel and South Africa. Environmental health and rural vs urban poverty are problems in nearly every corner of the world. We have a number of threatened and endangered species in the Klamath Basin, for example the Lost River sucker and Short Nose sucker. The conservation and management of endangered species is a global challenge all countries face, especially biodiverse tropical countries like Mexico, Indonesia, Madagascar, India and Brazil which have some of the greatest number of endangered species. The Klamath River will be the site of the largest dam removal project in the world, averting extinction of at least a dozen endangered species, and adapting to severe drought and up to 80% declines in winter snowpack. In China, dam construction and removal is central to many environmental concerns of water and energy development. Despite substantial management and policy efforts, our region is experiencing severely degraded air and water quality with significant environmental health impacts on our communities, concerns central to many of the 17 United National Sustainable Development Goals.

Our current undergraduate Environmental Science program prepares students to tackle these problems with applied science and communication skills. We work closely with a diversity of industry partners located in Klamath Falls including the US Forest Service, US Fish and Wildlife Service, US Geological Survey, Oregon

Department of Forestry, Bureau of Land Management, The Klamath Tribes, and many more. Our faculty and our partners desperately need to increase our capacity to manage, research, and monitor our efforts to understand and solve the problems we face, from local to global. Our capacity to meet these challenges and take advantage of these opportunities would be greatly expanded through the creation of a Master's in Natural Resources program at Oregon Tech.

Through the Natural Sciences (NSC) Department and the Environmental Sciences undergraduate program, the MS program would create both a 3-plus-2 year path for current undergraduates in ENV and a standalone 2-year program for students coming in with a relevant undergraduate degree from another institution. The MS program would be particularly designed to educate our students, with industry projects providing valuable opportunities to learn, while at the same time solving important issues. The MS program would:

- Increase recruitment of exceptional students through national searches,
- Expand the research and teaching capacity of our faculty,
- Draw academic acclaim to the university,
- Recruit advanced personnel for local agency offices, and
- Provide our industry partners with valuable deliverables and expand their capacity.

Development of the Natural Resources Master's would be done in close consultation with the Geomatics Department, Population Health Management program, and the Civil Engineering and Renewable Energy Engineering programs.

- c. Course of study – proposed curriculum, including course numbers, titles, and credit hours.

CURRICULUM

Within the first 2-4 years following program launch, the graduate curriculum would primarily consist of courses offered as 500 or as 400/500 level options; these are offered every other year. In addition to the required 500 level courses, graduate students (standalone MS and NR 3+2) would be in 400/500 level classes alongside undergraduates and would have additional requirements from their undergraduate peers. While requirements would vary with course and instructor, additional graduate requirements would include:

- Additional or more complex project work
- Additional readings and assignments on more advanced topics
- Additional or more advanced data analysis, mapping, and/or communication
- Mentoring of undergraduates

We expect that the addition of an MS program will also increase enrollment in the BS program. As the entire ENV program grows within the first 2-4 years after implementation, so too will our capacity to exclusively offer graduate courses in a greater diversity of areas.

Completion of the MS-NR degree consists of **47 credits**. Students must maintain a 3.0 graduate-level GPA with a final grade of "C" or better in all graduate courses.

- The **MS** consists of **23 credits of core classes** (including **10 credits of research/thesis work**) and **24 credits of elective courses**. Master's students will typically be either Teaching Assistants or Research Assistants, so the recommended course load is 6-9 credits per term for 6 terms (2 years).
- Students in the 3+2 NR option would follow the normal Bachelor of Environmental Science curriculum map through their third year. In their fourth year, students will complete their senior year requirements which are

comprised mostly of program-specific upper division required and technical elective courses. The electives would be taken at the 500 level. They would also integrate the required 500 level core classes.

Required Core Classes (23 credit hours):

- BIO 511 Ecological Conservation, **3 credit hours** (Offered every Fall)
- BIO 501 Graduate Study, **3 credit hours** (Offered Fall term)
- BIO 535 Advanced Data Analysis, **4 credit hours** (Offered Winter term)
- BIO 510* Current Issues in Science, **1 credit hour** (Offered each term)
* Students must take Current Issues 3 different terms for a total of **3 credit hours**
- BIO 595 Graduate Research/Thesis, **2 credit hours** per term*
*Students must take BIO 595 in 5 different terms, for a total of **10 credit hours**. Prerequisite: BIO 501.

Elective Coursework (24 credits)

In the 3+2 NR track, students would take the following elective courses at the 400-level through year three and at the 500-level in year four and five. They would be required to take 24 of the 32 credits of elective coursework at the 500-level. See **Appendix A: Curriculum Map for 3+2 Natural Resource track**, **Appendix C: Curriculum Map for 2-year Natural Resource track**.

In the stand-alone MS track, students would take the following courses at the 500-level. They would be required to take at least 80% of their elective coursework at the 500-level, allowing them to take courses relevant to their studies not offered at the 500-level (e.g. courses in GIS, GEOL, CE, CHEM).

Elective coursework that is currently in the course catalogue at the 400-level, could be offered immediately with current staff cross-listed as 400/500-level courses, including the following:

- BIO 526 - Evolutionary Biology: **3 credit hours**
- BIO 546 - Conservation Biology: **3 credit hours**
- CHEM 565 – Fate & Transport of Pollutants: **4 credit hours**
- CE 589 - Treatment Wetlands: **3 credit hours**
- ENV 521 Fire Ecology: **3 credit hours**
- ENV 534 Advanced Data Analysis 1: **4 credit hours**
- ENV 535 Advanced Data Analysis 2: **4 credit hours**
- ENV 559 Ichthyology: **3 credit hours**
- ENV 560 Risk Management and Wilderness First Aid: **3 credit hours**
- ENV 566 Environmental Education: **3 credit hours**
- ENV 565 - Ecological Resto. & Monitoring: **4 credit hours**
- ENV 569 - Treatment Wetlands: **3 credit hours**
- ENV 595 - Research in Env. Sciences: **4 credit hours**
- ENV 585 – Ecoregional Management: **3 credit hours**
- ENV 584 – Sustainable Human Ecology: **3 credit hours**
- BIO/ENV 507 – Seminars in Biology and Environmental Science: **3 credit hours**
- GIS 526 - Geospatial Vector Analysis II: **4 credit hours**
- GIS 532 - Customizing the GIS Environ II: **4 credit hours**
- GIS 546 - GIS Database Development: **2 credit hours**
- GME 525 - Remote Sensing: **4 credit hours**

A few additional courses could be created in the fields of expertise of our PhD level faculty, for example *mammalogy*, *fisheries management*, *ichthyology*, and *entomology*.

Additionally, students would take units of ENV 597 Research and ENV599 Thesis under their primary adviser while they are writing and defending their thesis.

Students lacking prerequisites for graduate courses will be required to fill those deficiencies. Deficiency credits will not be counted toward the total 47 credit requirements for the program.

We have a planned schedule for when the core and elective courses, currently listed in the course catalogue, will be offered in **Appendix B: Schedule of course offerings for ENV program, Fall 2023 through Spring 2025.**

GRADUATE THESIS

All MS students would be required to complete an original project-based research thesis. Students would develop and submit a proposal in their first term for approval by their adviser and graduate committee (see section below). The thesis would include at least five terms of thesis credit for project design, execution, and presentation. The completed written thesis would require review and approval by the student's graduate committee and one external reviewer. All MS theses would be made available online through the OIT Library Services. Peer-reviewed publication submission would be highly encouraged and under the discretion and mentorship of the primary graduate adviser.

- d. Manner in which the program will be delivered, including program location (if offered outside of the main campus), course scheduling, and the use of technology (for both on-campus and off-campus delivery).

All classes and courses will be offered on Klamath Falls Campus.

- e. Adequacy and quality of faculty delivering the program.

The faculty at Klamath Falls campus teaching in the Natural Sciences have the required credentials and experience to teach the suggested curriculum. Current faculty include:

- Dr. Jherime L. Kellermann, PhD
- Dr. Nate Bickford, PhD
- Professor Kerry Farris, MS
- Professor Christy VanRooyen, MS
- Dr. Ross Wagstaff, PhD
- Dr Wayne Hung, PhD (hire start Fall 2023)
- Dr Travis Owens, PhD (hire start Fall 2023)

See **Appendix E. Faculty CVs.**

- f. Adequacy of faculty resources – full-time, part-time, adjunct.

The Natural Sciences program has 19 full time faculty, one part time faculty and a few adjuncts. The full-time faculty will be the primary individuals teaching the curriculum in this degree.

- g. Other staff.

We have an office manager and plans to hire a lab manager in 2023.

- h. Adequacy of facilities, library, and other resources.

We have facilities that are already being successfully used for the BS program, which mainly consist of access to the primary peer-reviewed scientific literature. We feel these are adequate facilities and resources through the OIT library and inter-library loan system for the MS program as well. We also have field equipment and laboratory facilities that are modern and updated. The university has been very supportive in maintaining and purchasing equipment.

i. Anticipated start date.

We would like to have soft start of the program in Winter 2024 but a full recruitment year and official start in Fall 2024.

2. Relationship to Mission and Goals

Manner in which the proposed program supports the institution's mission, signature areas of focus, and strategic priorities.

The proposed MS Natural Resources program mission closely aligns with the Oregon Tech mission: Oregon Institute of Technology (Oregon Tech), Oregon's public polytechnic university, offers innovative, professionally focused undergraduate and graduate degree programs in the areas of engineering, health, business, technology, and applied arts and sciences. To foster student and graduate success, the university provides a hands-on, project-based learning environment and emphasizes innovation, scholarship, and applied research. With a commitment to diversity and leadership development, Oregon Tech offers statewide educational opportunities and technical expertise to meet current and emerging needs of Oregonians as well as other national and international constituents. The curriculum is a multidisciplinary integration of ecology, biology, chemistry, & natural resources; data analysis & statistics; geographic information systems (GIS); and other physical, natural, and social sciences. Emphasis in the program is placed on active experiential learning through engagement in real-world, real-time problems in collaboration with local and regional agency partners. The program offers numerous, diverse opportunities for students to engage in applied research, and resource management projects with the support of faculty and professionals. Further, Bachelor of Environmental Studies faculty and students engage with professional communities through publications and conference presentations. These research and scholarly activities are in direct alignment with Pillars II & III of Oregon Tech's strategic plan which state:

Pillar II COMMITMENT TO INNOVATION: Oregon Tech strives to be entrepreneurial and on the leading edge of student engagement, innovative teaching, and collaborative research.

Pillar III COMMITMENT TO COMMUNITY: Oregon Tech is an active member of the communities that it serves. Students, faculty, and staff are encouraged to contribute to their physical, professional, scholarly, and social communities via leadership and active participation through their academic and professional expertise.

Our faculty and students currently work with a diversity of community partners. Currently (2023) our faculty have funded research projects that involve undergraduates working with the US Fish and Wildlife Service on bird conservation and management, the EPA and DEQ on air quality and environmental health, the Bureau of Land Management on stream restoration and bird conservation, the US Forest Service on stream and wetland conservation and bird management, US FWS and NGOs on bee conservation, and Oregon Department of Forestry and the City Parks Department on forest and fire management in Moore Park. Past projects and collaborations have involved the Bureau of Reclamation, US Geological Survey, Oregon Department of Fish and Game, and US Fish and Game. We are also working to develop a strong relationship with the Klamath Tribes. We have current Tribal member students doing research with the tribes on fisheries and aquatic restoration and we have several Tribal members that are alumni of the program working at the US Fish and Wildlife, Department of Forestry and the Klamath Tribes Department of Natural Resources. We regularly engage tribal members and staff in our classes. For example, the former Klamath Tribal Chairman Don Gentry has met with our students for field courses/labs and Alex Gonyaw, Senior Fisheries Biologist for the Tribes, has given guest lectures and led field labs for a number of courses for the past 5 years. Our students have worked with the Tribal Forest and Fire management staff to study forest and fire ecology on lands managed by the Tribes in the Chiloquin area, including the use of monitoring technology in cooperation with Chiloquin High School students.

Like our BS program, the master's program will help students cultivate a deep experiential appreciation for the interdisciplinary character of natural resource problems.

Expanding capacity

The Master's program will increase our ability to achieve our mission and meet the goals of our strategic plan. Master's students and their required graduate projects will extend and expand the capacity of both our faculty and our agency partners to address the significant environmental and natural resource challenges we face in the Klamath Basin, the Pacific Northwest, nationally, and globally. We will create and design individual graduate projects and their products to address the needs of our partners and resource stakeholders. Graduate students will be expected to show leadership and initiative on their projects while providing critical support, value, and resources for our partners. Ultimately, our master's program will provide desperately needed human resources in the region to address critical and growing environmental and natural resource problems including air and water quality, extreme fire risk, conservation of fisheries and wildlife species, and environmental health, and sustainability.

Collaboration with other programs

CE & REE: Currently, students at Oregon Tech can pursue dual degrees in Environmental Science and either Civil Engineering or Renewable Energy Engineering. Both CE and REE now offer master's programs at the Klamath Falls campus. Our Master's program will provide an opportunity for students interested in the nexus of these disciplines to acquire a Master's in Natural Resources that integrates elements of these disciplines. These elements will support and build partnerships and collaborations among our faculty and partners that are already well established through our dual undergraduate programs.

GIS: The Environmental Sciences and GIS programs have always been closely aligned and overlapping in their learning outcomes, curricula, real-world applications, student interest, and industry partners. The ENV curriculum requires at least three terms of GIS coursework and many ENV students complete a minor in GIS. The Geomatics department is also considering developing a graduate program. Development of a Master's in Natural Resources should be in close consultation with the Geomatics Department to ensure synergy and reduce redundancy of future programs.

PHM: The Population Health Management program also has significant overlap in learning objectives such as environmental health. We will also include the PHM program in planning and development to increase opportunities for all programs.

State Universities: Faculty at Oregon Tech already have significant collaboration with Oregon State University. Dr. Jhermine Kellerman has collaborated with Dr. Daniel Leavell of OSU Extension. With this program we can build even more significant opportunities for collaboration on research at sites in the Klamath Falls region. Dr. Nate Bickford also communicated with Dr. Mark Needham (OSU) on potential collaboration results from the graduate program. **See attached letter in Appendix.**

Dr. Nate Bickford has also spoken to Dr. Karen Mager of Southern Oregon University about opportunities to collaborate in the classroom and in research. The graduate program will help facilitate many possible opportunities to work together.

See attached letter of support in Appendix

- a. Manner in which the proposed program contributes to institutional and statewide goals for student access and diversity, quality learning, research, knowledge creation and innovation, and economic and cultural support of Oregon and its communities.

The proposed program located in Klamath Falls will facilitate student experiences in underserved, rural regions of the state.

We are working to develop collaborations with the Klamath tribes and with the development of their environmental research and policies. We think we can find some strong common ground to build programs together.

Students attracted to this program are likely from Oregon Tech's biology/science programs and will help establish services in rural and underserved areas of the state.

In addition to providing a rigorous curriculum, and conducting regular assessment of learning outcomes, the program will admit students who have the necessary characteristics to succeed in this field. In order to ensure that students will have the necessary preparation for success, applicants must meet the program admissions requirements as determined by Oregon Tech. The program will have a rigorous curriculum, standards for admissions, accreditation standards, and ongoing program assessments.

Per Oregon Tech policy, to be considered for admission to this graduate program, an applicant must have a baccalaureate degree from a regionally accredited college or university, as well as a scholastic record that evidences the ability to perform satisfactory graduate work.

Specifically, all MS-NR students must:

- be in good academic standing currently or at the last college or university attended.
- have attained a grade point average of at least 3.0 on a 4.0 scale for the last 90 term (60 term) units attempted.
- have attained a grade point average of at least 3.0 on a 4.0 scale for the last 47 term hours in the major.

Students pursuing the standalone MS program:

- completed a four-year college course of study and hold a baccalaureate degree from an institution accredited by a regional accrediting association.

b. Manner in which the program meets regional or statewide needs and enhances the state's capacity to:

- i. improve educational attainment in the region and state;
 - ii. respond effectively to social, economic, and environmental challenges and opportunities; and
 - iii. address civic and cultural demands of citizenship.
- The Oregon Tech program will be the only Natural Resource Master's program east of the Cascades with a focus on rural, eastern arid land systems of the Cascade Mountains, Great Basin, Sage-steppe, juniper woodland, and high desert ecoregions.
 - We are embedded within and surrounded by small, rural natural resource-based communities that face a wide range of challenges which confront much of the American west including increasing drought & water scarcity, increasing risk of and catastrophic wildfire, endangered species management, development & land use change, climate change.
 - Although Klamath Falls is a relatively small town, it is home to the headquarters and offices of many major federal, state, and non-governmental natural resource management agencies and organizations including:
 - US Forest Service
 - Bureau of Land Management
 - US Fish & Wildlife

- US Geological Survey
 - Bureau of Reclamation
 - National Park Service
 - OR Dept of Forestry
 - OR Dept of Fish & Game
 - Klamath Tribes
 - The Nature Conservancy
 - Trout Unlimited
- We will have a graduate program focused on specific applied graduate projects designed to serve specific agency partners and local/regional needs
 - Our university and master's program will be well placed to address significant social, economic, and environmental challenges and opportunities in the region including:
 - Klamath River Dam Removal – the largest dam removal project in the world – beginning in 2023
 - Water quality and availability issues
 - Wildlife conservation and endangered species management
 - Air quality and environmental health
 - Wildland fire and forest resources management
 - Civic engagement in the management of public resources

3. Accreditation

- a. Accrediting body or professional society that has established standards in the area in which the program lies, if applicable.

NA

- b. Ability of the program to meet professional accreditation standards. If the program does not or cannot meet those standards, the proposal should identify the area(s) in which it is deficient and indicate steps needed to qualify the program for accreditation and date by which it would be expected to be fully accredited.

The department does not feel like this is a concern based on our accreditation of the BS through NWCCU.

- c. If the proposed program is a graduate program in which the institution offers an undergraduate program, proposal should identify whether or not the undergraduate program is accredited and, if not, what would be required to qualify it for accreditation.

The BS program is accredited through NWCCU.

- d. If accreditation is a goal, the proposal should identify the steps being taken to achieve accreditation. If the program is not seeking accreditation, the proposal should indicate why it is not.

We do not have specialized accreditation.

4. Need

- a. Anticipated fall term headcount and FTE enrollment over each of the next five years. The numbers in the table below represent a roughly 2:1 ratio of 3+2 NR to Standalone MS students. We recognize that this ratio could vary from year to year depending on the qualifications and interests of the undergraduates in any given year, faculty research and funding.

1 st Year (2024)	2 nd Year (2025)	3 rd Year (2026)	4 th Year (2027)	5 th Year (2028)	10 th Year (2034)
10 enrolled	5 incoming 15 enrolled 10 graduating	13 incoming 18 enrolled 5 graduating	5 incoming 18 enrolled 13 graduating	16 incoming 21 enrolled 5 graduating	8 incoming 24 enrolled 16 graduating

The number of enrolled students is a function of being able to supervise the thesis. As a graduate student defends and leaves the program, that opens space for another student. That is why there is a high and low number of enrolled students from year to year.

- b. Expected degrees/certificates produced over the next five years.
51 thesis MS degree in Natural Resources
- c. Characteristics of students to be served (resident/nonresident/international; traditional/ nontraditional; full-time/part-time, etc.).
The program design allows for students to be served from any of the listed characteristics.
- d. Evidence of market demand.

Anticipated market & demographics

The Master’s program will attract and target two primary markets and demographics.

- *Young people deeply concerned about critical environmental problems in rural regions:* Environmental issues are a central concern in the Northwest, the U.S. and globally, particularly for contemporary young people, sometimes called Generation Z (or Zed). The Climate Crisis, environmental pollution and health, biodiversity loss, catastrophic wildfires, destruction of the world’s rainforests, and environmental justice are all critical concerns of students in and entering universities. This is our market, people, especially young students coming out of high school, who feel compelled to help discover and contribute to solutions to the world’s pressing environmental problems at the graduate level. We expect to continue to attract students, for both our graduate and undergraduate programs that are interested in tackling global environmental problems at the local scale in rural communities that have challenges and problems unique to the history and circumstances of rural, in contrast to urban, America.

Specifically, our marketing will target:

- Students graduating from our own undergraduate program, or the dual majors with CE and REE, who are eligible to pursue a Master’s through the 3+2 option.
 - We believe that the 3+2 Master’s option could be very attractive to:
 - students at 2-year community colleges considering a bachelor’s degree.
 - students at other 4-year institutions that are considering transfer.

- Students graduating with other undergraduate degrees (not Environmental Science) from Oregon Tech but are interested in a graduate degree that integrates issues of natural resources and environmental science with their undergraduate discipline. These may be students from biology-health science, civil or renewable energy engineering, or social science programs such as population health management or applied psychology.
- Students graduating from regional undergraduate programs seeking to study natural resource and environmental problems in rural regions of Oregon, the Northwest, and beyond through adequately funded partner-driven projects.
- *Career professionals seeking advancement in their sector:* Both within and outside Klamath Falls, there are a large number of people already working in the field of natural resources and environment. Typically, people working in this sector already have an undergraduate degree, although this degree may have been attained some time ago. Others may be in a general field such as biology, or in an unrelated discipline. Attaining a graduate degree represents a way to qualify for more advanced positions and/or higher pay grades within their job series. For individuals with undergraduate degrees, more unrelated to environmental fields, they may wish to also take a number of undergraduate courses such as wildlife ecology, botany, environmental chemistry, or physics to help meet the qualifications of federal and state job series in order to prepare for entrance to the program.
- *Agency research needs:* The professors in the Environmental Science program have spoken with US Forest Service, US Geologic Service, US Fish and Wildlife Service, Bureau of Land Management, and Oregon Department of Fish and Game about the graduate program and potential projects. There was overwhelming excitement about the opportunities to work and fund local graduate students on projects. All of the agencies have district offices in Klamath Falls. The agency partners are very confident they can create opportunities since they have more project than people power.
- The Texas A&M Natural Resource Job Board is an industry standard to recruit students. Between November 1st and December 7th there were posting for 6 graduate positions in the Northwest out of 103 total requests during that same time period for the rest of the country. Clearly there is a need for more graduate study opportunities in the Northwest. Recruiting graduate students for funded position is as simple as advertising in a graduate student board such Texas A&M job board. At Colorado State University Pueblo – a similar school to Oregon Tech, a graduate position would attract 30 – 50 qualified applicants.
- The job outlook for Natural Science manager is a 6% increase which is the average increase for job market in the United States (<https://www.bls.gov/ooh/management/natural-sciences-managers.htm>).
- We conducted a survey of environmental students to identify their interest in the master’s program. Although we did not have large number of respondents, we do feel the patterns would stay the same for a larger number of students. We also feel the comments below indicate the overall feeling of the students.

“Klamath Falls is a region with diverse and complex natural resources opportunities and topics. The addition of a master’s program will draw in more prospective students and further elevate OIT as a premiere polytechnic university. I know I would pursue a master’s in natural science here”

“As a senior I don’t think it will impact me a lot. I do think that the freshmen or sophomores would definitely benefit from a master’s program. A Master’s program could bring in more students and money for the natural science department.”

“It will add opportunities for enhanced education that will set us up better in the future.”

“Oregon Tech on it's own has very few graduate programs compared to competition, so the more the merrier. In perspective to natural science, many jobs require some sort of graduate degree so implementing a program here would be very beneficial.”

“I think it would be awesome!”

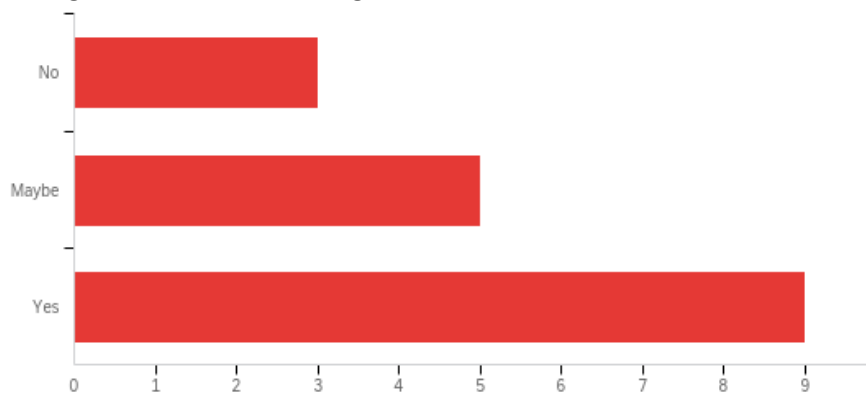
“I would consider adding a Master’s if it is implemented.”

“A Master’s Program would be beneficial for OIT students in the ENV program. This program could provide more educational opportunities for students to learn about more specific topics at a higher level.”

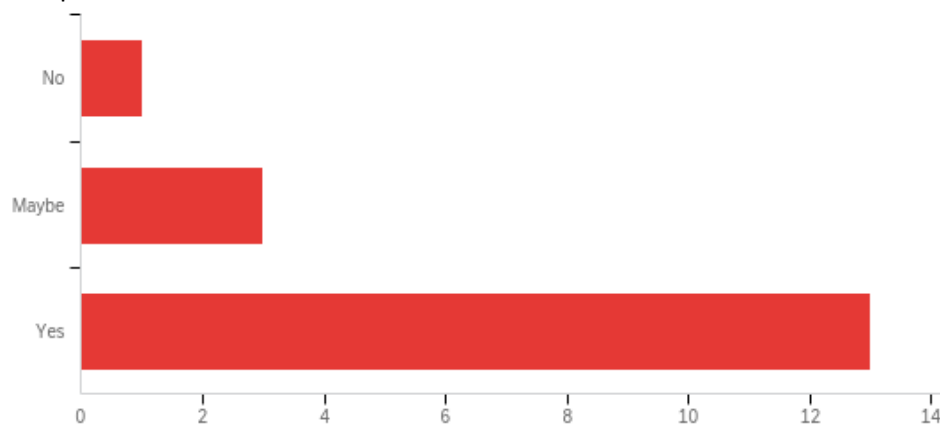
“I think a master’s program would help increase the research that we do and encourage more people to join the program since there is more room of individuals to grow”

Some of the questions asked of the students indicate that the majority of the students are both interested and excited about the graduate program and many are interested in applying to the program.

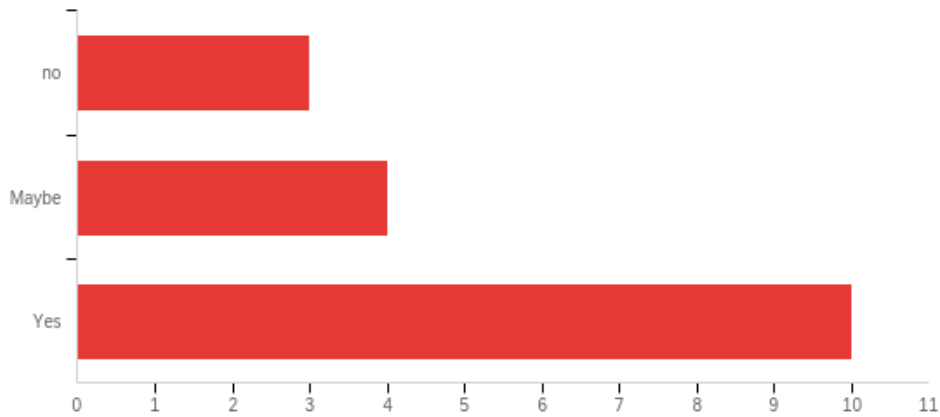
Have you thought about a Master’s degree?



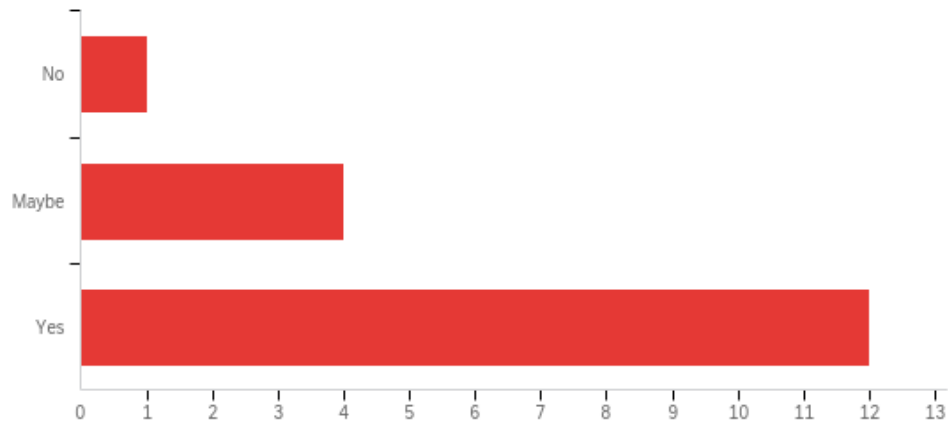
Do you think that adding a Master’s program in Natural Resources at Oregon Tech would enhance your educational experience?



Would you be interested in a Master’s Program?



Are you interested in research and developing a research project?



- e. If the program’s location is shared with another similar Oregon public university program, the proposal should provide externally validated evidence of need (e.g., surveys, focus groups, documented requests, occupational/employment statistics and forecasts).

NA

- f. Estimate the prospects for success of program graduates (employment or graduate school) and consideration of licensure, if appropriate. What are the expected career paths for students in this program?

There is extremely high demand for students with graduate degrees in natural resources and environmental sciences from a wide range of federal, state, private, and non-governmental organizations. Any organization or company that manages, uses, or impacts natural resources or the environment needs personnel with multidisciplinary science background in the environmental fields. In particular, highly trained individuals are in great demand by federal and state agencies that manage natural resources in our rural regions, such as the US Forest Service, Bureau of Land Management, US Fish & Wildlife, and Oregon Departments of Forestry and Fish and Wildlife.

Federal and state natural resource agencies pay good salaries with good benefits. Students with graduate degrees can qualify for intermediate to upper level pay grades, especially in conjunction with prior experience. For example, many of our undergraduate students work for the federal government (e.g. US Forest Service, US

Fish & Wildlife, National Park Service) during summer break and after graduation. These positions are within the federal Office of Personnel Management, 400 Occupational Series – Biological Sciences (Office of Personnel Management), which includes common job series such as Natural Resources Management and Biological Sciences, Biological Science Technician Series, Ecology Series, Forestry Series, and Wildlife Biology Series, most of which have educational requirements.

Individuals with a master's degree and some prior work experience in natural resources and environmental science can expect to start a federal job in the 400 series at the General Schedule (GS) level of 5, 7, or 9. These positions, as of 2020 have annual salaries in Oregon of \$45,000 - \$71,000 depending on position, location, and experience (Office of Personnel Management). Depending on experience and location, students with a master's degree and appropriate experience could qualify for positions at least at the GS-11 level, with 2019 salaries ranging from at least \$66,000 - \$86,000 and possibly the GS12-13 level ranging from \$79,000 - \$122,750.

It is extremely important to note that most of our current undergraduate students are from rural regions and wish to remain and work in rural regions, often in eastern Oregon, California, and Washington. The salaries stated above for positions in the federal 400 Biological series as well as for similar state agency job series provides a high standard of living in rural areas where the cost of living is relatively low compared to urban areas. For example, the average cost/value of a home in Klamath Falls is \$177,000, while in Portland, OR it is \$416,000, in Seattle it is \$714,000, and in San Francisco, CA is \$1.3 million! Furthermore, many individuals with undergraduate and advanced degrees in natural resources and environmental sciences work as, or for independent contractors regularly earning \$100-200 per hour.

These economic metrics highlight the fact that students attaining a graduate degree in NR at OIT can 1) achieve very comfortable salaries by any standard, 2) particularly in the rural areas where many jobs are located which have significantly lower costs of living compared with regions where many tech industry jobs are based.

5. Outcomes and Quality Assessment

- a. Expected learning outcomes of the program.
 1. Advanced conceptual and applied knowledge of conservation, ecology, and management of natural resources.
 2. Management and completion of an original research project including study design, hypothesis testing, data analysis, manuscript writing, and public communication and outreach
 3. Active professional engagement in a graduate-level community of peers, faculty, industry partners, and the public.
 4. Ability to effectively appraise and constructively critique scientific work and writing.
 5. Mentoring of undergraduates in the natural sciences.

- b. Methods by which the learning outcomes will be assessed and used to improve curriculum and instruction.

We will use techniques already developed to assess Programmatic Student Learning Objectives (PSLOs) in our BS of Environmental Science. This includes the analysis of academic works such as papers, presentations, exams, and lab exercises specifically developed to assess specific PSLOs. Additionally, we will use peer-review and publication of manuscript submissions to assess Number 2 above. We will also survey industry partners who work closely with our graduates as project mentors and collaborators on the professionalism, effectiveness, and skills of graduate students they engage with.

- c. Nature and level of research and/or scholarly work expected of program faculty; indicators of success in those areas.

Faculty will be expected to engage with the MS of Natural Resources program in at least one or more of four main areas:

1. Developing master's-level research projects in collaboration with partnering agencies and organizations to meet identified needs in management, conservation, planning, and research and to be published in peer-reviewed literature;
2. Develop master's projects that fit within ongoing research programs of the faculty member and to be published with peer-reviewed literature;
3. Provide graduate-level instruction in the form of courses, seminars, and trainings;
4. Serve on graduate thesis committees, providing mentorship and review of required graduate products

6. Program Integration and Collaboration

- a. Closely related programs in this or other Oregon colleges and universities.

Oregon State University

- MS in Fisheries & Wildlife Administration
- MS in Wildlife Science
- MS in Natural Resources
- MS in Forest Ecosystems & Society
- MS in Environmental Sciences

University of Oregon

- MS in Environmental Studies

Southern Oregon University

- MS in Environmental Education

Portland State University

- MS in Environmental Science and Management

Western Washington University

- MS in Environmental Science

Cal-Poly Humboldt

- MS in Environmental Systems
- MS in Natural Resources

- b. Ways in which the program complements other similar programs in other Oregon institutions and other related programs at this institution. Proposal should identify the potential for collaboration.

As we mentioned above, this will be the only Master's in Natural Resources east of the Cascade Mountains. The rural, arid lands ecosystems of our region are unique, with biogeographic and socioeconomic factors quite different from the more populated and mesic systems west of the Cascades. We have significant need and demand for graduate level research in our region that can meet the management and research needs of our faculty and partner agencies and organizations who lack capacity. We already collaborate with other universities in the state. For example, Dr. Jherime Kellermann has collaborated with Oregon State University, both the main and Cascades campuses, over the past ten years on research projects on sensitive species conservation, wildfire ecology, and climate change scenario planning. In the past we have collaborated with OSU-Cascades, Southern Oregon University, College of the Siskiyous, and Western Washington University.

The development of the MS in Natural Resources will facilitate added and advanced collaboration with other programs at Oregon Tech, including the MS in Civil Engineering (we already have a Dual major in CE and Environmental Science), the MS in Renewable Energy Engineering (we have a Dual Major in REE and ENV), the Geomatics program and the developing GIS Service Center, the Population Health Management Program, the proposed MS in Medical Science program, and the Data Science Program. With this program we can build even more significant opportunities for collaboration on research at sites in the Klamath region. As mentioned previously, Dr. Nate Bickford also communicated with Dr. Mark Needham (OSU) on potential collaboration results from the graduate program. Dr. Nate Bickford has also spoken to Dr. Karen Mager of Southern Oregon University about opportunities to collaborate in the classroom and in research. The graduate program will help facilitate many possible opportunities to work together.

c. If applicable, proposal should state why this program may not be collaborating with existing similar programs.

d. Potential impacts on other programs.

We expect minimal impact on programs at other institutions due to the unique location and programmatic offerings of Oregon Tech and the MS in Natural Resources. Students interested in Oregon Tech are typically seeking out our small school with low student to faculty ratios as well as our rural setting in the upper Klamath Basin and the Great Basin bioregion including the outstanding outdoor opportunities, low cost of living, and high quality of life.

7. External Review

If the proposed program is a graduate level program, follow the guidelines provided in *External Review of New Graduate Level Academic Programs* in addition to completing all of the above information.

See attached External review report and reviewers CV

Appendix A: Curriculum Map for 3+2 Natural Resources track

NR 3+2 CURRICULUM ("Senior" Year 4 of BS, Year 1 of the +2 BMS)															
	Fall					Winter					Spring				
Course	ENV 108	SPE 321	WRI Elec	Tech Elec	ENV 501	ENV 485	BIO 595	SOC/HUM Elective	Tech Elec	BIO 510	ENV 484	BIO 595	Tech Elec	Tech Elec	
Course Title	Mentorship & Team Building	Small Group and Team Com.	WRI 327, 328, 345, 350, or 410	Technical Elective (500)	Intro to Grad Studies	Ecoregional Management	Grad research/ Thesis	Social Sci/Hum elective	Technical Elective (500)	Current Issues	Sustainable Human Ecology	Grad research/ Thesis	Technical Elective (500)	Technical Elective (500)	Total Grad credits
Credits	1	3	3	4	3	3	2	3	4	1	4	2	4	4	24
Year 2 of +2															
Course	BIO 511	BIO 510	BIO 595	Tech Elec	Tech Elec	BIO 510	BIO 595	BIO 535			BIO 595				
Course Title	Foundations in Conservation	Current Issues	Grad research/ Thesis	Technical Elective (500)	Technical Elective (500)	Current Issues	Grad research/ Thesis	Advanced Data Analysis			Grad research/ Thesis				
Credits	3	1	2	4	4	1	2	4			2				23

Appendix B: Schedule of course offerings for the undergraduate ENV program, Fall 2023 through Spring 2025

Fall 2023		
Course Number	Course Name	Campus
BIO 255	Sophomore Research	Klamath Falls
BIO 355	Junior Research	Klamath Falls
BIO 455	Senior Research	Klamath Falls
BIO 307	Seminar: Ecology Elective	Klamath Falls
BIO 377	Wildlife Ecology	Klamath Falls
ENV 108	Mentorship & Team Building	Klamath Falls
ENV 111	Intro to Env Sciences	Klamath Falls
ENV 217	Intro to Natural Resource Management	Klamath Falls
ENV 355	Careers and Professions in Environmental Science	Klamath Falls
ENV 465	Ecological Restoration and Monitoring	Klamath Falls
ENV 495	Research in Environmental Sciences	Klamath Falls
GEOG 335	Soils	Klamath Falls
HED 240	Emergency Care and CPR	Klamath Falls
Winter 2024		
Course Number	Course Name	Campus
BIO 255	Sophomore Research	Klamath Falls
BIO 355	Junior Research	Klamath Falls
BIO 455	Senior Research	Klamath Falls
BIO 354	Environmental Health	Klamath Falls
BIO 446	Conservation Biology	Klamath Falls
CHE 315	Environmental Chemistry	Klamath Falls

ENV 224	Scientific Reasoning & Methodology	Klamath Falls
ENV 226	ENV Data Analysis	Klamath Falls
ENV 314	Environmental Policy and Management	Klamath Falls
ENV 4xx	Environmental Education	Klamath Falls
ENV 434	Advanced Data Analysis	Klamath Falls
ENV 495	Research in Environmental Sciences	Klamath Falls
PHED 163	Wilderness Navigation	Klamath falls
PHY 201	General Physics	Klamath Falls
Spring 2024		
Course Number	Course Name	Campus
BIO 2xx	Sophomore Research	Klamath Falls
BIO 3xx	Junior Research	Klamath Falls
BIO 4xx	Senior Research	Klamath Falls
BIO 386	Ornithology	Klamath Falls
BIO 369	Mammalogy	Klamath Falls
CHE 465	Fate/Transport of Pollutants	Klamath Falls
ENV 315	Water Resources	Klamath Falls
ENV 375	Forest Ecology & Mgmt	Klamath Falls
ENV 484	Sustainable Human Ecology	Klamath Falls
ENV 495	Research in Environmental Sciences	Klamath Falls
GEOG 105	Physical Geography	Klamath Falls
HED 240	Emergency Care and CPR	Klamath Falls
Summer 2024		
Course Number	Course Name	Campus
BIO 407	Ecology elective	Klamath Falls
Fall 2024		
Course Number	Course Name	Campus
BIO 255	Sophomore Research	Klamath Falls
BIO 355	Junior Research	Klamath Falls
BIO 455	Senior Research	Klamath Falls
ENV 355	Careers in Environmental Sciences	Klamath Falls
BIO 337	Aquatic Ecology	Klamath Falls
ENV 111	Intro to Env Sciences	Klamath Falls
ENV 214	Watershed Science and Tech	Klamath Falls
ENV 217	Intro to Natural Resource Management	Klamath Falls
ENV 3xx	Fire Ecology	Klamath Falls
ENV 355	Careers and Professions in Environmental Science	Klamath Falls
ENV 495	Research in Environmental Sciences	Klamath Falls

HED 240	Emergency Care and CPR	Klamath Falls
Winter 2025		
Course Number	Course Name	Campus
BIO 255	Sophomore Research	Klamath Falls
BIO 355	Junior Research	Klamath Falls
BIO 455	Senior Research	Klamath Falls
BIO 426	Evolutionary Biology	Klamath Falls
CHE 315	Environmental Chemistry	Klamath Falls
ENV 224	Scientific Reasoning & Methodology	Klamath Falls
ENV 226	Environmental Data Analysis	Klamath Falls
ENV 460	Risk Assessment and Wilderness First Aid	Klamath Falls
ENV 434	Advanced Data Analysis	Klamath Falls
ENV 485	Habitat Management	Klamath Falls
ENV 495	Research in Environmental Sciences	Klamath Falls
GEOG 313	Climatology and Atmospheric Science	Klamath Falls
HED 240	Emergency Care and CPR	Klamath Falls
PHY 201	General Physics	Klamath Falls
Spring 2025		
Course Number	Course Name	Campus
BIO 255	Sophomore Research	Klamath Falls
BIO 355	Junior Research	Klamath Falls
BIO 455	Senior Research	Klamath Falls
BIO 313	Botany and Plant taxonomy	Klamath Falls
BIO 367	Plant Ecology	Klamath Falls
BIO 428	Fisheries	Klamath Falls
CHE 465	Fate/Transport of Pollutants	Klamath Falls
ENV 226	Environmental Data Analysis	Klamath Falls
ENV 469	Treatment Wetlands	Klamath Falls
ENV 484	Sustainable Human Ecology	Klamath Falls
ENV 495	Research in Environmental Sciences	Klamath Falls
GEOG 105	Physical Geography	Klamath Falls
HED 240	Emergency Care and CPR	Klamath Falls
PHED 163	Wilderness Navigation	Klamath Falls

Appendix C: Curriculum Map for 2 year thesis track

NEW CURRICULUM		
1st Year - Fall		
BIO 511	Ecological conservation	3
BIO 501	Graduate Study	3

	Elective	3
	Elective	
	TOTAL:	9
1st Year - Winter		
ENV 535	Graduate Data Analysis	4
BIO 510	Current Issues	1
BIO 595	Graduate Research/Thesis	2
	TOTAL:	7
1st Year - Spring		
BIO 510	Current Issues	1
BIO 595	Graduate Research/Thesis	2
	Elective	3
	Elective	3
	TOTAL:	9
2nd Year - Fall		
BIO 510	Current Issues	1
BIO 595	Graduate Research/Thesis	2
	Elective	3
	Elective	3
	TOTAL:	9
2nd Year - Spring		
BIO 595	Graduate Research/Thesis	2
	Elective	3
	Elective	3
	TOTAL:	8
2nd Year - Spring		
BIO 595	Graduate Research/Thesis	2
	Elective	3
	TOTAL:	5
	DEGREE TOTAL:	47

Appendix D. Natural Resources Faculty CV

Jherime L. Kellermann, PhD
1001 Loma Linda Dr., Klamath Falls, OR 97601
jkellermann@gmail.com
Cell: 707-599-0777

EDUCATION

PhD 2013. University of Arizona, Tucson, AZ

- **Major:** Wildlife Conservation & Management, **Minor:** Renewable Natural Resources
- **Dissertation:** Spatiotemporal and phenological patterns of bird migration and the influence of climate and disturbance in the Madrean Sky Island Archipelago and American southwest.
- **Adviser:** Dr. Charles van Riper III

MS 2007. Humboldt State University, Arcata, CA

- **Major:** Wildlife
- **Thesis:** Ecological and Economic services provided by birds on Jamaican Blue Mountain coffee farms.
- **Adviser:** Dr. Matthew D. Johnson

BA 1998. Pennsylvania State University, University Park, PA

- **Multiple Major Program:** Anthropology & Psychology

TEACHING POSITIONS

Fall 2022 – To date: **Professor, Oregon Tech**, Natural Sciences Dept., Klamath Falls, OR.

Fall 2017 – Spring 2022: **Associate Professor, Oregon Tech**, Natural Sciences Dept., Klamath Falls, OR.

Fall 2013 – Spring 2017: **Assistant Professor, Oregon Tech**, Natural Sciences Dept., Klamath Falls, OR

New courses I have created and taught as **Lead Instructor** since Fall 2013

- Mentorship & Team Building (ENV108)
- Intro to Natural Resource Management (ENV217)
- Fire Ecology (ENV/BIO307)
- Coffee: Ecology & History (BIO307)
- Environmental Health (BIO354)
- Wildlife Ecology (BIO377)
- Ornithology (BIO386)
- Crater Lake Ecology (BIO307)
- Natural Resource Management & Environmental Health (BIO407)
- Conservation Biology (BIO446)

Pre-existing courses I have significantly re-designed/re-created and taught as **Lead Instructor** since Fall 2013

- Principles of Biology I (BIO211)
- Principles of Biology II (BIO212)
- Scientific Reasoning & Methodology (ENV224)
- Careers in Environmental Science (ENV275)
- Developmental Biology (BIO352)
- Methods in Environmental Science (ENV365)
- Evolutionary Biology (BIO426)
- Sustainable Human Ecology (BIO484)

Other academic positions and duties

- **Advising Coordinator** for Environmental Sciences program from 2017-to date

- **Assessment Coordinator** for the Environmental Sciences Program 2017-2019
- Academic advising of program majors (including those in the dual Environmental Science-Civil Engineering and –Renewable Energy Engineering degrees)
- Advising of independent student research projects
- Academic service on a range of academic committees including Sustainability Committee (2016-2021), Health & Wellness Committee (2018-to date), search committees

Fall 2017 – Spring 2021: **Environmental Sciences Program Director, Oregon Tech**, Natural Sciences Dept.

- Organize and lead strategic planning for the program
- Oversee program and curriculum development and changes
- Develop and maintain partnerships with regional, state, and national organizations, agencies, and individuals
- Develop opportunities for student research, internships, and jobs
- Organize and lead program faculty meetings
- Identify and support the teaching and research needs of our faculty
- Management of a program fund held by the Oregon Tech Foundation
- Lead and organize outreach and student recruitment including “influencer” events, high school and community college visits, on-campus events, materials development, and social media development
- Coordinate with upper administration (chair, dean, provost) to manage the program

2009-2011: **Graduate Teaching Associate, University of Arizona**, Ecology & Evolutionary Biology Dept., Tucson, AZ

- **Fall 2011 - Lead-Teaching Associate** - Ecology (ECOL302),
 - Supervise a team of six graduate student TAs for the course
 - Coordination of field materials and vans, examinations and grading
 - Teaching of weekly labs
 - Periodic lectures (150+ students)
- Spring 2011 - Intro Ecology & Evolutionary Biology (ECOL182L) – **Lab Instructor**
- Fall 2009 – 2011 Ecology (ECOL302) – **Lab Instructor**

2005-2007: **Graduate Teaching Assistant, Humboldt State University**, Wildlife Dept., Arcata, CA

- Ornithology (WDLF 365)
- Wildlife Management & Research Techniques (WDLF 311)
- Advanced Ornithology (WDLF465)

Fall 2006: **Tutor** – Ecology of Wildlife Populations (WDLF 478), **Humboldt State University**, Learning Center

Fall 1999: **Naturalist, Ferry Beach Ecology School**, Saco, ME

RESEARCH POSITIONS

08/19/2013 – 09/16/2017: **Science Coordinator** (0.5 FTE), **Crater Lake National Park – Science and Learning Center**, Crater Lake National Park

- Attract and promote research by academic scientists and students within Crater Lake National Park to further the natural resource needs of the park
- Assist natural resource staff in identifying and securing funding for park projects and monitoring
- Development of an annual competitive student research assistantship program
- Supervision of an annual student intern and independent research project
- Presentation of projects at annual conferences
- Lead annual summer course for university students at the park, including a group research project

02/04/2013 – 08/30/2013: **Wildlife Ecologist, USA National Phenology Network**, University of Arizona, Tucson

- Provide expertise on the development of monitoring protocols for wildlife species, especially birds

- Data analysis, report writing, conference presentations, organization of workshops for natural resource and research professionals
- Promote and Coordinate with other organizations, agencies, and researchers to implement USA-NPN protocols
- Support graduate students utilizing USA-NPN protocols and data across the country

01/11/2012 – 12/20/2012: **Graduate Research Associate, USA National Phenology Network**, & School of Natural Resources & Environment, **University of Arizona**, Tucson, AZ

- Provide expertise on the development of monitoring protocols for wildlife species, especially birds
- Data analysis, report writing, conference presentations, organization of workshops for natural resource and research professionals
- Coordinate with other organizations, agencies, and researchers to implement USA-NPN protocols

08/2008 – 06/2011: **Graduate Research Associate**, School of Natural Resources & Environment, **University of Arizona**, Tucson, AZ. Supervisor: Dr. Charles van Riper III

- Survey migratory bird populations during spring migration throughout the Madrean Archipelago of southeast Arizona.
- Supervise a team of 4-5 technicians
- Data management, analysis and report writing
- Management of other avian research project data, field work, technicians, and graduate students

05/2009 – 05/2010: **STEP Biologist, US Forest Service**, Coronado National Forest, Hereford, AZ, 40hrs/wk

- Assess impacts of vegetation thinning projects on bird communities throughout the Huachuca Mountain range of southeast Arizona.

02/2008 - 05/2008: **Biologist, US Fish & Wildlife Service**, Humboldt Bay National Wildlife Refuge, CA, 40hrs/wk, GS-5

- Lead Aleutian Cackling Goose project, conducting band recovery/resight surveys, mapping and report writing
- Monitoring of Black Brandt population on Humboldt Bay
- Refuge mapping

05/2007 - 08/2007: **Biologist, Bureau of Reclamation**, lower Colorado River, AZ and CA, 40hrs/wk, GS-7

- Surveys of the lower Colorado River for 8 species of birds of conservation concern using spot mapping method

05/2004 – 07/2008: **Biological Contractor, Klamath Bird Observatory**, Ashland, OR

- Conduct avian point count surveys throughout southern Oregon and Northern California

08/2003 - 11/2003: **Biologist** – Abaco Parrot Project, **North Carolina State University**, Abaco, Bahamas 40hrs/wk

- Tracking movements, dispersal, and habitat use by Abaco parrots using VHF telemetry

05/2002 - 07/2004: **Crew leader, USFS Pacific Southwest Research Station**, Redwood Sciences Laboratory, Arcata, CA, 40hrs/wk, GS-5

- Operation of MAPS stations in NW California following standardized protocols
- Capture and banding of small owls
- Lead American Dipper project on Smith River watershed
- Total capture & processing across projects of more than 1,000 birds across more than 50 species

02/2002 - 04/2002: **Biological Technician, Institute for Wildlife Studies**, San Clemente Island, CA 40hrs/wk.

- Capture, banding, and monitoring (resight) of endangered San Clemente Sage Sparrows

01/2001 - 08/2001: **Assistant Project Coordinator** – Puaiohi Recovery Project, **USGS Pacific Islands Ecosystem Research Center & University of Hawaii**, HI, 40hrs/wk

- Banding of critically endangered Puaiohi adults and nestlings

- Fitting of VHF transmitters to captured Puaiohi
- Tracking and data analysis of telemetry data
- Analysis of survival, population estimates, and habitat use

02/2000 - 08/2000: **Biological Technician, US Forest Service**, Gila National Forest, Silver City, NM, 40hrs/wk, GS-5

- Survey for Mexican Spotted Owls

05/1999 - 08/1999: **Biological Technician, Institute for Bird Populations**, Fremont National Forest, OR, 40hrs/wk

- Operation of MAPS stations following standardized protocols
- Capture and processing of more than 3,000 birds from more than 75 species

01/1999 - 05/1999: **Biological Technician** – Puaiohi Recovery Project, **USGS Pacific Islands Ecosystem Research Center**, HI, 40hrs/wk

- Banding of critically endangered Puaiohi adults and nestlings
- Fitting of UHF transmitters to captured Puaiohi
- Tracking and data analysis of telemetry data
- Lethal control of exotic predators (cats, rats)

07/1998 - 11/1998: **Aviculture Intern, The Peregrine Fund**, Keauhou Bird Conservation Center, HI, 40hrs/wk

- Handling and care of multiple species of critically endangered Hawaiian birds including the ‘Alalā, Puaiohi, and Nene.
- Lethal control of exotic predator on the KBCC property

06/1996 - 08/1996: **Volunteer Technician, Fundación Jatún Satcha**, Bilsa Biosphere Reserve, Ecuador, 40hrs/wk

- Collect and prepare plant specimens for the Missouri Botanical Gardens (see <http://www.mobot.org/MOBOT/research/ecuador/pacific/checklist.shtml> for list of type specimens)
- Reforestation including maintaining tree seedling beds, transplanting, and outplanting

PUBLICATIONS

*Represents undergraduate co-author, **represents graduate student co-author

PUBLISHED

Kellermann, J. L. 2021. The knowledge of rails and waterthrush: Observer value and information content in Oregon’s rare bird populations. *Oregon Birds* 47(2), 107-110

Albert, S.K., J.D. Wolfe, **J.L. Kellermann**, T.W. Sherry, B.J.M. Stutchbury, N.J. Bayly, & A. Ruiz-Sánchez. 2020. Habitat ecology of Nearctic-Neotropic migrant landbirds on the wintering grounds. *The Condor* <https://doi.org/10.1093/condor/duaa055>

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Gerst, K.L., **J.L. Kellermann**, C.A.F. Enquist, A.H. Rosemartin, E.G. Denny. 2015. Estimating the onset of spring from a complex phenology database: Tradeoffs across geographic scales. *International Journal of Biometeorology* DOI [10.1007/s00484-015-1036-4](https://doi.org/10.1007/s00484-015-1036-4)

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- Kellermann, J.L.**, C.A.F. Enquist, A. Rosemartin, D.L. Humple, N.E. Seavy, R. L. Cormier, and L. Barnett. 2015. A bird's eye view of the USA National Phenology Network: An off-the-shelf monitoring program. *Studies in Avian Biology* CRC Press, London p 47-60.
- Kellermann, J.L.** and C. van Riper III. 2015. Phenological synchrony of bird migration with tree flowering at desert riparian stopover sites. *Studies in Avian Biology* CRC Press, London p 133-144.
- Enquist, C.A.F., **J.L. Kellermann**, K.L. Gerst, & A. Miller-Rushing. 2014. Phenology for resource management: connecting science to practice. *International Journal of Biometeorology* DOI: [10.1007/s00484-013-0772-6](https://doi.org/10.1007/s00484-013-0772-6)
- Rosemartin, A.H., T.M. Crimmins, C.A.F. Enquist, K.L. Gerst, **J.L. Kellermann**, E.E. Posthumus, J. Weltzin, E.G. Denny, P. Guertin & L. Marsh. 2013. Organizing Phenological Data Resources to Inform Natural Resource Conservation. *Biological Conservation* DOI: [10.1016/j.biocon.2013.07.003](https://doi.org/10.1016/j.biocon.2013.07.003)
- Kellermann, J.L.**, T.M. Crimmins, E.G. Denny, C.A.F. Enquist, K.L. Gerst, A.H. Rosemartin, and J.F. Weltzin. 2013. Nature's Notebook: 2012 [State of the Data](#). USA-NPN Technical Series 2013-001 USGS IP-046270.
- Kellermann, J.L.**, T.M. Crimmins, E.G. Denny, C.A.F. Enquist, R.L. Marsh, A.H. Rosemartin, J.F. Weltzin. 2012. Nature's Notebook: 2011 [Data & Participant Summary](#). USA-NPN Technical Series 2012-001. USGS IP-038693.
- Johnson, M. D., **J. L. Kellermann** & A. M. Stercho. 2010. Pest reduction services by birds in shade and sun coffee in Jamaica. *Animal Conservation* 13: 140-147.
- Johnson, M. D., N. J. Levy*, **J. L. Kellermann**, & D. E. Robinson. 2009. Effects of shade and bird exclusion on arthropods and leaf damage on coffee farms in Jamaica's Blue Mountains. *Agroforestry Systems* 76: 139-148.
- Kellermann, J. L., M.D. Johnson, A.M. Stercho, & S. Hackett. 2008. Ecological and economic services of birds on Jamaican Blue mountain coffee farms. *Conservation Biology* 22: 177-1185.
- Kellermann, J.L.** & M.D. Johnson. 2006. Coffee-Friendly Birds: Can birds reduce pests in coffee? *Biocontrol News & Information* 27: 53N.
- Tweed, E.J., J.T. Foster, B.L. Woodworth, W.B. Monahan, **J. L. Kellermann**, & A. Lieberman. 2006. Breeding biology and success of a reintroduced population of the Critically endangered Puaiohi. *The Auk* 123: 753-763.
- Tweed, E.J., J.T. Foster, B.L. Woodworth, P. Oesterle, C. Kuehler, A. Lieberman, T.A. Powers, K. Whitaker, W.B. Monahan, **J.L. Kellermann**, & T. Telfer. 2003. Survival, dispersal, and home-range establishment of reintroduced captive-bred Puaiohi, *Myadestes palmeri*. *Biological Conservation* 111: 1-9.

CONFERENCE PRESENTATIONS (1st author)

- Kellermann, J.L., D. O'Leary**, C. Wayne. 2017. Snowmelt, phenology, and growing season length in Crater Lake National Park. Northwest Scientific Association Annual Meeting, Ashland, OR.
- Kellermann, J.L., T.J. Rodhouse, J.C.B. Nesmith, & A. Chung-MacCoubrey. 2016. Initiating climate change scenario planning for whitebark pine and American pika. 7th Mountain Climate Conference, Leavenworth, WA.
- Kellermann, J.L., J. Lajoie*, S. Mohren, & A. Robatcek*. 2014. Black-backed woodpecker occupancy and Mountain Pine Beetle disturbance at multiple scales: Crater Lake National Park, Oregon. American Ornithologist's Union, Cooper Ornithological Society, Society of Canadian Ornithologists 2014 Joint Meeting, Estes Park, Colorado.
- Kellermann, J.L., K.L. Gerst, & C.A.F. Enquist. 2013. When is the onset of a phenophase? Calculating phenological metrics from status monitoring data in the National Phenology Database. 98th Annual meeting of the Ecological Society of America, Minneapolis, MN.
- Kellermann, J. L. and E. M. Wood (Symposium organizers) 2012. Tracking migratory stopover phenology: Climate change and the phenological synchrony of North American bird migration with seasonal resources. 5th North American Ornithological Conference, Vancouver, B.C., Canada. <http://www.naoc-v2012.com/files/Kellermann.pdf>
- Kellermann, J.L. & C. van Riper III. 2012. Phenological synchrony, habitat breadth, and responses to climatic variation of bird migration in the Madrean Archipelago & American southwest. 5th North American Ornithological Conference, Vancouver, B.C., Canada.
- Kellermann, J.L., D. Falk, & C. van Riper III. 2011. Migratory stopover habitat and landscape fire mosaics in Arizona's Madrean Archipelago. 36th Annual Conference of Western Field Ornithologists, Sierra Vista, AZ, USA.

- Kellermann, J.L. & C. van Riper III. 2010. (Invited) Spring migration phenology and plasticity of habitat use by Neotropical migratory birds across an elevational gradient within the Madrean Archipelago, AZ, USA 25th International Ornithological Congress, Campos do Jordao, Brazil.
- Kellermann, J.L. & C. van Riper III. 2010. Temporal and spatial patterns of spring migration and plant phenology across large elevational gradients in the arid southwestern United States. COS/AOU/SCO 2010 Joint Meeting, San Diego, CA.
- Kellermann, J.L. & M.D. Johnson. 2009. Avian Diversity across tropical agroecosystems of Jamaica. 79th Meeting of Cooper Ornithological Society. Tucson, AZ.
- Kellermann, J. L., M.D. Johnson, A.M. Stercho, S. Hackett, & D. W. Robinson. 2008. (Invited) Pest Control as an incentive for Bird Conservation in coffee Plantations. 4th International Partners in Flight Conference, McAllen, TX.
- Kellermann, J. L. 2008. (Invited) Potential effects of late season hunting on Aleutian Cackling Goose distribution around Humboldt Bay. Humboldt Bay Symposium, Eureka, CA.
- Kellermann, J.L., M.D. Johnson, & A.M. Stercho. 2007. Ecological services of birds on Jamaican coffee farms: An economic incentive for habitat conservation. The Wildlife Society, Western Section, Annual Conference, Monterrey, CA, USA.
- Kellermann, J.L., M.D. Johnson, & A.M. Stercho. 2006. Neotropical insectivorous birds as pest control of the coffee berry-borer *Hypothenemus hampei* on Jamaican Blue Mountain coffee farms. IV North American Ornithological Conference, Veracruz, Mexico.

CONFERENCE PRESENTATIONS (co- author)

- Gunning, A.* & J.L. Kellermann. 2017. Black-backed Woodpecker and Wood-boring Beetle Associations with post-fire burn severity following the National Creek Fire. Northwest Scientific Association Annual Meeting, Ashland, OR.
- Rubenstein, M. & J. L. Kellermann. 2016. Phenological Overlap & Asynchrony in Migratory Birds as a Consequence of Climate Change. 6th North American Ornithological Conference, Washington D.C., USA.
- Crimmins, T. M., J. Kellermann, and J. F. Weltzin. 2012. A bird's eye view of the USA National Phenology Network: Expanding the scale of phenological research in avian ecology. 5th North American Ornithological Conference, Vancouver, B.C., Canada.
- Crimmins, T. M., J. F. Weltzin, and J. Kellermann. 2012. Anomalous Warm Spring of 2010 Advances Deciduous Forest Leaf-out: Application of the Nature's Notebook Dataset and Visualization Analysis Tool. 97th Annual meeting of the Ecological Society of America, Portland, OR.
- Johnson, M.D., B. Campos, J. Kellermann, S. Railsback, & V. Jirinec. 2010. Pest control services in coffee farms as a tool for bird and habitat conservation. 25th International Ornithological Congress, Campos do Jordao, Brazil.
- Johnson, M.D., Campos**, B.R., Jirinec*, V., Kellermann, J.L., & Railsback, S.F. 2010. Spatial ecology of ecosystem services provided by birds. COS/AOU/SCO 2010 Joint Meeting, San Diego, CA.
- Johnson, M.D., Kellermann, J.L., A.M. Stercho, R. Fowler, & D. Robinson. 2006. Can shade trees and birds help Jamaican coffee farmers with insect pests? 20th Annual meeting Society for Conservation Biology, San Jose, CA, USA.
- Monahan W., J. L. Kellermann, E. J. Tweed, & B. L. Woodworth. 2003. Habitat shortage vs. life history feature incompatibility: Quantitative assessment of factors limiting numbers of a critically endangered Hawaiian solitaire. 5th Bay Area Conservation Biology Symposium.
- Monahan W.B., J. L. Kellermann, E. J. Tweed, & B. L. Woodworth. 2002. Population consequences of life history features in an endemic and critically endangered Hawaiian Solitaire. 23rd International Ornithological Congress, Beijing, China.
- Tweed, E.J., W.B. Monahan, J. Foster, J.L. Kellermann, & B.L. Woodworth. 2001. Behavior of a reintroduced population of captive-bred critically endangered Puaiohi. Society for Conservation Biology Conference, Hilo, HI.

GRANTS, AWARDS & FUNDING

- 2023-2027 Federal Appropriations funding- Research for Northern Waterthrush and impacts of snowpack on the Deschutes National Forest – PI (\$200,000)
- 2021-2024 Cooperative Agreement - PI – Cascade-Siskiyou National Monument, *BLM* (\$13,295 for 2021-22)

- 2021 Western Yellow Rail migration with solar PTT tags - PI – *OIT* (\$13,500)
- 2021 Ground-based remote sensing of vegetation phenology - PI – *OIT* (\$2,500)
- 2020 Ore-Cal RC&D Pathways to Workforce Initiative, National Association of Resource Conservation and Development Councils (NARCD&C) Youth Development Grant – Co-PI with George Jennings, ORE-CAL RC&D executive director (\$8,000)
- 2018-2019 Beaver Restoration Assessment Tool (BRAT) for identifying stream restoration sites in the upper Klamath Basin, *Klamath Watershed Partnership* – PI (\$17,000)
- 2017 Snowmelt timing, phenology, and growing season length in conifer forests of Crater Lake National Park, *George Melendez Wright Foundation* - PI (Graduate student salary & housing for summer season 2017)
- 2015 Climate Change Scenario Planning for American Pika and Whitebark Pine, *National Park Service Inventory & Monitoring* - PI (\$17,000) -
- 2013 Bird use and water management, Klamath Important Bird Area, *Klamath Basin Audubon Society* - Co-PI (\$12,000)
- 2012-2013 Outstanding Dissertation Award, SNRE, University of Arizona
- 2011 Coordination and analysis of bird data – Saguaro National Park BioBlitz, *National Geographic* - PI (\$2,000)
- 2010 Bird Migration in Tumacacori National Historic Park, Desert Southwest Cooperative Ecosystems Study Unit grant – PI (\$15,000)
- 2010 University of Arizona, Graduate and Professional Student Council Travel Grant (\$500)
- 2010 International Ornithological Congress Travel Grant (\$500)
- 2010 Avian migration in the Madrian Archipelago, Grants for Conservation Biology Research, T&E Inc., NM - PI (\$2,000)
- 2009 Bird Migration in Tumacacori National Historic Park, Desert Southwest Cooperative Ecosystems Study Unit grant – PI (\$15,000)
- 2007 James Koplin Award, Humboldt State University, CA
- 2006 Ecosystem services by birds in Jamaican Coffee farms, Conservation Trust, *National Geographic Society*, Co-investigator. (\$22,000)
- 2006 Ecosystem services by migratory birds on Jamaican Coffee Farms, USFWS Neotropical Migratory Bird grant, Investigator - Investigator (\$32,000)
- 2005 Ecosystem services by birds in Jamaican Coffee farms, Frank M. Chapman Award, American Museum of Natural History, NY (\$2,000)
- 2005 Ecosystem services by birds in Jamaican Coffee farms, Mewaldt-King Award, Cooper Ornithological Society, KS (\$1,000)
- 2001 Attendance of the 23rd International Ornithological Conference, Beijing China, Dan Moriarty Award, Kilauea National Wildlife Refuge, HI (\$2,000)

Service (recent)

- Board Member – *Lake County Resource Initiative* (www.lcri.org) Fall 2019-today
- Board Member – *Klamath Basin Audubon Society* – 2014-2016

Nate A. Bickford, PhD, Male

2707 Franklin Ave Pueblo, Colorado 81003

Phone: (208) 301-8120

E-mail: nate.bickford@csupueblo.edu

Academic Preparation

2004-2006 NSF Polar Post-Doctoral Work

University of Alaska Fairbanks

Research: Movement patterns of fish in the Bering Sea and Gulf of Alaska

2000-2004 PhD, Environmental Science (emphasis in biology and chemistry)

Arkansas State University

Research: “Linkages between Hydrology and Essential Fish Habitat: Spring River, Arkansas”

1997-2000 M.S., Biology

Appalachian State University

Research: “Survey of Gastrointestinal Helminths in Small Mammals in Watauga County, NC and Changes in Parasite Populations Due to Changes in Host Species and Changes in the Season”

1993-1997 B.S., Biology

Lenoir-Rhyne University

Research: “The Caloric Content of Wild and Captive Bears Diet and the Difference in Calories Used by Captive Bears and Wild Bears”

Leadership

2019 AlumniTies State Department Program March– Develop leadership and Collaboration for Urban Renewal

2018 – Present Chair Conservation Committee North American Falconers Association

2016 – 2019 LEAP Research Group Leader

2016 – 2019 Board of Nebraska Academy of Sciences

2009 – 2015 Board of Montana Academy of Sciences

2008 – 2015 Director of Undergraduate Research Program, University of Great Falls

2005 – 2007 Lab Manager ICP-MS Lab University of Alaska

2000 – 2004 Graduate Student Lab Manager University of Arkansas

2004 – present Served on Multiple Department and University of Comities

2004 – present 9 Graduate students since 2004

2004 – present 48 Undergraduate student researchers

Skills

Ecology:

Bird Trapping

Bird Population estimation

Fish Age and Growth

Fish Community Assessment

Essential Habitat Identification

Aquatic Habitat Assessment

Wildlife Surveys

Management Reports

Habitat Restoration

Bird Population Surveying

Bird Trapping

Waterfowl Population Assessment

Upland Game Surveying

Quality Deer Population Management

Predator Control

Conservation Planning

Chemistry:

EPA Good Laboratory Practices

EPA standard methods 6020 and 200.8

Chain of Custody

APHA sample collection methods

Computer:

Microsoft Office (Word, Excel, PowerPoint, Access, PhotoDraw)

Sigma Plot

R Studio

GIS

Minitab

SPSS

Modeling

Huso Mortality Model

Bird Mortality Analysis

Analytical Expertise

Laser Ablation Inductively Coupled Plasma – Mass Spectrometry (LA-ICP-MS)

Inductively Coupled Plasma – Mass Spectrometry (ICP-MS)

Ion Chromatography

UV-vis spectrophotometry

Atomic Absorption Spectrometer

Language

English – Native Language

Finnish – Beginner

Spanish – Beginner

Academic Professional Experience

2019–present Director of Wildlife Program, College of Science and Mathematics, Department of Biology, Colorado State University Pueblo

2016-present Affiliated Faculty University of Nebraska Medical Center, Center for Global Health and Development

2015-2019 Associate Professor College of Natural and Social Science – Biology Department University of Nebraska Kearney

2012-2015 Online Faculty General Education Department Henley-Putnam University

2013 Tenure, University of Great Falls

2011-2015 Associate Tenured Faculty and Director of the Science Undergraduate Research Experience (SURE)

Division of Science and Humanities

University of Great Falls

2008-2011 Assistant Faculty and Director of the Science Undergraduate Research Experience (SURE) Division of Science and Humanities – University of Great Falls

2008-present Bird Survey specialist: sub-contractor for environmental consulting firms

2008-2015 Assistant Coach University of Great Falls Women's soccer team

2005 – 2009 Research Faculty: ESTES Department in the College of Natural Sciences and Mathematics – University of Alaska Fairbanks

2005 – 2007 Laboratory Manager: Inductively Coupled Plasma-Mass Spectrometer (ICP-MS) located in the Advanced Instrumentation Laboratory in the College of Natural Sciences and Mathematics – University of Alaska Fairbanks

2004 – 2006 NSF Polar Regions Post Doctoral program Post-Doc: Identifying movement patterns and stock identification in fish from the Bering Sea and Gulf of Alaska.

2004 Water Rock Life Lab (ASU) Post Doc: CRUI: Environmental Life History of Freshwater Fish using Otolith Microchemistry

2003 – 2004 Water Rock Life Lab (ASU) Project Manager: CRUI: Environmental Life History of Freshwater Fish using Otolith Microchemistry

2001 – 2004 Environmental Sciences Program (ASU) Graduate Assistant:

2000 – 2001 Environmental Health, ASU Environmental Health Assistant:

1997 – 2000 Appalachian State University Laboratory Assistant:
Classes taught –

1998 Grandfather Mountain Habitat Zoo Research Assistant:

1996 Lenoir-Rhyne College Laboratory Assistant
Classes taught-
Undergraduate laboratory assistant for general biology

1994 Oak Ridge National Laboratory

1990 – 1992 Rookery Bay Research Laboratory Research Assistant

Professional Experience

2001- present Southern Ecological Services Environmental Consultant:

- Bird Identification and surveys
- Survey for potential wind sites
- Fish Community assessment
- Habitat assessments
- Wildlife surveys and enhancements
- Management reports
- Bird survey and trapping
- Waterfowl assessment and habitat enhancement
- Upland game survey and habitat enhancement
- Quality deer management
- Predator control

Grant and Contract Funding

Solar Faculty Research Fund (2019) Wildlife Movement and use of Solar Facilities. \$10,500 PI
United States Department ALLUMNITIES funding (2019) Modern agriculture in our cities: a

workshop to develop the agricultural, leadership, and business skills to be successful. \$10,000 PI

United States Department ALLUMNITIES funding (2019) Modernizing management and leadership: Workshops to develop agile capabilities in a modern economy \$10,000 CO-PI

Nebraska University System Collaborative Research Initiative (2018) Capturing Archaeal Biochemistry to Build Bigger Botanical Biomass \$149,065 CO-PI

Nebraska University System Collaborative Research Initiative (2018) Aquaponics: An innovative approach to teach health. \$149,000 CO-PI

NASA-EPSCoR (2017) – Behavioral changes of animals during Solar Eclipse using telemetry. \$10,000 CO-PI

Nebraska University System Collaborative Research Initiative (2017) The impacts of habitat loss and fragmentation on human-wildlife conflict in an agriculturally dominated system. CO-PI. \$150,000.

Nebraska University System Collaborative Research Initiative (2017) Gathering the expertise needed to understand human-wildlife conflicts in fragmented prairie landscape. CO-PI. \$20,000.

Rural Futures Institute (RFI) (2017) – Teaching Health, Exercise, Technology, & Aquaponics (THETA) Day Camps to Grow Future Health Professionals from McCook Middle School Students. \$20,000 CO-PI

Nebraska’s Coordinating Commission for Postsecondary Education (2017) – Helping Rural Middle School Science Teachers Create Classroom Aquaponic systems enhancing soft skills and career readiness. \$59,766. Co-PI

Hollman Intern Program Proposal: Roadkill App. Hollman Intern Program, (2017), \$7,000 Co -PI

Nebraska Research Initiatives Equipment (2017) – Ion Chromatograph for Water analysis. \$60,949 PI

Nebraska Space Grant Fellowship (2016) – Graduate Student Fellowships \$12,000 – PI

NASA-EPSCoR (2016) – Identification of Climate Change Effects in a National Forest and Possible Remediation Using a Top Tier Predator: Goshawk Nesting Habitat Loss and Possible Effects on Goshawk Abundance. \$15,000 PI

University of Nebraska RSC grant (2016) – Aquaponics: Human Health and Wellbeing \$20,000 CO-PI

Nebraska food for Health Initiative (2016) – Drones and Agriculture, methods for precise agricultural application. – Planning and Proposal Generating grant. \$20,000 CO-PI

Nebraska food for Health Initiative (2016) – Solving for Pattern: Promoting Health through Localizing Food Systems Topic Areas to be Explored. – Planning and Proposal Generating grant. \$20,000 CO-PI

University of Nebraska RSC grant (2015) – Goshawk management effects on behavior \$20,000 PI

National Science Foundation (2015) – S-Stem Success Initiative. \$500,000 Co PI

Montana EPSCOR (2014) –Upper class curriculum enhancement. \$47,000 PI.

Montana EPSCOR (2014) –Goshawk as a Biological Indicator for Forest Change. \$50,000 PI. In Review

Montana Farmers Union (2014) – Aquaponics development. (\$10,000) PI

Wisconsin Fisheries (2012) – Goby otolith aging study. \$10,000 PI.

Montana Fish Wildlife and Parks (2010) –Sampling Equipment and Boat. \$30,000 PI.

Charlotte Martin Foundation (2010) – Goshawk Genetics and Prey Densities in the Lewis and Clark National Forest. \$10,000 PI.

Montana EPSCOR (2009 – 2010) –Biology curriculum enhancement. \$44,524 PI.

Montana EPSCOR (2009 – 2010) – General Biology lab enhancement. \$15,824 PI.

Sitka salmon age study (2008-2010) – Age and Stock delineation of sockeye salmon. \$29,000 PI.

Exxon Valdez Oil Spill Trustee Council (2006-2008) – Pacific Herring study – Herring Restoration in PWS: Identifying Natal and Nursery Habitats. \$335,000. PI

Exxon Valdez Oil Spill Trustee Council (2006-2009) – Pacific Herring study – Using otolith chemistry to discriminate Pacific herring stocks in AK. \$394,000 Co-PI

Exxon Valdez Oil Spill Trustee Council (2006-2008) – Pacific Herring study – Identification of essential habitat of Pacific herring (*Clupea pallasii*) in Sitka Sound. \$154,000 Co-PI

Kenai River Sport fishing Association – (2006-2007) Stock and sub-stock delineation of chinook, coho and sockeye salmon in select Kenai River drainages. \$80,533. PI

Sitka salmon age study (2005-2007) – Age and Stock delineation of sockeye salmon. \$19,000 PI.

North Pacific Research Board (2005-2008) – Identifying life history characteristics of squid in the Bering Sea. \$198,886 PI

Artic Yukon Kuskokwim –Sustainable Salmon Initiative (2005-2007) – Factors Affecting Juvenile AYK Chum Salmon Growth and Condition \$1,955,486 CO- PI.

Sea Grant (2005-2007) – Mentoring Undergraduates in Fisheries Techniques \$10,000 PI

Exxon Valdez Oil Spill Trustee Council (2005-2007) – Pacific Herring study – Using otolith chemical analysis to determine larval drift of Prince William Sound Pacific herring (*Clupea pallasii*). \$52,000 PI

Oil Spill Recovery Institute (2005-2007) – Pacific Herring in Prince William Sound – Identifying past habitat use and essential habitat of Pacific herring (*Clupea pallasii*).-\$33,000 CO- PI

Sitka herring and salmon study (2005-2007) – Stock delineation and natal homing in herring and sockeye salmon. \$30,000 CO- PI.

NSF Polar Programs Post Doctoral Fellowship (2004-2006) – “Identifying movement patterns and stock identification in fish from the Bering Sea and Gulf of Alaska.” \$140,000. PI

Arkansas Water Resources (2003-2004) – “Otoliths and Environmental Life History of Freshwater Fish”, \$20,000. Co- PI

NSF DBI 0328832 (2003-2007) “CRUI: Assessing Environmental Life Histories of Freshwater Fish: Applications of Otolith Microchemistry”. \$698,626. Project Manager (2003-2004).

Arkansas Environmental Federation – 2000 Environmental safety and leadership scholarship. \$1,000.

Appalachian State University – 1998 Graduate Student Research Grant, \$2,000. PI

Association of Southeastern Biologists – 1998 Student Research Grant, \$100. PI

North Carolina Natural Gardens – 1998 Student Research Grant, \$1,000. PI

Appalachian State University – 1998 Grants in Aid of Research. \$400. PI

Appalachian State University – 1997 Grants in Aid of Research. \$500. PI

Awards

2019 People's Choice Award Best Project, Stronger American Cities – Entrepreneurial Ecosystems.
Alumni Ties State Department.
2017-2018 Fulbright Specialist Program for Finland, University of Nebraska Kearney
2014 Research and Creativity Award, University of Great Falls
2013 TEDx Presentation, Connecting Fragmented Habitats: A Grass Roots Adventure
2011 Science Mentor of the Year, Montana Academy of Science
2010 Faculty Special Achievement Award, University of Great Falls
2004 National Science Foundation Post Doc Fellow

Teaching Experience – I have taught in person and online classes in the following subjects

Ecology – University of Nebraska Kearney (BIOL 307)
Wildlife Conservation – University of Nebraska Kearney (BIOL 330)
Aquatic Trophic Ecology – University of Nebraska Kearney (BIOL 883)
Conservation Biology – University of Nebraska Kearney (BIOL 834)
Taking Action in Science – University of Nebraska Kearney (BIOL 830p)
Range and Wildlife Management – University of Nebraska Kearney (BIOL 405)
Tour of the Arctic – University of Nebraska Kearney (BIOL 856)
Climate Change – University of Nebraska Kearney (BIOL 830)
Scientific Communication – University of Nebraska Kearney (BIOL 375)
Conservation of Birds and Mammals – University of Nebraska Kearney (BIOL 869)
General Biology – University of Nebraska Kearney (BIOL 105L)
Survival in the wilderness – University of Great Falls (ILC 350)
General Biology – University of Great Falls (BIO 151)
General Biology – University of Great Falls (BIO 152)
Conservation Ecology – University of Great Falls (BIO 420)
Form and Function – University of Great Falls (ILC 130)
Environmental Ecology – University of Great Falls (BIO 115)
Ecology – University of Great Falls (BIO 200)
Freshman Science Seminar – University of Great Falls (BIO 190)
Aquatic Ecology – University of Great Falls (BIO 320)
Ornithology – University of Great Falls (BIO 315)
Sophomore Science Seminar – University of Great Falls (BIO 290)
Zoology – University of Great Falls (BIO 211)
Meteorology and Oceanography – University of Great Falls (GSC 230)
Mammalogy – University of Great Falls (BIO 305)
Fisheries Techniques – University of Alaska Fairbanks (FISH 497)
Environmental Geology Lecture – Arkansas state University (GEO 1003)
Ind. Study in Stream ecology (Team Taught) – Arkansas state University (ESCI 7133)
General Chemistry Laboratory – Arkansas state University (CHEM 1011)
Introductory Biology Lecture – Arkansas state University (BIO 1110)

Online Teaching Experience

Aquatic Trophic Ecology – University of Nebraska Kearney (BIOL 883)

Conservation Biology – University of Nebraska Kearney (BIOL 834)

Taking Action in Science – University of Nebraska Kearney (BIOL 830p)

Tour of the Arctic – University of Nebraska Kearney (BIOL 856)

Climate Change – University of Nebraska Kearney (BIOL 830)

Scientific Communication – University of Nebraska Kearney (BIOL 375)

Conservation of Birds and Mammals – University of Nebraska Kearney (BIOL 869)

Environmental Science – Henley Putnam University (Bio 119)

Editor

2011 – Present Journal of Ecosystem & Ecography – Open Access – OMICS Publishing Group

Recent Reviews

2015– Hogan et. al. Reconstructing larval performance and habitat use in a diadromous fish using otolith increments, trace elements and oxygen isotopes. *Limnology and Oceanography Methods*.

2016 – Cain et. al. Ecology book

2016 – Tzadik et.al. Chemical archives in fishes beyond otoliths: A review on the use of other body parts as chronological recorders of microchemical constituents for expanding interpretations of environmental, ecological, and life-history changes. *Limnology and Oceanography Methods*.

2018 – Genaro A. G. and Yesica M-M. Food Waste Index and Corporate Social Responsibility Regarding Food Loss and Waste in some Mexican Food Companies. *Sustainability*

2018 – Qi Chen, Weiteng Shen and Bing Yu Assessing the Vulnerability of Marine Fisheries in China: Towards an Inter-provincial Perspective. *Sustainability*

Publications

Conference Proceedings

Bickford, S., Krans, J.K., and Bickford, N 2015 Impacts from Large Corporate Development on Indigenous Communities in Arctic: Specific Focus on Social Justice and Sustainability for the Swedish Sami. *International Business Information Management Conference (26th IBIMA)*

Bickford, N., Hannigan, R., and Bogdevich, O. 2003. Otolith Microchemistry of Freshwater Fish: Stock Discrimination of Brown Trout and Walleye. *Proceedings of the Sixth International Symposium and Exhibition on Environmental Contamination in Central and Eastern Europe and the Commonwealth of Independent States*. Prague, Czech Republic.

Bickford, N.A., and Hannigan, R.E. 2003. End-Member Mixing Analysis: Application To The Spring River, AR. *Proceedings of the Arkansas Water Resources Center Annual Conference*, April 2003. 54-61.

Journal Articles Submitted

Ritson R, Bickford N, Wuellner M, Fuda RK, Miller TA, Boulanger JR, Beasley JC, Brzorad JN, Fisher R, Orben RA, Kauffman M, Barber M, Kays R, Stuber MJ, Watson JL, Ranglack DH. Obscured Sun,

Obscure Behavior: Exploring the Effects of a Solar Eclipse on Animal Movement. Prepared for Movement Ecology.

Ringenberg, J, Bice, M., Hollman, A., Meyer, D., Ball, J. Wiedenman, E. *, Bickford, S., & Bickford, N. Aquaponics: An innovative teaching model for Middle School Science Education. Middle School Journal. In Review

Schlater, S., Ringenberg, J., Bickford, N., and Ranglack, D. White-tailed Jackrabbits: a Review and Call for Research. Journal of Wildlife Management. In Review.

Ramos, A., Trinidad, N., Bickford, S., Bickford, N., Torquati, T., Mushi, M. 2018. A manuscript titled Engaging residents in planning a community garden: A strategy for enhancing relevant messaging and participation (PCHP-WIP-0009-2018). Progress in Community Health Partnerships: Research, Education, and Action. IN REVIEW

Bickford, S.H., Bickford, N., Bice, M., Hollman, A., Ramos, A.K., and Torquati, J. (2018) If there is a will there is a way: assessment of success variables for community gardens in rural areas in Arctic and non-Arctic regions. Polar Geography. Under review. Submitted 08 Feb 2018. IN REVIEW

Adams, B, Bickford, N, Albrecht, M, Ranglack, D, and Bickford N. (2018) Cost Benefit Analysis of Medium and Micro Sized Aquaponics System. Aquaculture. IN REVIEW

Wright, M., Ranglack, D, and Bickford, N. (2018) A Comparison of Prey Availability at Active and Inactive Northern Goshawk Nest Areas in a Dry Forest Landscape. Raptor Research. IN REVIEW

Wright, M., Jackson, J., Tornberg, R., Higa, E., Clayton, A., McCartney, S., Ranglack, D.H., and Bickford, N. (2018) Habitat Suitability Modeling and Ecological Forecasting of Northern Goshawk Nesting Habitat. Raptor Research. IN REVIEW

Journal Articles

Hoyer, R., Bomske, C., and Bickford N. Dwarf Populations of Rubber Boas (*Charina bottae*) in Southern California. Southwestern Naturalist In Press

Anderson, H., and Bickford, N. Stream Assessment on the Impact of Agricultural Activity in the Dry River, VA. Virginia Journal of Science In press

Ramos, A., Trinidad, N., Bickford, S., Bickford, N., Torquati, T., Mushi, M. 2018. A manuscript titled Engaging residents in planning a community garden: A strategy for enhancing relevant messaging and participation (PCHP-WIP-0009-2018). Progress in Community Health Partnerships: Research, Education, and Action. In Press

Wright, M., Tornberg, R., and Bickford, N. (2019) Comparison of Nest Defense Behaviors of Goshawks (*Accipiter gentilis*) from Finland and North America. *Animals* 10(62).

Ritson R, Bickford N, Ranglack DH. (2019). Comparing Social Media Observations of Animals During a Solar Eclipse to Published Research. *Animals* 9(59):1-12. doi:10.3390/ani9020059

Bomske, C and Bickford, N. (2019) The Effects of Vegetation Variety on Overwintering Anuran Diversity in Permanent Florida Ponds. *Southeastern Naturalis* 18

Adams, B., Boyer, T., Albrecht, M., Ranglack, D. H., & Bickford, N. (2019). Micro-system aquaponics: testing designs for increased productivity. *Journal of Applied Aquaculture*, 1-12.

Hollman, A., Bice, M., Ball, J., Bickford, N., Shafer, A. & Bickford, S. (2018). A comparison of scholarly productivity among current professors who obtained terminal degrees. *American Journal of*

Distance Education, 32(4), In Press August 8, 2018.

Bice, M., Ball, J., Bickford, N., Bickford, S., Hollman, A., Coughlin, A., Dinkel, D., Meyer, R., & Ranglack, D. (2018) Community Gardens: Interactions between communities, schools, and impact on students. *The Health Educator* 50(1).

Helms, B., Bickford, N., Tubbs, N., and Feminella, J. (2017) Feeding, growth, and trophic position of redbreast sunfish (*Lepomis auritus*) in watersheds of differing land cover in the lower Piedmont, USA. *Urban Ecosystems*.

Mailey, S., Shafer, A., and Bickford N. (2017) Pain Tolerance and Pain Threshold According to Indoor versus Outdoor Sport Participation and Sex. *Jacobs Journal of Physiotherapy and Exercise*, 3(1).

Bickford, N., Smith, L., Bickford, S., Bice, M.R., Ranglack, D., H., (2017) Evaluating the Role of CSR and SLO in Ecotourism: Collaboration for Economic and Environmental Sustainability of Arctic Resources. *Resources*, 6(2), 21.

Bice, M.R., Hollman, A., Bickford, S., Bickford, N., Ball, J., Wiedenman, E.M., Brown, G., Dinkel, D., & Adkins, M. (2017). *Kinesiology in 360 Degrees*. *International Journal of Kinesiology in Higher Education*, 1(1), 9-17.

Bickford, S., Krans, J.K., and Bickford, N. 2016. Social and Environmental Impacts of Development on Rural Traditional Arctic Communities: Focus on Northern Sweden and the Sami. *Journal of EU Research and Business* Vol 2016 1:11.

Hogan, J., McIntyre, P., Blum, M., Gilliam, J., and Bickford, N. 2014 Consequences of Alternative Dispersal Strategies in a Putatively Amphidromous Fish. *Ecology* 95(9):2397-2408.

Collins, S., Bickford, N., McIntyre, P., Coulon, A., Ulseth, A., Taphorn, D., and Flecker, A. 2013 Population Structure of a Neotropical Migratory Fish: Contrasting Perspectives from Genetics and Otolith Microchemistry. *Transaction of American Fisheries* 142.5 (2013): 1192-1201.

Beaulaurier, J. N. Bickford, J.L. Gregg, C.A. Grady, A. Gannam, J.R. Winton, P.K. Hershberger. 2012. Susceptibility of Pacific herring *Clupea pallasii* to Viral Hemorrhagic Septicemia (VHS) is Influenced by Diet. *Journal for Aquatic Animal Health* 24.1 (2012): 43-48.

Brown, R., Bickford, N., and Severin, K. 2007. Probing Upstream Migrations of Anadromous Coregonid Fish (Family: Salmonidae; Subfamily: Coregoninae) in the Yukon River Drainage. *Transactions of American Fisheries Society*. *Transaction of American Fisheries* 136: 678-690

Bickford, N., and Hannigan, R. 2006. Stock identification of Walleye (*Sander vitreum*) using otolith chemistry in the Eleven Point River, AR *North American Journal of Fisheries Management*. 25: 1542-1549.

Bouldin, J., Bickford, N., Stroud, B., and Guha, G. 2004. Tailwater recovery systems for irrigation – benefit/cost analysis and water resource conservation technique in Northeast Arkansas. *Journal of the Arkansas Academy of Sciences* 58: 23-31

Sako, A., O'Reilly, C.M., Hannigan, R., Bickford, N., and Johnson, R.L. 2004. Stock identification of two clupeid species, *Stolothrissa tanganicae* and *Limnothrissa miodon* in Lake Tanganyika using otolith microchemistry. *Geochemistry: Exploration, Environment, Analysis*. 5: 91-97.

Hannigan, R.E. and Bickford, N.A. 2003. Hydrochemical Variations In A Spring-Fed River, Spring River Arkansas. *Environmental Geoscience* 10 (4): 167-188.

Bickford, N.A. and Hannigan, R.E. 2003. Trace element chemistry of fish tissues: Uptake routes in

genus *Moxostoma*. *Environmental Geoscience* 11(2): 226-236.

Christian, A.D., Bouldin, J., Bickford, N., McCord, S.B., Sako, A., and Ferris, J. 2003. Winter and spring water quality of Big Creek watershed, Craighead County, AR: Nutrients, habitat, and macroinvertebrates. *Journal of the Arkansas Academy of Sciences* 57: 27 -36

Peer Reviewed Final Report

Woody, H. and Bickford, N. 2009. Identifying Essential Habitat (Source vs. Sink Habitat) for Pacific Herring (*Clupea pallasii*) in Sitka Sound Using Otolith Microchemistry Restoration Project 080834. Exxon Valdez Oil Spill Restoration Project Final Report.

Bickford, N. 2007. Using otolith chemical analysis to determine larval drift of Prince William Sound Pacific herring (*Clupea pallasii*) Restoration Project 060782. Exxon Valdez Oil Spill Restoration Project Final Report

Invited Workshops

APECS-U Arctic Science Communication Workshop – The Association of Polar Early Career Scientists (APECS) and UArctic jointly organised a science communication workshop in connection with the U Arctic Congress 2018 in Oulu, Finland. The workshop included both introductory lectures and also hands-on practical parts. In addition to the workshop day, the participants received a task to use the skills gained during the workshop during the UArctic Congress (incl. conducting interviews).

Invited Symposiums

Bickford, N. Elevator Talk: Developing the Ability to Make Connection for Future Collaboration and Funding. The Wildlife Society Annual Meeting, Reno. Symposium: Communication: The Key to Effective Natural Resource Programs. 2019

Bickford, N. Cost Benefit Analysis: A tool to help farmers prioritize wildlife improvements. The Wildlife Society Annual Meeting, Reno. Symposium: Natural Resource Conservation in Agricultural Landscapes: Challenges and opportunities. 2019

Invited Presentations

Bickford, N. and Bickford, S. Transdisciplinary Research and How to Integrate Innovation into University Systems. Lenoir Rhyne University 2019

Menke, Kelsey, Marc Albrecht, and Nate Bickford. 2019. Tilapia feeding preference using commercial fish food, ethanol distiller's grain, and lab-made food. University of Arizona Controlled Environment Agriculture Center.

Willmore, Cody, Marc Albrecht and Nate Bickford. 2019. Aquaponic systems: a comparative assessment of commercial and reclaimed crop production systems. University of Arizona Controlled Environment Agriculture Center.

Bickford, N. Falconry and Upland game. Nebraska Habitat Meeting. February 2018

Schlater, S., Ranglack, D., Bickford N. How are Red-tailed Hawks influenced by highly fragmented, agricultural landscapes? North American Falconry Association Annual Meeting Nov 2017.

Ringenberg, J., Ranglack, D., Bice M., Bickford N. Rabbits in Nebraska and Possible Movement Troubles. North American Falconry Association Annual Meeting Nov 2017.

Presentations at Scientific Meetings

Reinson, M., Bickford, N., Burger, P., and Ranglack, D. Habitat Selection of White-Tailed Deer during Agricultural Growing and Non-Growing Season. The Wildlife Society Annual Meeting, Reno 2019

Riston, R., Bickford, N., Ranglack, D. Variations in American Bison Resource Selection across Their Former Range. The Wildlife Society Annual Meeting, Reno 2019

Barnes, Jackson, Albrecht, Marc, and Bickford, Nate. Aquaponics Comparison Study Using Commercial Feed and Homemade Plant Based Feed. Nebraska Research Days 2019

Laub, Emily, Reichart, Letty, and Bickford, Nate Molecular Identification of Sex of Northern Goshawk (*accipiter gentilis*) Feathers Collected Across Multiple Goshawk Populations in Finland. Nebraska Research Days 2019

Ritson R, Bickford N, Ranglack DH. Seasonal space use patterns of Plains bison (*Bison bison*) across multiple ecological gradients and management regimes in the American West. Nebraska Chapter of The Wildlife Society Annual Meeting. York, NE. Feb 2019.

Schlater, S. M., Ranglack, D. H., Shreading, A., Domenech, R., Bickford, N. Differences in breeding and nonbreeding red-tailed hawk home range size throughout the breeding season. Oral Presentation. Nebraska Chapter: The Wildlife Society, York, NE. Feb 2019.

Ringenberg, J., Bickford, N., Ranglack, D. The impact of fragmented landscapes on the spatial distribution and dispersal of eastern cottontail rabbits (*Sylvilagus floridanus*). 25th Annual Meeting of the Wildlife Society, Cleveland, OH, October 7 – 12, 2018.

Reinson, M.C., Bickford N., and Ranglack D.H. “Evaluating the usage, design, and effectiveness of roadway underpasses as wildlife crossings in Nebraska” presented at the Annual Meeting of the Central Mountains and Great Plains Section of The Wildlife Society (CMPS), 28 February 2018 – 2 March 2018, Kearney, NE.

Reinson, M.C., Bickford N., and Ranglack D.H. “Impacts of habitat fragmentation on white-tailed deer (*Odocoileus virginianus*) in south central Nebraska”, presented at the International Deer Biology Congress (IDBC), 5-10 August 2018, Estes Park, CO.

Reinson, M.C., Bickford N., and Ranglack D.H. “A comparison of wildlife tracking technologies: where are we going?”, presented at The Wildlife Society 25th Annual Conference (TWS), 7-11 October 2018, Cleveland, OH.

Schlater, S. M., Bickford, N., Ranglack, D. H. Time-of-day effects reassessed with roadside raptor surveys and red-tailed hawk (*Buteo jamaicensis*) GPS transmitter data. Raptor Research Foundation Conference Kruger National Park, South Africa. Nov 2018

Schlater, S. M., Bickford, N., Ranglack, D. H. Raptor Mortality along an Interstate Highway in the Great Plains, North America. Raptor Research Foundation Conference Kruger National Park, South Africa. Nov 2018.

Schlater, S. M., Bickford, N., Ranglack, D. H., Domenech, R., Shreading, A. Changes in the home range size of breeding and nonbreeding red-tailed hawks (*Buteo jamaicensis*) throughout the breeding season. Raptor Research Foundation Conference Kruger National Park, South Africa. Nov

2018

Schlater, S.M., Bickford, N., Ranglack D.H. Carcass persistence and searcher efficiency trials reveal the number of raptor mortalities along Interstate 80 in central Nebraska. Poster Presentation: The Wildlife Society, Cleveland, Ohio. Oct 2018.

Bickford, N., Schlater, S., Domenech, R., Shreading, A., Ranglack, D. H. Migration corridors and stop over locations for red-tailed hawks. Raptor Research Foundation Conference Kruger National Park, South Africa. Nov 2018

Bickford, N., Ritson, R., and Ranglack, D. H. Wildlife Behavior Changes During a Solar Eclipse. The Wildlife Society Cleveland, OH. Oct 2018

Bickford, N. North American Falconers Association Commitment to Research and Conservation. Raptor Research Foundation Conference Kruger National Park, South Africa. Nov 2018

Bickford, N, Bice, M., Ringenberg, J., Hollman, A., Meyer, D., Ball, J. Wiedenman, E., & Bickford, S. Aquaponics: An innovative teaching model for science education. U Arctic Congress Helsinki Finland September 2018

Bickford, N., and Wright, M. Goshawk as a bioindicator species for climate change in the boreal forest. U Arctic Congress Helsinki Finland September 2018

Bickford, N., Adams, B., Willmore, C., and Albrecht, M. Compare and Contract Aquaponic Systems: Can reclaimed material be used to create an economically viable food production system. U Arctic Congress Helsinki Finland September 2018

Unvert, K., Ringenberg, J., Ball, J., Dinkel, D., Bickford, N., Hollman, A., Meyer, R., Bice, M. Aquaponics Growing Systems: An Innovative Approach to Health Consciousness and Science in Elementary Education. Early Childhood Conference: Promoting Wellbeing for Children and Families. October 2018.

Ritson, R., Bickford, N., Smith, L., Bickford, S., Bice, M., and Ranglack, D. Evaluating the role of CSR and SLO in Ecotourism Plains Safaris: A conference on tourism and conservation in the Great Plains April 2018

Ritson, R., Bickford, N., and Ranglack, D. Does Wildlife Behavior Change in Response to a Solar Eclipse? The Nebraska Academy of Sciences Annual Meeting April 2018

Bickford, N. and Wright, M. Goshawk as a bioindicator species for climate change in the boreal forest. U Arctic Congress Helsinki Finland September 2018

Bickford, N and Ranglack, D.H, (2018) Life History Plasticity Creates Long-Term Options for Species Survival. The wildlife Society Central Mountains and Plains Section meeting. Kearney, Nebraska, February 28- March 2, 2018.

Ringenberg, J., Bickford, N., and Ranglack, D. (2018) Lagomorph management in a fragmented world: the need to incorporate meta-population dynamics. 51st Annual Meeting of the Nebraska Chapter of The Wildlife Society, Kearney, Nebraska, February 28- March 2, 2018.

Reinson, M. C., N. Bickford, and D. H. Ranglack. (2018) Evaluating the usage, design, and effectiveness of roadway underpasses as wildlife crossings in Nebraska. Poster Presentation. 51st Annual Meeting of the Nebraska Chapter of The Wildlife Society. Kearney, Nebraska. 1 March 2018.

Schlater, S. M., N. Bickford, and D. H. Ranglack. (2018) Cellular GPS transmitter provide insight on fluctuating home range size of breeding and nonbreeding red-tailed hawks (*Buteo jamaicensis*).

Poster Presentation. 51st Annual Meeting of the Nebraska Chapter of The Wildlife Society. Kearney, Nebraska. 1 March 2018.

Ritson, R, Bickford, N and Ranglack, D.H, (2018) Spatial Requirements of Plains Bison (*Bison bison*) in the American West March Central Mountains and Plains Section of the Wildlife Society meeting. Kearney, Nebraska, February 28- March 2, 2018.

Adkins, M., Bice, M., Brown, G., Bickford, N., Hollman, (2018) A Farm to Fresh! A multidisciplinary approach to teach Health and Physical Activity. Central District Society of Health and Physical Educators of America Conference. Sioux Falls, South Dakota (January 27-29, 2018).

Unvert, K., Ringenberg, Meyer, D., Bickford, N., Hollman, A., Bickford, S., Bice, M. (2018) Aquaponics: An innovative approach to teaching Health. National Conference for Undergraduate Research.

Rowles, G., Bickford N., and Wuellner, M. Walleye and White bass in Management from a Rivers cape perspective on the North Platte River. Nebraska Chapter AFS Rivers and Streams Technical Committee

Bice, M., Ball, J., Wiedenman, E., Bickford, N., Bickford, S., Hollman, A., & Meyer, D. Aquaponics: An assessment of physical activity, nutrition, and health consciousness. Society of Health and Physical Educators (SHAPE) America 2018 National Conference Nashville, Tennessee, March 20-24, 2018

Bice, M, Bickford, N., Meyer, D., Hollman, A., Bickford, S., & Ringenberg, J. Aquaponics: An innovative model to teach science and technology. University of Nebraska at Kearney – Community Early Childhood Conference. Kearney, Nebraska September 2017

Bickford, S., Waples, C., Hollman, A. K., Bice, M. R., Brachle, B. J., Heikkinen-Moilanen, R.-L., Bickford, N. A. (2017) The Multiple Faces of CSR: an international comparison of a multidisciplinary view of CSR best practices based on stakeholder engagement and collective values. Academy of International Business. (July 2-5, 2017)

Hollman, A., Torquati, J., Bickford, N., Bickford, S. & Bice, M. (June 8 – 12, 2017). Growing food and knowledge in the Arctic: combining biological processes with the Internet of Things. Conference presentation. International Congress of Arctic Social Science (ICASS) IX, Umeå, Sweden.

Bickford, N., Bickford, S., Lanteigne, M., Bice, M., Ranglack, D. & Hollman, A. (June 8 – 12, 2017). The Village: Using high-tech for international multidisciplinary education of Indigenous sustainability. Conference presentation. International Congress of Arctic Social Science (ICASS) IX, Umeå, Sweden.

Bickford, S., Hollman, A., Torquati, J., Ramos, A., Bice, M., Bickford, N. (June 8 – 12, 2017). Assessing local food production and accessibility for community gardens in rural areas: Arctic and beyond. Conference presentation. International Congress of Arctic Social Science (ICASS) IX, Umeå, Sweden.

Bickford, S., Heikkinen-Moilanen, R., Lanteigne, M., Waples, C., Hollman, A., Bice, M., Brachle, B. & Bickford, N. (June 8 – 12, 2017). A multidisciplinary assessment of community level corporate social responsibility in rural communities: Arctic and non-Arctic. Conference presentation. International Congress of Arctic Social Science (ICASS) IX, Umeå, Sweden.

Bickford, S., Hollman, A., Waples, C., Bice, M., Brachle, B., and Bickford, N. (2017) Assessment of rural community level CSR via a Quintuple Helix Model. University of Tampere Finland; Research

Seminar on Responsible Business (March 15-16, 2017)

Boyer, T, Adams, B., Ranglack, D., and Bickford, N. Aquaponics Productivity: Heated VS. Room Temperature Water. Nebraska Academy of Science April 2017.

Sanchez, J, Adams, B., Ranglack, D., and Bickford, N. A Comparative Study between Polyculture of Brussel Sprouts and Sweet Peppers and a Monoculture of Sweet Peppers in an Aquaponics system. Nebraska Academy of Science April 2017.

Wright, M and Bickford, N. Goshawk prey availability in the Lewis and Clark National Forest. Midwest Fish and Wildlife Conference, Lincoln, Nebraska 2017.

Wright, M., Jackson, J., Murphy, V., Higa, E., McCartney, S., Clayton, A., Nelson, R., Bolten, J., and Bickford, N. Quantifying northern goshawk (*Accipiter gentilis*) habitat in the Lewis and Clark National Forest, Montana. Idaho Chapter of the Wildlife Society and the American Fisheries Society Meeting, Boise, Idaho, 2017.

Boyer, T, Adams, B, and Bickford, N. Aquaponics Productivity: Heated vs. Non-heated Water in an Aquaponics System. Nebraska Academy of the Sciences, Lincoln, Nebraska 2017.

Jazmin, S, Adams, B., and Bickford, N. A Comparative Study between Polyculture of Brussels Sprouts and Sweet Peppers with Monocultures in an Aquaponics System. Nebraska Academy of the Sciences, Lincoln, Nebraska 2017.

Adams, B and Bickford N. Murphy's law and Aquaponics. Midwest fish and wildlife, Lincoln Nebraska 2017.

Adams, B and Bickford N. Aquaponics. Nebraska Academy of the Sciences, Lincoln, Nebraska 2017.

Wright, M, Burger, P, Combs, J., and Bickford N. Using GIS for habitat comparisons: a case study with northern goshawks. Nebraska Academy of the Sciences, Lincoln, Nebraska 2017.

Wright, M., Tornberg, R., Hill, E., and Bickford N. The Loss of Aggression in Northern Goshawk: Comparisons from Finland and North America, Department of Biology, University of Nebraska at Kearney, NE 68849

Wright, M and Bickford N. Quantifying northern goshawk (*Accipiter gentilis*) habitat in the Lewis and Clark National Forest, Montana. Nebraska Academy of the Sciences, Lincoln, Nebraska 2016.

Bickford et.al. Sustainable Food for Health: a comprehensive study assessing food security and benefits for wellbeing. Rural Initiative 2015

Bickford, N. Connecting Fragmented Habitats a Grassroots Adventure. TEDx Great Falls MT 2014

Leonard, M. and Bickford, N. Walleye Larval Drift and Dams. Montana Academy of Science. April 2014

Kemp, D and Bickford, N. White Tailed Jack Rabbit population dynamics in short grass Prairie. Montana Academy of Science. April 2014

Jones S, and Bickford N. Water effect on decomposition rates. Montana Academy of Science. April 2014

Jackson, J, Bickford, N., and Murphy, V. Analysis of Northern Goshawk Nest Site and Nesting Habitat on the Lewis and Clark National Forest. Montana Academy of Science. April 2012

Ward, R. and Bickford, N. Investigating how native species are affected by road obliteration in the Lewis and Clark National Forest. Montana Academy of Science. April 2012

Hill, J., Bickford, N., and Gibbons, J. Landscape Alterations on a Military Base: The Effects on Bird

Diversity. Montana Academy of Science. April 2012

Pezel, A., Bickford, N., and Lund D. Using feather genetics to determine the relatedness between goshawks in the Lewis and Clark National Forest. Montana Academy of Science. April 2012

Weber, J., Bickford, N., and Lund, D. Identifying walleye populations in the Missouri River in central Montana. Montana Academy of Science. April 2012

Bossert-Lomeli, H., Bickford, N., Vansickle, S. The Effects of Logging Roads in Aquatic Systems, Montana Academy of Science. April 2012

Fenger, E, Bickford, N, and VanSickle. Effects of Road and Culvert Removal on Macroinvertebrates and Total Suspended Solids in Headwater Streams. Montana Academy of Science. April 2011

Beaulaurier J, Bickford, and Hershberger. Can Commercially made Feed have Pathogens? Montana Academy of Science. April 2011

Hill, J., Bickford J., and Gibbons, J. Land Use Effects on Bird Diversity. Montana Academy of Science. April 2011

Fenger, E, Bickford, N, and VanSickle, S. Effects of Road and Culvert Removal on Macroinvertebrates and Total Suspended Solids in Headwater Streams. Murdock Foundation. Oct 2010

Beaulaurier J, Bickford, N., and Hershberger. Can Commercially made Feed have Pathogens? Murdock Foundation. Oct 2010

Fenger, Erin, Bickford, N, and VanSickle. Effects of Road and Culvert Removal on Total Suspended Solids in Headwater Streams. Montana Academy of Science. April 2010

Morris Daniel and Bickford N. Bird Population Densities of Cheatgrass Influenced Prairie Habitat. Montana Academy of Science. April 2010

Beaulaurier Josh, Bickford, and Hershberger. Can Commercially made Feed have Pathogens? Montana Academy of Science. April 2010

Morris Daniel and Bickford N. Bird Population Densities of Cheatgrass Influenced Prairie Habitat. Montana Space Grant. April 2010

Collins, S. M., Bickford, N., McIntyre, .P, Coulon, A., Ulseth, A., and Flecker, A. Genetic and microchemical analysis of population structure in a migratory Neotropical fish. North American Benthological Society National Meeting, May 2008.

Hannigan, R.E, and Bickford, N., Nutrient Chemistry of Chukchi Sea Sediments. Geologic Society of America, 2008.

Bickford, N., Fish habitat and Otolith Chemistry. Alaska Marine Science Symposium. January 2007.

Keyse, M., Bickford, N., and Norcross, B. Patterns in life and environmental histories of *Myoxocephalus scorpius* in the Chukchi Sea. Alaska Marine Science Symposium. January 2007.

Drobny, P., Bickford, N., and Norcross, B. Squid Overload: *Berryteuthis magister* in the Bering Sea. Alaska Marine Science Symposium. January 2007.

Helms, B., Bickford, N., and Feminella, J. Does increasing urbanization affect the feeding ecology and growth of redbreast sunfish? American Fisheries Society. September 2006.

Bickford, N., Where do fish go, let's ask them: or at least their otolith. North American Benthological Society National Meeting, May 2006.

Kelly, S., Bickford, N., and Norcross, B. Otolith chemical tags identify past habitat use of larval and

juvenile Prince William Sound Pacific Herring. North American Benthological Society National Meeting, May 2006.

Drobny, S., Bickford, N., and Norcross, B. Identifying life history characteristics of squid in the Bering Sea. North American Benthological Society National Meeting, May 2006.

Schumann, K., Bickford, N., Norcross, B., and Spangler, R. Identifying eulachon populations to spawning locations using otolith chemistry. North American Benthological Society National Meeting, May 2006.

Jones, M., Haas, G., and Bickford, N. Movement of Coho salmon on the Yakutat Foreland revealed from otolith chemistry. North American Benthological Society National Meeting, May 2006.

Hamilton, B., Bickford, N., and Hannigan, R. Elemental chemistry of endolymph and otolith: passive recorder or active writer? Geological Society of America National Meeting, November 2004.

Bouldin, J.L., N.A. Bickford, B. Stroud and G. Guha. Irrigation options for best management practices – benefit/cost analysis, resource conservation, and ecological benefits. MidSouth Regional Society of Environmental Toxicology and Chemistry Society annual meeting. Oxford, MS. 2004.

Bouldin, J.L., N.A. Bickford, B. Stroud and G. Guha. Tailwater recovery systems for irrigation – benefit/cost analysis and water resource conservation technique in Northeast Arkansas. Arkansas Geographical Society spring meeting. Jonesboro, AR. 2004.

Bouldin, J.L., N.A. Bickford, B. Stroud and G. Guha. Tailwater recovery systems for irrigation as water resource conservation technique in Northeast Arkansas. Arkansas Academy of Science 88th Annual meeting. Jonesboro, AR. 2004

McDaniel, B., Bickford, N.A. and Hannigan, R.E. Age and growth patterns of fish from the Spring River, AR. Arkansas Academy of Sciences. 2004

Hamilton, B., Bickford, N.A. and Hannigan, R.E. Elemental variations of endolymph and otolith composition in *Moxostoma erythrurum*. Arkansas Academy of Sciences. 2004

Clarke, D., Bickford, N.A. and Hannigan, R.E. Analysis of dissolved organic carbon in an interconnected ditch system in the delta agricultural zone, AR. Arkansas Academy of Sciences. 2004

Walls, J., Bickford, N.A. and Hannigan, R.E. Age and growth analysis of centrarchid species in the Spring River, AR. Arkansas Academy of Sciences. 2004

Horton, M. Bickford, N.A. and Hannigan, R.E. Uptake and storage of metals by crayfish Arkansas Academy of Sciences. 2004

Howard, R., Bickford, N.A. and Hannigan, R.E. Age and growth analysis of Cyprinid, Ictalurid, Fundulid, Cottid, and Percid species in the Spring River, AR. Arkansas Academy of Sciences. 2004

Young, S., Bickford, N.A. and Hannigan, R.E. Age and growth patterns of large mouth bass, small mouth bass, and spotted bass from the Spring River, AR. Arkansas Academy of Sciences. 2004

Bickford, N.A. and Hannigan, R.E. A Multi-Disciplinary Approach to Locating Essential Fish Habitat in Freshwater Systems. North American Benthological Society National Meeting, May 2004.

Hannigan, R.E., Bickford, N.A., Bogdevich, O.P. “Assessing Essential Fish Habitat In Freshwater Environments using Otolith Microchemistry”. Sixth International Symposium and Exhibition on Environmental Contamination in Central and Eastern Europe. Prague, Czech Republic. 2003.

Hannigan, R. and Bickford, N. "Assessing Essential Fish Habitat in Freshwater Environments using Otolith Microchemistry" Gordon Research Conference, Catchment Hydrology. Colby-Sawyer College, New Hampshire. 2003.

Hannigan, R., Farris, J.L., and Bickford, N. "Chemical Weathering and The Biotic Ligand Model". Arkansas Water Resources Conference. Fayetteville AR. 2003

Hannigan, R.E and Bickford, N.A. Linkages between bioavailability and equilibrium kinetics in a freshwater system and the effects on fish. Southcentral-Southeast sectional meeting of the Geological Society of America. Memphis TN. 2003.

Bickford, N.A. and Hannigan, R.E. Can fish hear the chemistry of the water? North American Benthological Society National Meeting, May 2003.

Bickford, N.A., Hamilton, B., and Hannigan, R.E. Assessing essential fish habitat in freshwater environments using chemical fingerprinting, Spring River AR. North American Benthological Society National Meeting, May 2002.

Investigation of nitrate pollution and the effects on fish community in the Spring River, AR. Association of Southeastern Biologist, April 2002.

Bickford, N.A. and Hannigan, R.E. Major and trace element hydrochemistry in a spring-fed river (Spring River, Arkansas). American Geophysical Union Fall Meeting. December 2001.

Bickford, N.A. and Hannigan, R.E. Investigation of nitrate pollution in the Spring River, AR: Preliminary results of a spatial-temporal study. Geological Society National Meeting, November 2001.

Bickford, N. and Hannigan, R. Investigation of nitrate pollution in the Spring River, Arkansas: Preliminary results of a spatial-temporal study. Mid-South Society of Environmental Toxicology and Chemistry, Jonesboro, AR, May, 2001.

Bickford, N.A. and Henson R. Characteristics of small mammals that help or inhibit parasite infection. Association of Southeastern Biologist, Chattanooga, TN, March 2000.

Bickford, N.A. and Henson R. Survey of Gastrointestinal Helminths in Small Mammals In Watauga County, NC and Changes in Parasite Populations Due to Changes in Host Species and Changes in the Season. Association of Southeastern Biologist, Wilmington, NC, March 1999.

Bickford N.A. 1996-1997. Ecological Essays. Monthly article in Lenoir-Rhynean Newspaper.

Service

2015 – present Nebraska Academy of Sciences

2015 – present Graduate Research Committee

2015 – present Wildlife Committee

2010 – 2015 Chair of the Last Lecture Series – University of Great Falls

2010 – 2015 Montana Academy of Science – University of Great Falls

2010 – 2015 Electric City Soccer Board, Montana

2009 – 2012 Curriculum Committee – University of Great Falls

2003 – 2004 Arkansas State University – President of Association of Graduate Scientist and President Graduate Student Advisory Council

2003 Geological Society of America – Convener, Special Session SE/SC Joint meeting of the Geol.

Soc. Am. “Water Rock Life: Interactions Between Hydrology and Biology”

2001 – 2004 Arkansas State University – Member of Graduate Council

1999 – 2000 Appalachian State University – President of Biology Graduate Student Association

1998 – 1999 Appalachian – Vice President of Biology Graduate Student Association

Memberships in Professional Societies

Nebraska Academy of Sciences (member since 2016)

Association of Southeastern Biologist (member since 1997)

North American Benthological Society (member since 1998)

Geological Society of America (member since 2000)

American Geophysical Union (member since 2000)

American Chemical Society (member since 2003)

North American Fisheries Society (member since 2003)

Kerry L Farris

Environmental Sciences Program
Department of Natural Sciences
OREGON TECH

541.885.1042
kerry.farris@oit.edu

Skills & Objectives

I am a broadly trained ecologist specializing in wildlife-habitat relationships, silvicultural and fire management techniques, and quantitative analysis. I have experience both teaching and mentoring undergraduate and graduate students in biology and ecology. My objective is to draw from my applied professional experiences to teach courses integrating theory and application.

Education

University of Idaho / M.S. Natural Resources
1997-2000 MOSCOW, IDAHO

Thesis: Micro-habitat selection of *Picoides* woodpeckers in relation to ponderosa pine decomposition

University of Idaho / B.S. Wildlife Resources
1995-1996 MOSCOW, IDAHO

Magna Cum Laude
Outstanding Senior - Department of Fish and Wildlife

Humboldt State University / B.S. Wildlife Management (*transfer*)
1988-1991 ARCATA, CALIFORNIA

Experience

Oregon Tech AIRE Center / Environmental Research Scientist
2020 - Present, KLAMATH FALLS, OREGON

- Worked to establish Oregon Tech's Center for Advancing Interdisciplinary Research on the Environment and Health (AIRE) by providing project leadership and management related to the quantitative analysis of air quality and hospitalization data, conducted and published research generated by the team, trained and managed other researchers and staff, and participated in long-range research planning.

Oregon Tech / Faculty Instructor
2017 - Present, KLAMATH FALLS, OREGON

- *Research in Environmental Sciences* (ENV 495) – directed students in the development of research projects designed to assist the City of Klamath Falls Parks Division in the proactive management of vegetation in Moore Park.
- *Advanced Environmental Data Analysis* (ENV 434) – created newly offered course examining the modern statistical approaches used to address the special needs of ecological data sets
- *Forest Ecology and Management* (ENV 375) – created newly offered course focused on western coniferous forests and their management challenges
- *Plant Ecology* (BIO 367) – developed an upper division course examining the fundamentals of terrestrial ecology with an emphasis on vascular plant communities
- *Principles of Biology* (BIO 211 & 212) – instructed both lecture and laboratory sections

Oregon Tech / Adjunct Instructor

2016-17 KLAMATH FALLS, OREGON

- Principles of Biology (BIO 211 & 212) - instructed laboratory sections
- Sustainable Human Ecology (ENV 484) - led weekly discussion sessions

Wildlife Conservation Society / Associate Conservation Scientist

2000 - 2009, NORTH AMERICA PROGRAM, BOZEMAN, MONTANA

- Collaborated with public resource agencies and private organizations to conduct interdisciplinary research focusing on ecological forest management, with a particular emphasis on prescribed fire. Notable projects (see publications) include: wildlife discipline leader for a nation-wide project investigating the effects of prescribed fire and silvicultural treatments for forest restoration; principal investigator for research quantifying the relationship between bark foraging birds, bark beetles, and fungi in the process of tree decay
- Hired, trained and supervised 15 to 20 undergraduate students per year to conduct field work and data analysis for various research projects; assisted multiple graduate students with thesis research related to Wildlife Conservation Society research projects, and served as a core thesis committee member.
- Developed research objectives and experimental design; conducted meta-analyses for large, national level conservation datasets; wrote customized code to implement a variety of statistical analysis techniques including univariate and multivariate statistics, generalized linear modeling, mixed and random effects modeling, logistic regression, and ordination
- Conducted outreach and technology transfer to disseminate research results to the general public and land managers, including lectures at universities. Authored scientific papers and presented at professional society conferences.

University of Idaho / Graduate Teaching and Research Assistant

1997 - 2000, DEPT OF FISH & WILDLIFE RESOURCES and DEPT OF BIOLOGICAL SCIENCES

- Served as lead laboratory instructor for three courses: wildlife ecology, wildlife techniques, and ornithology. Developed and graded lab exercises, quizzes, and exams covering: (1) identification, anatomy, aging and sexing of both avian and mammalian specimens in both laboratory and field settings; (2) habitat ecology, population estimation, and basic field-data collection techniques; organized and led field trips; prepared and presented substitute classroom lectures
- Conducted original research investigating the synergistic ecology of tree decomposition, woodpecker foraging, and bark beetle phenology

Humboldt State University Foundation / Research Crew Leader

1996 & 1997, ARCATA, CALIFORNIA

Served as crew leader on research projects investigating the response bird and mammal communities to experimental silvicultural and prescribed burning treatments

Turnstone Ecological Research / Research Assistant

1995 & 1996, MOSCOW, IDAHO

Conducted point-count and vegetation surveys in support of research on avian-habitat

relationships as part of the Partners in Flight/Northern Region Landbird Monitoring Program

USDA Forest Service Intermountain Research Station / Research Assistant

1994, MISSOULA, MONTANA

Used the Breeding Bird Research Database (BBIRD) protocol to locate and monitor nests, conducted point counts and vegetation surveys in support research investigating the effects of forest fragmentation on breeding bird communities in cedar-hemlock forests of northern Idaho

USDA Forest Service / Biological Technician

1990-1993, TAHOE NF, ELDORADO NF, and LAKE TAHOE BASIN MANAGEMENT UNIT

Conducted surveys for threatened, endangered and sensitive species including: willow flycatcher, peregrine falcon, bald eagle, northern goshawk, California spotted owl, pine martin, fisher, and Sierra Nevada red fox using nocturnal and diurnal surveys techniques such as taped playbacks, mimic calls, track plates, bait stations, and remote cameras

Humboldt State University / Biological Technician

1988-1992, CAMPUS GAME PENS

Cared for a variety of wildlife species kept on campus for research purposes (e.g., mule deer, Pacific fisher, Sierra Nevada red fox, gray fox, kit fox, coyote and Canada goose). Physically and chemically immobilized animals in support of teaching and research.

Peer-Reviewed Publications

([Google Scholar](#))

Kyle A. Chapman, Adelaide E. Clark, **Kerry L. Farris**, and Sarah Fitzpatrick. 2023. Fires, Respiratory Hospitalizations, and Capacity Issues. Pp. 210-221 in Fleishman, E., editor. 2023. Sixth Oregon Climate Assessment. Oregon Climate Change Research Institute, Oregon State University, Corvallis, Oregon. <https://blogs.oregonstate.edu/occri/oregon-climate-assessments>

Mclver, James D., Scott L. Stephens, James K. Agee, Jamie Barbour, Ralph E.J. Boerner, Carl B. Edminster, Karen L. Erickson, **Kerry L. Farris**, Christopher J. Fettig, Carl E. Fiedler, Sally Haase, Stephen C. Hart, Jon E. Keeley, Eric E. Knapp, John F. Lehmkuhl, Jason J. Moghaddas, William Otrosina, Kenneth W. Outcalt, Dylan W. Schwilk, Carl N. Skinner, Thomas A. Waldrop, C. Phillip Weatherspoon, Daniel A. Yaussy, Andrew Youngblood, Steve Zack. 2013. Ecological effects of alternative fuel-reduction treatments: highlights of the National Fire and Fire Surrogate study (FFS). *International Journal of Wildland Fire* 22(1):63-82.

Farris, Kerry L., Steve Zack, Andy J. Amacher, Jennifer C. Pierson. 2010. Microhabitat selection of bark-foraging birds in response to fire and fire surrogate treatments. *Forest Science* 56(1):100-111.

Farris, Kerry L., Sarah J. Converse, Steve Zack, Andy J. Amacher, Thomas Contreras, William Gaines, Donald Miles, Douglas Robinson, Ghislain Rompre, Katie Sieving, and Jenny Woolf. 2010. Short-term effects of fire and fire surrogate treatments on avian nest survival: a national-scale analysis. *Open Environmental Sciences* 4:53-62

Farris, Kerry L. and Steve Zack. 2008. A comparison of post-burn woodpecker foraging use of white fir (*Abies concolor*) and Jeffrey pine (*Pinus jeffreyi*). In: Narog, M.G., technical coordinator. Proceedings of the 2002 Fire Conference on Managing fire and fuels in the remaining wildlands and open spaces of the southwestern United States. December 2-5,

2002, San Diego, CA. Gen. Tech. Rep. PSW-189, Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture.

Converse, Sarah J., Gary C. White, Kerry L. Farris, and Steve Zack. 2006. Small mammal responses to forest fuel reduction: national scale results from the fire and fire surrogate project. *Ecological Applications* 16(5):1717-1729.

Farris, Kerry L. and Steve Zack. 2005. Woodpecker-snag interactions: an overview of current knowledge in ponderosa pine systems. Pp.183-195 In: Ritchie, M.W., D.A. Maguire and A. Youngblood, technical coordinators. Proceedings of the Symposium on ponderosa pine: Issues, trends and management. 2004 October 18-21; Klamath Falls, OR. General Technical Report PSW-GTR-198. Albany CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture. 281 pp.

Farris, Kerry L., Martin J. Huss, and Steve Zack. 2004. The role of foraging woodpeckers in the decomposition of ponderosa pine snags. *The Condor* 106(1):50-59.

Farris, Kerry L., Edward O. Garton, Patricia J. Heglund, Steve Zack, and Patrick J. Shea. 2002. Woodpecker foraging and the successional decay of ponderosa pine. Pp. 237-246 in W.F. Laudenslayer, P.J. Shea, B.E. Valentine, P.C. Weatherspoon, T.E. Lisle (tech coord). Proceedings of the symposium on the ecology and management of dead wood in western forests. Gen. Tech. Rep. PSW-GTR-181. Albany, CA. Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture, 949 pp.

Farris, K.L. 2000. The foraging ecology of Picoides woodpeckers in relation to ponderosa pine decay dynamics. MS Thesis. Department of Fish and Wildlife Resources, University of Idaho, Moscow, Idaho. 63pp.

SELECTED EXAMPLES OF RESEARCH IN THE NEWS

Oregon Public Broadcasting (OPB). 2022. "Million-dollar federal grant boosts efforts to monitor air quality and improve health outcomes in wildfire-prone Southern Oregon". Interview on Think Out Loud Radio Program. 4 August 2022.
<https://www.opb.org/article/2022/08/04/million-dollar-federal-grant-boosts-efforts-to-monitor-air-quality-and-improve-health-outcomes-in-wildfire-prone-southern-oregon/>

Herald and News. 2022. "Oregon Tech awarded a \$1M federal grant for air quality research; faculty to create a new research center". 29 July 2022.
https://www.heraldandnews.com/klamath/oregon-tech-awarded-a-1m-federal-grant-for-air-quality-research-faculty-to-create-a/article_d7d9f9a5-d0a5-5229-8227-082b8fcb1653.html

Canadian Broadcasting Corporation (CBC). 2004. "Woodpeckers and Fungus". Radio Interview on Quirks and Quarks Radio Program. 13 March 2004.

Society of American Foresters. 2004. "Woodpeckers Play a Vital Role in Creating Quality Snags". *The Forestry Source*. April 2004.

Birder's World Magazine. 2004. "Snag Starters". *Birding Briefs*. June 2004.

Science Daily. 2004. "Woodpeckers Carry Fungus in Beaks That Promotes Tree Decay". Science Daily Online. 12 Feb. 2004.

Environmental News Service. 2004. "Fungus in Woodpeckers' Beaks Crucial to Forest Processes". ENS Daily Headlines. 11 Feb. 2004. Canadian Broadcasting Corporation (CBC). 2004. "Woodpeckers and Fungus". Radio Interview on Quirks and Quarks Radio Program. 13 March 2004.

Society of American Foresters. 2004. "Woodpeckers Play a Vital Role in Creating Quality Snags". The Forestry Source. April 2004. Birder's World Magazine. 2004. "Snag Starters". Birding Briefs. June 2004.

Science Daily. 2004. "Woodpeckers Carry Fungus in Beaks That Promotes Tree Decay". Science Daily Online. 12 Feb. 2004.

Environmental News Service. 2004. "Fungus in Woodpeckers' Beaks Crucial to Forest Processes". ENS Daily Headlines. 11 Feb. 2004.

Selected Presentations

INVITED PAPERS

Chapman, Kyle, Kerry Farris, and Adelaide Clark. 2022. Drought, wildfires, air quality, and respiratory hospitalizations in Southern Oregon. Pacific Northwest Drought and Public Health Workshop. Portland, OR 19-20 October 2022.

Clark, Adelaide, Kyle Chapman, Kerry Farris, and Sarah Fitzpatrick. 2021. Helping hospitals predict capacity issues: using state agency data to examine the relationship between PM2.5 and respiratory hospitalizations in southern Oregon. AGU Fall Meeting 2021, New Orleans, LA, 13-17 December 2021, id. 5Y13B-05.

Zack, Steve and Kerry L. Farris. 2007. Managing for Wildlife with Prescribed Fire in Eastside Pine Habitats. Society of American Foresters and Oregon State University Department of Forestry: The Art and Science of Multiaged Forest Management. 5-6 June 2007. Klamath Falls, Oregon.

Farris, Kerry L., Sarah J. Converse, Steve Zack, Andy J. Amacher, Thomas Contreras, William Gaines, Donald Miles, Douglas Robinson, Ghislain Rompre, Katie Sieving, and Jenny Woolf. 2006. The effects of fire and fire surrogate (FFS) treatments on avian nest survival. The Association for Fire Ecology: 3rd International Fire Ecology and Management Congress. 13-17 November 2006. San Diego, California.

Converse, Sarah J., Gary C. White, Kerry L. Farris, and Steve Zack. 2006. Small mammal responses to forest fuel reduction: national scale results from the fire and fire surrogate project. The Association for Fire Ecology: 3rd International Fire Ecology and Management Congress. 13-17 November 2006. San Diego, California.

Farris, Kerry L. and Steve Zack. 2004. Woodpecker snag interactions: an overview of current knowledge in ponderosa pine systems. USDA Forest Service, Pacific Southwest Research Station and Oregon State University Outreach Education: Ponderosa Pine – Management, Issues, Trends. 21-23 October 2004. Klamath Falls, Oregon.

Farris, Kerry L. 2003. An overview of desert cavity nesting species: implications for management plans. California Partners in Flight: Desert Bird Conservation Planning. 6-7 November 2003. Yuma, Arizona.

Farris, Kerry L., Martin J. Huss, and Steve Zack. 2002. Complexities of snag decay in ponderosa pine: how foraging woodpeckers may influence decay patterns and subsequent nest-site quality. American Ornithologist Union (AOU): 3rd North American Ornithological Conference – Special Symposium: The Ecology of Cavity-Nesters: Keystone Processes. 24-28 September 2002. New Orleans, Louisiana.

CONTRIBUTED PAPERS

Zack, Steve, Kerry L. Farris, and T. Luke George. 2005. Bird responses to thinning and prescribed fire in ponderosa pine. Partners in Flight – California Chapter, Oregon/Washington Chapter: Tools for Bird Conservation in Conifer Forests. 7-8 April

2005. Ashland, Oregon.

Farris, Kerry L. and Steve Zack. 2002. A comparison of post-burn woodpecker foraging use between white-fir (*Abies concolor*) and yellow pine (*Pinus jeffreyi* and *P. ponderosa*). The Association for Fire Ecology: Managing Fire and Fuels in the Remaining Wildlands and Open Spaces of the Southwestern United States. 2-5 December 2002. San Diego, California.

Zack, Steve and Kerry L. Farris. 2002. Wildlife responses to alternative fire management treatments: the national fire and fire surrogate approach. USDA Forest Service: Rocky Mountain Research Station: Fire, Fuel Treatments, and Ecological Restoration. 16-18 April 2002. Fort Collins, Colorado.

Farris, Kerry L., Steve Zack, Edward O. Garton, William F. Laudenslayer, and Patricia J. Heglund. 2001. Woodpeckers and snag decay in North American forests: foraging patterns of three sympatric *Picooides* woodpeckers in relation to the initial decay of ponderosa pine (*Pinus ponderosa*). Woodpeckers Working Group of the German Ornithologists Society: International Symposium on Woodpecker Ecology. 23-25 March 2001. Berchtesgaden, Germany.

Hughes, Kerry L., Edward O. Garton, Patricia J. Heglund, and Steve Zack. 2000. The role of foraging woodpeckers in the decay of ponderosa pine. Cooper Ornithological Society: 70th Annual Meeting. 25-29 April 2000. Riverside, California.

Hughes, Kerry L., Edward O. Garton, Patricia J. Heglund, Steve Zack, and Patrick J. Shea. 1999. The dynamic relationship of woodpecker habitat selection and the successional decay of ponderosa pine. The Wildlife Society - Western Section: Symposium on the Ecology and Management of Dead Wood in Western Forests. 2-4 November 1999. Reno, Nevada.

Hughes, Kerry L., Edward O. Garton, Patricia J. Heglund, Steve Zack, and William F. Laudenslayer. 1999. Woodpecker foraging selection in relation to tree decay characteristics. Cooper Ornithological Society: 69th Annual Meeting. 29 March - 3 April 1999. Portland, Oregon.

Specialized Skills & Experience

Project Management, Instruction, and Data Analysis

- Experimental/study design for inventory and monitoring of various taxa
- Proposal writing and manuscript preparation
- Coordination and management of dispersed field crews and senior scientists
- Classroom, laboratory, and field instruction in both academic and field settings
- Data management in EXCEL and ACCESS
- Statistical analysis using: R, SAS, DISTANCE, SPSS, S-PLUS, PC-ORD
- Budget management

Field Techniques

- Avian point counts using distance sampling
- Nest searching and monitoring techniques
- Mist netting and fungal sampling of birds
- Spot-mapping avian territory use
- Surveys for sensitive, threatened, and/or endangered species including: Spotted Owl, Northern Goshawk, Willow Flycatcher, Pine Martin, Sierra Nevada Red Fox
- Live trapping of small mammals
- Use of track plates and remote cameras
- Acoustic bat sampling

Specialized

- Excellence in Teaching Workshop. Commission on College Teaching, Oregon

Training

- Institute of Technology. September 2018.
- **Statistical Design and Analysis of Biological Monitoring Programs for Conservation Management.** Samantha Strindberg PhD, Fernanda Marques PhD, and Tim O'Brien PhD. Department of Landscape Ecology and Science Exploration, Wildlife Conservation Society, Bronx, New York. 20 June – 1 July 2005.
- **Analysis of Ecological Communities using PC-ORD.** Jeri Peck. Department of Forest Resources, University of Minnesota. 16-17 March 2005.
- **GIS for Wildlife Conservation.** Eric Sanderson PhD and Gosia Bryja. Department of Landscape Ecology and Geographic Analysis, Living Landscapes Program, Wildlife Conservation Society, Bronx, New York. 4-15 October 2004.
- **Advanced Techniques and Recent Developments in Distance Sampling.** Steven Buckland PhD and Len Thomas PhD. Center for Research into Ecological and Environmental Modeling, University of St. Andrews, Scotland. 15-17 September 2003.
- **Introduction to Distance Sampling.** Steven Buckland PhD and Len Thomas PhD. Center for Research into Ecological and Environmental Modeling, University of St. Andrews, Scotland. 10-12 September 2003.
- **Metapopulation Ecology of Animals and Plants: Inventory, Monitoring, and Viability Analysis.** Edward O. Garton PhD, Department of Fish and Wildlife Resources, University of Idaho. 3-7 January 2000.

Grants & Awards

- **Research Grant: Establishing a Vegetation Monitoring Network for Moore Park: A Partnership Between Oregon Tech and the Klamath Falls Parks Division.** Principal Investigator. June 2022. \$10,000. Provost Office, Oregon Tech.
- **Research Grant: Health effects of smoke from wild and human-related fires.** Co-Principal Investigator with Kyle Chapman and Adelaide Clark. June 2022. \$1,000,000. United States Health Resources and Services Administration.
- **Nomination: Oregon Tech Foundation Excellence in Teaching Award 2020**
- **Research Grant: Effects of altering stand-structure on wildfire severity and effects in the Blacks Mtn. Experimental Forest, Cascade Range, California.** Co-Principal Investigator with M. Ritchie, W. Oliver, C. Skinner, S. Zack, G. Nakamura. Fiscal Years 2003, 2004, 2005. \$171,000. Joint Fire Sciences Program.
- **Research Grant: Woodpeckers and the process of snag decay in the management of wildlife of western coniferous forests.** Co-principal investigator with S. Zack. Fiscal Years 2001 & 2002. \$20,000. The Walt Disney Wildlife Conservation Fund.
- **Research Grant: Micro-habitat selection of Picooides woodpeckers in relation to ponderosa pine decomposition on Blacks Mountain Experimental Forest.** Principal Investigator. Jan-Dec 1999. \$10,000. USDA Forest Service: Pacific Southwest Research Station.
- **Honorary Membership: Cooper Ornithological Society 1999**
- **Student Travel Award: Cooper Ornithological Society 1999**
- **Outstanding Senior Award: Department of Fish and Wildlife Resources, University of Idaho, Academic Year 1995-1996**
- **Marvin Klemme Centennial Scholarship: College of Natural Resources, University of Idaho, Spring 1995**
- **Safari Club International Scholarship: American Wilderness Leadership School, Jackson, Wyoming, Summer 1986**

Professional Service & Membership

- **Klamath Lake Forest Health Partnership (KLFHP) – member of a science committee engaged in research and management of forest related projects on public lands throughout southern Oregon.**
- **Peer Reviewer: Journal of Wildlife Management, Journal of Fire Ecology, Forest Ecology and Management, Restoration Ecology, Journal of Field Ornithology, and Northwest Science**



Christy VanRooyen

christy.vanrooyen@oit.edu

3201 Campus Drive,
Klamath Falls, OR 97601
(541) 885-0959

EDUCATION

Master of Science in Environmental Education

Southern Oregon University – Ashland, OR
Phi Kappa Phi honorary society

December 2017

Bachelor of Science in Applied Environmental Sciences

Oregon Institute of Technology – Klamath Falls, OR
Magna Cum Laude
Alpha Chi honorary society

June 2001

PROFESSIONAL POSITIONS

Environmental Sciences Program Director. Oregon Institute of Technology. 2021-Current

- Strategic planning and curriculum development to support programmatic, departmental, academic and university wide objectives and outcomes.
- Maintenance and development of the dual CE-ENV and REE-ENV programs through communication with their program directors and department chairs.
- Leading faculty program meetings (scheduled by department chair) including setting of the agenda, meeting management, and follow-up on action items.
- Coordinate programmatic recruitment and retention efforts in close collaboration with departmental efforts.
- Develop and maintain partnerships with local, regional, and national agencies and organizations that can provide educational, professional, and research opportunities for students and faculty.
- Planning and execution of the annual ENV Student Research Symposium.
- Assessment coordinator – Facilitate PSLO and ISLO Data Collection. Write the annual assessment report for the ENV program.

Assistant Professor, Natural Science Department. Oregon Institute of Technology. 2018-Current

- Teach a variety of courses within the Natural Science department including chemistry, biology, nutrition, and environmental sciences. See teaching experience for a comprehensive list.
- Apply innovative pedagogy to promote student success and retention.
- Chemistry Advanced Credit Placement Liaison - Work with high school teachers from around the state to offer CHE 101/104 and CHE 2xx credit to high school students.
- Serve on multiple departmental and institutional committees: Academic Master Plan Committee, Assessment Executive Committee, Online Learning Advisory Committee, Sustainability Committee, and search committees.

- Primary or secondary academic advisor to 14 students.
- Advisor for the student Bee Keeping Club.

Co-Coordinator, Fall in the Field. Southern Oregon University Environmental Education. 2016-2017.

- Worked in close collaboration with 15 other graduate students to create and execute standards aligned curriculum for residential and day program outdoor school.
- Over 1,500 k-12 students participated in Fall in the Field over the course of eight weeks of programming.
- Communicated with a wide range of stakeholders including teachers, administrators, nonprofits, government agencies, and businesses.
- Co-authored an Ashland Food Co-op grant which provided a locally sourced “Food for Thought” meal with a lesson on the environmental costs associated with food purchasing. \$1,200 was awarded.
- Risk Management Committee Chair.
- For more info, go to <http://fallinthefield.sou.edu/>

Intern. Bee Girl Organization. 2016-2017.

- Developed a graduate thesis around a multi-year pollinator monitoring project at an Oregon Department of Transportation wetland remediation site in White City, OR. See research for more details.
- Analyzed data related to ongoing research projects.
- Created maps using ArcGIS for public land and virus monitoring projects.
- Promoted bee conservation at various educational, fundraising, and tabling events.
- Helped with honey extraction and processing from Bee Girl managed hives.
- Co-authored a Coquille Tribal Community Fund grant for Kids and Bees programming. Funding pending.
- For more info, go to <https://www.beegirl.org/>

Sustainability Coordinator. Oregon Institute of Technology. 2005.

- Sustainability Committee Chair.
- Wrote a report detailing environmental sustainability efforts on campus and focus areas for improvement.
- Offered sustainability seminars for faculty, staff, and students advising ways to reduce individual carbon footprints.

Instructor, Natural Science Department. Oregon Institute of Technology. 2002 – 2007.

- Taught a variety of introductory courses within the Natural Science department including chemistry, biology, and environmental sciences. See teaching experience for comprehensive course list.

Senior Geographic Information Systems (GIS) Analyst. Oregon Institute of Technology. 2001-2002.

- Consulting work doing cartography and data analysis on the following topics: Oregon mortality rates and disease outbreak, websites for economic development groups, stream restoration projects, trail locations, animal habitat, and watershed health

OIT: CHE 101 – Introduction to General Chemistry. VanRooyen, C. Editor. 2021. Open-Source chemistry text available online via Libretext created by remixing other available OERs and writing original content. View here: <http://bit.ly/OTCHE101>

Comparison of Hymenoptera Abundance at Three Vernal Pool Sites in White City, Oregon in Varying Stages of Disturbance. 2017. VanRooyen, C. Graduate Thesis for Southern Oregon University.

Native Bees at Oregon Tech. Edenhofer, K. * & VanRooyen, C. Poster Presentation at the Annual Meeting of the Oregon Chapter of the Wildlife Society Conference. Abstract submitted December 2022 with presentation scheduled for February 2023.

Apis Mellifera Floral Resource Use in the Oregon Tech Apiary. Steiber, M.*, Trier, F. *, Torres, T., & VanRooyen, C. Poster Presentation at the Annual Meeting of the Oregon Chapter of the Wildlife Society Conference. Abstract submitted December 2022 with presentation scheduled for February 2023.

Improved Teaching: A Symptom of COVID 19. VanRooyen, C. Biennial Conference on Chemical Education – American Chemical Society. In this talk I shared about the variety of tools I use to engage students online in my introductory chemistry course including: a phone friendly open textbook, virtual escape rooms, flexible policies, reading quizzes, games, CHEM 101, and coffee hours. Data on student’s interactions with the tools correlated to student success will be included. August 2022.

Faculty Panel on Open Educational Resources in Promotion and Tenure. VanRooyen, C. - panel facilitator. Open Oregon’s Open Education Week virtual symposium. March 2022.

Bee School. VanRooyen, C. & Corzatte, L. Klamath Basin Beekeepers Association. Co-taught an introductory beekeeping class. March 2022.

Importance of Pollinators. VanRooyen, C. & Torres, T. Klamath Tree League community educational event. October 2021.

Lessons Learned from Spring of 2020. Panel presentation at the Commission on College Teaching Conference at Oregon Tech on successes and failures of moving to all remote teaching due to COVID. September 2020.

Promoting Engagement with OERs. VanRooyen, C. Oregon Virtual Statewide Open Educational Resources Symposium. Shared tips for getting to students to engage with OERs in STEM courses. May 2021.

6 Tips for Improving Heart Health. VanRooyen, C. Owl about Health Oregon Tech Alumni Event. Virtual Presentation shared via the alumni association on various social media platforms. February 2021.

Native Bee Walk. VanRooyen, C. An interpretive hike starting from the Oregon Tech Apiary and finishing at the native plant garden on campus to discuss bees and to teach pollinator sampling methods. This event was open to the Klamath Falls community. May 2020 & May 2019.

Integrating OERs in the Classroom. VanRooyen, C. & Clark, A. Presentation during open education week discussing how we have used our original OER in introductory chemistry which was shared at Oregon Tech and through the Oregon Open Ed. website. This talk was also accepted to be presented at the Biennial Conference on Chemical Education which was cancelled in 2020 due to COVID. March 2020.

The Honey Bee. VanRooyen, C. & Kenyon, E.* Sustainapalooza presentation given at the Klamath County Library about honeybees and their role in food production in the United States. May 2019.

Plight of Our Pollinators. VanRooyen, C. Public presentation on pollinator decline given to the Klamath Basin Bee Keeping Association. February 2019

Geospatial Analysis of Apis Mellifera Colonies VanRooyen, C. & Bennett, J.* Western Apicultural Society Conference. Poster presentation examining how GIS can be used for pollinator research. July 2019.

PolliNation Podcast OSU Extension Service. I participated in the recording of this episode of the podcast on pollinator science. July 2018.

You can access the episode here:

<http://blogs.oregonstate.edu/pollinationpodcast/2018/07/30/sam-droege/>

The Buzz on Bees. VanRooyen C. Interpretive Talk at U.S. Forest Service Diamond Lake Campground. July 2017.

An Introduction to Process Oriented Guided Inquiry Learning (POGIL). Parrett, L., VanRooyen, C., & Klopff, E. Oregon Institute of Technology Commission on College Teaching Pre-convocation Workshop. September 2016.

Beginning a transition towards active-learning classrooms: Oregon Tech's story. Anthony, S., Lund, T., & VanRooyen, C. 70th Northwest Regional Meeting of the American Chemical Society, Pocatello, ID. June 2015.

Flipping the Classroom in CHE 101. VanRooyen, C. Oregon Institute of Technology Commission on College Teaching Tech Talk. February 2015.

Prescription for Increasing Student Interest in GOB Chemistry I and Prescription for Increasing Student Interest in GOB Chemistry II. VanRooyen, C. & Swisher, R. Biennial Conference on Chemical Education (BCCE). August 2014.

Fractal Analysis Watershed Project. VanRooyen, C., Ritter, J., Hansen, M., & Emmen, B. Klamath Basin Fish and Water Management Symposium. Humboldt State University,

Arcata, CA. May 2001.

*Indicates Oregon Tech student name

GRANT AWARDS

Oregon Tech Foundation Innovation Grant 2022-2023. “Phenological Study of *Apis mellifera* Pollen Collection with Shifting Climate and Fire Regimes”. The purpose of this project is to identify important floral resources for bees, particularly during fire season, and to correlate hive data with particulate matter to better understand how air quality during fire season affects bees. We currently have three students involved in this work. \$11,000

Oregon Open Education Grant. 2019-2021. Collaborative project with Dr. Addie Clark to produce an OER and ancillary resources for introductory chemistry CHE 101. Dr. Clark is mainly responsible for the ancillary products and I have developed the online textbook for the class using other available OER materials and original content. \$6,000

Oregon Tech OER Grant. 2019. Internal grant for switching to an open education resource in human nutrition BIO 205. Award \$500

Provost’s Summer Creativity Grant. 2018. Funds from this grant were used to establish the Oregon Tech Apiary with two live honey bee colonies. As a result of this grant a student bee keeping club was established at Oregon Tech. The apiary provides educational opportunities to talk about pollinator decline. Award \$3,500.

Coquille Tribal Community Fund grant. 2017. Grant written for the Bee Girl Organization’s Kids and Bees program. Award \$2,000

Ashland Food Co-op grant. 2016. Grant provided funding for Southern Oregon University’s Fall in the Field *Food for Thought* lesson. Award \$1,200

ONGOING RESEARCH =

Oregon Bee Atlas Project. Sample contributor to this collaborative project, which is being coordinated through Oregon State University and the Oregon Department of Agriculture.

Entomological Collection. I am working with a group of research students to curate an entomological reference collection of bees at Oregon Tech. Students are learning pan trapping, areal netting, specimen pinning, and labeling techniques as part of this work.

Hive Monitoring. I consulted on a project for CSET juniors 2021 who developed a hive monitoring system to track internal temperature and hive weight. These students developed a working prototype which successfully collected hive temperature and humidity data. Data could be downloaded via wifi to a laptop. Students presented their work at the Oregon Tech Student Project Symposium in May of 2021. This project enabled us to secure funding for a more robust

hive monitoring system which we installed in February of 2022. Data from these monitors will be used for ongoing projects in the ENV 495 Bee Research class.

Pollen Collection in the Oregon Tech Apiary. Research students working in the Oregon Tech apiary collected pollen last year to contribute to an international study conducted by BeeODiversity. The purpose of this project was to determine which floral resources bees were visiting and to identify environmental contaminants using pollen brought back to the hives. In addition to this study, students conducted their own analysis of the pollen using color as an indicator of floral species. This work will be ongoing in 2023.

Halictidae Phenological Trends. Continued monitoring of phenological trends of floral resources and pollinators with shifting climate and fire regimes in the Klamath Basin. Baseline data was established in 2022 using hive monitors, pan trapping, floral surveys, pollen collection, and time lapse photography.

PROFESSIONAL MEMBERSHIPS & PUBLIC SERVICE

Oregon State Beekeepers Association – South Central Oregon Representative Executive Board Member. OSBA is a group of committed beekeepers who manage colonies, provide educational opportunities, lobby for government support of pollinator protection and research, and contribute to bee research. Through this association, I have been able to connect student beekeepers at Oregon Tech to state and national research initiatives. 2020-current.

Klamath Basin Bee Keeping Association – board secretary. Local chapter of beekeepers, which spans membership across southeast Oregon and northeast California. This organization is dedicated to the well-being of honeybees and to the fields of bee keeping, apiculture, research and education. My involvement with the board allows me to keep up to date with the most current initiatives related to pollinators and to ensure that Oregon Tech plays a role in pollinator conservation. KBBA has kindly adopted the Oregon Tech Beekeeping Club as a sister organization which has allowed OIT students to participate and even present at KBBA meetings. 2019 -current.

Oregon Educational Resources Steering Committee. This committee, which reports to HECC, is advising institutions on how to meet the statewide standards for providing open source materials for students and organizes educational events for both higher ed. and K-12 professionals about using or creating open educational resources. Grant funds to support the creation of Open Educational Resources are channeled through this committee. On this board, I served on the Open Education Week subcommittee who was responsible for the planning and implementation of Open Ed. Week. 2019 – 2022.

Western Apicultural Society – 2019-current. Member

American Chemical Society. 2022-current. Member.

COLLEGIATE SERVICE

Online Learning and Advisory Council - This committee makes recommendations to the Provost regarding online learning policies and guidelines. 2021 – current.

Sustainability Committee. The mission of the Sustainability Committee -Our mission is to “serve as the coordinating body for the University’s activities relating to sustainability. The committee will address methods to imbue the theme of sustainability throughout Oregon Tech in meaningful and visible ways.” Notable accomplishments of the committee during my time of service include planning and delivering a variety of Earth Week events, proving volunteers for National Bike to Work Day stations, and facilitating the instillation of water bottle refill stations in every building. 2019-present.

Academic Master Plan Steering Committee -We developed an academic master plan for Oregon Tech that aligned with the University’s Strategic Plan. As the chair of the Charge 3 Subcommittee, I facilitated the creation of the section focused on increasing enrollment, retention, and four-year graduation rates. 2022.

Executive Assessment Committee - Our team has created a variety of trainings and guides to help departments more effectively use assessment data for evaluating programmatic and institutional success. I have scored program assessment reports and provided individual feedback for the reports I assessed. I have offered training to various departments on campus about reporting data on institutional and programmatic learning outcomes and using equity dashboards. At convocation, I led a session on reporting requirements in preparation for Northwest’s accreditation visit. 2022-current.

Oregon Tech Foundation Faculty Employee Giving Ambassador - Help to raise funds from staff and faculty for the Oregon Tech foundation and participate planning and execution of recognition events throughout the year. 2019-2022.

Chemistry Lab Move. In preparation for the renovation of Boivin Hall, chemistry faculty coordinated the movement of chemicals and equipment to temporary locations. I was specifically responsible for sorting, packing, and moving the CHE 104 labs from BH to the DOW building. As part of this process, I had to organize a temporary chemical prep space in what was formally a biology storage room. I hosted an event for local middle and high school teachers, where they could look through our older/outdated chemistry/science equipment and take supplies for their schools. Twelve teachers from seven different schools benefited from our donations. (2021).

Search Committee member for the following faculty and staff positions:

- Environmental Chemistry Assistant Professor, 2022 (ongoing). Committee Chair.
- Chemistry Visiting Instructor, 2022. (filled).
- Chemistry Assistant Professor, 2022. (1 of three positions filled)

- Natural Science Department Chair, 2022 (filled).
- Assistant Professor of Chemistry, 2021 (filled).
- Chemistry Visiting Instructor 2021 (filled).
- Assistant Professor of Chemistry, 2021 (failed).
- Foundation Annual Giving Manager. 2021 (filled)
- Educational Partnerships and Outreach Assistant Director, 2021 (filled).

BES Assessment Coordinator – I work to continually improve the Environmental Science assessment processes. I am responsible for writing our annual report and coordinate the collection of both institutional and programmatic assessment data in our program. 2018-current.

Dual Credit Faculty Liason for CHE 101/104 and CHE 201/204 - Coordinate with high school teachers to offer college level chemistry courses for Oregon Tech credit at their schools. In the last few years, I have partnered with 11 different teachers from across Oregon to offer college credit to hundreds of high school students.

Planning Committee for the Natural Science Department Retreat – I helped the department secure a discounted rate for our venue at Siskiyou Field Institute and did the meal planning and some cooking for the event which allowed us to host the retreat at a minimal cost to the university. 2018.

Admissions Recruitment Events – I have represented the Environmental Science Program at numerous Oregon Tech admissions events, including college preview days, Tech Treks, and New Wings. From leading guided walks in the arboretum to rolling beeswax candles, I always try to incorporate an activity for our visitors to make their experience memorable. 2018-current.

Girls Got STEM - residential summer camp for teenage women. Developed curriculum and was a primary instructor for land navigation and outdoor survival courses. 2018.

ABET Accreditation -Natural Science Department representative for CHE 101/104 as a support course in the accreditation process. This included meeting with ABET evaluators and preparing course materials for inspection. 2015 & 2019.

Scholarship Reader – I have long participated as a an evaluator of student scholarship applications. 2015-current.

TEACHING EXPERIENCE

Primary instructor for the following classes offered at Oregon Institute of Technology:

BIO 205 Nutrition. A study of the relationships of food and nutrition to health. An overview of the basic nutrition principles including the nutrients and how they function in the body, nutrient requirements, diet planning and energy balance. Current topics and controversies are examined.

BIO 211 Laboratory. Principles of modern biology emphasizing form and function of multicellular plants, major invertebrate phyla, and general vertebrate morphology and physiology.

- BIO 212 Laboratory.** Principles of modern biology emphasizing evolution, ecology, population genetics, and behavior of organisms.
- BIO 225 Riparian Assessment.** Introduced topics such as Greenline assessment protocol, proper functioning condition, repeat photography, macroinvertebrate collections, stream survey, flow/discharge calculations, and field sketches.
- CHE 101 Introduction to General Chemistry.** A brief presentation of introductory chemical concepts including atomic structure, the chemical equation, the behavior of gases, the chemistry of solution and acid-base chemistry. First term in GOB chemistry series.
- CHE 104 Laboratory.** Lab accompanying introductory general chemistry.
- CHE 102 Introduction to Organic Chemistry.** The role of organic chemistry in life and industrial processes is discussed. Second term in GOB chemistry series.
- CHE 105 Laboratory.** Lab accompanying introductory organic chemistry.
- CHE 201/221 Laboratory.** Lab accompanying general chemistry I.
- CHE 202/222 Laboratory.** Lab accompanying general chemistry II.
- ENV 108 Mentorship and Team Building.** We develop a strong sense of community, trust, inclusion, and belonging within the Environmental Science program among all students and faculty. We introduce student mentorship opportunities and engage in team building exercises and environmental exploration during a weekend camping trip. Course is required every Fall. Can be taken multiple times for credit. No prerequisites.
- ENV 117 Stream Water Chemistry.** Chemical analysis of water quality parameters including temperature, turbidity, pH, dissolved oxygen, nitrates, and phosphates.
- ENV 307 Water Resources.** This course will provide an overview of the science & policy related to managing freshwater resources in the Western United States. Fundamentals of hydrologic processes, riparian assessment, stream surveying techniques, water sampling methods, watershed delineation, adjudication processes, the environmental impacts of water use, and riverine restoration practices will be included
- ENV 407 Ecological restoration and monitoring.** Co-taught with Dr. Michael Hughes. One week intensive field study assessing the stream restoration work on North Creek and Elder Creek in Lake County, OR.
- ENV 226 Environmental Data Analysis I.** Introduction to compilation, manipulation, and analysis of datasets common to environmental analysis. Includes measures of central tendency and spread; characterizing data distribution; linear regression; exceedance probability and cumulative frequency functions; understanding time series; and basic principles of graphical data displays.
- ENV 355 Careers and Professionalism in Environmental Sciences.** Practical seminar focusing on career opportunities in environmental sciences, professional standards, culture, ethics, and skills to enhance communication and collegiality. Assists students with workforce transition, including job search, preparation of resume packages and portfolios, interviewing tips, and job-offer negotiation.
- ENV 420 Extern in Environmental Science.** Students work in applied settings related to their career interest under the supervision of a professional mentor.

ENV 495 Bee Research. Supports student-initiated research projects in environmental sciences. Topic and scope must be reviewed and accepted by a faculty advisor. Registration by instructor consent. Counts as technical elective credit. May be repeated for up to nine total credits.

ENV 496 Senior Project. Advisor for a student project, *Waste Stream Audit at Oregon Tech*, examining waste disposal trends at Oregon Tech and ways to reduce, reuse, and recycle.

GEOG 105 Physical Geography. Comprehensive introduction to physical geography, including maps and representation of the earth's surface, the climate system and weather phenomena, plate tectonics, landform evolution and interpretation, and human-landscape interactions.

ROSS WAGSTAFF CURRICULUM VITAE

ross.wagstaff@oit.edu • 208-918-1875
336 W Oregon Ave • Klamath Falls OR, 97601

EDUCATION

PhD, Crop Science, University of Illinois Champaign-Urbana **December 2016**

Dissertation Title: *Farming in the City: How the altered urban environment affects vegetable crop production, insect pest abundance, raised-bed soil dynamics, and fruit nutritive quality in a rural to urban transect of Chicago, IL.*

Advisor: Dr. Sam Wortman

MS, Crop and Soil Science, Washington State University **December 2011**

Thesis Title: *Off season sowing and comparative overwintering traits of spring, winter, and facultative habit wheat cultivars.*

Advisor: Dr. Steven Guy

BS Agronomy, Brigham Young University Idaho **August 2009**

Cumulated GPA: 3.97, *magna cum laude*

Major: Agriculture Science, Management, and Technology

Minor: Chemistry and Biology

RESEARCH AND PROFESSIONAL EXPERIENCE

Oregon Technical Institute (OIT), Klamath Falls, OR **Sept. 2021 – Current**

Visiting instructor

- Built curriculum and instructed new 300 level soil science incorporating professional and community stakeholders for project based on local soil issues.
- Revised course and instructed over 100 students in introductory chemistry and chemistry lab.
- Achieved over 80% pass rate (over 80%) in all three quarters of teaching.

Advanced Filtration Systems Inc, Champaign IL **2017- Feb. 2020**

Machine Maintenance Technician

- Maintained and serviced over 100 machines producing high value products for Caterpillar Inc heavy machinery.
- Collaborated with engineers and management to implement three new product lines and constructed superstructures and conveying equipment to facilitate production.

University of Illinois Urban Agriculture Lab, Urbana IL **2012-2016**

Research Assistant/Post-Doc

- Established multi-collaborator cross discipline research project across six sites within the Chicago metroplex, analyzing vegetable production and nutrition quality, insect abundance, fruit quality, and raised bed soil dynamics.
- Collaborated with farmers, community members, and six labs in three universities in project conceptualization, data collection, and knowledge dissemination.

CIMMYT, Ciudad Obregón, México **2012**

Intern/Research Consultant

- Provided support, planning, and data collect from nine different projects in physiological response of wheat to heat and drought.
- Participated in knowledge exchange with researchers from 12 countries worldwide.

RESEARCH AND PROFESSIONAL EXPERIENCE, CONTINUED

Washington State University Extension, Pullman WA

2009 - 2011

Research Assistant

- Assisted in planning, organizing, and carrying out a 35 location grain and legume variety trial and associated research projects.
- Summarized and presented data to producers and industry representatives at multiple meetings.

United States Marine Corps

1999 - 2004

Aviation Technician

- Supervised 8 technicians in the maintaining of 12 multimillion dollar F-18 fighter jets.
- Trained other aviation technicians as a certified QA representative.
- Exposed to many cultures as deployments were across 6 countries in Asia.

TEACHING AND SERVICE EXPERIENCE

- Developed curriculum and instructed a new soil science class in fall of 2021. Made lab an integral part of the lecturing to give seamless transitions and reinforce concepts. Utilized field experiences and local experts to take learning from classroom to practical application.
- Mentored and taught over 100 students in introductory chemistry courses over 2021 and 2022. Introduced new activities to involve several interactive modalities to engage more students in learning process. Through trial and error, found new ways to gain respect and build confidence of students just starting college studies.
- Coached youth soccer and volleyball teams for YMCA youth leagues in winter of 2021 and spring of 2022.
- Lectured and evaluated student work for Introduction to Horticulture class as teaching assistant at UIUC between 2013 and 2016.
 - Totaled 245 students (freshmen and sophomore) over three courses.
 - Used innovative tactics such as pre-class presentations and discussion boards to encourage application of topic to non-major students
 - Assessed each student with interviews to inform material and methods for best learning environment for classroom.
- Tutored 25 students individually for two semesters of sophomore and junior level general and organic chemistry at BYU-Idaho.
 - Achieved no-fail rate (B+ average) and all students advanced to successive semester chemistry classes.
- Designed, planned, and helped build 7 community gardens for churches, non-profits, and food pantries.
 - Gardens are still utilized and average 5000 lbs of produce for the community per year.
 - Taught 6 community classes on gardening and nutrition to underserved and immigrant populations.

TECHNICAL SKILLS

- Proficient at utilizing Blackboard and Canvas learning platforms to build and maintain content and structure.
- Have a working knowledge with distance learning tools (Zoom, Yuja, and Canvas) and building online teaching content.
- Utilized statistical software packages SAS, R, and Python for data analysis and database administration. Advanced level statistical and analytical knowledge.
- Fluent in Mandarin Chinese. Intermediate in spoken and written Spanish.
- Experienced at maintaining many types of field and lab equipment, including; Campbell Scientific equipment, field and plot level harvester and cultivation machines, and bench electronics.

HONORS AND AWARDS

- Received invitation to Borlaug Fellows Summer institute on Global Food Security in 2014 for a two-week symposium and learned with World Food Prize winners and experts worldwide about food and agriculture security.
- Second place in best original research project at the 2015 Ecological Society Meeting in Sacramento CA.
- Community recognition for developing and designing three community gardens in the Champaign Illinois community.
- Received two Letters of Accommodation for technical work and leadership as F/A-18 mechanic. Received a Navy Unit Accommodation award for squadron accident free training hour accumulation.

OUTREACH

- **Cantata community outreach and education class series.** *Farming in the city: How does the altered urban environment affect vegetable yield and quality, soil properties, and insects?* Brookfield, IL Mar. 29, 2016. Attendance, 35.
- **Cantigny Park community and volunteer special presentation.** *Farming in the city: How does the altered urban environment affect vegetable yield and quality, soil properties, and insects?* Wheaton, IL Feb. 4, 2016. Attendance, 27.
- **Garfield Park Conservatory community lecture series.** *How does pollution and altered urban climate effect various aspects of garden vegetable production?* Garfield Park, IL Jan. 13, 2016. Attendance, 26.
- **Field day, St. Charles Horticulture Research and Extension farm.** *Variable micro-environment effects on vegetable phenology, early growth, disease pressure, and insect pests.* St. Charles, IL, July 16, 2015. And *Field results from vegetable production in a rural to urban gradient.* July 17, 2014. Total attendance, 94.
- **Connell, Pullman, and Walla Walla extension, variety testing, and wheat breeding field days.** *Late fall, winter, and early spring planting of winter, facultative, and spring wheat varieties in Northern Oregon and Eastern Washington.* June 9- July 6, 2011. Attendance, 145.

GRANTS AND FELLOWSHIPS

GRANTS

NCR-SARE Graduate Student Grant. *Farming in the city: How does the altered urban environment influence cropping system productivity, ecology, and profitability?* Sept. 2014 to Dec. 2015. (\$9,994)

Illinois Specialty Crop Block Grant. Illinois Department of Agriculture. *Assessing variability in vegetable crop yield and heavy metal recontamination across the Chicago metropolitan region.* Jan. 2015 to May 2016. (\$67,603)

Western Ag. PRS® Probes Annual Research Award Competition. *In urban food production systems will heavy metal deposition lead to increased plant uptake? Can this lead to plant growth effects?* 2014. (\$1,640)

FELLOWSHIPS

G. Victor Ball Horticulture Graduate Student Fellowship. Sept. 2014 to Sept. 2016. (\$13,500)

Agroecology and Sustainable Agriculture Program (ASAP) scholar fellowship. Aug. 2014 to Aug. 2016. (\$24,750)

2014 Borlaug Summer Institute on Global Food Security Fellow. June-July 2014. Purdue University.

D. W. Steiger Family Fellowship. Award for graduate student studying wheat genetics or breeding. 2010 and 2011. (\$2,400)

BYU-I Award of Excellence Scholarship. Student scholarship for excellence in scholarship, leadership, and service. 2007-2009. (~\$15,000, full tuition waiver)

PUBLICATIONS

Wagstaff, R. 2016. *Farming in the city: How the urban environment affects production, insect, disease, and soil dynamics of vegetable production.* PhD Dissertation. University of Illinois Champaign-Urbana.

Wagstaff, R.K., and S.E. Wortman. 2013. *Crop physiological response across the Chicago metropolitan region: Developing recommendations for urban and peri-urban farmers in the North Central US.* *Renew. Agric. Food Syst.*

Wagstaff R.K. and S.O. Guy 2012. *Off-season sowing of spring, winter, and facultative wheat cultivars in the Pacific Northwest.*

Wagstaff R.K. and S.O. Guy 2012. *Assessing vernalization, photoperiod, and freeze tolerance of nine Pacific Northwest adapted wheat cultivars in controlled environment studies.*

Wagstaff R. and S. Guy. 2011. *Off season sowing and comparative overwintering traits of spring, winter, and facultative habit wheat cultivars.* M Sci. thesis. Washington State University, USA.

MEETING PRESENTATIONS

ORAL PRESENTATIONS

Wagstaff RK, S Wortman, 2015. *Soil remediation and the threat of recontamination in urban agroecosystems.* Ecological Society of America annual meeting, Baltimore, MD.

Clay, C, **R Wagstaff**, S Wortman. 2015. Agroecosystem changes across urban to rural transects in Salt Lake City, UT and Chicago, IL. Ecological Society of America, Baltimore, MD.

Wagstaff, RK, C Bernacchi, AE Davis, JA Juvik, and SE Wortman. Farming in the city: How does the urban atmospheric environment influence vegetable crop physiology? ESA Annual Convention Sacramento, CA, 2014.

Wagstaff RK, SO Guy. 2011. Off-season sowing of spring, winter, and facultative wheat cultivars in the Pacific Northwest. WSCS annual meeting, Laramie, WY.

POSTER PRESENTATIONS

Wagstaff RK, SW Wortman. Heavy metal deposition and soil microbe abundance in urban raised bed gardens. Urban Food Systems Symposium. June 2016. Unpublished Conference Paper.

Wagstaff, RK, CA Clay, KM Ku, C Bernacchi, AE Davis, JA Juvik, and SE Wortman. Vegetable crop response and insect prevalence in urban agroecosystems. ESA Annual Convention, Baltimore, MD, 2015.

Wagstaff RK, SO Guy. 2011. Quantifying wheat vernalization, photoperiod, and freeze tolerance in controlled environment studies to predict survival at variable planting dates. Tri-society Annual Meeting San Antonio, TX.

REFERENCES

Wang Jin-Tai, Assistant Professor

Department of Civil Engineering
Oregon Technical Institute
(541) 885-1504, jintai.wang@oit.edu

Adam Davis, Professor and Dean

Department of Crop Science
University of Illinois-Urbana Champaign
(217) 333-9654, adavis1@uiuc.edu

Christy Clay, Associate Professor

Chair of Environmental Studies, Biology
Westminster College, Salt Lake City, UT
(801) 832-2375, cclay@westminstercollege.edu

Curriculum Vitae
Wei-Cheng (Wayne) Hung

waynewchong@gmail.com
(310) 295-7733
Seaver Hall 218
1 LMU Drive
Los Angeles, CA 90045

ACADEMIC APPOINTMENT

August 2022–Present Visiting Assistant Professor
Department of Chemistry and Biochemistry & Environmental Science Program
Loyola Marymount University (LMU)

January 2021–August 2022 Postdoctoral Researcher
Department of Civil and Environmental Engineering
University of California, Los Angeles (UCLA)
Mentor: Dr. Jennifer Jay

EDUCATION

2020 Ph.D. in Civil and Environmental Engineering
University of California, Los Angeles (UCLA)
Dissertation: *Prevalence, Fate, and Co-selection of Metals and Antibiotic Resistance Genes in Urban and Agricultural Soils*
Committee Members: Dr. Jennifer Jay (Chair), Dr. Richard Ambrose, Dr. Sanjay Mohanty,
and Dr. Michael Stenstrom

2017 M.S. in Civil and Environmental Engineering
University of California, Los Angeles (UCLA)
Area of Concentration: *Environmental and Water Resource Engineering*
GPA: 3.85/4.00

2014 B.S. in Chemical Engineering (Major GPA: 3.93/4.00)
B.S. in Geography (Major GPA: 3.73/4.00)
National Taiwan University (NTU), Taiwan
GPA: 3.81/4.00

TEACHING EXPERIENCE

Class names followed by an asterisk (*) indicate graduate-level courses

August 2022–Present Visiting Assistant Professor
Department of Chemistry and Biochemistry & Environmental Science Program
Loyola Marymount University (LMU)

- Teach four classes each semester with approximately 30 students per class

1. Fall, 2022 CHEM 114-02 *General Chemistry for Engineers*

2. Fall, 2022 CHEM 114-03 *General Chemistry for Engineers*
3. Fall, 2022 CHEM 114-04 *General Chemistry for Engineers*
4. Fall, 2022 ENVS 491 *Environmental Science Capstone I*

March 2022–June 2022 Co-Instructor
 Department of Civil and Environmental Engineering
 University of California, Los Angeles (UCLA)

1. Spring, 2022 CEE 298 *Spatial Analysis of Antibiotic Resistance and Metals in the Environment**

August 2021–December 2021 Lecturer
 Seaver College of Science and Engineering
 Environmental Science Program
 Loyola Marymount University (LMU)

- Employed a suite of instructional techniques to retain and maximize non-science student interest and learning
- Developed interactive hands-on activities and discussions on environmental sustainability to facilitate learning
- Communicated with the program director, colleagues, and students to meet and exceed teaching and learning goals

1. Fall, 2021 ENVS 279 *Principles of Environmental Sustainability*

TEACHING RELATED EXPERIENCE

April 2016–December 2020 Teaching Fellow
 Department of Civil and Environmental Engineering
 University of California, Los Angeles (UCLA)

- Guest-lectured on acid-base equilibria (CEE 254A) and water challenges in Southern California (CEE 58SL)
- Co-developed course syllabus and assignments with instructors and conducted weekly facilitated sessions and office hours
- Taught five classes in 11 quarters with a total of 300+ students, earning an average of 9/10 on teaching evaluations

1. Fall, 2020 CEE 254A *Environmental Aquatic Inorganic Chemistry**
2. Spring, 2020 CEE 188 *Scientific Solutions to Environmental Inequalities: Theory and Practice*
3. Winter, 2020 CEE 154 *Chemical Fate and Transport in Aquatic Environments*
4. Fall, 2019 CEE 254A *Environmental Aquatic Inorganic Chemistry**
5. Winter, 2019 CEE 154 *Chemical Fate and Transport in Aquatic Environments*
6. Fall, 2018 CEE 254A *Environmental Aquatic Inorganic Chemistry**
7. Spring, 2018 CEE 58SL *Climate Change, Water Quality, and Ecosystem Functioning*
8. Fall, 2017 CEE 254A *Environmental Aquatic Inorganic Chemistry**
9. Spring, 2017 CEE 110 *Introduction to Probability and Statistics for Engineers*
10. Winter, 2017 CEE 154 *Chemical Fate and Transport in Aquatic Environments*
11. Fall, 2016 CEE 254A *Environmental Aquatic Inorganic Chemistry**

March 2016–June 2016 Grader
 Department of Civil and Environmental Engineering
 University of California, Los Angeles (UCLA)

1. Spring, 2016 CEE 110 *Introduction to Probability and Statistics for Engineers*

RESEARCH EXPERIENCE

Postdoctoral

- Managed and mentored three doctoral students in experimentation design and delivery
- Researched and developed grant proposals for companies, government agencies, and non-profit organizations
- Introduced and developed metagenomic sequencing techniques for ongoing research projects

Graduate

- Selected as a key participant in five research projects since 2016, supervising 20+ undergraduates and interns
- Collaborated and coordinated with teams of multidisciplinary faculty, researchers, and staff from universities and public agencies
- Analyzed, synthesized, and statistically/graphically presented research results, resulting in 20+ publications/presentations
- Designed, optimized, and implemented cultural (plating), and molecular (qPCR) methods under BSL-2 conditions
- Operated various complex analytical instrumentation including GFAAS, ICP-OES, and XRF following standard protocols
- Co-wrote five grant applications to foundations and agencies, funded a total of \$60K+ for laboratory research

Projects (*lead author)

- Sep 2021–August 2022 *Monitoring of Antibiotic Resistance based on Metagenomics Analyses of Sewage in four California Cities**
- Mar 2020–June 2022 *Incorporating field-based research into the classroom under the COVID-19 pandemic: An assessment of soil lead pollution in different land-use types in Los Angeles**
- July 2019– August 2022 *Prevalence and Fate of Antibiotic Resistance Genes in Biosolids and Impact on the Resistome of Spreading Grounds**
- Develop and manage the project from proposal development to research design, and ultimately, scheduled biosolid sampling from the Hyperion Wastewater Treatment Plant and Joint Water Pollutant Control Plant
 - Monitor ARGs and ARB in biosolids and soils using heterotrophic plate count and qPCR methods
 - Perform 16S rRNA metagenomic and ARGsOAP shotgun sequencing pipeline using Linux/R for the bacterial microbiome and ARGs in biosolids and soils
- July 2018– August 2022 *Antibiotic Resistance Genes in Reclaimed Water for Irrigation in the Maneadero Valley, Mexico**
- Plan and conduct sample collection and processing of agricultural soil, wastewater, groundwater, and reclaimed water
 - Perform soil characterization and water quality analysis following EPA standard methods
 - Apply shotgun metagenomic sequencing pipeline for the bacterial microbiome in agricultural soils irrigated with recycled water
- July 2018–June 2019 *Commercially Available Garden Products as Potential Sources of Antibiotic Resistance Genes—A Survey*
- Developed and optimized TaqMan probe-based assay of *Coxiella burnetii* (Q fever) in gardening products by applying fundamental engineering principles focusing on defining/testing key parameters to optimize the experimental process
 - Created data visualization by processing and analyzing large qPCR datasets to provide data-driven insights in a published manuscript
- June 2017–June 2020 *UC Multi-campus Research Programs and Initiatives “Fighting Drought with Stormwater”**
- Designed and operated full-scale planted stormwater biofilters for sewage-polluted stormwater
 - Evaluated removal of pathogens (i.e., MRSA), genetic markers (i.e., Salmonella), and metal(loid)s from 200+ biofilter influents, effluents, and soil cores by cultural methods, qPCR, metagenomics, and ICP-OES
- April 2016–October 2018 *Assessment of Lead Concentrations in Top Soil of 100 Parks in Los Angeles**
- Conducted laboratory analysis for soil Pb concentrations from 100 urban Los Angeles parks using GFAAS, ICP-OES, and XRF
 - Performed statistical and GIS analysis to examine environmental and urban factors leading to Pb contamination and developed complex analytical findings into statistics and maps in an aesthetic and easy-digestible manner

Undergraduate

January 2013–June 2014	<i>Attachment of Kidney Stones (CaOx) Induce Formation of New Phases in Supported Lipid Bilayers</i>
March 2012–December 2012	<i>Investigation of Thermal Insulation Performance of Glass/Carbon Fiber-Reinforced Silica Aerogel Composites</i>
January 2011–February 2012	<i>Effect of Process Conditions on Simultaneous Removal and Recovery of Boron from Boron-Laden Wastewater using Improved Bipolar Membrane Electrodialysis (BMED)</i>
June 2011–August 2011	<i>Effects of Different Nutrients on Community Respiration Rate at Feitsui Reservoir</i>

PUBLICATIONS AND PRESENTATIONS

Names followed by an asterisk (*) indicate UCLA undergraduate students

Published Journal Articles (Selected)

1. **Hung, W. C.**, Adams, N., Ibrahim-Watkins, Z. R., Nguyen*, D., Jain*, T. & Jay, J. A. Incorporating field-based research into remote learning: An assessment of soil lead pollution in different land-use types in Los Angeles. (2022) *Environmental Research*. <https://doi.org/10.1016/j.envres.2022.114480>.
2. Rugh, M., Grant, S. B., **Hung, W. C.**, Jay, J. A., Parker, E., Feraud, M., Li, D., Avasarala, S., Holden, P. A., Liu, H., ... & Cao, Y. (2022) Highly variable removal of pathogens, antibiotic resistance genes, conventional fecal indicators, and human-associated fecal source markers in a pilot-scale stormwater biofilter operated under realistic stormflow conditions. *Water Research*, 118525. <https://doi.org/10.1016/j.watres.2022.118525>.
3. **Hung, W. C.**, Yu, M., Truong, N.*, Jones, A. C., Mahendra, S., & Jay, J. A. (2022) Tracking antibiotic resistance genes and antibiotic-resistant bacteria through the environment near a biosolid spreading ground: resistome changes, transport, and metal co-selection. *Science of the Total Environment*, 153570. <https://doi.org/10.1016/j.scitotenv.2022.153570>.
4. **Hung, W. C.**, Horng, R. S., & Tsai, C. H. (2022) Effect of process conditions on simultaneous removal and recovery of boron from boron-laden wastewater using improved bipolar membrane electrodialysis (BMED). *Journal of Water Process Engineering*, 102650. <https://doi.org/10.1016/j.jwpe.2022.102650>
5. **Hung, W. C.**, Rugh, M., Feraud, M., Avasarala, S., Kurylo, J., Gutierrez*, M., Jimenez*, K., Truong*, N., Holden, P. A., Grant, S. B., Liu, H., Ambrose, R. F., & Jay, J. A. (2021) Prevalence of antibiotic resistance genes and co-selection of metal(loid)s in green stormwater infrastructure in Southern California. *Journal of Hazardous Materials*, 127469. <https://doi.org/10.1016/j.jhazmat.2021.127469>.
6. Li, D., Van De Werfhorst, L., Rugh, M., Feraud, M., **Hung, W. C.**, Jay, J. A., Cao, Y., Parker, E., Grant, S. B., Holden, P. A. (2021) Limited Bacterial Removal in Full Scale Stormwater Biofilters as Evidenced by Community Sequencing Analysis. *Environmental Science & Technology*, 55 (13), 9199-9208. <https://doi.org/10.1021/acs.est.1c00510>
7. **Hung, W. C.**, Horng, R. S., & Shia, R. E. (2021) Investigation of thermal insulation performance of glass/carbon fiber-reinforced silica aerogel composites. *Journal of Sol-Gel Science and Technology*, 97(2), 414-421. <https://doi.org/10.1007/s10971-020-05444-3>.
8. Cira, M., Echeverria-Palencia, C. M., Callejas, I., Jimenez, K., Herrera, R., **Hung, W. C.**, Colima, N., Schmidt, A. & Jay, J. A. (2021) Commercially available garden products as important sources of ARGs—a survey. *Environmental Science and Pollution Research*, 1-8. [10.1007/s11356-021-13333-7](https://doi.org/10.1007/s11356-021-13333-7).
9. Parker, E. A., Grant, S. B., Cao, Y., Rippey, M. A., McGuire, K. J., Holden, P. A., Feraud, M., Avasarala, S., Liu, H., **Hung, W. C.**, Rugh, R., Jay, J. A., Peng, J., Shao, S., & Li, D. (2021) Predicting Solute Transport through Green Stormwater Infrastructure with Unsteady Transit Time Distribution Theory. *Water Resources Research*, 57(2), e2020WR028579. <https://doi.org/10.1029/2020WR028579>.
10. **Hung, W. C.**, Cira*, M., Jimenez*, K., Elston*, I., & Jay, J. A. (2018) Preliminary assessment of lead concentrations in topsoil of 100 parks in Los Angeles, California. *Applied Geochemistry*, 99, 13-21. <https://doi.org/10.1016/j.apgeochem.2018.10.003>.

Manuscript Currently in Peer-Review

1. Feraud, M., Ahern, S. P., Parker, E. A., Avasarala, S., Rugh, M. B., **Hung, W. C.**, Li, D., Van De Werfhorst L. C., Kefela, T., Hemati, A., Mehring, A. S., Cao Y., Jay, J. A., Liu, H., Grant, S. B., Holden, P. A. (In Review) Ammonium and nitrate fates, and N₂O emissions in a full-scale stormwater biofilter operating under transient flow conditions with varying N loading. *Water Research*.

Manuscript in Development (Target Journal)

1. Whitener, V., Cira*, M., **Hung, W. C.**, Mendoza-Espinosa, L., & Jay, J. A. (Water Research) Antibiotic resistance genes in reclaimed water for irrigation in the Maneadero Valley, Mexico.
2. **Hung, W. C.**, Yu, M., Mendoza, L., Jones, A. C., Mahendra, S., & Jay, J. A. (Journal of Hazardous Materials) Impact of long-term application of class A biosolids on soil microbial community.
3. **Hung, W. C.**, Whitener, V., Cira, M., Mendoza-Espinosa, L., & Jay, J. A. (Journal of Hazardous Materials) Bacterial community changes in surface agricultural soils with recycled water in the Maneadero Valley, Mexico.

Reviewers for International Journals and Conferences

1. Journal of Building Environment
2. Environmental Engineering Science
3. Frontiers in Microbiology
4. Journal of Hazardous Materials
5. Journal of Trace Elements and Minerals

Oral Presentation

1. Whitener, V., **Hung, W. C.**, and Jay, J. A. (2019) Antibiotic resistance genes in reclaimed water for irrigation in the Maneadero Valley, Mexico. 258th American Chemical Society National Meeting, San Diego, CA. August 25-29, 2019
2. **Hung, W. C.**, Wang, Y., Lin, Y. (2013) Developing Strategies and Strategic Planning for Public Transportation in the Villages of Xicun and Ankang, Xinyi District, Taipei City. Conference of 8th Practical Exhibition for Departments of Planning, Hsinchu, Taiwan. June 2, 2013

Poster Presentation

1. Horng, R. S., **Hung, W. C.**, and Kuo, J. (2020) Investigation of using multi-hydroxyl ionic liquid polymer as catalyst to produce propylene carbonate. 5th International Conference on Mechanical Structures and Smart Materials, Ho Chi Minh City, Vietnam. July 26, 2020.
2. Zhang, M., Tseng, H., Chiu, B., **Hung, W. C.**, and Horng, R. S. (2020) Investigation of optimal esterification conditions of Lactic Acid with Butanol by Using Response Surface Methodology. 5th International Conference on Mechanical Structures and Smart Materials, Ho Chi Minh City, Vietnam. July 26, 2020.
3. Rugh, M., **Hung, W. C.**, Sumant, A., Liu, H., and Jay, J. A. (2019) Survey of antibiotic resistance gene and heavy metal co-selection in UC campus stormwater biofilters. 258th American Chemical Society National Meeting, San Diego, CA. August 25-29, 2019.
4. **Hung, W. C.** and Jay, J. A. (2019) Effect of copper on the spread of sulfonamide resistance genes and class I integrons in compost-based biofilters. UNC Water Microbiology Conference, Chapel Hill, NC. May 13-16, 2019.
5. **Hung, W. C.**, Lai, C., Shia, F. (2011) The Effects of Different Nutrients on Community Respiration Rate in Feitsui Reservoir. Poster presentation at the final presentation of undergraduate summer program in Research Center for Environmental Changes, Academia Sinica.

Invited Talks

1. **Hung, W. C.** (2022) Integrating interdisciplinary research and citizen science to study antibiotic resistance in urban and agricultural soils. Department of Natural and Applied Sciences, University of Wisconsin-Green Bay.
2. **Hung, W. C.** (2022) Prevalence of antibiotic resistance genes and co-selection of metal(loid)s in green stormwater infrastructure in Southern California. Department of Chemistry and Biochemistry, Loyola Marymount University.

ACADEMIC SERVICES

July 2021–Present Financial Aid and Scholarships Reviewer
Office of Academic and Student Affairs
University of California, Los Angeles (UCLA)

- Evaluate undergraduate engineering scholarship applications based on the scoring rubrics

AWARDS

1. Nominated for the UCLA Chancellor's Award for Postdoctoral Research (2022)
2. Finalist, 3-Minute Research Pitch Competition (2021)
3. Campus Alternate, Phi Beta Kappa Alumni in Southern California International Scholarship (2020)
4. Southern California Scholarship, STUF and Yin-Chin Foundation of USA; US\$10,000 (2018)
5. Taiwan Government Scholarship, Ministry of Education, Taiwan; US\$32,000 (2018)
6. CESASC Scholarship, Chinese-American Engineers and Scientists Association of Southern California; US\$1,000 (2018)
7. 3rd Place, Creative Competition on Spatial Information Sciences, National Development Council (2014)
8. Dean's Award (top 5% ranking graduate), College of Science, National Taiwan University (2013)
9. International Exchange Scholarship, College of Science, National Taiwan University US\$700 (2013)
10. College Student Research Scholarship, Academia Sinica; US\$1,000 (2011)
11. Presidential Award (top 5% ranking student), National Taiwan University (2011)
12. Presidential Award (top 5% ranking student), National Taiwan University (2010)

GRANTS

1. Sources and fate of microbial contaminants in coastal watersheds near Los Angeles: a quantitative approach combining mass balance, source identification, and remote sensing. USC Sea Grant; US\$130,000 (2021) (lead-author)
2. Tracking antibiotic resistant organisms and antibiotic resistance genes through the environment to people in two geographical areas in California; Joan Doren Family Foundation; US\$250,000 (2020) (lead-author)
3. Antibiotic and heavy metal-driven co-selection of antibiotic resistance in stormwater runoff microcosms. National Water Research Institute Fellowship Program; US\$5,000 (2020) (lead-author)
4. ARG prevalence and fate in biosolids and impact on the resistome of spreading grounds. World Water Forum College Grant, Metropolitan Water District of Southern California; \$20,000 (2019) (lead-author)
5. Antibiotic resistance genes in stormwater biofilters: implications for hotspot identification. National Water Research Institute Fellowship Program; \$10,000 (2018) (co-author)
6. Reclaimed water as a potential source of antibiotic resistance in agricultural soil, Northern Mexico. World Water Forum College Grant, Metropolitan Water District of Southern California, US\$10,000 (2017) (co-author)
7. Assessment of lead concentrations in top soil of 100 Los Angeles parks. The Skyscraper Foundation; \$25,000 (2016) (lead-author)

WORK EXPERIENCE

August 2014–July 2015 Pump Station Technician (Military Service)
Taipei City Government, Taiwan

- Operated and monitored floodgates to guarantee uninterrupted operation for typhoon and flood events
- Performed and managed routine maintenance tasks for 12 pump systems and two debris removal screens

ACADEMIC AND COMMUNITY SERVICES

Supervision of Graduate Research Projects

2022	Ileana Callejas, Karina Jimenez, Katie Osborn, Marisol Cira, Yu-Wei Kong, and Zanolbia Ibrahim-Watkins
2021	Ileana Callejas, Karina Jimenez, Marisol Cira, Naomi Adams, Yu-Wei Kong, and Zanolbia Ibrahim-Watkins

Supervision of Undergraduate Research Projects

2022	Lilah Fienberg, Tricia Jain, Dorothy Nguyen
2021	Lilia Mendoza, Tricia Jain
2020	Nhi Truong
2019	Anita Sie, Venezia Ramirez, Mathew Gutierrez, Pauline Nguyen
2018	Mathew Gutierrez
2017	Marisol Cira, Karina Jimenez, Imani Elston, Jin-Yi Wu

Supervision of Center for Excellence in Engineering and Diversity (CEED) Projects

2018	Saimon Hagu, Aidan Hasegawa, Ryan Ortiz, Richard Trujeque
2017	Eric Oajaca, Mathew Gutierrez, Elizabeth Paz, Cristian Rodriguez

PROFESSIONAL MEMBERSHIPS

1. American Chemical Society
2. American Water Works Association
3. National Water Research Institute
4. Chinese-American Engineers and Scientists Association of Southern California

SKILLS

Software: R Studio, SPSS, SAS, MATLAB, COMSOL, Aspen Plus, AutoCAD, Grapher, ArcGIS, QGIS, GeoDa, ENVI
 Languages (proficiency): Mandarin Chinese (Native); Hokkien (Native); English (Professional); Japanese (Limited)

CERTIFICATES

1. Engineer-in-Training (EIT) #159292 certified by NCEES (2016)
2. Japanese Language Proficiency Test N3 (2015)
3. Mandarin Tour Guide certified by Ministry of Examination, Taiwan (2014)
4. English Tour Manager certified by Ministry of Examination, Taiwan (2014)
5. English Tour Guide certified by Ministry of Examination, Taiwan (2013)
6. Mandarin Tour Manager certified by Ministry of Examination, Taiwan (2013)

Dr. Travis M. Owen

Business Address

Missouri Valley College
500 E. College Street
Marshall, MO 65340
660-831-4070
owent@moval.edu

Home Address

30989 Muschaney Road
Sedalia, MO 65301
319-471-7951

Education

The University of Iowa

Iowa City, IA

Doctor of Philosophy, Chemistry, December 2012. Thesis: Oxidation of Nitrogen Monoxide by Oxoiron(IV) Complexes: Mechanistic Studies and Related Investigations with an Iron Nitrosyl Complex.

Missouri State University

Springfield, MO

Bachelor of Science, Chemistry, Minor in Mathematics, Summa Cum Laude, December 2005. Participated in an undergraduate research program resulting in a presentation. Title: Preparation and Studies of Highly-Colored Anionic Fe(II) *tris*(cyanoximates).

Awards

John McCallum Excellence in Teaching Award (2018), Graduate Student Senate Travel Award (2012), Departmental Travel Award (2012), Council for Teaching Outstanding Teaching Assistant Award (2008), Department of Chemistry Teaching Assistant Award (2007), Shriner Fellowship (2006).

Teaching Experience

Missouri Valley College, Department of Math and Science Marshall, MO

General Chemistry I and II – Associate Professor.

Prepared and delivered class lectures, prepared homework problem sets, quizzes and exams. Prepared and delivered pre-laboratory lectures, oversaw laboratory sessions. (August 2014 – Present)

Organic Chemistry I and II – Associate Professor.

Prepared and delivered class lectures, prepared homework problem sets, quizzes and exams. Prepared and delivered pre-laboratory lectures, oversaw laboratory sessions. (August 2017 – Present)

Analytical Chemistry – Associate Professor.

Prepared and delivered class lectures, prepared homework problem sets, quizzes and exams. Prepared and delivered pre-laboratory lectures, oversaw laboratory sessions. (August 2017 – Present)

Physical Science – Assistant Professor.

Prepared and delivered class lectures, prepared homework problem sets, quizzes and exams. Prepared and delivered pre-laboratory lectures, oversaw laboratory sessions. (August 2015 – May 2016)

Environmental Science – Associate Professor.

Prepared and delivered class lectures, prepared homework problem sets, quizzes and exams. (August 2014 – Present)

Honors: Humanity & Science – Associate Professor.
Prepared and delivered class lectures, led socratic discussions, prepared reading responses, quizzes and exams. (August 2017 – Present)

Earth Science: Soils and Water – Associate Professor.
Prepared and delivered class lectures, prepared homework problem sets, quizzes and exams. (January 2020 – Present)

Freshman Seminar – Associate Professor.
Prepared and delivered class lectures, prepared homework problem sets, quizzes and exams. (August 2015 – Present)

Career Exploration and Development – Associate Professor.
Prepared and delivered class lectures, prepared homework problem sets, quizzes and exams. (August 2022 – Present)

The University of Iowa, Department of Chemistry Iowa City, IA
Principles of Chemistry II – Instructor.
Prepared and delivered class lectures, prepared homework problem sets, quizzes and exams.
Prepared and delivered pre-laboratory lectures, oversaw teaching assistants and prepared laboratory exams. (June 2013 – August 2013, June 2014 – August 2014)

Principles of Chemistry II Laboratory – Instructor.
Prepared and delivered pre-laboratory lectures, oversaw teaching assistants and assisted in preparing exams with the lecture portion of the course. (August 2013 – May 2014)

Cornell College, Department of Chemistry Mount Vernon, IA
Principles of Chemistry I – Instructor.
Prepared and delivered class lectures, prepared homework problem sets, quizzes and exams. (February – May 2013)

Principles of Chemistry II – Instructor.
Prepared and delivered class lectures, prepared homework problem sets, quizzes and exams. (February – May 2013)

**Research
Experience**

Missouri Valley College Marshall, MO
Advising and leading a collaborative research project with a colleague and multiple undergraduate students over the past five years. Collected water samples and completed extensive analytical surveys of samples to determine water quality including, but not limited to, pH, conductivity, nitrate levels, phosphorus levels, dissolved oxygen and gravimetric analysis of solids. Surveys were conducted in the local Salt Fork Creek in Saline County Missouri to correlate water quality and riparian zones to observed presence of unique fish species. A second project consists of analyzing over 180 water samples from the entirety of the Mississippi River collected to better understand agricultural, industrial and power plant effects on the water quality.

The University of Iowa Department of Chemistry Iowa City, IA
Advisor: Prof. Jan-Uwe Rohde
Investigated the reactivity of nitric oxide and nitrite with nonheme iron complexes. Results from this research have expanded the understanding of how high-valent iron complexes react with the

free radical nitric oxide, providing insight to relevant biological reactions. Synthesized and characterized new iron(II) complexes relevant to the study involving high-valent iron and nitric oxide. Techniques used include aerobic and anaerobic synthesis, Schlenk and glovebox manipulations, ¹H and heteronuclear NMR spectroscopy, electrospray mass spectrometry, FT-IR spectroscopy, UV-vis spectroscopy, single crystal X-ray diffraction, cyclic voltammetry. (December 2006 – December 2012)

Missouri State University, Department of Chemistry Springfield, MO

Advisor: Prof. Nikolay Gerasimchuk

Synthesized and characterized novel *tris*(cyanoximato)iron(II) complexes *via* anaerobic metal complexation. New complexes were characterized as potential sensitizers to activate triplet oxygen to singlet oxygen. Techniques used include synthesis, high-temperature reductions, Schlenk manipulations and synthesis, ¹H NMR spectroscopy, FT-IR spectroscopy, UV-vis spectroscopy, single crystal X-ray diffraction. (August 2004 – December 2005)

Presentations “Effects of Agricultural Practices on Water Quality and Sustainability of a Central Missouri Waterway.” Z. Baker, W. Hiler, T. M. Owen. 58th Meeting of the Missouri Academy of Science in Fayette, MO, United States. April 22-23, 2022.

“Effects of Water Quality on Unique Darter Species of Central Missouri.” K. Ndlovu, W. Hiler and T.M. Owen. Alpha Chi National Honor Society 2019 National Convention in Cleveland, OH, United States. April 4-6, 2019.

“Reactivity of an oxoiron(IV) complex toward nitrogen monoxide.” T. M. Owen and J.-U. Rohde. 243rd ACS National Meeting and Exposition in San Diego, CA, United States. March 25-29, 2012.

“Investigation of the Oxidation of Nitric Oxide by Non-Porphyrin Oxoiron(IV) Complexes.” T. M. Owen and J.-U. Rohde. 44th Midwest ACS Regional Meeting in Iowa City, IA, United States. October 21-24, 2009.

Publications “Reaction of an Oxoiron(IV) Complex with Nitrogen Monoxide: Oxygen Atom or Oxide(•1-) Ion Transfer?” Owen, T. M.; Rohde, J.-U. *Inorg. Chem.* **2011**, *50*, 5283.

“Synthesis and Characterization of Two Intensely Colored Tris(benzoylcyanoxime)iron(II) Anionic Complexes.” Owen, T.; Grandjean, F.; Long, G. J.; Domasevitch, K. V.; Gerasimchuk, N. *Inorg. Chem.* **2008**, *47*, 8704.

Activities Faculty Advisor, Sigma Zeta National Math & Science Honor Society, Chi Chapter, 2018-2020.

Member, American Chemical Society, 2012-2013.

References Dr. Diane Bartholomew
VP of Academic Affairs
Cleveland University
10850 Lowell Ave.
Overland Park, KS 66210
913-234-0665

diane.bartholomew@cleveland.edu

Dr. Andrew Linsenbardt
Math and Science Division
Missouri Valley College
500 E. College Street
Marshall, MO 65340
660-831-4348
linsenbardta@moval.edu

Prof. Waylon Hiler
Math and Science Division
Missouri Valley College
500 E. College Street
Marshall, MO 65340
660-831-4203
hilerw@moval.edu

Appendix E. Letters of Support

Dr. Nate Bickford
DOW 208
Oregon Tech
Klamath Falls, OR 97601

Dr. Scott Prah
EERE Department
Oregon Institute of Technology
Wilsonville, OR 97070

March 13, 2023

Dear Nate:

I am writing to express my support for the proposed new MS degree program in Natural Resources at Oregon Tech. The Electrical Engineering and Renewable Energy department is thrilled at the prospect of a new degree program that will broaden the scope of science education at our institution.

I believe that the new program has the potential to attract a diverse range of students who are interested in pursuing careers in various scientific fields. Moreover, some of the classes that are being considered for this new program would be highly beneficial for students enrolled in our Masters in Renewable Energy Engineering program.

The potential overlap between the two programs could create a valuable opportunity for collaboration and interdisciplinary learning. Our students could benefit from the diverse set of skills and knowledge that are offered through the new program, and vice versa.

We are excited about the possibility of this new program and we look forward to the opportunities it may bring. Thank you for considering our support for this initiative.

Sincerely,



Scott Prah
Professor & Chair EERE



United States Department of the Interior



FISH AND WILDLIFE SERVICE

Klamath Falls Fish and Wildlife Office
1936 California Avenue
Klamath Falls, Oregon 97601
(541) 885-8481 FAX (541) 885-7837

February 17, 2023

Oregon Institute of Technology
Attn: Nate Bickford, Ph.D., Department Chair of Natural Sciences
3201 Campus Drive
Klamath Falls, Oregon 97601

Subject: Letter of Support for Creation of Master's Degree Program in Natural Sciences at Oregon Institute of Technology (OIT)

Dear Dr. Bickford,

The U.S. Fish and Wildlife Service's Klamath Falls Fish and Wildlife Office (Service) is supportive of the establishment of OIT's Master's Degree Program in the Natural Sciences Department. The Service is excited and optimistic about the vision and purpose of the program to increase the number of individuals in the job force that can work with local, state, and federal partners to address ecosystem challenges.

The Klamath Basin contends with many of the biggest environmental and natural resource management challenges in the United States, and indeed the world: catastrophic wildfire, drought, conflict over limited water resources, species extinction, environmental health, and rural poverty. However, there are also many opportunities to address these challenges. The largest dam removal in U.S. history is imminent in the Klamath River, local communities and Tribes are coming together to address climate change, and historic efforts are being made to protect endangered species and their habitats. It is against this backdrop that OIT seeks to establish a new Master's in Natural Resources program. This new program would create and expand opportunities for formative student experiences, develop research and teaching capacities, and increase the prospective job candidate pool for natural resources management positions in Klamath Falls and southern Oregon. It is expected that this program will draw strong student interest and produce qualified candidates for local and national job markets.

The Service supports research and science collaborations to address the Klamath Basin's environmental challenges, and a new generation of scientists is needed meet these challenges. As such, the Service foresees the potential for rich reciprocal relationships between OIT and natural resources management entities through this program.

If you have any questions or would like to discuss this further, please feel free to contact me at 541-891-4202 or adam_johnson@fws.gov.

Sincerely,

Adam Johnson
Field Supervisor



United States Department of the Interior
BUREAU OF LAND MANAGEMENT
MEDFORD DISTRICT OFFICE
CASCADE-SISKIYOU NATIONAL MONUMENT



January 2, 2023

Dear Dr. Kellermann,

This is a letter of support for a new Master's Degree Program in Natural Resources as proposed by the Natural Sciences Department at Oregon Institute of Technology. The Cascade-Siskiyou National Monument of the Bureau of Land Management is currently working collaboratively with you on a couple of natural resource projects. We have discussed the needs for this program and agree that there is a need in southern Oregon.

I fully support this program and look forward to working with you and the future students on projects within the Cascade-Siskiyou National Monument.

Sincerely,

Charles Schelz

Charles Schelz / Ecologist
Bureau of Land Management
Cascade-Siskiyou National Monument
3040 Biddle Road
Medford, Oregon 97504
cschelz@blm.gov
(458) 265-9335



File Code: 2400

Date: December 14, 2022

Dear Dr. Nate Bickford,

With this letter, I would like to express my support for the Oregon Institute of Technology's Master's Degree in Natural Resources. The Fremont-Winema National Forest is often challenged with finding skilled employees that are educated in natural resources and willing to live in rural communities. I feel the proposed master's degree program would be very beneficial to increasing the capacity of our local workforce for our natural resource agencies. This program would also create opportunities for students to engage in local collaborative and partnership efforts to address natural resource issues in our local area. I fully support and encourage the development of a master's degree program in natural resources.

Sincerely,

SHANDA DEKOME
Acting Forest Supervisor

cc: Mercury WP FY2023-599520



Oregon State University
College of Forestry

DEPARTMENT OF FOREST ECOSYSTEMS AND SOCIETY
204 Richardson Hall, Corvallis, OR 97331
T 541-737-1498 | F 541-737-5814
<http://nature.forestry.oregonstate.edu>
mark.needham@oregonstate.edu

December 14, 2022

To Whom it May Concern,

My name is Dr. Mark Needham and I serve as the Director of Graduate Programs in the Department of Forest Ecosystems and Society (FES) at Oregon State University (OSU). Earlier this year, we became aware of the new Master of Science (MS) in Natural Resources degree being proposed by the Oregon Institute of Technology (OIT).

After reviewing this proposal and engaging in conversations with colleagues at OIT, we concluded that this proposed degree was not similar and would not compete with our online / E-Campus Master of Natural Resources (MNR) degree program (<https://ecampus.oregonstate.edu/online-degrees/graduate/natural-resources>). There is some overlap between this new degree proposed by OIT and our on-campus Master of Science (MS) and Master of Forestry (MF) in Forest Ecosystems and Society degree programs (<https://fes.forestry.oregonstate.edu/graduate-programs/fes-degree-offerings>), but we do not see too much direct competition and there seem to be some possible future synergies and collaborative opportunities (e.g., courses from OSU that could fulfill some OIT needs or at least be an option; co-teaching / course cross-listing opportunities; opportunities for OIT students to collaborate with the OSU Extension Service; developing bridge opportunities from OIT MS programs into OSU PhD programs).

Therefore, we support OIT's development of their proposed MS in Natural Resources degree. We believe that this program is exciting and complementary to our degree programs at OSU. We look forward to working with OIT where relevant and appropriate.

Please contact me if you have any questions or require any additional information. My contact information is listed in the letterhead above.

Sincerely,

Mark Needham, PhD
Professor

Director of Graduate Programs in the Department of Forest Ecosystems and Society
Director of the Natural Resources, Tourism, and Recreation (NATURE) Studies Lab
International Collaborator at the Institute for Communities and Wildlife in Africa (iCWild)

Hi Nate,

Please see the language below regarding the potential collaboration between PHM and Natural Resources.

The faculty of the Population Health Management program would like to show support for the proposed Natural Resources graduate program. The two academic programs overlap significantly in the area of environmental health. A graduate program in natural resources could support research efforts being carried out in the area of health and the environment, particularly with the research projects at Oregon Tech's AIRE Center (Center for Advancing Interdisciplinary Research on the Environment). There is potential collaboration for community projects at the Population Health Management Research Center. Lastly, there may be potential to develop new courses as well.

Thank you,
Kyle



*Celebrating 75 Years
Of Applied Learning*

Kyle A. Chapman, Ph.D.

He/Him/His

*Director, Center for Advancing Interdisciplinary Research on the Environment and Health
(AIRE CENTER)*

Associate Professor of Sociology and Population Health, Humanities and Social Sciences

Oregon Institute of Technology

3201 Campus Drive, Klamath Falls, OR 97601

kyle.chapman@oit.edu | 541.885.1006 | www.oit.edu



4/19/2023

Jherime L. Kellermann, PhD
Professor
Natural Sciences Dept.
Oregon Institute of Technology
3201 Campus Drive
Klamath Falls, OR 97601

Dear Dr. Kellermann,

This is a letter of support for the new Master's Degree in Natural Resources as proposed by the Natural Sciences Department at Oregon Institute of Technology. After having spent 6 years working in Klamath Falls for Oregon State University (2014 to 2020), I worked collaboratively with you in partnership to teach a few classes in natural resources and fire ecology, which included a couple of field trips. At that time, you and I had discussed the potential development of a Master's degree program in Natural resources because we had both identified the need for a program like this to service a need identified in Klamath and Lake County. Indeed, we had identified a need for southern Oregon and beyond.

Very pleased to see the program has been elevated to a formal proposal and submitted to the Provost's Council and HEC. I fully support this program and foresee many collaborative ventures in the future – even enhancing the efforts you and I successfully accomplished. A formal program between our two Institutions would provide a much easier path to work together, enable articulations, and hopefully transfers of students between our schools – and much more.

Anything I can do to further promote this Program, please let me know. Thank you.

Only the Best,

A handwritten signature in black ink, appearing to read "Daniel M. Leavell". The signature is somewhat stylized and enclosed within a faint, hand-drawn oval shape.

Daniel M. Leavell, PhD.
Associate Professor of Practice
Oregon State University
College of Forestry, Forest Engineering, Resources, and Management Dept.

December 15, 2022

Nate Bickford, Ph.D.
Oregon Institute of Technology
321 Campus Drive
Klamath Falls, OR 97601

Letter of Support for master's degree in Natural Resources

Dear Dr. Bickford,

The Nature Conservancy (TNC) is pleased to express strong support for the proposed development of a master's degree in Natural Resources. As a resource manager in the Klamath Basin for TNC, I lead the Conservancy's efforts to ensure a rigorous evidence base to direct conservation actions. Our science-based mission requires we invest extensive efforts of collaboration with universities. Developing and implementing sciences-based natural resources management offers our best efforts for a sustainable future.

Across the Pacific Northwest, promoting the health and resilience of our varied ecosystems is one of the Conservancy's primary conservation objectives. Providing educational advancement builds a strong future through continued academic achievements.

TNC strives to be a leader in the development and use of ecological based management approaches at our preserves and through our agency and stakeholder collaborations. TNC has managed lands in the Klamath Basin for over 40 years. Sycan Marsh Preserve, in the Upper Sycan Watershed of the Klamath Basin is a complex of forested uplands with seven HUC six watersheds, providing streams of high-quality water which feed into the complex wetland systems. Working in the headwaters offers the best opportunity to develop lasting conservation benefits to the entire Klamath Basin. Here our research in collaboration with federal agencies and universities has been ongoing since 2000. Results have been incorporated into improved management policies, and guidelines. Our research has recently been a testimony on the effectiveness of our treatments to diminish the impacts of high severity. This is being considered a model in developing and applying active fire and forest management approaches to promote ecosystem resilience in the face of a warming climate.

TNC's global mission of "conserving the lands and waters on which all life depends" cannot be met solely by focusing on protecting and managing small nature preserves. Our success is instituted on Partnerships. We acknowledge and have worked closely with the Klamath Tribes to support their cultural and traditional stewardship to sustain their reserved rights. We have a long and eminent history of successful collaboration with the Forest Service and other landowners in Oregon. For more than two decades, TNC has worked effectively to achieve collaboratively developed goals and implement a Long-Range Strategy for the Lakeview Federal Stewardship Unit, including additional funding to support collaborative restoration, monitoring, and research.

Through these efforts we have developed an extensive network of relationships with natural resource managers, stakeholders, tribes, and policy makers. Through the trust of long-term partnerships, we are well positioned to extend resources management to both 1) help develop and

incorporate the diverse perspectives from proposed research and 2) to facilitate the subsequent technology and information transfer.

In summary, the proposed master's degree in Natural Resources will be highly valuable to TNC's efforts to adaptively management our ecosystems for resilience in the face of a changing environment. I am excited to learn of your investment into our future and potentially by hosting research on our preserves, leveraging our partnerships and relationships, and being an active participant on the research team.

If you have any questions, please contact me at cbienz@tnc.org or (541) 891-0062.

Sincerely,

Craig Bienz.
Director of Sycan Marsh
The Nature Conservancy in Oregon

Appendix F: External Review

Responses from review team (Matt Johnson [Cal Poly Humboldt], Megan Skinner [US Fish & Wildlife Service], Craig Bienz [The Nature Conservancy])

The panel is asked to assess the program within the present and projected future contexts, addressing program elements, faculty, need, and resources.

1. Program

a. The program objectives and requirements; the mechanisms for program administration and assessment.

The objectives and requirements are excellent and well described. Mechanisms for assessment are indicated, but some additional detail could be provided (i.e., example assessment tools or rubrics in an Appendix). Also, we recommend a simple assessment tool (score sheet with rubric) for graduate committees to assess each MS student's thesis proposal and final thesis document. Lastly, time to degree completion should be tracked carefully, and practices adjusted accordingly, as this can be a challenge for some MS programs.

Dr Bickford has a lot of experience building graduate programs; leadership is supportive, the campus will likely be hiring more faculty, more leeway for faculty focus on research. Those all bode well for the success of them program. New and additional TA support, which provides support for grads and more time for faculty, will be essential. Sounds like a mechanism of a course released based on research students (e.g., 2 grads and 7 undergrads = course release) will be implemented, which is excellent. Could consider a "running average" model so loads faculty loads stay more stable. Program also plans to have adjuncts serve as graduate mentors, which is good for a smaller program like this one.

The program is focused on increasing capacity to manage, research, and monitor our efforts to understand and solve the (unprecedented environmental challenges) problems we face, from local to global. Through the curriculum and partnerships develop through OIT, there would be an expanded and collaborative effort to address the objectives. Through the creation of a Masters in Natural Resources program capacity would be increased in people and knowledge. Adding to the knowledge circle the Master's Program would be in close consultation with existing Departments at OIT. This may leverage knowledge in coordination with other academic institutions and research facilities.

Program administration follows the current policies of OIT, including academic credibility. Emphasis in the program is placed on active experiential learning through engagement in real-world, real-time problems in collaboration with local and regional agency partners.

b. The program's alignment with the institution's mission and strategic objectives.

Excellent.

The proposed program closely aligns with the Oregon Tech mission and pillars of commitment to innovation: Oregon Tech strives to be entrepreneurial and on the leading edge of student engagement, innovative teaching, and collaborative research. And commitment to community. It would contribute

to institutional and statewide goals for student access and diversity, quality learning, research, knowledge creation and innovation, and economic and cultural support of Oregon and its communities.

This program is pitched largely as meeting a regional need, being the only one of its kind east of Cascades in Oregon, and much of the narrative focuses on what students could learn about in the region, projects they could do in the region, etc. But as pointed out in the proposal, the issues in the region are illustrative of issues faced all over the world, so the regional learning has national and global applicability. We think that point could be made more explicitly.

c. The depth and breadth of coverage in terms of faculty availability and expertise, regular course offerings and directed study, and access to and use of support resources within and external to the institution.

Good, given the constraints in number of faculty and breadth of expertise. Any capacity for the growth in enrollment that may come from this program leading to another faculty hire(s)?

The graduate course list is fairly thin, so most grad students will likely end up taking many or most of the courses in the curriculum. That's difficult to avoid with a small program, but rotating course topics as much as feasible and bringing in adjuncts and professionals to teach occasional courses can help. Will need to create modern and serviceable faculty web pages.

d. The relationship of this program to undergraduate and other graduate programs at the institution and other institutions in the state, if appropriate. Consider collaborative arrangements, partnerships, interdisciplinary programs, service functions, joint research projects, support programs, etc.

Collaboration is a key theme of the Master's Program. The Program is designed to collaborate with local land and resource management agencies. Outreach has been made to collaborate with the Klamath Tribes, state, and federal land and resources management agencies. Graduate projects will increase local knowledge and address research questions that are currently outside the capacity of agencies. Having graduate students conducting research on local issues will extend and expand the capacity of current faculty, incorporate local and potentially Traditional Ecological Knowledge and possible incorporate other research partners and/or faculty from other institutions.

Fits well with existing programs at OIT, and the 3+2 plan appears excellent. Very strong collaboration with agencies and some other universities. OSU has written a letter of support, not from SOU. This program will complement OIT's undergrad environmental sciences program. Nearest similar MS program is at OSU Corvallis. A key difference here is that this program would likely be dedicated to Klamath issues. Place-bound approach is good for tribal members; go at the speed of trust.

e. The justification in terms of state needs, demand, access, and cost effectiveness (if this program represents duplication within the state).

There is strong need, well demonstrated in the proposal. Demand is clear from comparable programs (even small ones) getting large number of applicants. Klamath Falls (& OIT itself) are comparatively inexpensive.

There is a known market of recent high school graduates, with a passion to help discover and contribute to solutions to the world's pressing environmental problems at the graduate level. There is extremely high demand for students with graduate degrees in natural resources and environmental sciences from a wide range of federal, state, private, and non-governmental organizations. Placement into rural environments presents a secondary challenge as amenities can be limited.

f. The probable impact of the program on the department or academic unit, as well as its effect on current programs.

The Master's program will be an academic boost within OIT and the local community, as the higher-level curriculum and focus on individual lead research inspires others as undergraduates and graduate students. There will be a positive effect on the current program as the curriculum and student body will aspire to a higher level of academic importance. Increase and expanding the academic curriculum into existing land and resource management agencies may significantly add to current facilities of space and services.

This program would very nicely complement the current Enviro Sci program at OIT. Undergraduates will benefit tremendously from having the graduate program, and it will help recruit and retain faculty. Lots of opportunities for cross-departmental collaboration as well (e.g., Civil and ENV5).

One concern we have is the faculty getting stretched too thin. Both in terms of needing keep up with high course load while advising MS students, AND in terms of keeping up with seeking and securing external grants and contracts. As noted below, MS programs are increasingly needing to secure significant funds for student wages to remain competitive, and that puts a large responsibility on faculty to secure those funds.

g. The program's major strengths and weaknesses.

Strengths of the Master's Program are multifaceted. Increased academic excellence will add breadth and depth in increased capacity in the Klamath Region. Opportunities for local high school students to foster their knowledge and understanding while remaining with their peers is culturally and socially valuable. It will provide desperately needed human resources to local land and resources management agencies to address critical and growing environmental and natural resource problems including air and water quality, conservation of fisheries and wildlife species, impacts from altered climate, and environmental health, and sustainability. Close working relationships with the Klamath Tribes, state, and federal agencies. Offering educational programs specific to an ecoregion provides context for place-based knowledge of the ecological processes in this bioregion, conservation biology as the region has a high level of aquatic endemism, and specific needed elements of restoration. Education in collaboration with other programs at OIT is a strength.

This program will help address many local issues, many research opportunities. Strong need and unique location. There is already a lot of research going on in the Klamath, so close coordination with Federal, state, and non-profit partners will be important to ensure effectiveness and reduce redundant/duplicate efforts. The remote location is both a pro and a con (for some students), but cost of living could make it more attractive. Not sure a new program is a top choice for grad students, so most in the program will initially come from OIT undergrad programs, but the program will quickly build momentum and a recognition/reputation.

2. Faculty

a. The quality of the faculty in terms of training, experience, research, scholarly contributions, ability to generate external support, stature in the field, and qualifications to serve as graduate faculty.

Existing faculty have experience working in the Natural Resources field. They have experience and have collaborated extensively with resource managers to expand on their credentials to conduct research in the Klamath Region. They are committed to advance our scientific knowledge through their own research and as part of the curriculum with the graduate students to published and made scholarly contributions. They are continuing to expand their knowledge into the pressing issues within their disciplines.

The core faculty is small but strong. A number of the faculty appear to have experience necessary to take on grad students and administer the program. The faculty are well-published for the most part. Unsure about stature in the field- generally, local experts currently do not always turn to OIT faculty for expertise and leadership in the field of natural resource sciences. Perhaps the graduate program and initiative of new and collaborative research project will change that. We will note that the proposal lists 19 faculty in all, but only the names and CV's of a few are provided.

b. The faculty in terms of size, qualifications for area(s) of specialization offered, and the student body served. Include analysis of program sustainability in light of such factors as upcoming retirements, etc.

As long a retirements are replaced, the existing faculty is adequate, but would be strengthened by adding more people and greater range of expertise.

Areas with good coverage include fisheries, fire, birds, climate change. Key expertise that could be strengthened in the current faculty list include restoration ecology, conservation of rare and threatened species, aquatic ecology/limnology, water quality, and hydrology. Unreplaced retirements could be problematic for the future, so replacements should be a high priority (and we were led to believe they will be).

c. Areas of faculty strength and weakness.

Good range of expertise; evidence that most are strong teacher-scholars. Strengths: birds, fire/forestry, general fisheries, conservation theory; weaknesses: limnology, hydrology, aquatic ecology, restoration. This is a new program and may experience challenges with time to develop and mentor students. Building trust and gaining acknowledged support by students will be an essential building block for this Program.

d. Faculty workload, including availability for student advising, research oversight, mentoring, and teaching effectiveness.

This is a concern, partially alleviated by apparent plan for course release linked to student mentoring (grad and undergrad). Graduate faculty will need support for this program to excel. Specifically, they should get some credit/course release for advising graduate students. In addition, the grant office (sponsored programs) will need to offer support (training and assistance pre- and post-award). The faculty need support to help seek and secure external grants and contracts. Also, the committee had a hard time understanding the total and pathways depicted in the table.

e. The credentials, involvement of, and reliance upon support faculty from other departments within the institutions, from other institutions, and/or adjunct faculty.

Adequate. GIS and STATS. Good collaborative opportunities w CE & REE, GIS (did that GIS center open?). "Substantial collaboration w OSU" and potential collaboration w Dr Needham at OSU and Dr Mager at SOU. STATS teaching in house, appears adequate; would benefit if this is an area that could grow.

3. Need

a. The evidence of sufficient demand and/or relevant employment opportunities for graduates of this program.

There is strong need for the program and its graduates, as demonstrated in the proposal. Always lots of employment opportunities in Klamath for folks w an MS in enviro sci.

b. The overall need for the program within the institution, state and/or region, and nation.

There is strong need for the program and its graduates, as demonstrated in the proposal. Increase capacity in eastern Oregon; OMB offering up money. Would complement OIT undergrad program, and it will be good to have another enviro sci MS program in the south and east of the state. For students student seeking rural setting, this will be a good additional to the national profile of regional Master's level grant universities in the West. The demand for people in natural resources management in rural environments is currently unmet. Highly trained individuals are in extremely high demand by federal and state agencies that manage natural resources in our rural regions, such as the US Forest Service, Bureau of Land Management, US Fish & Wildlife, and Oregon Departments of Forestry and Fish and Wildlife. Special funding is being considered by the Office of Management and Budget to increase capacity for federal agencies in rural environments.

4. Resources

a. The adequacy of library, computer, laboratory, and other research facilities and equipment; offices; classrooms; support services for the program; and, if relevant, the program's utilization of resources outside the institution (e.g., field sites, laboratories, museums, libraries, and cooperative arrangements with other institutions).

What is minimally essential appears available. MS projects in natural resources need adequate intellectual support (advisors with expertise in, other courses on) especially in statistics and GIS. The proposal could elaborate some on how MS students could gain these, and how to meet the seat demand of the influx of MS students taking these courses. Expanding this to the natural world and public land, this could be one of the greatest strengths of this program. The opportunities for diversity of field sites are diverse and levels of cooperation are unique. The history of partnerships in natural resources management in the Klamath Basin is renowned.

b. The proposed budget and any need for new resources to operate the program effectively. Where appropriate, review resources available to support graduate students (e.g., fellowships and other scholarships, teaching and research assistantships).

The proposal doesn't elaborate on this topic much, but does mention some teaching assistantships. In discussion we learned that 6 TAs are likely (including tuition waiver), which will be very helpful. Prospective MS students are increasingly expecting (deservedly so) a reasonable wage/financial support during graduate school. Many funded MS positions now offer \$12,000-\$30,000 per year in financial support, sometimes also with tuition waiver. Meeting this high bar is difficult for small regional universities. How can OIT be competitive in that market, at least for some of the graduate positions? External funds will be essential, and the university would be wise to strategize ways to help secure those funds, and perhaps clever ways to arrange reduced tuitions and/or tuition waivers.

As noted above, the faculty also need support from the Grants and Sponsorship Office – that office needs more experience and development. There appears some support for faculty to attend conferences. We recommend OIT host a conference!

We recommend launching the program with a workshop, inviting local collaborators and Nat Resource professionals to get "re-introduced" to OIT ENVS, this time through the lens of the new trajectory of collaborate research projects involving graduate students. This could help build community, excitement, networking, and lucrative project collaboration.

c. In terms of national standards, the institution's commitment to the program as demonstrated by the number of faculty relative to workload and student numbers, support for faculty by nonacademic personnel (e.g., support, staff, technicians), financial support for students, and funds for faculty research and professional activities (e.g., conferences, visiting lectures).

\$850 for faculty – undergrad research; some funds for student travel. See not above re: support for faculty seeking and securing external grants and contracts.

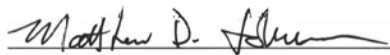
d. Institution leaders' commitment to this program in the long term.

This isn't addressed explicitly in the proposal, but our discussion suggested it is strong (new provost etc.). Would be good to see explicit. Full time chair is a great step forward.

e. The institution's ability to sustain the program in the foreseeable future along with its current and future projected commitments.

There are two factors contributing to the future of the program. One is the interest providing for a sustainable environment that will support community health. As identified in the proposal, this is a growing trend. In the Klamath Basin, where there are commitments to conduct large scale ecosystem restoration and available federal funding to support these projects there will be a growing interest to build the capacity to implement these projects. Federal funding has never been more available. The opportunity to participate in this all-lands effort is unprecedented. The second is the importance of establishing a commitment to the education and well-being of people in the Klamath Basin. Nothing succeeds like success. And the more the graduate program grows, the greater the interest in being part of the success.


Signed, 11 April 2023



Dr. Matt Johnson, Dept. of Wildlife, Cal Poly Humboldt



Craig S. Bienz, Director of Sycan Marsh
The Nature Conservancy

 Recoverable Signature

X Megan Skinner

Megan Skinner, Ph.D.

Signed by: MEGAN SKINNER

Appendix G: External Reviewer CVs

MEGAN M. SKINNER, Ph.D.

Water Quality Specialist, US Fish and Wildlife Service

Phone: 541-891-2055 (work mobile)

Email: megan_skinner@fws.gov (work), meganmskinner@yahoo.com (personal)

Education

Ph.D.---Environmental and Natural Resource Sciences **MAY 2017**
WASHINGTON STATE UNIVERSITY, Pullman, WA **GPA: 4.0**
Advisor: Dr. Barry Moore

M.S.---Natural Resource Sciences **DEC. 2013**
WASHINGTON STATE UNIVERSITY, Pullman, WA **GPA: 4.0**
Advisor: Dr. Barry Moore

B.S.---Biology, Minor in Political Science **JUN. 2008**
WESTERN WASHINGTON UNIVERSITY, Bellingham, Washington **GPA: 3.4**

Study Abroad **SEP. - DEC. 2006**
UNIVERSITY OF HULL, Kingston upon Hull, United Kingdom

Employment and Research

Water Quality Specialist **SEP. 2019 TO PRESENT**
US Fish and Wildlife Service, Klamath Falls, OR

- Develop a water quality program for the Klamath Falls Fish and Wildlife Office that includes study and monitoring plan design, advising on restoration activities, and implementing water quality-related projects to support the Recovery Plan for ESA-listed Lost River and Shortnose suckers
- Plan, design, implement, and manage riparian and aquatic restoration projects with a direct water quality benefit in the Upper Klamath Basin
- Develop and implement a cyanobacteria monitoring program for Lower Klamath and Tule Lake National Wildlife Refuges, and Upper Klamath Lake
- Lead the effort to develop the Upper Klamath Basin Watershed Action Plan for prioritization and implementation of restoration activities, with an interdisciplinary group of collaborators
- Act as the resident water quality expert for Klamath Falls Fish and Wildlife Office, the Klamath Basin Refuge Complex, and local collaborators
- Compile, manage, analyze, and interpret complex limnological, biological, and hydrologic datasets
- Plan, design, and implement research related to water quality and restoration activities
- Assist in the planning, design, and implementation of fisheries, hydrology, and geomorphic research
- Prepare technical reports and manuscripts detailing the progress and findings of water quality, fisheries, hydrology, and geomorphic research and apply findings to inform restoration activities
- Develop, implement, and manage contracts, grants, and cooperative agreements to conserve or recover sensitive aquatic resources including developing scopes of work, managing projects, and assessing deliverables to ensure they meet contract conditions
- Develop and submit grant proposals, including budgets, for program and project funding
- Prepare and update/revise as necessary annual and multi-year operating budgets for the water quality program; oversee the overall planning, direction, and timely execution of water quality program activities; oversee development and revision of multi-year work plans in cooperation with Federal, Tribal, private, and non-profit cost-sharing partners; and negotiate the role of the water quality program in complex multi-partner activities to account for budgetary, staff, and other resource limitations
- Plan and conduct ecological investigations on a wide variety of land and water resource development proposals to determine their effects on aquatic resources
- Provide fish and wildlife resource expertise and technical assistance regarding requirements under the Endangered

- Species Act, Tribal Trust responsibilities, and other state and federal regulations
- Negotiate controversial natural resource issues with private landowners, Tribes, Federal and state agencies, and other entities
- Assist in strategic planning for the Klamath Falls Fish and Wildlife Office
- Assist in negotiations for Upper Basin-wide riparian restoration in cooperation with private landowners and off-project irrigators
- Provide formal feedback on restoration plans developed by collaborators (Federal and state agencies, Tribal entities, nonprofits, etc.)
- Represent the US Fish and Wildlife Service on multiple Oregon Watershed Enhancement Board technical review teams
- Represent the US Fish and Wildlife Service on the Integrated Fisheries Restoration and Monitoring Plan technical steering committee, Upper Basin sub-team, and Federal Coordination Team
- Member of the US Fish and Wildlife Service national America the Beautiful coordination team
- Interact with people of diverse backgrounds including technical personnel; members of local agricultural communities; Tribal government; federal, state, county, and city officials and politicians; solicitors; and other members of the public

California Science Coordinator

DETAIL: MAY - JUL. 2021

US Fish and Wildlife Service, Sacramento, CA

- Coordinated conservation efforts crossing multiple jurisdictional boundaries
- Developed and coordinated landscape-scale partnerships with a wide variety of external partners (state conservation agencies, Federal agencies, private organizations, universities, non-governmental organizations, etc.)
- Provided technical expertise and support in developing and refining the biological foundation underlying fish and wildlife conservation strategies and plans including conservation design, conservation delivery, decision-based monitoring and assumption-driven research.
- Advised agency officials on complex scientific and natural resource issues
- Coordinated with Federal and state officials to strategize US Fish and Wild Service actions to benefit the Biden administration's America the Beautiful initiative and the state of California's 30x30 campaign; this included developing briefing papers for agency leadership
- Joined the US Fish and Wildlife Service American the Beautiful coordination team
- Completed several contracts, agreements, and grants with external partners in support of the Shared Science Priorities program
- Received a STAR award for outstanding performance during this detail

Klamath River Manager

SEP. 2017 TO SEP. 2019

US Bureau of Reclamation, Klamath Falls, OR

- Compiled, QA/QC'd, managed, analyzed, and interpreted complex hydrologic, biological, and limnological datasets
- Utilized modeling platforms such as MS Excel to investigate complex hydrologic and Klamath Project operations issues
- Worked collaboratively with state, county, city, Tribal, private, academic, and federal technical personnel to ensure Klamath Project operations were consistent with applicable regulatory requirements and human health and safety concerns
- Managed and coordinated hydrologic data collection related to Klamath Project operations and Endangered Species Act compliance
- Analyzed water supply, water demand, and reservoir operations and management data and applied findings to operations planning
- Provided fish and wildlife resource expertise and technical assistance regarding compliance with the Endangered Species Act, Tribal Trust responsibilities, and other state and federal regulations
- Prepared technical reports, position papers, and briefings detailing the progress and findings of hydrologic investigations and operations issues
- Delivered formal and informal briefings on highly contentious and controversial natural resource and operations issues
- Provided formal feedback on technical reports, draft manuscripts, and briefing papers related to hydrologic and biological information and studies
- Provided formal feedback on projects and project proposals regarding compliance with the Endangered Species Act, Tribal Trust responsibilities, and other state and federal regulations
- Participated in the planning, design, and implementation of hydrologic research
- Provided technical assistance in legal proceedings; interpreted and implemented legal decisions regarding the impact of

Klamath Project operations on listed species; and provided guidance on, interpreted, and ensured compliance with natural resource laws, regulations, policies, standards, and procedures

- Negotiated controversial natural resource issues with Project irrigators, Tribes, Federal and state agencies, and other entities
- Interacted with people of diverse backgrounds including technical personnel; Klamath Project irrigators; Tribal government; federal, state, county, and city officials and politicians; solicitors; and other members of the public
- Communicated (verbally and in writing) complex technical information and concepts to lay audiences
- Assisted in strategic planning for Klamath Basin Area Office Water Operations Division
- Represented Reclamation on the Integrated Fisheries Restoration and Monitoring Plan technical steering committee and Upper Basin sub-team
- Coordinator and Reclamation technical lead for Tri-Agency Hydrology Team, tasked with hydrologic modeling to support consultation under the Endangered Species Act on the ongoing operations of the Klamath Project
- Coordinator and Reclamation technical lead for the Klamath Basin Flow Account Scheduling Technical Advisory (FASTA) team, tasked with discussing current water operations issues and providing input on operations

Water Operations Branch Chief

DETAIL: JAN. - MAR. 2019

US Bureau of Reclamation, Klamath Falls, OR

- Directed operations of the Klamath Project consistent with applicable regulatory and human health and safety concerns including flood control regulations, contractual agreements, water rights, and the Endangered Species Act requirements
- Responsible for the oversight and direction of the Fisheries Resources Branch, ensuring that Project operations were consistent with Endangered Species Act and other biological regulatory requirements
- Worked collaboratively with state, county, city, Tribal, private, academic, and federal technical personnel to achieve the objectives of the Klamath Basin Area Office and Reclamation
- Directly supervised 6 water operations staff
- Directly supervised the Lead Fisheries Biologist and indirectly supervised two fisheries biologists and two fisheries technicians
- Planned and directed the work of professional and technical staff involved in collecting, exchanging, and analyzing hydrologic and related data collaboratively with other agencies; planning Klamath Project operations; coordinating flood control operations; and developing Klamath Project operating criteria and procedures, issuing Klamath Project operation instructions, and monitoring Klamath Project operating performance
- Planned, scheduled, and assigned short-term priorities for work activities within established resources and program requirements
- Allocated work assignments based on priorities and staff capabilities
- Utilized modeling platforms such as MS Excel to investigate complex hydrologic and Klamath Project operations issues
- Identified and evaluated issues involving Klamath Project operations that require engineering analysis or affect achievement of Klamath Basin Area Office and/or Reclamation objectives
- Managed and coordinated hydrologic data collection related to Klamath Project operations and Endangered Species Act compliance
- Directed analysis of water supply, water demand, and reservoir operations and management data and apply findings to operations planning
- Negotiated controversial natural resource issues with Project irrigators, Tribes, Federal and state agencies, and other entities
- Delivered formal and informal briefings on highly contentious and controversial natural resource and operations issues
- Oversaw the preparation of technical reports, position papers, and briefings detailing the progress and findings of hydrologic investigations and operations issues
- Oversaw development of contracts and/or cooperative agreements developed to support efforts to conserve and recover endangered species
- Provided technical assistance in legal proceedings; interpreted and implemented legal decisions regarding the impact of Klamath Project operations on listed species; and provided guidance on, interpreted, and ensured compliance with natural resource laws, regulations, policies, standards, and procedures
- Communicated (verbally and in writing) complex technical information and concepts to lay audiences
- Interacted with people of diverse backgrounds including technical personnel; Klamath Project irrigators; Tribal government; federal, state, county, and city officials and politicians; solicitors; and other members of the public
- Oversaw coordination of the Tri-Agency Hydrology Team, tasked with hydrologic modeling to support consultation under the Endangered Species Act on the ongoing operations of the Klamath Project

- Represented the Klamath Basin Area Office and Reclamation in meetings or correspondence regarding highly controversial water resource and operational issues with the Oregon Water Resources Department, US Fish and Wildlife Service, Oregon Department of Fish and Wildlife, United States Geological Survey, irrigation districts, and other agencies and private entities

Ecosystem Restoration Scientist

SEP. 2015 - SEP. 2017

The Klamath Tribes, Chiloquin, OR

- Managed The Klamath Tribes Water Quality Monitoring Program and Restoration Program
- Planned, designed, implemented, and managed riparian and aquatic restoration projects in the Upper Klamath Basin including oversight of preparation and submission of permits and other regulatory documents
- Planned, implemented, and managed a Wocus (*Nuphar lutea polysepala*) restoration program in Upper Klamath and Agency Lakes
- Implemented riparian and aquatic restoration project monitoring
- Led the effort to develop the Upper Klamath Basin Watershed Action Plan for prioritization and implementation of restoration activities with an interdisciplinary group of collaborators
- Supervised The Klamath Tribes Water Quality Monitoring Crew of 4-5 technicians
- Supervised The Klamath Tribes Restoration Project Monitoring Crew of 1 technician
- Supervised a Restoration Project Manager
- Planned, scheduled, and assigned short-term priorities for work activities within established resources and program requirements
- Allocated work assignments based on priorities and staff capabilities
- Gave advice, counsel and/or instruction to employees on both work and administrative matters
- Made selections for appointment, promotion or reassignment to subordinate positions within the Aquatics Program
- Established performance standards and initiated employee recognition and training actions
- Approved leave, promotions/pay raises, overtime, and employee travel
- Effectuated minor personnel disciplinary actions and recommended action in more serious cases
- Heard and resolved complaints from employees
- Compiled, managed, analyzed, and interpreted complex limnological, biological, and hydrologic datasets
- Planned, designed, and implemented research related to water quality and restoration activities
- Assisted in the planning, design, and implementation of fisheries, hydrology, and geomorphic research
- Prepared technical reports and manuscripts detailing the progress and findings of water quality, fisheries, hydrology, and geomorphic research and apply findings to inform restoration activities
- Developed, implemented, and managed contracts and/or cooperative agreements to conserve or recover sensitive aquatic resources including developing scopes of work, managing projects, and assessing deliverables to ensure they meet contract conditions
- Developed and submitted grant proposals, including budgets, for program and project funding
- Prepared and updated/revised as necessary annual and multi-year operating budgets for the Water Quality Monitoring and Restoration programs; oversaw the overall planning, direction, and timely execution of the Water Quality Monitoring and Restoration programs; oversaw development and revision of multi-year work plans in cooperation with Federal, private, and non-profit cost-sharing partners; and negotiated the role of the Water Quality Monitoring and Restoration programs in complex multi-partner activities to account for budgetary, staff, and other resource limitations
- Interacted regularly with Tribal leadership and government to deliver technical scientific information including updates on on-going planning and regulatory processes; updates on on-going restoration, research, and monitoring efforts; summarizing research; and discussing current conditions of water and Tribal treaty resources
- Planned and conducted ecological investigations on a wide variety of land and water resource development proposals to determine their effects on aquatic resources
- Provided fish and wildlife resource expertise and technical assistance regarding requirements under the Endangered Species Act, Tribal Trust responsibilities, and other state and federal regulations
- Negotiated controversial natural resource issues with private landowners, other Tribes, Federal and state agencies, and other entities
- Assisted in strategic planning for The Klamath Tribes Aquatics Program
- Assisted in negotiations for Upper Basin-wide riparian restoration in cooperation with private landowners and off-project irrigators
- Provided formal feedback on restoration plans developed by collaborators (federal and state agencies, nonprofits, etc.)
- Represented The Klamath Tribes on the Oregon Watershed Enhancement Board's Central Oregon grant proposal technical review team

- Represented The Klamath Tribes on the Oregon Watershed Enhancement Board's Klamath Basin Small Grants Team
- Represented The Klamath Tribes on the Interim Measures Implementation Committee managed by PacifiCorp under the terms of the Klamath Hydropower Settlement Agreement
- Interacted with people of diverse backgrounds including federal, state, county, and tribal employees; tribal members; and private landowners for the purposes of collaboration, outreach, and recruitment for restoration, research, and monitoring efforts

Research Assistant - Limnology

MAY 2011 - SEP. 2015

Washington State University, Pullman, WA

- Collected physical, chemical, biological, and flow data from lakes and streams in eastern Washington state
- Supervised 2-3 part-time, hourly laboratory technicians in the laboratory and field
- Planned, scheduled, and assigned short-term priorities for work activities within established resources and program requirements
- Allocated work assignments based on priorities and staff capabilities
- Established performance standards and initiated employee recognition and training actions
- Gave advice, counsel and/or instruction to employees on both work and administrative matters
- Made selections for appointment, promotion or reassignment to subordinate positions within the limnology lab
- Approved leave, promotions/pay raises, overtime, and employee travel
- Effectuated minor personnel disciplinary actions and recommended action in more serious cases
- Heard and resolved complaints from employees
- Operated SEAL AutoAnalyzer 3 continuous flow nutrient analyzer for total nitrogen, total phosphorus, nitrate/nitrite, ammonia, alkalinity, and orthophosphate concentrations in water samples collected from the field
- Compiled, managed, analyzed, and interpreted complex limnological and biological datasets
- Prepared and submitted manuscripts for publication in peer-reviewed scientific journals
- Assessed fish feeding ecology and species interactions via gut content analysis, stable isotope analysis, and relative abundance surveys
- Developed and assessed stable isotope analysis methods
- Captured and handled adult fish
- Volunteer experience trapping, handling, and tagging juvenile and adult salmonids

Wilderness and Climbing Ranger

JUN. 2006 - NOV. 2010

United States Forest Service (USFS) Trout Lake, WA, May-Nov.

- Patrolled Mt Adams, Indian Heaven and Trapper Creek Wilderness areas
- Educated the public about proper wilderness travel and awareness including Leave No Trace ethics
- Maintained trails and backcountry campsites
- Provided assistance to Klickitat and Yakima county Search and Rescue
- Supervised volunteer Wilderness Stewards involved in backcountry trail and campsite restoration work
- Fought wildfires on and off the Mt. Adams Ranger District as a type-2 wildland firefighter

Volunteer work

Technical Peer-Reviewer

2017 TO PRESENT

Lake and Reservoir Management, Limnology and Oceanography Methods

- Review manuscripts assessing fisheries management, climate change adaptation, general limnology, stable isotope analysis, water quality, and aquatic ecology and provide feedback and recommendations to journal editors and manuscript authors

Member, and current President, of the Board of Directors

JAN. 2019 TO PRESENT

Klamath Lake Land Trust, Klamath Falls, OR

- President of the Board of Directors (since December 2020)
- Successfully recruited and hired an Executive Director
- Led the effort to develop an Organizational Needs Assessment and Business Plan
- Directly supervise the Klamath Lake Land Trust Executive Director
- Facilitate and lead Board meetings
- Provide leadership to Board and staff to implement the mission of the Klamath Lake Land Trust

- Interact with people of diverse backgrounds including technical personnel; members of the agricultural community; Tribal government; federal, state, county, and city officials and politicians; solicitors; and other members of the public
- Assist in the planning, design, implementation, and management of riparian and aquatic restoration projects in the Upper Klamath Basin
- Assist in developing and submitting grant proposals, including budgets, for program and project funding
- Assist with strategic planning, including prioritization of future land purchases
- Assist in fundraising efforts, including securing corporate sponsors
- Review and approve program and project budgets
- Review operations and personnel matters and resolve any associated issues
- Communicate with the Land Trust Alliance, Coalition of Oregon Land Trusts, and other entities to support operations of the Klamath Lake Land Trust

B-run Steelhead Project Volunteer

DEC. 2013 - MAR. 2014

Nez Perce Tribe Department of Fisheries Resources Management, Orofino, ID

- Assisted fisheries technicians with mobile telemetry of adult steelhead and interrogation and installation of stationary telemetry units
- Assisted with adult steelhead collection and tagging

Environmental Education Intern

JAN. 2006 - MAR. 2006

Nooksack Salmon Enhancement Association (NSEA) Bellingham, WA

- Mentored high school students designing stream ecology focused projects
- Taught various stream ecology topics in the field including native plant and aquatic macroinvertebrate identification and water quality testing techniques
- Assisted in the design and implementation of stream restoration plans and plantings

Environmental Education Intern

JAN. 2006 - MAR. 2006

Skagit Fisheries Enhancement Group Mt. Vernon, WA

- Assisted in the implementation of salmon focused lessons and activities
- Taught various stream ecology topics in a classroom setting including native plant and aquatic macroinvertebrate identification, water quality testing techniques, and basic fish ecology
- Assisted in the design and implementation of stream restoration plantings

Publications

Peer-reviewed Journal Articles

- **Skinner M.** 2022. Wetland phosphorus dynamics and phosphorus removal potential. *Water Environment Research*. DOI: 10.1002/wer.10799. (featured as the October 2022 issue cover article)
- Preece E, Moore B, **Skinner MM**, Child A, Dent S. 2019. A review of the biological and chemical effects of hypolimnetic oxygenation. *Lake and Reservoir Management*. DOI: 10.1080/10402381.2019.1580325.
- Cross BK, Moore BC, **Skinner MM**. 2017. Hypolimnetic oxygenation effects on trout condition and growth in North Twin Lake, Washington. *Lake and Reservoir Management*. DOI: 10.1080/10402381.2016.1276654.
- **Skinner MM**, Cross BK, Moore BC. 2017. Using stable isotope analysis to assess the effects of hypolimnetic oxygenation on diet in a mixed cold- and warmwater fish community. *Environmental Biology of Fishes*. DOI: 10.1007/s10641-017-0625-y.
- **Skinner MM**, Cross BK, Moore BC. 2016. Estimating *in situ* isotopic turnover in Rainbow Trout (*Oncorhynchus mykiss*) muscle and liver tissue. *Journal of Freshwater Ecology*. DOI: 10.1080/02705060.2016/1259127.
- **Skinner MM**, Martin AA, Moore BC. 2016. Is lipid correction necessary in the stable isotope analysis of fish tissues? *Rapid Communications in Mass Spectrometry* 30:881-889.

- **Skinner MM**, Moore BC, Swanson ME. 2014. Hypolimnetic oxygenation in Twin Lakes, WA: Part II: Feeding ecology of a mixed cold- and warm-water fish community. *Lake and Reservoir Management* 30(3):240-249.
- Moore BC, Cross BJ, Clegg EM, Lanouette BP, **Skinner M**, Preece E, Child A, Gantzer P, Shallenberger E, Christensen D, Nine B. 2014. Hypolimnetic oxygenation in Twin Lakes, WA: Part I: Distribution and movement of trout. *Lake and Reservoir Management* 30(3):226-239.

Technical Reports and Planning Documents

- The Upper Klamath Basin Watershed Action Plan Team¹. 2021. The Upper Klamath Basin Watershed Action Plan, March 2021. Prepared by U.S. Fish and Wildlife Service, Trout Unlimited, Klamath Watershed Partnership, The Klamath Tribes, Oregon Department of Environmental Quality, The Natural Conservancy, and the North Coast Regional Water Quality Control Board of California.
- **Skinner M**, Vradenburg LA. 2020. Considerations for riparian fencing, planting, and grazing management in the Upper Klamath Basin of Oregon. Klamath Falls Fish and Wildlife Office, U.S. Fish and Wildlife Service and Klamath Watershed Partnership: Klamath Falls, OR.
- **Skinner M**, Erdman C, Stoken O. 2020. Considerations for implementation of beaver dam analogs and similar structures in the Upper Klamath Basin of Oregon, USA. Klamath Falls Fish and Wildlife Office, US Fish and Wildlife Service and Trout Unlimited: Klamath Falls, OR.
- **Skinner M**. 2020. Feasibility of using floating wetlands to treat Upper Klamath Lake phosphorus load. US Fish and Wildlife Service, Klamath Falls Fish and Wildlife Office: Klamath Falls, OR.
- **Skinner M**, Blocker S, Gonyaw A. 2017. Chinook Salmon (*Oncorhynchus tshawytscha*) habitat assessment in the Wood River watershed, Oregon. Prepared for the NOAA Pacific Coast Salmon Recovery Fund. Aquatics Program, Natural Resources Department, The Klamath Tribes: Chiloquin, OR.
- **Skinner M**. 2016. Water year 2016 water quality assessment report. Prepared for the U.S. Environmental Protection Agency. Aquatics Program, Natural Resources Department, The Klamath Tribes: Chiloquin, OR.
- **Skinner M**. 2016. Wocus Restoration Plan for the Upper Klamath Basin. Prepared for the U.S. Environmental Protection Agency. Aquatics Program, Natural Resources Department, The Klamath Tribes: Chiloquin, OR.
- **Skinner MM**. 2016. *Nuphar lutea* in wetlands and shallow lakes with particular emphasis on the Upper Klamath Basin of Oregon. Aquatics Program, Natural Resources Department, The Klamath Tribes: Chiloquin, OR.

Presentations at Professional Meetings

- **Skinner M**. Poster. “Results from the 2022 U.S. Fish and Wildlife Service synoptic cyanotoxin assessment in Upper Klamath Lake, Oregon.” 11th U.S. Symposium on Harmful Algae, October 24-28, 2022, Albany, NY.
- **Skinner M**. Oral Presentation. “Upper Klamath Basin Watershed Action Plan.” California State Water Boards water quality seminar series, April 7, 2022, virtual.
- **Skinner M**. Plenary speaker, oral presentation. “Upper Klamath Lake and watershed: past, present, and future.” Pacific Northwest Water Research Symposium, April 4, 2022, Corvallis, OR.
- **Skinner M**. Oral Presentation. “Assessing novel water quality improvement methods for Upper Klamath Lake, AKA: ‘techy fixes.’” Sucker Technical Symposium, February 4, 2022, virtual.
- **Skinner M**, Nichols C, Rasmussen J, Spangler SJ. Oral Presentation. “Klamath lakesuckers: past, present, and future.” American Fisheries Society annual meeting, November 8 – 10, 2021, virtual.

¹ Megan Skinner was the founder and leader of the Upper Klamath Basin Watershed Action Plan Team.

- **Skinner M.** Oral Presentation. “Upper Klamath Basin Watershed Action Plan.” Klamath Basin Monitoring Program Fall Meeting, October 29, 2021, Klamath Falls, OR.
- **Skinner M.** Oral Presentation. “Upper Klamath Basin Watershed Action Plan.” National Conference for Ecosystem Restoration, July 26 – 29 and August 2 – 5, 2021, virtual.
- **Skinner M.** Oral Presentation. “Upper Klamath Lake water quality: past, present, and future.” 2021 Sucker Technical Symposium, March 4, 2021, virtual.
- **Skinner M.** Oral Presentation. “Upper Klamath Basin Watershed Action Plan.” Klamath Basin Monitoring Program semi-annual meeting, May 18, 2020, virtual.
- **Skinner M.** Oral Presentation. “Upper Klamath Basin Watershed Action Plan.” Oregon Chapter of the American Fisheries Society annual meeting, March 5, 2020, Bend, OR.
- **Skinner M.** Oral Presentation. “Wocus in the Upper Klamath Basin, Oregon.” Klamath Basin Monitoring Program semi-annual meeting, November 10, 2016, Yreka, CA.
- **Skinner M, Moore BC.** Oral Presentation. “Using stable isotope analysis and multiple-source mixing models to assess the influence of hypolimnetic oxygenation on diet in a mixed cold- and warm-water fish community” American Fisheries Society Annual Meeting, August, 2015, Portland, OR.
- **Skinner M, Moore BC.** Oral Presentation. “Stable isotope analysis of fish liver in food web studies: a methods investigation” Idaho Chapter American Fisheries Society, March 7, 2015, Boise, ID.
- **Skinner M, Moore BC.** Poster. “Stable isotope analysis of fish liver in food web studies: a methods investigation” Washington State Lake Protection Association 2014 Annual Meeting, October 1, 2014, Chelan, WA.
- **Skinner M, Moore BC, Swanson ME.** Poster. “Does hypolimnetic oxygenation influence the diets of trout and golden shiner in Twin Lakes, WA?” Washington State University Academic Showcase, March 28, 2014, Pullman, WA.
- **Skinner M, Moore BC, Swanson ME.** Oral Presentation. Does hypolimnetic oxygenation affect feeding ecology in a mixed cold- and warm-water fish community in Twin Lakes, WA? Eastern Washington and Northern Idaho Regional Lakes Conference, February 8, 2014, Spokane, WA.
- **Skinner M, Moore BC, Swanson ME.** Oral Presentation. “The effects of hypolimnetic oxygenation on the diets of brook trout (*Salvelinus fontinalis*), rainbow trout (*Oncorhynchus mykiss*), and golden shiner (*Notemigonus crysoleucas*) in Twin Lakes, Washington.” North American Lake Management Society 2013 Annual Meeting, November 1, 2013, San Diego, CA.
- **Skinner M, Moore BC, Swanson ME.** Poster. “Does hypolimnetic oxygenation influence the diets of trout and golden shiner in Twin Lakes, WA?” North American Lake Management Society 2013 Annual Meeting, November 1, 2013, San Diego, CA.
- **Skinner M, Moore BC, Swanson ME.** Oral Presentation. “The effects of hypolimnetic oxygenation on the diets of brook trout (*Salvelinus fontinalis*), rainbow trout (*Oncorhynchus mykiss*), and golden shiner (*Notemigonus crysoleucas*) in Twin Lakes, Washington.” Washington State Lake Protection Association 2013 Annual Meeting, October 18, 2013, Vancouver, WA.
- **Skinner M, Moore BC, Swanson ME.** Poster. “Does hypolimnetic oxygenation influence the diets of trout and golden shiner in Twin Lakes, WA?” Washington State Lake Protection Association 2013 Annual Meeting, October 18, 2013, Vancouver, WA.
- **Skinner M, Moore BC.** Oral Presentation. “The effects of hypolimnetic oxygenation on the diets of brook trout (*Salvelinus fontinalis*) and rainbow trout (*Oncorhynchus mykiss*) in Twin Lakes, Washington.” Western Division American Fisheries Society 2013 Annual Meeting, April 17, 2013, Boise, ID.

- **Skinner M** and Moore BC. Poster. “Influence of hypolimnetic oxygenation on trout diet in Twin Lakes, Washington.” Washington State University Academic Showcase, March 29, 2013, Pullman, WA.
- **Skinner M** and Moore BC. Oral Presentation. “The effects of hypolimnetic oxygenation on fish diet in a mixed warm- and cold-water fish community in Twin Lakes, Washington.” North American Lake Management Society 2012 Annual Meeting, November 8, 2012, Madison, WI.
- **Skinner M** and Moore BC. Oral Presentation. “The effects of hypolimnetic oxygenation on fish diet in a mixed warm- and cold-water fish community in Twin Lakes, Washington.” Washington State Lake Protection Association 2012 Annual Meeting, October 24, 2012, Wenatchee, WA.
- Preece E, **Skinner M**, Moore BC. Poster. “Comparison of extraction methods used to isolate the cyanotoxin, Microcystin, from fish muscle.” Washington State University Academic Showcase, March 30, 2012, Pullman, WA.

Workshops/training courses

Process-Based Riverscape Restoration

Restoring Riverscapes, webinar

Building Strong Relationships with Landowners

Land Trust Alliance, webinar

Mastering the art of negotiation

Land Trust Alliance, webinar

Endangered Species Act of 1973- Overview

Department of the Interior, webinar

Proper Functioning Condition monitoring training

National Riparian Service Team, Upper Klamath Basin, OR

Beaver dam analogs

Salmon Restoration Federation pre-conference workshop, Fortuna, CA

Design and engineering of off-channel habitat and large wood projects

Salmon Restoration Federation pre-conference workshop, Fortuna, CA

GIS techniques for fisheries scientists

American Fisheries Society pre-conference workshop, Portland, OR

Physical and biological considerations related to the use of wood in aquatic habitat and stream restoration projects^[SEP]

Western Division American Fisheries Society pre-conference workshop, Boise, ID

Internal phosphorus loading in lake systems

North American Lake Management Society pre-conference workshop, Spokane, WA

Scholarships, Awards, and Honors

- Numerous performance awards from US Bureau of Reclamation and US Fish and Wildlife Service, including a STAR award for 2021 detail position
- Idaho Chapter American Fisheries Society Graduate Student Scholarship

- Washington State Lake Protection Association 2014 Nancy Weller Memorial Scholarship
- Elected WSU Liaison of the Palouse Student Unit of the American Fisheries Society for the 2014-2015 school year
- Clearwater Fly Casters 2014 Student Scholarship
- Jody Connor Student Award for best student paper at the 2013 International Symposium of the North American Lake Management Society
- Jody Connor Student Award Honorable Mention for outstanding student poster at the 2013 International Symposium of the North American Lake Management Society
- Elected secretary of the Palouse Student Unit of the American Fisheries Society for the 2013-2014 school year
- Western Division American Fisheries Society 2013 Student Travel Grant
- North American Lake Management Society 2012 Student Travel Grant
- Washington State University Graduate and Professional Student Association Student Travel Grant
- Washington State University Graduate and Professional Student Association Student Registration Grant
- Graduate of Western Washington University Honors College
- Completed and defended an undergraduate thesis assessing the impacts of a small dam on aquatic benthic macroinvertebrate community structure
- Western Washington University's Presidential Merit Scholarship

Scientific and Professional Association Memberships

- North American Lake Management Society (NALMS)
- American Fisheries Society and select subunits (AFS, WDAFS, ICAFS, WA/BC AFS, PUAFS)
- Washington State Lake Protection Association (WALPA)
- Klamath Basin Monitoring Program (KBMP)

CRAIG BIENZ

19619 Webber Road
Klamath Falls, OR 97603

Tel: 541 891 0062
Email: cbienz@tnc.org.

Personal Profile

I am the Director of Sycan Marsh Preserve, and a forest project manager with The Nature Conservancy (TNC), Restore America's Forests. In this capacity I plan, direct, and implement TNC's research, development and restoration programs in the Upper Sycan Watershed and south-central Oregon. I develop conservation actions in collaboration with state and federal agencies and Native American Tribes using analytical tools like Miradi, Systems Thinking, and Open Standards to identify strategic actions to abate threats and restore ecosystem functions. My interests including the human dimension in conservation actions focusing on relationships and process as much as — or more than — results and practicing deep listening skills. My efforts include prioritizing watershed restoration strategies based on community values and other critical goals, including protection of tribal resources, at-risk vegetation communities, private timber lands, instream, riparian, and wetland habitats.

Act as the lead TNC representative in south-central Oregon to increase capacity for conservation actions through collaboration with neighbors, community leaders, The Klamath Tribes, and state and federal agencies. Initiated and directed the Southern Oregon Fire Learning Network. Member, and previously Chair of the Board for the Klamath Lake Forest Health Partnership, Lakeview Stewardship Group, Lake County Cooperative Weed Management Board, Chair of the Klamath River Fisheries Task Force, Klamath Basin Bull Trout Working Group, ZX – Sycan Coordinated Resources Management Plan, Upper Sycan Native Fish Restoration Plan, Upper Sycan Watershed Council and Klamath Watershed Partnership.

My research addresses restoring ecological resilience: from climate analogue reference spatial patterns to restoration prescriptions and monitoring. I conduct research at multiple spatial and temporal scales to examine: (1) disturbance dynamics, successional patterns and processes, (2) effects of climate change and natural disturbance on ecological resistance, fish and wildlife habitats and populations, (3) impacts of forest and fire management on US Forest Service focal and threatened species (Birds and Burn Project), which in 2007 was awarded the "Wings Across the Americas" (4) development and application of spatial statistical models for forest structure and use of digital and social media to connect people, information, and landscapes, and (5) ecological implications of forest and wildfire management policy. Much of my recent effort strives to integrate wildfire science into relevant policy and to address the impacts of climate change on the risks and costs of natural hazards.

I have provided expert witness testimony in state and federal courts, with two cases reaching the US Supreme Court. Provided scientific and technical information on a variety of natural resources issues (endangered species, ecosystem management and the Klamath Basin water adjudication).

Education

- 1982 Master of Science in Ecology. Northern Michigan University, Marquette, Michigan. Thesis: Circadian rhythms in white-tailed deer, using a telemetric approach.
- 1973 Bachelor of Science. Alma College, Alma, Michigan. Major: Biology.

Publications

- 2023 Bienz, C. Nexus between fire risk and thinning. Northwest Woodlands. Pages 16 – 19.
- 2022 This Vast Wildfire Lab Is Helping Foresters Prepare for a Hotter Planet. The New York Times. <https://www.nytimes.com/2022/01/05/climate/fire-forest-management-bootleg-oregon.html>
- 2022 Olszewski, J., C. Bienz, and A. Markus. Using Airborne LiDAR to Monitor Spatial Patterns in South-Central Oregon Dry Mixed-Conifer Forest. Journal of Forestry. <https://doi.org/10.1093/jofore/fvac020>
- 2022 Levin, D., N. Grulke, C. Bienz, K. Hrinkevich, A. Merschel, and Uyeda. Forest treatment effects on wood production in ponderosa pine. Forest Ecology and Management. 591: 1-14. <https://doi.org/10.1016/j.foreco.2022.120295>
- 2021 D'Evelyn, S., L. Woods, C. Bienz. Living with Fire: Collaborative Partnerships for Forest and Public Health. Northwest Woodlands. Pages 8 – 10, 20 – 23.
- 2021 Schrader-Patton, C., N. Grulke, and C. Bienz. Assessment of Ponderosa Pine Vigor Using Four-Band Aerial Imagery in South Central Oregon: Crown Objects to Landscapes. Forests 2021, 12, 612:1- 23. <https://www.mdpi.com/1999-4907/12/5/612/pdf>
- 2020 Grulke, N., C. Bienz, K. Hrinkevich, J. Maxfield, and K. Uyeda. Quantitative and qualitative approaches to assess tree vigor and stand health in dry pine forests. Forest Ecology and Management. 465:2743–2750. ISSN: 0378–1127 <https://doi.org/10.1016/j.foreco.2020.118085>
- 2019 Bienz, C., R. Parsons, C. Moran, K. Sauerbrey, and K. Rosendaul. Multi-scale approach to fuel reduction in a fragmented landscape in eastern Oregon. Proceedings for the 6th International Fire Behavior and Fuels Conference April 29 – May 3, 2019, Albuquerque, New Mexico USA. Published by the International Association of Wildland Fire, Missoula, Montana, USA.
- 2019 Bienz, C., R. Parsons, N. Grulke, K. Sauerbrey, K. Rosendaul. Sharing the Road: Managers and Scientists Transforming Fire Management. In: Hood, Sharon M.; Drury, Stacy; Steelman, Toddi; Steffens, Ron, [eds.]. 2020. Proceedings of the Fire Continuum-Preparing for the future of wildland fire; 2018 May 21-24; Missoula, MT. Proceedings RMRS-P-78. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 358 p. <https://www.fs.usda.gov/treearch/pubs/60581>
- 2018 Churchill, DJ., ST. Seager, AJ. Larson, EE. Schneider, KB. Kemp, and C. Bienz. 2018. Ecological Functions of Spatial Patterns in Dry Forests: Implications for Forest Restoration. The Nature Conservancy, Portland, OR. 7 p.
- 2018 Bienz, C. Evaluation and validation on use of Virtual Boundary Technology. Pacific Northwest Research Station, Portland, Oregon. General Technical Report PNW-GTR-DOI: 10.13140/RG.2.2.23344.10243. 22 p.
- 2018 Leavell, D, A. Markus, C. Bienz, K. Carlsen, E. J. Davis, M. Douglas, D. Ferguson, L. Fledderjohann, K. Johnson, N. Livingston, J. Pettigrew, G. Rogers, M. Schreder, D. Shoun, and L. A. Vradenburg. Planning and Implementing Cross-boundary, Land-landscape-scale Restoration and Wildfire Risk Reduction Projects. A Guide to Achieving the Goals of the National Cohesive Wildland Fire Management Strategy. PNW 707. <https://catalog.extension.oregonstate.edu/pnw707>
- 2017 Floodplain restoration. IMPACT. American Water Resources Association.
- 2010 Lawler, Tear, Pyke, Shaw, Gonzalez, Kareiva, Hansen, Klausmeyer, Aldous, and Bienz. Conservation in a changing climate: a new paradigm for land management. Frontiers in Ecology and the Environment 2010 8(1) 35-43.
- 1999 Bienz, C. and L. K. Dunsmoor. Methods to evaluate habitat requirements for redband trout in the Klamath Basin of Oregon. Oregon Chapter, American Fisheries Society, Bend Oregon.
- 1991 Bienz, C. S. and L. K. Dunsmoor. Quantification of mule deer carrying capacity in south-central Oregon. The Biology of Deer. R. D. Brown, Editor. Springer-Verlag. 596 pp.
- 1991 Bienz, C. S. Using mule deer antler beam diameters as a possible index of habitat quality. Ungulate Behavior and Management. E. C. Mungall, Editor. Elsevier. 531 pp.

- 1987 Bienz, C. S. and J. S. Ziller. The status of three lucustrine species of Catostomidae. (Publication used in listing *Chasmistes brevirostris* and *Deltistes luxatus* as endangered by the United States in 1988.)
- 1985 Bienz, C. S., J. Inman, R. Opp, G. Silovsky and J. Toman. Mule deer habitat effectiveness: the criteria for habitat management. Technical Advisory Committee. 26pg.
- 1982 Ozoga, J. J., L. J. Verme, and C. S. Bienz. Parturition behavior and territoriality in white-tailed deer: impact on neonatal mortality. *Journal of Wildlife Management*. 46 (1): 1-11.
- 1982 Ozoga, J. J., C. S. Bienz and L. J. Verme. Red fox feeding habits in relation to fawn mortality. *Journal of Wildlife Management*. 46 (1): 242-243.

Professional Memberships

American Society of Mammalogist, Life Membership

International Association of Wildland Fire

Society for Conservation Biology, Life Membership

Society for Range Management, Life Membership

MATTHEW D. JOHNSON

Department of Wildlife
Cal Poly Humboldt (formerly Humboldt State University)
Arcata, California 95521

EDUCATION

Ph.D.	Ecology	Tulane University New Orleans, Louisiana	1999
B.S.	Wildlife Biology	University of California at Davis Davis, California	1992

RELEVANT EXPERIENCE

- *Professor (2008-), Chair (2008-2013), Associate Professor (2005-2008), Assistant Professor (2001-2005), and Lecturer (1999-2001); Department of Wildlife, Cal Poly Humboldt, Arcata, California.* 1999- present
- *Ph.D. work, Tulane University, New Orleans, Louisiana.* 1993 - 1999
- *Research Assistant, University of California at Davis.* 1993
- *Ornithological technician, Point Reyes Bird Observatory (now Point Blue Conservation Science)* 1993
- *Wildlife Biologist, US Forest Service, Eldorado National Forest, California.* 1992

FELLOWSHIPS AND AWARDS

California State University, Faculty Innovation & leadership Award	2020
Humboldt State Univ. Sponsored Programs Foundation, 5 million dollar club	2020
Fulbright Commission, Teaching-Research Award for stay in India (partial acceptance)	2012
North Coast Chapter of the Wildlife Society, Conservationist of the Year Award,	2012
British Ornithologists Union, Invited Speaker Award	2012
Humboldt State University, Scholar of the Year,	2010
Humboldt State University, Service Learning Fellow	2009
Humboldt State University, Alistair McCrone Promising Young Scholar Award	2004
Cooper Ornithological Society A. Brazier Howell Award for outstanding presentation.	1999
Cooper Ornithological Society Travel Award	1999
American Ornithologists' Union Tucker Travel Award	1998
Southern Graduate Student Biological Symposium Award for Outstanding Presentation	1998
Louisiana Educational Quality Support Fund Graduate Fellowship	1993-1997
U.S. Forest Service Award of Appreciation for firefighting.	1992
President's Award for Outstanding Freshmen, UC Davis	1988

TEACHING

Since the 2014-2015 academic year I have taught or co-taught (or supervised in the case of theses and independent study courses) the following courses at HSU:

- Wildlife Habitat Ecology (WLDF 531)
- Critical Thinking in Social & Environmental Responsibility (FOR 100; co-taught with Dr. Amy Sprowles)
- Becoming a STEM Professional (SCI 100; co-taught with Dr. Micaela Szykman Gunther)
- Case Studies in Environmental Ethics (WLDF 309; co-taught with Dr. Rafael Cuevas Uribe)
- Wildlife Techniques and Scientific Method (WLDF 311)
- Ecology and Management of Upland Habitats for Wildlife (WLDF 430)
- Seminar on International Research with Wildlife (Special Topics, WLDF 480)
- Graduate Seminar in Wildlife Ecology (WLDF 585)
- Undergraduate Honor's Thesis in Wildlife (WLDF 490)
- Independent Study in Wildlife (WLDF 499)
- Graduate Thesis in Wildlife (WLDF 690)
- Advanced Field Problems in Wildlife (WLDF 695)

UNDERGRADUATE AND GRADUATE STUDENT THESIS ADVISING GRADUATE ADVISEES

I began my tenure-track position at Humboldt in fall 2001. Since that time, I have supervised 40 graduate students (Master's candidates) in total – 37 in the Wildlife option of the Natural Resource MSc program, and three in the Environment and Community MA program. Ten are currently enrolled, 30 have finished their MS or MA degrees. Of the 30 that have finished, 28 are professional biologists or environmentalists, including nine that are in (or finished) PhD programs, and two are in education.

UNDERGRADUATE ADVISEES

I have also advised 49 Honor's undergraduate theses. All graduated, and most of these students are now working professionally in the discipline of wildlife conservation and management or in graduate school, and several have written peer-reviewed publications.

POST-DOCTORAL FELLOWS

I have also advised two post-doctoral fellows: Dr. Seafha Ramos (funded by an NSF grant of her own) and Dr. Samuel Oliveira (funded by a research grant of mine from the Agricultural Research Institute). Dr. Ramos has now secured a tenure-track position at Northern Arizona University; Dr. Oliveira is still in his post-doc.

PUBLICATIONS

¹indicates HSU graduate student author, ²indicates HSU undergraduate student author (**79 total; 21 in last 5 years – from 2019 to today**)

- 2022 Johnson, M.D., A.E. Huysman, D.A. St. George, D. Kammerich-Berke, J. Carlino, and B.R. Estes. Wine and Wildlife: An Exploratory Study of the Depiction of Animals on Wine Labels Available in the United States. **Journal of Food Distribution Research** 53:40-66.
- 2022 Carlino, J.E., S.D. Chavez, L.M. Echávez, and M.D. Johnson. Can Barn Owl (*Tyto furcata*) Nest Boxes in Winegrape Vineyards Sustain a Population of Barn Owls? **Proceedings of the 30th Vertebrate Pest Conference**. Paper No. 26.
- 2022 Hansen, A. and M.D. Johnson. Evaluating the Use of Barn Owl Nest Boxes for Rodent Pest Control in Winegrape Vineyards in Napa Valley. **Proceedings of the 30th Vertebrate Pest Conference. Paper No. 27.**
- 2022 Johnson, M.D., Margell, S.T., Goldenberg, K.R., Palomera, and A.E. Sprowles. Impact of a first-year place-based learning community on STEM students' academic achievement in their second, third, and fourth Years. **Innovative Higher Education**, pp.1-27.
- 2022 Ong'ondo*, F.J., F.A. Forgarty III, P. Njoroge, M.D. Johnson. Bird abundance and diversity in shade coffee and natural forest in Kenya. **Global Ecology & Conservation** Vol. 39. e02296.
- 2022 Kammerichs-Berke, D.¹, F.J. Lane², F.J. Ong'ondo², E.M. Mlamba, W.T. Bean, J.A. Jedlicka, P. Njoroge, M.D. Johnson. The effect of shade tree species on bird communities in central Kenyan coffee farms. **Bird Conservation International**.
- 2022 Parker, K., M. Johnson, D. Blake, and C. Reed. "Klamath Mountains as a Teacher." In *The Klamath Mountains: A Natural History*. M. Kauffmann and J. Garwood, eds. Backcountry Press.
- 2021 Sprowles, A.E. and M.D. Johnson. A faculty-led effort to build campus community around inclusive excellence in STEM. Ch. 5 in **Shared Leadership in Higher Education**, E. Holcombe, A. Kezar, S. Elrod, and J.A. Ramaley, Eds. Stylus Publishing.
- 2021 Huysman¹, A.E. and M.D. Johnson. Barn owl habitat selection is resilient to wildfire in a vineyard ecosystem. **Ecology & Evolution**. DOI: 10.1002/ece3.8416
- 2021 Estes¹, B.R. and M.D. Johnson. Environmental values of California winegrape growers and the use of barn owl nest boxes as a tool for integrated pest management. **California Fish and Wildlife** 107:260-275.
- 2021 Huysman¹, A.E. and M.D. Johnson. Multi-year nest box occupancy and short-term resilience to wildfire disturbance by barn owls in a vineyard agroecosystem. **Ecosphere**. 12(3): e03438.
- 2021 St. George¹, D. and M.D. Johnson. Effects of habitat on prey delivery rate and prey species composition of breeding barn owls in winegrape vineyards. **Agriculture, Ecosystems, and the Environment**. 312:107322
- 2021 Castañeda¹ X.A., M.D. Johnson, A.M. Huysman¹. Barn Owls select uncultivated habitats for hunting in a winegrape growing region of California. **Ornithological Applications**. 123:1-15
- 2020 Schooler, S.L., M.D. Johnson, P. Njoroge, and W.T. Bean. Shade trees preserve avian insectivore biodiversity on coffee farms in a warming climate. **Ecology & Evolution**. 12960-12972.
- 2020 Johnson, M.D., Sprowles, A.E., Goldenberg, K.R., Margell, S.T. and Castellino, L., Effect of a place-based learning community on belonging, persistence, and equity gaps for first-year STEM students. **Innovative Higher Education**, pp.1-23.

- 2020 Johnson, M.D. and D. St. George*. Estimating the number of rodents removed by barn owls nesting in boxes on winegrape vineyards. **Proceedings, 29th Vertebrate Pest Conference** (D. M. Woods, Ed.), Published by Univ California, No. 17.
- 2020 Willis¹, W. and M.D. Johnson. The political ecology of shade coffee: perspectives from Jamaican Blue Mountain farmers. **Conservation and Society** 18: 280-292.
- 2019 Mendia¹, S.M., Johnson, M.D. and Higley, J.M. Ecosystem services and disservices of bear foraging on managed timberlands. **Ecosphere** 10:1-25
- 2019 Bergstrom, B.J., M.D. Johnson, J.C. Harris, and T.W. Sherry. Effects of habitat, season, and age on winter fat storage by migrant and resident birds in Jamaica. **Journal of Field Ornithology** 90:1-14
- 2019 Spowles, A.E. K. Goldenberg, P.D. Goley, S. Ladwig, F. Shaughnessy, K.J. Malloy, C.R. Baldy, M.M. Mola, J.R. Smith, M.A. Hemphill-Haley, Melanie J. Michalak, Claire P. Till, Alison P. O'Dowd, Gillian Black, Patricia L. Siering, Eileen Cashman, Alexandru M.F. Tomescu, Matthew P. Hurst, Borbala Mazzag, Sonja Manor, Dale R. Oliver, Jeffrey R. Dunk, Jeffrey Abel, Micaela S. Gunther, Andre Buchheister, Ruth Saunders, James Floss, Erin Sullivan, Sarah Ben-Zvi, and Matthew D. Johnson. Place-Based Learning Communities on a Rural Campus: Turning Challenges into Assets. **Learning Communities Research and Practice**. 7: Article 6.
- 2019 Maas, B., Heath, S., Grass, I., Cassano, C., Classen, A., Faria, D., Gras, P., Williams-Guillén, K., Johnson, M., Karp, D.S. and Linden, V. Experimental field enclosure of birds and bats in agricultural systems—Methodological insights, potential improvements, and cost-benefit trade-offs. **Basic and Applied Ecology** 35: 1-12.
- 2018 Johnson, M.D., C.A. Wendt¹, D. St. George¹, A. Huysman¹, B. Estes¹, X. Castañeda¹. Can barn owls help control rodents in winegrape vineyard landscapes? A review of key questions and suggested next steps. Proc. 28th Vertebr. Pest Conf. (D.M. Woods, Ed.), Published at Univ. of Calif., Davis. Pages 180-187.
- 2018 Johnson, M.D., Wood, E. Habitat Ecology. Ch. 18 in **Ornithology: Foundation, Critique, and Application**, Morrison, M.L., A.D. Rodewald, G. Voelker, M.R. Colón, and J.F. Prather, eds. Johnson Hopkins Univ. Press, Baltimore, Maryland.
- 2018 Meisman², E., C. Bortot², L. Enriquez², C. Herr², S. Ihle², S. Jensen², M. Johnson, M. Sampson², and C. Wendt¹. Coastal vegetation communities affect mesocarnivore activity in Northern California dune ecosystems. **Western Wildlife** 5:1–6.
- 2018 Smith¹, C., M.C. Milligan¹, M.D. Johnson, and P. Njoroge. Bird community response to landscape and foliage arthropod variables in sun coffee of central Kenyan highlands. **Global Ecology and Conservation** 13: e00378
- 2017 Johnson, M.D., Spowles, A.E., Overeem, K., and Rich, A. A place-based learning community: Klamath Connection at Humboldt State University. **Learning Communities Research & Practice** 5(2): 1-13
- 2017 Wendt¹, C. A., & Johnson, M. D. Multi-scale analysis of barn owl nest box selection on Napa Valley vineyards. **Agriculture, Ecosystems & Environment** 247:75-83.
- 2017 Eyes¹, S. A., Roberts, S. L., & Johnson, M. D. California Spotted Owl (*Strix occidentalis occidentalis*) habitat use patterns in a burned landscape. **The Condor** 119:375-388.
- 2016 Browning, M., Cleckler, J., Knott, K. & Johnson, M.D. Prey Consumption by a Large Aggregation of Barn Owls in an Agricultural Setting. **Proc. 27th Vertebr. Pest Conf.** (R. M. Timm and R. A. Baldwin, Eds.) Pp. 337-344.
- 2016 Spidal², A.B. and M.D. Johnson. Sexual habitat segregation in migrant warblers along a shade gradient of Jamaican coffee farms. **Journal of Caribbean Ornithology** 29:37–42.
- 2016 Sherry, T.W., M.D. Johnson, K.A. Williams, J.D. Kaban, C.K. McAvoy, A.M. Hallauer, S. Rainey, and S. Xu. Dietary opportunism, resource partitioning, and consumption of coffee berry borers by five species of migratory wood warblers (Parulidae) wintering in Jamaican shade coffee plantations. **Journal of Field Ornithology** 87:273-292.
- 2016 Johnson, M.D. & S.C. Hackett. Why birds matter economically. Ch. 2 in **Why Birds Matter: Avian Ecological Function and Ecosystem Services**, C.H. Sekercioglu, D.G. Wenny, and C.J. Whelan, eds. Univ. Chicago Press.
- 2016 Whelan, C.J., D.F. Tomback, D. Kelly, and M. D. Johnson. Trophic interaction networks and ecosystem services. Ch. 3 in **Why Birds Matter: Avian Ecological Function and Ecosystem Services**, C.H. Sekercioglu, D.G. Wenny, and C.J. Whelan, eds. Univ. Chicago Press.
- 2016 Milligan¹, M. C., Johnson, M. D., Garfinkel¹, M., Smith¹, C. J., & Njoroge, P. 2016. Quantifying pest control services by birds and ants in Kenyan coffee farms. **Biological Conservation** 194: 58-65.
- 2015 Smith¹, C., D. Barton, M.D. Johnson, C. Wendt², M.C. Milligan¹, P. Njoroge, P. Gichuki. Bird communities in sun and shade coffee farms in Kenya. **Global Ecology and Conservation** 4: 479-490.

- 2015 Delgado de la Flor, Y.A.² and M.D. Johnson. Influence of invasive European beachgrass on mesopredator activity in the coastal dunes of Northern California. **Western Wildlife**. 2: 29-34.
- 2015 Garfinkel¹, M. and M.D. Johnson. Pest-removal services provided by birds on small organic farms in northern California. **Agriculture, Ecosystems, and the Environment**. 211: 24-31.
- 2015 Johnson, M.D. and Y.L. De Leon². Effect of an invasive plant and moonlight on rodent foraging behavior in a coastal dune ecosystem. **PLoS ONE** 10(2): e0117903
- 2015 Spragens, K¹, J.M. Black, and M.D. Johnson. Aleutian Cackling Goose *Branta hutchinsii leucopareia* use of pastures in relation to livestock management. **Wildfowl** 65: 31–50.
- 2014 Howard², K. and M.D. Johnson. Effects of natural habitat on pest control in California Vineyards. **Western Birds** 45:276–283
- 2014 Kalinowski¹, R.S., M.D. Johnson, and A.C. Rich. Habitat relationships of great gray owl prey in meadows of the Sierra Nevada Mountains. **Wildlife Society Bulletin** 38: 547-556.
- 2014 Trainor², M., M.D. Johnson, and H. Davis. Orangequit (*Euneornis campestris*) and Bananaquit (*Coereba flaveola*) body condition in response to shade coffee habitat in the Blue Mountains of Jamaica. **J. Caribbean Ornithology**. Volume 27.
- 2014 Railsback, S.F. and M.D. Johnson. Effects of land use on bird populations and pest control services on coffee farms. **Proceedings of the National Academy of Sciences**. 111(16): 6109-6114.
- 2014 Wolfe¹, J.D., M.D. Johnson and C.J. Ralph. 2014. Do Birds Select Habitat or Food Resources? Nearctic-Neotropic Migrants in Northeastern Costa Rica. 2014 **PLOS ONE** 9(1): e86221.
- 2013 Wood¹, E.M., M.D. Johnson, R.D. Jackson, A.M. Pidgeon, and B.A. Garrison. Avian community use and occupancy of California oak savanna. **Condor**. 115: 712-724.
- 2013 Wolfe¹, J., M.D. Johnson, and C.J. Ralph. Higher mass increases annual survival of wintering Prothonotary Warblers (*Protonotaria citrea*) in Northeastern Costa Rica. **Condor** 115:163–167.
- 2012 Smith², C., M.D. Johnson, B. Campos¹, and C. Bishop². Variation in aggressive behavior of black-throated blue warblers in Jamaica. **Condor** 114: 831-839.
- 2011 Railsback, S.F. and M.D. Johnson 2011. Pattern-oriented modeling of bird foraging and pest control in coffee farms. **Ecological Modelling** 222:3305-3319.
- 2011 Wenny, D., T.L. DeVault, M.D. Johnson, D. Kelly, C.H. Sekercioglu, D.F. Tomback, and C.J. Whelan. The need to quantify ecosystem services provided by birds. **Auk** 128:1-14.
- 2011 Powers², B., M.D. Johnson, J. LaManna¹, and A. Rich. The influence of cattle grazing on pocket gophers in the central Sierra Nevada. **Northwestern Naturalist** 92:13-18.
- 2011 Jirinec², V. B. Campos¹, and M.D. Johnson. Roosting behavior of a migratory songbird on coffee farms in Jamaica: implications for ecosystem services. **Bird Conservation International**. Feb: 1-9.
- 2010 Wood¹, E.M., M.D. Johnson, and B.A. Garrison. Quantifying bird habitat using a releve method. **Trans. West. Sec. Wildlife Society** 46:25-41.
- 2010 Kalinowski², R.S., M.D. Johnson. Influence of suburban habitat on a wintering bird community in coastal northern California. **The Condor**. 112: 274–282.
- 2010 Johnson, M.D., J.L. Kellermann¹, and A.M. Stercho¹. Pest control services by birds in shade and sun coffee in Jamaica. **Animal Conservation** 13:140-147.
- 2009 Johnson, M.D., N.J. Levy², J.L. Kellermann¹, and D.E. Robinson. Effects of shade and bird predation on arthropods and leaf damage on coffee farms in Jamaica's Blue Mountains. **Agroforestry Systems**. 76: 139-148
- 2009 Tonra¹, C.M., M.D. Johnson, M.E. Hauber, and S.K. Heath. Does nesting habitat influence hatching synchrony between brood parasitic Brown-headed Cowbirds (*Molothrus ater*) and two hosts? **Ecography**. 32:497-503.
- 2008 Johnson, M.D. and C.M. Horn². Effects of rotational grazing on rodents and raptors on a coastal grassland. **Western North American Naturalist**. 68:444-462.
- 2008 Kellermann¹, J.L., M.D. Johnson, A.M. Stercho¹, and S. Hackett. Ecological and economic services provided by birds on Jamaican Blue Mountain coffee farms. **Conservation Biology** 22:1177-1185.
- 2008 Tonra¹, C.M., M.E. Hauber, S.K. Heath, and M.D. Johnson. Ecological correlates and sex differences in early development of a generalist brood parasite. **Auk** 125:205-213.
- 2007 Myers², C.H., L. Eigner², J.A. Harris², R. Hilman², M.D. Johnson, R. Kalinowski², J.J. Muir², M. Reyes², L.E. Tucci². The effectiveness of ground-based and tree-based polyvinyl chloride traps for capturing *Pseudacris regilla* in northwestern California. **Northwestern Naturalist** 88:147-154.
- 2007 Tietz¹, J.R. and M.D. Johnson. Stopover ecology and habitat selection of juvenile Swainson's Thrushes along the Northern California coast. **Condor**. 109:795-807.
- 2007 Johnson, M.D. Measuring habitat quality: a review. **Condor** 109:489-504.

- 2007 Kristan, W.B. III, M.D. Johnson, and J.T. Rotenberry. Choices and consequences of habitat selection for birds. **Condor** 109:485-488.
- 2006 Johnson, M.D., T.W. Sherry, R.T. Holmes, and P.P Marra. Assessing habitat quality for a migratory songbird wintering in natural and agricultural habitats. **Conservation Biology** 20:1433-1444.
- 2006 Johnson, M.D., A.M. Strong, and T.W. Sherry. The balanced breeding hypothesis for the integration of migrant and resident insectivorous birds in the tropics. **Journal of Avian Biology** 37: 229-237.
- 2005 Johnson, M.D., T.L. Adams², T.M. Branston², R.D. Clark², W.B. Crombie², D.L. Germann², A.D.M. Ives-Ringstad², H. Langendorf², and J.L. Moore². Variables influencing predation of artificial duck nests in Northwest Coastal California. **Transactions of the Western Wildlife Society** 41:11-20.
- 2005 Johnson, M.D. Habitat quality: a brief review for wildlife biologists. **Transactions of the Western Wildlife Society** 41:31-41.
- 2005 Johnson, M.D. Academic performance of 'native' versus transfer students in natural resource sciences. **College Student Journal** 39:570-579.
- 2005 Sherry, T.W., M.D. Johnson, and A.M. Strong. Are migrant birds limited by food in winter? Chapter 31 in **Birds of Two Worlds: The Ecology and Evolution of Migration**. Johns Hopkins University Press.
- 2005 Johnson, M.D., T.W. Sherry, A.M. Strong, and A. Medori. Migrants in Neotropical bird communities: an assessment of the breeding currency hypothesis. **Journal of Animal Ecology** 74:333-341.
- 2004 Johnson, M.D. The next Reality Show: legitimizing experiential learning with community-based research. **The American Biology Teacher** 66: 249-253.
- 2002 Johnson, M.D., D. Ruthrauff¹, J. Jones², and J. Robinson², and J. Tietz¹. Short term effects of tartar emetic on re-sighting rates of migratory songbirds in the non-breeding season. **Journal of Field Ornithology** 73:191-196.
- 2001 Johnson, M.D. and T.W. Sherry. Effects of food availability on the distribution of migratory warblers among habitats in Jamaica, West Indies. **Journal of Animal Ecology** 70:546-560.
- 2001 Strong, A.M. and M.D. Johnson. Exploitation of a seasonal resource by non-breeding Plain and White-crowned pigeons: implications for conservation of tropical dry forests. **Wilson Bulletin** 113:73-77.
- 2000 Johnson, M.D. Effects of shade-tree species and crop structure on the bird and arthropod communities in a Jamaican coffee plantation. **Biotropica** 32:133-145.
- 2000 Johnson, M.D. Evaluation of an arthropod sampling technique useful in measuring food availability for forest insectivores. **Journal of Field Ornithology** 71:88-109.
- 2000 Johnson, M.D. and A. M. Strong. Length-weight relationships of Jamaican arthropods. **Entomological News** 111:270-281.
- 1996 Johnson, M.D. and G.R. Geupel. The importance of productivity to the dynamics of a Swainson's Thrush population. **Condor** 98:133-141.
- 1996 Johnson, M.D. and J.G. Gilardi. The communal roosting behavior of the Crested Caracara in southern Guatemala. **Journal of Field Ornithology** 67:44-47.

Opinion-editorial publications & popular articles

- 2002- Various published "Letters-to-the-Editor" for newspapers on natural resource issues. Including current letters in: San Francisco Chronicle, LA Times, Eureka Reporter, and the Eureka/Arcata Times Standard
- 2003 Johnson, M.D. Liar, liar, brush on fire. [Opinion essay on prevention of brush fires like those in Southern California, fall 2003] **EcoNews** Nov-Dec, 2003.
- 2003 Johnson, M.D. Where will the wood come from? [Opinion essay on logging in National Forests inspired by preparatory work for Habitat Ecology course lectures] **San Francisco Chronicle**, Sunday October 13.
- 2003 Johnson, M.D. Student project contributes to marsh restoration and enhancement effort. **Outdoor California**, May-June Issue, Pages 4-7.
- 2001 Johnson, M.D. "Twenty years of schooling and they put you on the day shift": reflections of a first-year wildlife teacher. **Wildlife Society Bulletin** 29:1298-1299.
- 2001 Johnson, M.D. [Co-written with numerous student authors] Why Y2Y? [Opinion essay on merits of a conservation initiative written with students and stemming from in-class debate in Habitat Ecology course.] **EcoNews** Jan-Feb, 2001.
- 2000 Johnson, M.D. A piece of the pie. [Opinion essay on human population problem inspired by preparatory work for Wildlife Ecology & Management lectures]. **EcoNews** Nov-Dec, 2000.

Manuscripts currently in press and under review

- (In press) Johnson, M.D., K.R. Goldenberg, S.T. Margell, R. Palomera, A. O'Dowd, J. Smith, E. Robinson, S. Marks, S. Tuttle, C. Risling-Baldy, E.N. Ford Turnbow, and A.E. Spowles. Reimagining welcome week: effects of an immersive experience on community and belonging for first-year STEM students. **College Student Journal**
- (In press) Campos, B.R. C. Smith, and M.D. Johnson. Habitat selection by an avian predator of insect pests on Jamaican coffee farms. **Global Ecology and Conservation**

PRESENTATIONS & WORKSHOPS

Presentations at Professional Scientific Conferences:

Over 50 presentations (oral and poster) at regional, national, and international scientific conferences including those of: The Society for Conservation Biology, The Wildlife Society, The American Ornithologists' Union, The Cooper Ornithological Society, The Ecological Society of America, and others.

Invited Seminars & Public Presentations:

I no longer keep a 100% record of oral presentations and poster presentations at scientific conferences, but in the past 5 years some of the presentations include:

- Johnson, Carlino¹, Wang¹, Chavez¹, and Echávez¹. Oral presentation results of barn owl nest box occupancy. Western Wildlife Conference 2022 and American Ornithological Society 2022.
- Chavez¹ and Johnson. Oral presentation of results of barn owl spatial habitat use. Western Wildlife Conference 2022.
- Echávez¹ and Johnson. Oral presentations of results of barn owl polymorphism research. Raptor Research Foundation 2021 and Western Wildlife Conference 2022.
- Carlino¹ and Johnson. Oral presentations of results of barn owl demographic research. Raptor Research Foundation. 2021 and Western Wildlife Conference 2022.
- Spowles and Johnson. Oral panel presentation. AAC&U Shared Leadership Virtual Panel 2021
- Johnson, Spowles, Goldenberg, and Margell. Presented results of Place-based Learning Communities at the Association of Hispanic Institution Educators (2017, 2018, 2019, 2020)
- Spowles, Johnson, Goldenberg, and Margell. Presented results of Place-based Learning Communities at the American Association of Colleges and Universities (2015, 2017)
- Johnson, Wendt, Castañeda¹, St. George¹, and Huysman¹. Presented results of barn owl research. Vertebrate Pest Conference. 2018
- Huysman¹ and Johnson. Presented results of barn owl research. Raptor Research Foundation 2017. The Wildlife Society 2018. American Ornithological Society. 2019.
- Kammerichs-Berke¹ and Johnson. Presented results of research on birds in Kenyan coffee farms. American Ornithological Society. 2019.
- St. George¹ and Johnson. Presented results of barn owl research. Raptor Research Foundation 2017. The Wildlife Society 2018.
- Blake¹ and Johnson. Presented results of research in Pileated Woodpeckers on Hoopa Valley Indian Reservation. American Indian Science and Engineering Society 2018.
- Haumann² and Johnson. Presented results of research in western pond turtles on the Klamath River. Society for the Advancement of Chicanos & Native Americans in the Sciences 2019. American Indian Science and Engineering Society 2018.

Over 30 invited oral presentations to various groups, usually open to the public, including:

- Universities: Oregon State University, College of William & Mary, The Ohio State University, University of Montana, University of Utah, Purdue University, SUNY Environmental Science & Forestry, Louisiana State University, Warren Wilson College, Fresno State University
- NGOs & Stakeholder Groups: The Audubon Society, The Nature Conservancy, Wild Farm Alliance, various Rotary Clubs, etc.
- Agencies: US Fish and Wildlife Service, the US Forest Service, the National Resources Conservation Service, Napa County Resource Conservation District, Jamaican Coffee Industry Board, the Jamaican National Environmental Protection Agency

GRANTS (as PI unless otherwise noted; **>\$10 million total; >\$2 million in the last 5 years**)

Agricultural Research Initiative (\$620,635). Effects of vegetation management on barn owls as predators of rodent pests in vineyards. Co-PI Tim Bean Cal Poly San Luis Obispo 2023

Agricultural Research Initiative (\$43,396). Investigating the market for biodiversity-friendly cannabis. Co-PIs Josh Meisel (Cal Poly Humboldt), Daniel Sumner (UC Davis)	2023
Agricultural Research Initiative (\$659,987). Integrating insectivorous birds into California vineyard pest management programs. Co-PIs Daniel Karp (UC Davis), Erin Wilson-Rankin (UC Riverside), Houston Wilson (UC Davis)	2022
US Dept of Agriculture (\$199,956). Evaluation of use of owl nest boxes for rodent control in winegrape vineyards.	2022
Agricultural Research Initiative (\$65,770). Assessing the Impact of Wildlife Conscious Certification on Biodiversity.	2022
Agricultural Research Initiative (\$28,834). Is it a trap? Understanding reciprocity between winegrape vineyards and barn owls.	2021
California Dept Fish & Wildlife (\$127,167). Piloting Wildlife Conscious Certification for Cannabis.	2021
US Dept of Agriculture (\$269,781). Camino al Rancho: Welcoming underrepresented students to agroecological science through innovative educational programming and wildlife conservation internships on California grazed rangelands. (Dr. Susan Marshall is co-PI).	2020
Agricultural Research Initiative (\$61,978). Developing a spatial model to optimize rodent pest control by barn owls in Napa's winegrape vineyards. (Dr. James Graham is co-PI)	2020
US Dept of Agriculture (\$248,960). <i>Échale Ganas</i> : Engaging Hispanic Students in Agriculture and Natural Resources at Humboldt State University. (Dr. Rafael Cuevas-Urbe is co-PI)	2019
Agricultural Research Initiative (\$22,000). Initiating research on rodent pest response to barn owls in integrated pest management in winegrape vineyards.	2019
Agricultural Research Initiative (\$26,000). Expanding barn owl-pest control research: new questions, new places.	2018
Agricultural Research Initiative (\$16,000). Barn owls as pest control: workshop, surveys, and tracking.	2017
Bi-national Agricultural Research & Development (\$38,300). International workshop in the use of barn owl as pest management. (Dr. Motti Charter and Dr. Sara Kross are co-PIs)	2017
Howard Hughes Medical Institute (\$1,000,000) Place-based learning communities to advance inclusive excellence in STEM. (I am co-PI; Amy Sprowles of HSU Biology is PI)	2017
National Science Foundation (\$245,237). Collaborative: Research at Undergraduate Institution; International Research Experience for Students: Birds, beans, and bugs – Modeling a warming climate's effect on the natural enemies hypothesis. (Dr. Julie Jedlicka and Dr. Tim Bean are co-PIs)	2017
Agricultural Research Initiative (\$22,000). Videography of barn owls in nest boxes in California's winegrape vineyards.	2016
U.S. Department of Education (\$3,902,145). Hispanic-Serving Institutions - Science, Technology, Engineering, or Mathematics and Articulation Program. (Dr. Amy Sprowles is co-PI)	2016
National Science Foundation (\$369,000). Research Experience for Undergraduates Site: Natural Resource Science on Native American Lands.	2015
Helmsley Charitable Trust via California State University System (\$375,000). Transforming the freshman year for STEM students at Humboldt State: Building a Place-based' Learning Community.	2014
Critical Ecosystem Partnership Fund (\$19,500). Disseminating ecosystem services of trees on farms to coffee farmers in Western Jamaica and the Cockpit Country	2013
Humboldt Area Foundation (\$25,000-\$30,000 annually awarded). Wright Refuge: monitoring songbird demography, training undergraduates, and offering field education for local school children.	2012-2022
National Science Foundation (\$148,998). Birds and beans – an interdisciplinary examination of ecosystem services in tropical coffee farms (research in Kenya and Jamaica). International Research Experience for Students (IRES) Award.	2011
National Science Foundation (\$10,000). Planning visit to extend Ecosystem Services Research 2010 to coffee growing regions on Mt Kenya, Kenya	2010
US Fish & Wildlife Service (\$14,200). Bird use of restored and Spartina-invaded salt marsh.	2009
National Science Foundation (\$892,253). Undergraduate Research & Mentoring – Opportunities for underrepresented students in biological and natural resource sciences at Humboldt State University (I was co-PI; Bruce O'Gara of HSU Zoology was PI)	2009

National Science Foundation (\$142,660). International Research Experience for Students: Ecosystem Services in Jamaican Agriculture (Michael Mesler of HSU Botany was co-PI).	2008
National Science Foundation (\$367,741). REU Site: Engaging undergraduates in ecological and evolutionary research at Humboldt State University. Research Experience for Undergraduates (I was co-PI; Sean Craig of HSU Zoology was PI).	2007
National Geographic Society (\$22,000). An economic incentive for bird friendly coffee around a threatened National Park.	2006
US Fish & Wildlife Service (\$11,600). An economic incentive to maintain shade-coffee habitat in the Caribbean.	2005
Humboldt State University, Office of Research and Graduate Studies (\$4,600): Incorporating undergraduates in international agricultural research.	2005
Agricultural Research Initiative (\$119,000, of which ~\$30k to HSU). Assessing the effects of high-intensity-short-duration grazing on wildlife in coastal California (I was co-PI along with Jeff Black, PI was Mike Hall of Cal Poly SLO).	2005
Headwaters Fund (\$39,000). Habitat management of Aleutian cackling geese in Humboldt County (co-PI with Margaret Gainer of HSU Economics and Jeff Black of HSU Wildlife).	2005
California Coastal Conservancy (\$28,000): Developing a grazing manual for integrating agricultural and wildlife needs on coastal grasslands in Humboldt County.	2004
National Science Foundation (\$279,986). REU Site: Engaging undergraduates in ecological and evolutionary research at Humboldt State University. Research Experience for Undergraduates – REU (I was co-PI; Sean Craig of HSU Zoology was PI).	2003
US Fish & Wildlife Service (\$3,000): Understory-overstory vegetation association at the Lanphere Dunes.	2003
US Fish & Wildlife Service (\$2,000): Mapping vegetation of the Lanphere Dunes in a Geographic Information System.	2003
Humboldt State University, Office of Research and Graduate Studies (\$3,000): Fruit abundance and phenology at the Lanphere Dunes.	2003
Nielson Foundation, Humboldt State University (\$1,800): Effects of cattle grazing on birds in the Mad River Slough Wildlife Area.	2003
California Coastal Conservancy (\$28,000): Effects of the Savory grazing system on wildlife in a coastal California grassland.	2002
Humboldt State University, Office of Research and Graduate Studies (\$8,180): Stopover ecology of Swainson's Thrushes in a coastal dune habitat mosaic.	2001 & 2002
Humboldt State University Small Research Grants (\$2,400): Radio telemetry equipment for studies of wildlife habitat selection at the Lanphere Dunes.	2001 & 2002
Humboldt State University, Office of Research and Graduate Studies (\$1,892): Bird diets in shade-coffee: a first step in examining the role of biological control.	2000
Humboldt State University Small Research Grants (\$754): Undergraduate participation in Jamaica wildlife research.	1999
Neotropical Ecology Institute of the Roger Thayer Stone Center (\$1,585): The role of migrants in tropical bird communities: a test of the breeding currency hypothesis.	1998
Chicago Zoological Society Grant for Biological Research (\$1,700): Habitat suitability for canopy-foraging migratory warblers wintering in agricultural and natural habitats in Jamaica: patterns, ecological determinants, and conservation implications.	1996
National Sigma Xi Research Grant (\$650): Effects of shade-tree species on the arthropod and bird communities supported in Jamaican shade-coffee plantations.	1996
World Nature Association Research Grant for Conservation (\$1,000): Comparison of the suitability of agricultural and natural habitats for migratory warblers wintering in Jamaica.	1995

REVIEWER FOR:

National Science Foundation (2003-)	Birds of Two Worlds (Smithsonian Inst. Press; 2003)
Conservation Biology (2006-)	Partners in Flight (2003)
Conservation International (1999-)	Journal of Entomology (2004-)
Ecology (2002-)	Ecological Applications (2004-)
Journal of Wildlife Management (2005-)	Ornitología Neotropical (2007-)
The Journal of Animal Ecology (2001-)	Wilson J. of Ornithology (2001-)
The Auk (1999-)	Journal of Tropical Ecology (2000-)
The Condor (1997-)	BioScience (2013-)

RELEVANT TRAININGS AND PROFESSIONAL DEVELOPMENT

- ESCALA, Culturally Responsive College Teaching Institute, 2021
- Attended workshops on inclusive excellence, cultural humility, and institutional change organized by Howard Hughes Medical Institute's Inclusive Excellence program, Association of Hispanic Serving Institution Educators, Society for the Advancement of Chicanos and Native Americans in the Science, American Indian Science & Engineering Society, Washington Center's Learning Community Institute, CSU's STEM Collaboratives, and CSU's Center for Evaluation and Educational Effectiveness, 2015-2021
- Attended numerous special lectures by visiting scholars and practitioners on effective teaching & mentoring strategies, 2002-2020, including presentations by Drs. Mica Estrada, John Matsui, Gina Garcia, Asao Inoue
- ESCALA, Cultural Responsive Pedagogy, 2017
- HSU ODEI, Cultural Humility, 2018
- HSU ODEI, Whiteness & White Fragility, 2016
- HSU ODEI, Unconscious bias, 2018 and 2014,
- HSU CTL, Active Learning Pedagogies, 2013 and 2011
- HSU CTL, Writing Across the Curriculum, 2005
- MacKenzie & Associates, Occupancy Modeling, 2007
- WEST Inc., Resource Selection Analyses, 2005

SERVICE TO UNIVERSITY, PROFESSION, COMMUNITY

- Scientific Advisory Board, Point Blue Conservation Science (2019-)
- Board Member, Cooper Ornithological Society (2014-2016) and American Ornithological Society (2017)
- Part of Environment & Community Interdisciplinary MA program at HSU; emphasis on interdisciplinary analysis of conservation, agriculture, and rural communities
- Board member, Friends of the Dunes (2008-2017), a non-profit environmental education and restoration organization.
- Member, Hispanic Serving Institution Advisory Committee
- Member, HSU Re-imagining the First Year Experience Committee (2015)
- Member, HSU President's Cabinet for Institutional Change (2010)
- Member, HSU University Senate (2012-2013)
- Member, HSU Sustainability Steering Committee (2011-)
- Member, HSU First Year Experience Task Force

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 dollars adjusted for inflation. 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).

College/University:

Program:

I. PLANNED STUDENT ENROLLMENT

	FY 1		FY 2		FY 3		FY 4	
	FTE	Headcount	FTE	Headcount	FTE	Headcount	FTE	Headcount
A. New enrollments to institution	90	10	45	5	117	13	54	6
B. Enrollment from existing programs			90	10	45	5	117	13
	90	10	135	15	162	18	171	19

II. REVENUE

	FY 1		FY 2		FY 3		FY 4	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
1. New Appropriated Funding Request	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2. Institution Funds		\$0	\$0	\$0	\$0	\$0	\$0	\$0
3. Federal (e.g. grant, appropriation)	\$0	\$0	\$0	\$0	\$100,000	\$0	\$100,000	\$0
4. New Tuition Revenues from Increased Enrollment	\$132,030	\$0	\$203,986	\$0	\$244,784	\$0	\$258,383	\$0
5. Student Fees	\$2,330	\$3,500	\$3,495	\$5,250	\$4,194	\$6,300	\$4,427	\$6,650
6. Other (e.g., Gifts, Program Revenue)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Revenue	\$134,360	\$3,500	\$207,481	\$5,250	\$348,978	\$6,300	\$362,810	\$6,650

Budget Note: I. A Enrollments are assumed to be full time; therefore FTE=headcount

III. EXPENDITURES

	FY 1		FY 2		FY 3		FY 4	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
A. Personnel Costs								
1. FTE (total for all personnel types)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2. Faculty	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
3. Adjunct Faculty	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
4. Grad Assts	\$132,000	\$0	\$135,960	\$0	\$139,920	\$0	\$143,880	\$0
5. Research Personnel	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
6. Directors Administrators	\$1,500	\$0	\$1,500	\$0	\$1,500	\$0	\$1,500	\$0
7. Administrative Support Personnel	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
8. Fringe Benefits	\$3,986	\$0	\$3,986	\$0	\$4,223	\$0	\$4,342	\$0
9. Other:	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Costs	\$137,486	\$0	\$0	\$0	\$145,643	\$0	\$149,722	\$0

Budget Notes:

III.A.2. Faculty Salaries are increased by ____% each year

III.A.8. Fringe calculated as ____%

	FY 1		FY 2		FY 3		FY 4	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
B. Operating Expenditures								
1. Travel	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
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 & supplies	\$10,000	\$0	\$5,000	\$0	\$5,000	\$0	\$5,000	\$0
6. Rentals	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
7. Materials & goods used for product sale (e.g. fabrication auto repair) Please reflect revenue in II.6	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
8. Marketing materials and advertising	\$1,000	\$0	\$1,000	\$0	\$1,000	\$0	\$1,000	\$0
9. Miscellaneous:	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Operating Expenses	\$11,000	\$0	\$6,000	\$0	\$6,000	\$0	\$6,000	\$0

Budget Note:

III.B.8. \$____K of operating expense is provided for each new faculty line

	FY 1		FY 2		FY 3		FY 4	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
C. Capital Outlay								
1. Library Resources	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2. Equipment	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Capital Outlay	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
D. Capital Facilities Construction or Major Renovation								
	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
E. Indirect Costs (overhead)								
1. Utilities	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2. Maintenance & repairs	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
3. Other	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Indirect Costs	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
TOTAL EXPENDITURES	\$148,486	\$0	\$138,500	\$0	\$151,643	\$0	\$155,722	\$0
Net Income (Deficit)	(\$14,126)	\$3,500	\$68,981	\$5,250	\$197,335	\$6,300	\$207,088	\$6,650