

2018 USGS NAGT Internship Opportunity

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|  Project Title: | Optimize pheromone application rates to yield consistent catches of sea lamprey in barrier-integrated traps |
|  Project Scientists: | Nicholas Johnson Gale Bravener and Lisa O'Connor - Department of Fisheries and Oceans Canada; Jessica Barber, USFWS; Michael Wagner and Weiming Li, Michigan State University; Michael Siefkes, Great Lakes Fishery Commission |
|  USGS Center: | Great Lakes Science Center, GGEMND0000 |
|  Location: | Hammond Bay Biological Station, Millersburg, Michigan |

Project Description:

Background Information:

Sea lamprey invaded the upper Great Lakes during the first half of the 20th century and were a primary contributor to catastrophic ecological and economical damage to the Great Lakes fishery. Since the 1960s, sea lamprey populations have been controlled in the Great Lakes by using dams and other barriers to block adult sea lamprey from reaching spawning sites and by killing larval sea lamprey with lampricides where adults successfully reproduce. But there is a need for new control tactics because sea lamprey still cause unacceptable amounts of damage, existing tactics are expensive, and because of waning social acceptance of chemical lampricides and barriers to fish migration.

Adult sea lamprey have well-developed olfactory organs and exceptionally large olfactory bulbs relative to the brain. In insect species, blends of synthesized female pheromones (odors) have been used for decades to lure males into traps and sea lamprey may be vulnerable to similar pheromone-baited traps. Indeed, among the many options considered as new sea lamprey control techniques, pheromones are considered closest to implementation at management scales. A sea lamprey mating pheromone has been identified (3kPZS), shown to function in large-scale in-stream experiments, and is jointly registered by the U.S. Environmental Protection Agency and Health Canada as the first ever vertebrate biopesticide.

However, crucial knowledge gaps limiting the use of 3kPZS in the control program are (1) how much 3kPZS should be applied to traps, (2) what is the expected increase in adult sea lamprey exploitation, and (3) how do (1) and (2) vary among streams. We hypothesize that: (1) 3kPZS increases sea lamprey capture by increasing the probability of encountering a trap while migrating upstream and entering a trap after encounter; and (2) sea lamprey are less likely to encounter traps in large rivers because of the larger scale in which sea lamprey search. Accordingly, we predict that: (1) sea lamprey encounter and entry

probabilities will increase as the amount of 3kPZS exiting a trap increases; and (2) 3kPZS application at high rates increases encounter probability more in wide streams than narrow streams.

Objectives:

Determine if the probabilities and timing of trap encounter and entry are related to 3kPZS application rate and stream width.

Intern Tasks:

The intern will participate and lead some aspects of our pheromone dose-response experiments that will occur in Michigan streams during 2018. Tasks will include, but not be limited to setting up telemetry arrays in streams, tagging sea lamprey, checking sea lamprey traps, application of pheromones to traps, measurement of stream characteristics, data analysis, and drafting preliminary reports for management agencies

Expected Outcomes:

The student will gain a diverse and educational experience while working at Hammond Bay Biological Station. Hammond Bay is the hub for fisheries research in the Great Lakes and annually hosts over 50 visiting researchers during the summer months from international agencies and Universities, so the intern will have the opportunity to interact and engage with a broad group of biologists. On the job, the student will be working with the first ever EPA registered vertebrate pheromone and will be responsible for many key aspects of this high profile experiment including fish tagging, telemetry deployment and design, and data management. The student will work directly with researchers from Department of Fisheries and Oceans Canada, U.S. Fish and Wildlife Service, Michigan State University, and the Great Lakes Fishery Commission. The most rewarding part of the summer for me is having the intern summarize and write up the methods and results of the work that was conducted; doing so gives them a sense of accomplishment and a product they can have and use when applying to graduate schools or jobs.

Details for Matching:

Type of Project: Field Work

Project Discipline: Ecology, Surface Water

Project Start Date: Mon May 01 2017 00:00:00 GMT-0400 (EDT)

Project Duration: May 2018 through early August 2018

Level of Physical Demand: Level 8-2: The work requires some physical exertion such as long periods of standing, walking over rough, uneven, or rocky surfaces; recurring bending, crouching, stooping, stretching, reaching, or similar activities; or recurring lifting of moderately heavy items. The work may require specific, but common, physical characteristics and abilities such as above-average agility and dexterity.

GIS Training: No

Special Skills and Interests: •Willing and excited to work outdoors in sometimes adverse weather conditions

- Can tolerate living in remote area with streams, lakes, and wildlife, but limited social experiences (i.e. clubs, music concerts, non-western food options).
- Experience working in water and handling fish
- Outgoing with a positive attitude
- Works well with others
- Farm experience (i.e. common sense pertaining to tools and animal care)



2018 USGS NAGT Internship Opportunity

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| Project Title: | Bull Trout in Glacier National Park |
| Project Scientist: | D'Angelo, Vincent |
| USGS Center: | USGS NOROCK |
| Location: | Glacier National Park, primarily backcountry |

Project Description:

The intern will work primarily on two related projects, full descriptions for each are available on Dr. Clint Muhlfeld's staff page on the USGS NOROCK website. 1) Experimental suppression of invasive lake trout: Implications for conservation of imperiled bull trout in Glacier National Park; 2) Translocation of imperiled fishes: Conservation introduction of threatened bull trout in Glacier National Park. Both projects involve close collaboration with the National Park Service (NPS) and will provide interns with experience on collaborative multiagency projects.

Background Information:

These two projects are very closely related and are being carried out in the same watershed in Glacier National Park (GNP). Both projects are directly related to the decline of bull trout *Salvelinus confluentus* in western GNP, due to the invasion and establishment of nonnative lake trout *Salvelinus namaycush*. The overall goal of these projects is to protect Logging Lake's ecologically unique bull trout population from further declines and potential extinction and provide an opportunity for rescue via translocation and conservation introduction to nearby Grace Lake which is protected from invasive species by a barrier falls. These projects involve a unique multifaceted approach to conservation and nonnative species control. On one hand we are implementing aggressive lake trout control measures in Logging Lake-gillnetting, trapnetting and telemetry- that are also used to glean demographic data needed to develop statistical models predicting susceptibility to exploitation under various future gillnetting regimes. Depletion and mark-recapture techniques will be used to develop population estimates for subadult and adult lake trout in Logging Lake and the results are used to inform future efforts and measure success to date. Simultaneously, we will continue to translocate bull trout to nearby Grace Lake in an effort to ensure the persistence of Logging Lake bull trout into the future. As of 2017, 857 bull trout have been translocated to Grace Lake; a mix of wild and hatchery born fish. We plan to introduce more fish in 2017 and continue population monitoring efforts via mark-recapture trap-netting and fish telemetry. This information is critical to understanding the feasibility of suppressing nonnative lake trout in a small, backcountry lake that contains native bull trout, as well as the feasibility of the first conservation introduction of bull trout in GNP's history. Results from these collaborative USGS and National Park Service studies will be applied to management of other lakes in GNP and possibly other systems throughout the native range of bull trout.

Objectives:

The overall goal of these projects is to protect Logging Lake's ecologically unique bull trout populations from further declines and potential extinction and provide an opportunity for rescue via translocation and conservation introduction. Specific objectives toward achieving that goal are:

- 1) Collect data to inform population estimates of subadult and adult lake trout in Logging Lake while suppressing the overall population via targeted gillnetting.
- 2) Identify the timing and location of lake trout spawning in Logging Lake using fish telemetry and maximize suppression of adult lake trout in those locations.
- 3) Monitor movement of subadult lake trout in Logging Lake to ensure the success of subadult suppression.
- 4) Oversee the translocation of bull trout from Logging Lake and/or Creston Hatchery to Grace Lake, GNP.
- 5) Continue to monitor the bull trout population in Grace Lake via systematic live trapnetting and fish telemetry.
- 6) Where possible collect relevant data to assist with food web studies in Logging Lake and Grace Lake.

Our goal in advertising this internship is to acquire a hard working individual interested in aquatic ecology and the interface between science and management to work as part of a small crew (2-3 people) of technicians and biologists working on the projects described in this advertisement. Ideally, the position will be from mid-May to mid-November 2018.

Intern Tasks:

Work is almost entirely field-based and will involve working in remote stream and lake environments as well as alpine and subalpine zones primarily within Glacier National Park (GNP). Field work is carried out by small teams of field technicians and biologists working in remote areas--therefore, some self-reliance is a must, as is the ability and desire to become an integral member of a small team. All fieldwork will be in backcountry locations frequented by grizzly bears and most trips to work sites will involve multiple nights of camping. Fieldwork will frequently involve hiking and navigating across rugged terrain with a heavy backpack or working on a 25' commercial fishing style boat in often harsh and rapidly changing weather conditions. Intern should expect to work between 40-50 hours per week mostly between the hours of 8am-530pm with occasional early morning or evening work. Projects will involve suppression of invasive lake trout, monitoring of translocated bull trout populations, and the collection of invertebrate presence and abundance data in alpine streams. Specific duties will include gillnetting invasive species in lakes, electrofishing and trapnetting streams and lakes, assisting biologists with fish telemetry in lakes and streams, installing and removing stream temperature data loggers, and sampling stream invertebrates using Surber samplers, kick nets and aspirators. Data entry using multiple interfaces is associated with each project. There are also numerous GIS tasks associated with each project if the intern has GIS skills. The field work timeline is roughly as follows: May-June, and October--most of the work involves suppression of nonnative lake trout via gillnetting as well as translocating and monitoring bull trout, this involves backcountry work Monday-Friday for about 6 weeks in spring and 6 weeks in fall. July-August-September involves bull trout population monitoring in Grace Lake, as well as occasional alpine stream sampling. Summer work involves day trips as well as overnight camping. Periodic work monitoring stream flow sites may also occur throughout the summer months.

Expected Outcomes:

Work is almost entirely field-based and will involve working in remote stream and lake environments as well as alpine and subalpine zones primarily within Glacier National Park (GNP). Field work is carried out by small teams of field technicians and biologists working in remote areas--therefore, some self-reliance is a must, as is the ability and desire to become an integral member of a small team. All fieldwork will be in backcountry locations frequented by grizzly bears and most trips to work sites will involve multiple nights of camping. Fieldwork will frequently involve hiking and navigating across rugged terrain with a heavy backpack or working on a 25' commercial fishing style boat in often harsh and rapidly changing weather conditions. Intern should expect to work between 40-50 hours per week mostly between the hours of 8am-530pm with occasional early morning or evening work. Projects will involve suppression of invasive lake trout, monitoring of translocated bull trout populations, and the collection of invertebrate presence and abundance data in alpine streams. Specific duties will include gillnetting invasive species in lakes, electrofishing and trapnetting streams and lakes, assisting biologists with fish

telemetry in lakes and streams, installing and removing stream temperature data loggers, and sampling stream invertebrates using Surber samplers, kick nets and aspirators. Data entry using multiple interfaces is associated with each project. There are also numerous GIS tasks associated with each project if the intern has GIS skills. The field work timeline is roughly as follows: May-June, and October-most of the work involves suppression of nonnative lake trout via gillnetting as well as translocating and monitoring bull trout, this involves backcountry work Monday-Friday for about 6 weeks in spring and 6 weeks in fall. July-August-September involves bull trout population monitoring in Grace Lake, as well as occasional apline stream sampling. Summer work involves day trips as well as overnight camping. Periodic work monitoring stream flow sites may also occur throughout the summer months.

Details for Matching:

Type of Project: Field Work

Project Discipline: Ecology, Field Mapping, Modeling, Surface Water, Climate Science, Fisheries

Project Start Date: Mon May 15 2017 00:00:00 GMT-0400 (EDT)

Project Duration: 3-6 months

Level of Physical Demand: Level 8-2: The work requires some physical exertion such as long periods of standing, walking over rough, uneven, or rocky surfaces; recurring bending, crouching, stooping, stretching, reaching, or similar activities; or recurring lifting of moderately heavy items. The work may require specific, but common, physical characteristics and abilities such as above-average agility and dexterity.

GIS Training: Yes

Special Skills and Interests: Experience or interest in learning fisheries sampling techniques-electrofishing, gillnetting, etc. and collecting the associated biological data.

Experience cataloguing biological data in the field and office (electronic and hard copy)

Experience with backcountry travel

Ability or willingness to learn to navigate with a GPS in unfamiliar terrain

Backpacking experience preferred but not required

Willingness to travel and camp in grizzly bear habitat

Ability to hike up to 10 miles with a moderate pack weight~30 pounds

Comfortable hiking off-trail

Experience or willingness to learn to drive boats, rowing rafts, canoeing

Comfortable with boat travel on lakes

Comfortable walking in small streams

Must be willing to work long hours with a small crew

Proficient with Microsoft Office (Word and Excel primarily)

R Code and ArcGIS experience beneficial but not required



NAGT-USGS 2017 Cooperative Summer Field Training Program Project Description Form

Introduction

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PROPOSAL DEADLINE: December 23, 2016

Contact Information

- **USGS Project Scientist:** Dean Biggins
- **Address:** Fort Collins Science Center, 2150 Centre Avenue, Building C
- **City, State, Zip Code:** Fort Collins, Colorado 80526
- **Phone:** 970-226-9467
- **E-mail Address:** bigginsd@usgs.gov

- **Science Center (or if you can provide the Organizational code, that would be helpful):**
Fort Collins Science Center, GGCMRB0000

- **Project Scientist's Supervisor:** Patty Stevens, Trust Species and Habitats Branch Chief

Project Criteria Information

- **Project Start Date:** June 1, 2017
- **Preferred Project Duration:** 3 months
- **Project Location:** Badlands National Park and Buffalo Gap National Grassland, South Dakota

Internship Project Description (up to two pages)

(Please provide adequate detail in each of the following areas so that appropriate student placements can be determined.)

- **Title:** Developing an Integrative Approach to Manage Plague for the Purposes of Black-footed Ferret Conservation
- **Background Information:** Plague is a widely distributed flea-borne disease that was introduced to western North America ca. 1900, where it disrupts ecosystems and became a substantial threat to several endangered species, including the black-footed ferret, a specialized predator of prairie dogs. Ferrets can be vaccinated against plague but, in the wild, they are difficult to locate and capture, making it infeasible to vaccinate most individuals. To facilitate conservation efforts, ferrets are often protected from plague using an insecticide that suppresses fleas (plague vectors). Namely, "dusting" of prairie dog burrows with DeltaDust, an insecticide containing deltamethrin, is sometimes effective in controlling flea populations and protecting ferrets and prairie dogs from plague-caused mortality. In Montana, for instance, Delta Dust increased annual rates of survival for ferrets by 240%.

In Badlands National Park and Buffalo Gap National Grasslands, DeltaDust has been used as a tool for plague management since 2005. By 2009, accumulating evidence suggested that

DeltaDust was losing its effectiveness in reducing flea densities and protecting ferrets. The USGS conducted experiments and determined that fleas are developing resistance to DeltaDust at sites treated with the product for 8 or more years. Flea resistance to DeltaDust has dampened the ferret population, thereby hampering efforts to restore the species in South Dakota.

Flea resistance to DeltaDust has additional, economic consequences. The cost of applying DeltaDust at existing ferret reintroduction sites is estimated at \$825,000-\$2.8 million. With the addition of new sites brought on as a result of a new Comprehensive Strategy for species recovery, projections for insecticide use are estimated at \$12.9 million, which will be borne by USDA APHIS. During 2015 in Badlands/Conata alone, the total cost of applying DeltaDust was \$203,274. Obviously, using an effective vector control products has large economic consequences.

- **Objectives:** 1) Evaluate the efficacy of alternative vector control products and 2) identify ways in which tools can be combined and rotated over time under an integrative management approach. This research will not only assist recovery efforts for black-footed ferrets, but also recovery efforts for Utah prairie dogs, which are federally listed as threatened and are commonly protected from plague using DeltaDust.
- **Proposed Intern Tasks:** 1) Assist in field investigations, collecting and processing biological data on prairie dogs, other grassland species, and the associated habitat; 2) assist in conducting surveys of prairie dogs and other small mammals; 3) assist in coordination of the study to ensure quality of information collected; 4) assist with screening data to ensure accuracy. The intern will work mainly outdoors. Field work will require strenuous walking and bending and carrying and lifting objects up to 40 pounds. Work may be conducted under adverse terrain and weather conditions during the day or night. Hours of work will vary with the type of data being collected. Specific tasks include trapping and handling of small mammals (including prairie dogs and mice), taking blood and flea samples, treating designated areas with insecticides, taking measurements and recording information for project biologists, maintaining capture equipment and field equipment in operating condition, and compiling and entering data into electronic formats. After required training, the intern could operate government-provided vehicles (with a valid driver's license).
- **Expected Results and Benefits to the Intern:** We will identify several tools that can be used, in an integrative manner, to suppress flea densities, thereby dampening the spread of plague and helping to protect black-footed ferrets from the disease. The intern will gain first hand, professional experience with field research on wildlife in grassland ecosystems. The intern will acquire training on ethical practices in science and the use of safe and appropriate field methodologies. The intern will be mentored by a scientist who has studied ferrets, prairie dogs and plague for >35 years, and a post-doctoral researcher who has studied this system for 12 years. The researcher will work closely with the USGS, other government agencies, and non-profit organizations involved in efforts to conserve black-footed ferrets, thereby broadening their experience and providing them with contacts within the community of wildlife scientists.

Skills and Interests of Candidates

(Please describe specific skills or interests that you prefer for your intern.)

1) Experience with handling and/or caring for non-human animals (not required); 2) an interest in wildlife sciences; 3) a desire to conserve wildlife and natural resources; 4) an ability to work on a team and maintain professionalism.



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PROPOSAL DEADLINE: December 23, 2016

Contact Information

- **USGS Project Scientist: Kristin Byrd, Ph.D.**
- **Address: 345 Middlefield Rd.**
- **City, State, Zip Code: Menlo Park, CA 94025**
- **Phone: 650-329-4279**
- **E-mail Address: kbyrd@usgs.gov**

- **Science Center (or if you can provide the Organizational code, that would be helpful):
Western Geographic Science Center**

- **Project Scientist's Supervisor: Mara Tongue**

Project Criteria Information

- **Project Start Date: 6/1/**
- **Preferred Project Duration: 12 weeks**
- **Project Location: Menlo Park, CA, project field work in CA Central Valley**

Internship Project Description (up to two pages)

(Please provide adequate detail in each of the following areas so that appropriate student placements can be determined.)

Title: Integrating Remote-Sensing and Ecological Forecasting into Decision-Support for Wetland Wildlife Management and Ecosystem Services in the Central Valley of California: Optimizing Across Multiple Benefits

This is a project recently funded by the NASA Applied Sciences Ecological Forecasting Program. Lead PI: Matt Reiter, Point Blue Conservation Science; USGS Institutional PI: Kristin Byrd

Background Information: California's Central Valley is a semi-arid region that is a nexus for water resources. Approximately 90% of the Central Valley's naturally occurring wetlands have been lost and fragmented due to anthropogenic alterations of the landscape, yet the Central Valley remains a critical landscape for migratory waterbirds and freshwater dependent aquatic

and terrestrial species through a system of managed wetlands and post-harvest flooded agriculture. Balancing multiple needs with water management in the Central Valley and maintaining habitat connectivity across multiple scales requires data for optimization that only satellite-based Earth Observations can provide. Spatially-explicit conservation prioritization can use these data to identify strategies to support landscape-scale decision-making to meet multiple objectives in the face of great uncertainty and multiple constraints. Our proposed project will take advantage of Earth Observation time-series and biological observations to help forecast and prioritize where to put water and when to optimize multiple benefits across the large mosaic of California's Central Valley croplands and wetlands; a spatial extent required for the wide-ranging ecology of migratory waterbirds. We will assess habitat connectivity and its influences on multiple taxa as it changes over time within a year and under future scenarios. Remote-sensing is required to guide decision-making and will serve as a catalyst for coordinated large-scale water and wetland conservation and management. To fully support our decision-making collaborators, we will take advantage of the regular return interval of satellite data and state-of-the-art bioinformatics to develop a web-based decision support framework that can compile and evaluate the data developed from this project and provide ongoing updates through time. This project will develop and use multi-annual forecasts, as well as long-term projections (50 years), of the spatial and temporal availability of wetland habitats, wetland and open water dependent species, connectivity, biodiversity and groundwater recharge to prioritize and strategically create wetland habitat on the landscape as part of large-scale coordinated conservation using a decision-support application. Integrating the water and wetland habitat forecast models with species and ecosystem services distributions through a spatially explicit conservation prioritization framework will provide the essential resources for improved, coordinated landscape-scale conservation decisions that optimize across multiple benefits.

Objectives:

1. Provide multi-annual within-year forecasts and updates of the spatial and temporal availability of wetland habitats, the distribution of wetland and open water dependent species, connectivity, and groundwater recharge.
2. Generate long term projections (50 year) of flooded cropland and wetland habitat in order to forecast wetland and open water dependent species, connectivity, and groundwater recharge under multiple scenarios.
3. Prioritize and strategically create an integrated network of wetland habitat on the landscape as part of large-scale coordinated conservation to optimize focal wetland-dependent species and habitats, biodiversity, spatio-temporal habitat connectivity, and groundwater recharge in the Central Valley both in the near-term (within year) and over the long-term (50 years).

Proposed Intern Tasks: 1) Collect field data in Central Valley seasonal wetlands to develop remote sensing metrics of habitat quality. In particular, we will develop remote sensing based estimates of swamp timothy seed yield, an important food source for migratory birds. 2) We will also generate maps of wetland habitat quality at the landscape scale, which will include the spatial distribution of vegetation cover in the open water matrix of seasonal and permanent wetlands. We will map emergent vegetation patches in wetlands using midsummer Landsat OLI images according to the following classes: upland habitat, green bulrush/cattail, floating aquatic vegetation, and non-vegetated areas (open water, road). After classification, landscape pattern metrics will be calculated in Fragstats 4.2 including patch area, shape index and connectivity as well as vegetation-to open water ratio which maybe particularly important for giant garter snakes.

Expected Results and Benefits to the Intern: Results: 1) field dataset of swamp timothy seed yield, matched with remote sensing data; 2) ground-truth field dataset of wetland cover classes

and preliminary wetland habitat map. **Benefits:** Experience in field data collection for remote sensing studies, experience with habitat mapping

Skills and Interests of Candidates: Interest in field data collection, willingness to tolerate sometimes challenging field conditions and warm temperatures, experience with geospatial software, for example, ArcGIS, ERDAS, ENVI, or R Raster Package



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PROPOSAL DEADLINE: December 23, 2016

Contact Information

- **USGS Project Scientist: Jill R. Bourque**
- **Address: 7920 NW 71st St**
- **City, State, Zip Code: Gainesville, FL 32653**
- **Phone: 352-264-3527**
- **E-mail Address: jbourque@usgs.gov**

- **Science Center (or if you can provide the Organizational code, that would be helpful):
Wetland and Aquatic Research Center, GGESMR0000**

- **Project Scientist's Supervisor: Amanda Demopoulos, ademopoulos@usgs.gov**

Project Criteria Information

- **Project Start Date: April 30, 2017, or close thereafter**
- **Preferred Project Duration: 3 months**
- **Project Location: Gainesville, Florida**

Internship Project Description (up to two pages)

(Please provide adequate detail in each of the following areas so that appropriate student placements can be determined.)

- **Title:** Characterizing the ecology of seep-associated invertebrate communities on the US Atlantic margin

- **Background Information:** The recent discovery of hundreds of methane seeps along the US Atlantic margin, ranging from New England south to the Blake Ridge Diapir, has prompted multiple investigations to characterize these habitats. Very few visual surveys have identified seep communities, including deep-sea mussels and microbial mat habitats, which often represent different chemical environments related to the flux of methane through sediments. However, infaunal communities have only been characterized at three sites, leaving gaps in our understanding of the broad-scale relationships between benthic communities and localized geochemical environments, and regional connectivity among taxa. Increased knowledge of seep faunal diversity and connectivity will help inform effective adaptive management and conservation strategies for these unique environments. Through a collaborative research cruise in 2015, sediment samples were collected from deep-sea mussel and microbial mat habitats at four newly

discovered seep environments in the western Atlantic. Data from these samples will provide information on benthic biodiversity, community composition, and geochemical parameters of seep sediments across a regional scale. In addition, results from this study will build upon research funded by the NOAA OER project entitled: Timing of US Atlantic margin methane seepage relative to major climate and oceanographic change, which will embark on its first research expedition in May 2017.

- **Objectives:** The benthic invertebrate community structure and function, including densities, diversity, and functional groups are being examined in seep environments in the US Atlantic. Specific objectives include the following:
 1. Identifying and characterizing the sediment invertebrate communities associated with deep-sea mussels and microbial mats.
 2. Characterizing the geochemical properties of sediments associated with deep-sea mussel beds and microbial mats.

- **Proposed Intern Tasks:** The NAGT intern will be involved in processing a subset of the samples collected in the field. Specifically, the intern will:
 1. Sort, quantify, and identify marine invertebrates from sediments collected in the deep-sea.
 2. Prepare sediments for stable isotope and grain size analyses.
 3. Compare data from new study sites with existing data from the literature.
 4. Write a brief summary report, including calculations of densities and diversity, and basic statistical comparisons of the communities found in these environments.

- **Expected Results and Benefits to the Intern:** This work will enhance our understanding of the diversity and community composition of deep-sea mussel and microbial mat habitats and the regional connectivity among seep environments. There is a high potential for new species discoveries given the paucity of information available for these environments. Overall, this work represents part of one of the most comprehensive studies of seep habitats in the world. The intern will learn a variety of research techniques that can be applied to different scientific endeavors both in the field and laboratory. He/she will learn how to collect and process samples for invertebrate identification, identify marine invertebrates, develop and test hypotheses, analyze data, and summarize research results. These basic skills are among those required to conduct scientific investigations and for preparing manuscripts and reports. In addition, the techniques used in this research are the same as those applied to environmental assessments conducted in marine and freshwater environments. Thus, the intern will develop a skill set that may be used in future work for the government, including environmental assessments and an understanding of the importance of baseline environmental information for adaptive management and conservation.

Skills and Interests of Candidates

(Please describe specific skills or interests that you prefer for your intern.) For this position, it is recommended that the student is pursuing or has completed a degree in Biology, Marine Sciences, or Zoology. Demonstrated course completion in invertebrate zoology is also recommended. Experience with basic statistical analysis and Microsoft Excel is required. Interest and knowledge of marine invertebrates and community ecology is desirable, general interest in marine science is recommended, as are good communication skills.



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PROPOSAL DEADLINE: December 23, 2016

Contact Information

- **USGS Project Scientist:** Ian Jezorek
- **Address:** 5501-A Cook-Underwood Rd
- **City, State, Zip Code:** Cook, WA 98605
- **Phone:** 509 538 2908
- **E-mail Address:** ijezorek@usgs.gov

- **Science Center:** Western Fisheries Research Center, Columbia River Research Lab

- **Project Scientist's Supervisor:** Kenneth Tiffan

Project Criteria Information

- **Project Start Date:** Late-June through mid-July
- **Preferred Project Duration:** 12 weeks
- **Project Location:** Duty station is in Cook, Washington; projects will be primarily in SW Washington's Wind, Klickitat, and White Salmon Rivers

Internship Project Description (up to two pages)

(Please provide adequate detail in each of the following areas so that appropriate student placements can be determined.)

- **Title:** Wind River Watershed Cooperative Fish Population and Restoration Assessment.
- **Title:** Klickitat River and Rock Creek: Technical Assistance with Juvenile Salmonid Monitoring Equipment.
- **Title:** White Salmon River Salmonid Recolonization Assessment.

Background Information:

Wind River Project Description: The Wind River is a tributary of the Columbia River in the Columbia Gorge National Scenic Area in SW Washington State. The Wind River Watershed project is a collaborative effort to restore wild steelhead *Oncorhynchus mykiss* populations to the watershed. Wind River steelhead are considered to be part of the Lower-Columbia Evolutionarily Significant Unit, and have been listed as "threatened" under the Endangered Species Act. The four agencies forming the nucleus of this partnership include USGS-Columbia River Research Lab, the US Forest Service, Washington

Department of Fish and Wildlife, and Underwood Conservation District. This partnership was established in the early 1990's and continues to conduct research, monitoring, habitat restoration, and coordination activities in the watershed. The project works at multiple levels to identify and characterize key limiting habitat factors in the Wind River, to restore degraded habitats and watershed processes, to document fish populations, life histories, and interactions, and to share information across agency and non-agency boundaries. Work conducted by USGS is designed to determine stream habitat conditions, juvenile steelhead abundance, and life-history characteristics. Most actions during the 2017 field season will focus on tagging juvenile steelhead with Passive Integrated Transponder (PIT) tags and maintaining an infrastructure of instream systems to document passage by PIT-tagged juvenile and adult steelhead.

Klickitat River and Rock Creek Project Description: The Klickitat River is the longest undammed river in Washington. Over half the watershed is located within the Yakama Indian Reservation and it supports a traditional tribal dip net fishery near its confluence with the Columbia River, as well as a popular sport fishery for several species of salmon. The wild steelhead and spring Chinook *O. tshawytscha* are native to the watershed and these populations are a fraction of their historic size. They are listed as "threatened" under the endangered species act. The research being conducted with USGS assistance will characterize juvenile life-history patterns and habitat use, and identify important tributary habitat for spawning. Rock Creek is a small tributary of the Columbia River where tribal biologists are characterizing use of the watershed by steelhead and coho salmon *O. kisutch* prior to restoration actions within the watershed.

White Salmon River Project Description: The White Salmon River in Washington State is a tributary of the Columbia River which, since 1913, had been blocked at river mile 3.3 by the 125 foot tall Condit Dam. In 2011, the dam was breached, releasing over 60 million ft³ of sediment into the lower river, and allowing anadromous salmonids access to upstream portions of the watershed. Historically, the watershed supported Chinook salmon, coho salmon, and steelhead upstream of the dam site. A hands-off approach to allowing recolonization of these fish runs was enacted by management and research agencies. To date, there had been no stocking of fish in the watershed and the opportunities to learn from a natural recolonization program have not been fully realized.

Objectives:

In the Wind River, we will assess fish species assemblage and distribution, and investigate life history attributes using PIT tags and PIT-tag tracking equipment. We operate a series of six instream PIT-tag detection systems in the subbasin. The population of PIT-tagged steelhead will contribute data to help assess where steelhead rear in the river and what life-history traits result in the most successful adult returns. Additionally, data from PIT-tagged steelhead will help evaluate habitat restoration actions, including the removal of Hemlock Dam on Trout Creek, a major tributary of the Wind River.

In the Klickitat River and Rock Creek, the goal is to assist Yakama Nation biologists with instream monitoring equipment to detect PIT-tagged juvenile and adult salmonids. We will provide help with installation and maintenance of PIT-tag detection equipment in several tributaries of the Klickitat River and in Rock Creek.

In the White Salmon River we will assess distribution and populations of juvenile salmonids. This will be the first effort at characterizing juvenile salmonid population metrics in the White Salmon River since removal of Condit Dam. This sampling may involve a combination of a rotary screw trap and backpack electrofishing. We will likely be tagging juveniles with PIT tags and collecting samples for genetic analysis. These efforts will add to data collected during 2016 to begin assessing efficacy of recolonization and to describe juvenile populations and life-history characteristics.

Proposed Intern Tasks:

The NAGT intern will work in the Wind River with personnel from USGS-Columbia River Research Lab with fish sampling by backpack electrofishing to capture juvenile steelhead and get direct measures of length, weight, and other life-history and fish health information. The intern will assist with PIT-tagging efforts to gather information on individual fish movement and growth. The intern will be trained in the use of several types of PIT-tag detectors to actively and passively track fish movement.

The intern may have some opportunity to assist with installation and maintenance of PIT-tag detection equipment in the Klickitat River and Rock Creek watersheds.

The intern and USGS-Columbia River Research Lab personnel will work in the White Salmon River on juvenile fish sampling by backpack electrofishing and screw trapping. The intern will provide assistance with collection of genetic material and other samples.

The intern will likely spend some time with data entry, quality control, and data summary tasks while not in the field.

Expected Results and Benefits to the Intern:

The intern will get a broad field experience in aquatic ecology and fisheries biology research. They will learn proper habitat assessment, fish collection, fish handling, data collection, and data management techniques. The intern will work in varied landscapes and watershed settings from temperate rainforest to arid shrub steppe. They gain exposure to state of the art electronics used in fish tagging and fish tracking. They will learn how to work within a team and how to coordinate efforts with other agencies including other Federal, State, and Tribal entities. They will learn the importance of data management and quality assurance.

Because the CRRL is a large research facility, the intern will gain exposure to a wide variety of research projects regarding fisheries issues in the Columbia River and its tributaries. They will gain professional guidance with leading experts in the field of aquatic ecology and research

Skills and Interests of Candidates:

We would prefer candidates with interests in aquatic resources, stream ecology, hydrology, and/or biology.

Preferred skills include: ability to work outdoors in all types of weather and terrain, attention to detail, the ability to wade in swift water, able to carry loads up to 50 pounds over rough terrain and inclement weather, computers and data management (e.g., electronic spreadsheets); and the ability to work as a team member.



NAGT-USGS 2017 Cooperative Summer Field Training Program Project Description Form

Introduction

The U.S. Geological Survey (USGS) is partnering with the National Association of Geoscience Teachers to provide internship opportunities for rising college seniors and recent graduates through the Cooperative Summer Field Training Program. If you would like to request an intern from this program, please complete the form below and e-mail to Laura Corey, Education Program Analyst, at nagtusgsinternship@usgs.gov. Questions can be directed to Laura through personal e-mail at lcorey@usgs.gov or by telephone at (703) 648-6872.

PROPOSAL DEADLINE: December 23, 2016

Contact Information

- **USGS Project Scientist:** Terry Shaffer
- **Address:** USGS Northern Prairie Wildlife Research Center, 8711 37th St. SE
- **City, State, Zip Code:** Jamestown, ND 58401
- **Phone:** 701-253-5522
- **E-mail Address:** tshaffer@usgs.gov

- **Science Center (or if you can provide the Organizational code, that would be helpful):**
Northern Prairie Wildlife Research Center, GGEMNN0000

- **Project Scientist's Supervisor:** Michael Anteau

Project Criteria Information

- **Project Start Date:** May 8, 2017
- **Preferred Project Duration:** July 22, 2017
- **Project Location:** north central Montana (Glasgow to Malta)

Internship Project Description (up to two pages)

(Please provide adequate detail in each of the following areas so that appropriate student placements can be determined.)

- **Title:** Investigating detection and roadside bias in surveys of grassland birds in the Great Plains
- **Background Information:** Populations of grassland birds are declining at a steeper rate than any other group of North American birds and the Northern Great Plains hosts the highest diversity of grassland bird species in the continent. The North American Breeding Bird Survey (BBS) is the primary source of information on grassland bird population size and trends, but two critical assumptions related to occurrence and detectability of birds relative to roads have not been tested. This study will examine those assumptions and results will increase the power of this existing, readily available, and widely used BBS data. The study will address many priority species of concern, including Sprague's pipit, Baird's sparrow, Chestnut-collared and McCown's longspur.

- **Objectives:** We will assess occurrence and detection of grassland birds in relation to roads as well as evaluate seasonal timing of surveys.
- **Proposed Intern Tasks:** Conduct breeding bird surveys, enter field data, drive 4-wheel-drive pickup trucks, problem solve when issues arise, work as an integral member of the research team.
- **Expected Results and Benefits to the Intern:** Study results will allow Breeding Bird Survey results to be calibrated, providing better estimates of population size, and improving population monitoring. Additional improvements to spatial models used to guide grassland bird conservation will bolster confidence in population data used in listing decisions under the Endangered Species Act.

The Intern will learn, by sight and sound, a variety of grassland bird species. They will work with GPS equipment, satellite imagery, and road maps to learn navigation skills. They will learn to drive large 4-wheel-drive vehicles and procedures to use when road conditions deteriorate. The Intern will learn bird survey techniques, learn good habits for writing field journals and filling out field data forms. They will learn MS Access while entering field data. The Intern will learn how to work independently and as a research team member. They will interact with Federal, State, and Private organizations and individuals.

Skills and Interests of Candidates:

(Please describe specific skills or interests that you prefer for your intern.)

Strong ability to identify grassland birds by visual and auditory skills, keen interest in grassland ecology and willingness to work irregular hours, skill with operation of large 4-wheel-drive vehicles, GPS units, and range finders, familiarity with GIS, aerial photographs, topographic maps, road maps, and maintaining computer databases, field work will be conducted under harsh field conditions with significant travel potentially being necessary, Intern must be able to negotiate difficult terrain on foot, including walking through tall grassland vegetation while carrying field gear. Extended hours/days may be required and work during early mornings will be necessary. Some office work will be required to maintain field records and conduct data entry. Intern will work independently and as a research team member.