

ANNUAL REPORT

July 1, 2024–June 30, 2025

Washington
Cooperative
Fish and Wildlife
Research Unit





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MESSAGE FROM THE UNIT LEADER

Sarah Converse

The last year has been marked by change and uncertainty.

In January, a new presidential administration took office, bringing its own perspective to science and natural resources management. We have been adjusting to those new realities. In addition, Washington state budget challenges have hit both our university and state agency cooperators hard this year, requiring everyone to give up some of the things that we wish we could do for students and resources in our state. Through it all, Alex, Mark, and I have been truly touched by the support that so many have expressed for the WACFWRU in big and small ways. We certainly hope for more stability in the year ahead.

This year was the first full year of Unit operations under our new Cooperative Agreement, which brought changes to our indirect rates and to the annual contributions of our state cooperators. Things seem to be ticking along smoothly, with comparable funding levels and positive feedback from our agency cooperators. The transparency and simplicity of the new system, which eliminates the tiered indirect structure in favor of a flat indirect structure, seems to be a plus.

We find ourselves connecting in increasingly rich and diverse ways with our agency cooperators. For example, Alex's lab is working closely with WDFW on wolf-livestock conflict, my lab has been developing decision-analytic processes with WDFW to assist with management of several listed species, and Mark is currently advising multiple graduate students under agency cooperative agreements, allowing these students to maintain their employment while pursuing graduate degrees. We're gratified by the willingness of our cooperators to work with us in ways that improve our ability to train students and provide critical information to our cooperators.

Serving Washington's Fish and Wildlife community is critical to our mission. On this front, the monthly Washington Fish and Wildlife Ecology seminar series is entering its eighth year, most recently thanks to Alex's efforts. Attendance continues to grow, and the quality and diversity of speakers is exceptional. Go here to join the mailing list and stay on top of upcoming seminars and opportunities to sign up as a speaker: <https://depts.washington.edu/wacfwru/category/seminar-series>.

Recently, I've been reflecting on the period just after my arrival here 8 years ago, when I was the sole Coop Unit faculty member and I had one graduate student. Now, the WACFWRU faculty, post-docs, students, and staff constitute nearly 30 people. This prompts me to take a minute and express my appreciation to Mark and Alex for all that they've brought to the WACFWRU. Especially during challenging times (and we've definitely had some in the last 5 years), I am deeply appreciative of having such great colleagues who are so committed to our mission.

I had two graduates from my lab this year: Amelia DuVall (PhD) and Eve Hallock (MS, coadvised by Beth Gardner). The lab now consists of Matt Farr (postdoc, Salish Sea marine birds); Amelia DuVall (postdoc, seabirds in French Polynesia, co-advised by Beth Gardner), Tim Chen (PhD student, Northwestern pond turtles), and Nate Redon (PhD student, Cascade red fox). We're also joined this year by Caroline Blommel (PhD), who will be working with WDFW on seaduck demography and movement.

This year, we said goodbye to one Cooperator's Committee Member. Scott Covington, U.S. Fish and Wildlife Service, moved into a new position with agency reorganization. I thank Scott for his contributions to the WACFWRU.

—Sarah Converse, *Seattle, September 30, 2025*



MESSAGE FROM ASSISTANT UNIT LEADER—FISHERIES

Mark Scheuerell

This past year presented my lab group with some reasons to celebrate as well as some challenges.

In October, I began helping WDFW and the Puget Sound Partnership with developing a new “vital sign” indicator for benthic fishes and invertebrates. Ken Warheit (WDFW) and I were also guests in FISH 522 “Hot Topics in Aquatic and Fishery Sciences,” where we discussed the role of advocacy by scientists in environmental policy and decision making. In November, I helped organize a day-long symposium, “Reflections on Tribal Fisheries and Co-Management 50 years after the Boldt Decision.” In December and January, I chaired a search for a new faculty member with expertise in Pacific salmon, but we were ultimately prevented from hiring our preferred candidate due to state budget concerns.

In March, I had the good fortune to participate in the Judicial Education Workshop on Water Resource Science, sponsored by the National Judicial College and the State of Washington Water Resource Center. Notably, my PhD student Angela Dillon was the only student presenter, having shared her expertise about salmon ecology and habitat restoration. Also in March, my PhD student Markus Min and undergraduate researcher Callie Murakami shared their research at the WA–BC meeting of the American Fisheries Society. In April, my MS student Amirah Casey wrapped up some experiments on sublethal effects of tire-wear particles on juvenile coho. During the spring I also collaborated on some grant proposals with scientists from the Seattle Aquarium, WDFW, and NOAA, but we were ultimately unsuccessful in securing funding.

In May, my PhD student Nicole Doran passed her qualifying exam and MS student Tessa Code submitted her successful application to bypass into our PhD program. Our lab also hosted a well-attended booth at our annual Aquatic Sciences Open House, providing hands-on opportunities to age fish from scales. In June, my PhD student Brian McGreal passed his general exam for candidacy, and our lab group spent four very productive days at a writing retreat near Leavenworth. Andrea Hennings, an MS student and WDFW employee, spent the spring and summer on family leave.

Despite the current funding climate, I’ve had some productive discussions with people at USFWS and WDFW, respectively, about some possible bull trout and sturgeon projects. I’ve also just joined the steering committee of the Lake Washington Science Summit with folks from USGS, WDFW, King County, and the Muckleshoot Indian Tribe. It’s always reassuring, especially in these challenging times, when I’m reminded that our cooperators continue to share a strong vision for successful research that informs management and trains the next generation of scientists.

—Mark Scheuerell, *Seattle, September 30, 2025*



MESSAGE FROM ASSISTANT UNIT LEADER—WILDLIFE

Alex McInturff

Alex is taking a year off from writing his full annual message, as he and his wife have recently welcomed a new baby, Rowan, who was born in late August.

In brief, the past year has been one that has demonstrated the remarkable resilience of the Coop Unit and the People and Wildlife Lab.

I've been awed by my students' continued progress on their research, service, and learning, in spite of a range of uncertainties and disruptions. Collectively, we've managed to have one of our most productive years—multiple publications, exams, and diverse connections with our cooperators. And to our cooperators: I'm grateful to have worked alongside you this past year through it all! Here's to a less "interesting" but equally successful 2026.

I enter the new year with pride and gratitude for the students and collaborators I work with every day. I'm looking forward to deepening and strengthening relationships with cooperators as current projects mature and new projects emerge and grow.

—Alex McInturff, Seattle, September 30, 2025



Unit Award Recipients



Amelia DuVall



Tessa Code

The Gilbert B. Pauley Award

Awarded annually for best student presentation at the Annual Student Symposium

2024 Winners (tie)

Amelia DuVall

School of Aquatic and Fishery Sciences, University of Washington;
advised by Dr. Sarah Converse

Tessa Code

School of Aquatic and Fishery Sciences, University of Washington;
advised by Dr. Mark Scheuerell



Nathan Hooven

The John Pierce Outstanding Graduate Student Award

Awarded annually to the graduate student who best embodies the spirit and mission of the WACFWRU

2024 Winner

Nathan Hooven

School of the Environment, Washington State University;
advised by Dr. Daniel Thornton

Photos: Courtesy of Amelia DuVall, Tessa Code, and Nathan Hooven
Below: iStockphoto.com: Strekoza2



Annual Student Symposium

The 2024 WACFWRU Annual Student Symposium was held both virtually and in person at the University of Washington on October 16. The full line-up of speakers included:



WASHINGTON COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT



Annual Student Symposium

Wednesday, October 16, 2024, 4:00 pm

<https://washington.zoom.us/j/94532650419>

depts.washington.edu/wacfwru/category/symposium/

Location: Room 203,
Fishery Sciences Building

AGENDA

- | | |
|--|---|
| <p>4:00 pm Introduction
Mark Scheuerell
<i>US Geological Survey, Washington
Cooperative Fish and Wildlife Research Unit,
School of Aquatic and Fishery Sciences, UW</i></p> | <p>4:44 pm A little red fish at risk: the state of Kokanee salmon in Lake Sammamish, WA
Nicole Doran
<i>School of Aquatic and Fishery Sciences, UW</i></p> |
| <p>4:05 pm A framework for identifying threats and prioritizing monitoring and management to conserve seabirds in the face of uncertainty
Amelia Duvall, <i>School of Aquatic and Fishery Sciences, UW</i></p> | <p>4:57 pm Vegetative cover and flora species predict breeding seabird space use on Tetiaroa Atoll
Eve Hallock, <i>School of Environmental and Forest Sciences, UW</i></p> |
| <p>4:18 pm A novel framework for research prioritization at the science-policy interface: insights for wildlife conservation and management
Nikol Damato, <i>School of Environmental and Forest Sciences, UW</i></p> | <p>5:10 pm Using quantitative methods to assess and manage threats for Northwestern pond turtle recovery in Washington
Timothy Chen, <i>School of Environmental and Forest Sciences, UW</i></p> |
| <p>4:31 pm Hare today, gone tomorrow? Short-term effects of forest resilience treatments on the ecology of a small herbivore
Nathan Hooven, <i>School of the Environment, WSU</i></p> | <p>5:23 pm Too much of a good thing? Pink salmon abundance in the Indian River
Brian McGreal, <i>Quantitative Ecology and Resource Management, UW</i></p> |
| | <p>5:36 pm Lake Washington is lit: Quantifying artificial light at night and juvenile salmon predation risk in Seattle's largest urban lake
Tessa Code, <i>School of Aquatic and Fishery Sciences, UW</i></p> |

Disability Accommodations: Contact the Disability Services Office at 206-543-6450 (voice), 206-543-6452 (TTY), 206-685-7264 (fax) or dso@uw.edu for accommodation requests.

Photo: iStockphoto.com: Drew Payne





Photos, l to r: iStockphoto.com: sekarb, Jeff Huth, Marcopolo9442

Research Projects

During state fiscal year 2025, the WACFWRU Cooperative Agreement facilitated \$7,595,111 in project funding at UW, including \$2,319,391 in new dollars, and \$2,980,226 in project funds at WSU, including \$1,177,499 in new dollars. The WACFWRU Unit staff and cooperating faculty at UW and WSU worked with 4 federal agencies in addition to our 3 state cooperating agencies. All funded projects led by WACFWRU staff are listed by funder, including project title, with student and postdoctoral scientist support listed below the project title. For cooperating faculty, projects are listed by university and funder, including project title, principal investigator, and department, along with student and postdoctoral scientist support.

Sarah Converse, WACFWRU Unit Leader

National Oceanic and Atmospheric Administration (Washington Sea Grant)

- **Integrating community science data with long-term aerial surveys to understand seasonal and long-term shifts in marine bird use of Puget Sound**

Matthew Farr, postdoctoral scientist

National Park Service/U.S. Geological Survey

- **Assessing anthropogenic threats and predation/competition from coyotes on Cascade red fox combining spatial capture–recapture methods and historical Indigenous knowledge**
- **Long-term seabird monitoring data analysis to update Channel Islands National Park Seabird Inventory & Monitoring Program and inform management and conservation**

Nathan Redon, PhD student

Amelia DuVall, PhD student

U.S. Fish and Wildlife Service

- **Assessing threats to critical seabird foraging habitat in the Salish Sea**

Photos, l to r: iStockphoto.com: westlaccountphoto, benedek, Ken Griffiths



U.S. Fish and Wildlife Service and U.S Geological Survey

- Improving our tools for combating invasive species
- Understanding threats to Pigeon Guillemot and Rhinoceros Auklet foraging habitat in the Salish Sea
Matthew Farr, *postdoctoral scientist*

U.S. Geological Survey

- Effects of habitat and predation on subalpine endemic mammals in Olympic National Park
- Evaluating climate-related threats and conservation strategies for the Cascade red fox in Washington
Nathan Redon, *PhD student*
- Modeling brown treesnake management strategies

Washington Department of Fish and Wildlife

- Assessing movements and habitat selection of northwestern pond turtles
Timothy Chen, *PhD student*
- Washington pygmy rabbit conservation planning process

Other

- Seabird ecology and conservation at Tetiaroa, French Polynesia (*supported by private donors to the University of Washington*);
Co-investigator: Beth Gardner, *School of Environmental and Forest Sciences*
Eve Hallock, *MS student*
Amelia DuVall, *postdoctoral scientist*

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Photos: above: iStockphoto.com: naturediver ; below, l to r: iStockphoto.com: mlharing, Pascale Gueret, dypics



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PROJECT IN THE SPOTLIGHT

Assessing threats to Cascade red foxes in Washington

Principal Investigator:	Sarah Converse, <i>USGS Washington Cooperative Fish and Wildlife Research Unit, University of Washington</i>
Graduate Student:	Nathan Redon, <i>School of Environmental and Forest Sciences, University of Washington</i>
Funder:	Washington Department of Fish and Wildlife, USGS Natural Resources Preservation Program, USGS Northwest Climate Adaptation Science Center

The Cascade red fox (*Vulpes vulpes cascadensis*) is one of three subspecies of red fox native to montane regions of the American West. The fox, a Washington endemic that now appears to be mostly limited to the South Cascades, has recently been listed as endangered by the Washington Department of Fish and Wildlife. This iconic Cascades carnivore is much loved by visitors to places like Mount Rainier National Park, but increasing threats in high-elevation habitat appear to be impacting the viability of the fox. We are working to understand Cascade red fox movements, habitat use, demography, and putative threats – including habitat loss, road mortality, coyote encroachment, and climate change—and how management actions may address these threats. To date, we have collared 7 foxes and have documented some of the only known den and mortality sites. Currently, in addition to more collaring efforts, we are working to analyze existing large datasets from camera trapping and scat collection. We are also working closely with partners to develop a decision framework for evaluating conservation actions for Cascade red foxes. This research effort—in partnership with the Cascades Carnivore Project, Washington Department of Fish and Wildlife, Yakama Nation, National Park Service, US Geological Survey, US Forest Service, and Washington Department of Natural Resources—is the most comprehensive effort ever to investigate Cascade red fox threats and conservation.

Mark Scheuerell, WACFWRU Assistant Unit Leader—Fisheries

National Park Service

- **Estimating the natural range of abundance of pink salmon in the Indian River, Sitka National Historical Park**

Brian McGreal, *PhD student*

U.S. Fish and Wildlife Service

- **Evaluating the relative effects of top-down and bottom-up factors on declines in Lake Sammamish Kokanee salmon**

Nicole Doran, *MS student*

U.S. Geological Survey

- **Investigating the influence of Artificial Light at Night (ALAN) on juvenile sockeye salmon behavior and predation risk in an urban lake**

Tessa Code, *MS student (co-advised by Dave Beauchamp, USGS)*

Washington Department of Fish and Wildlife

- **Evaluation of survey designs and spatial distributions of rockfish in Puget Sound**

Andrea Hennings, *MS student*

Callie Murakami, *BS student*

Other

- **Identifying priority areas for mitigating contaminant and thermal stress on salmon** (*supported by UW Future Rivers via the National Science Foundation*)

Amirah Casey, *MS student*

- **Quantitative analyses to support the recovery and management of West Coast fishes** (*supported by the National Science Foundation Graduate Research Fellowship Program*)

Markus Min, *PhD student*

- **Restoration of riparian vegetation shapes prey timing and quality for juvenile salmon** (*supported by The Puyallup Tribe of Indians*)

Angela Dillon, *PhD student*

- **Rhythm and blooms: deciphering metabolic, functional and taxonomic interactions over the life cycle of a phytoplankton bloom** (*supported by National Science Foundation*)

Co-investigators: Brook Dunn, *UW Department of Genome Sciences*; Julia Kubanek, *Georgia Institute of Technology*;

Tatiana Rynearson, *University of Rhode Island*

- **Spatiotemporal patterns of marine debris distribution in Puget Sound** (*supported by Conservation, Research and Education Opportunities International, CREOI*)

Callie Murakami, *BS student*

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Photos, l to r: iStockphoto.com: Supercaliphotolistic, Supercaliphotolistic, Jello5700



Alex McInturff, WACFWRU Assistant Unit Leader—Wildlife

U.S. Forest Service

- **Understanding protocols for wildlife translocation**
Danny Kosiba, *PhD student*

U.S. Geological Survey

- **Measuring values, attitudes, beliefs, and behaviors of Washington residents toward contentious wildlife species**
Lara Volski, *PhD student*
- **Novel methods for studying human-wolf interactions in Washington**
Lara Volski, *PhD student*
Viv Hawkinson, *PhD student*

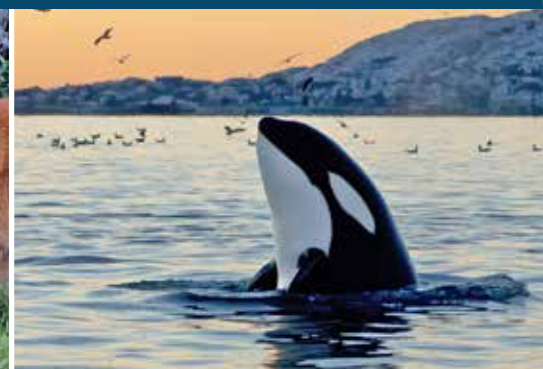
Washington Department of Fish and Wildlife

- **Align social science research with the social sciences for the Salish Sea**
Nikol Damato, *PhD student*
- **Assessing perceptions of risk and uncertainty during adaptive management: A case study of the Washington state forest practices habitat conservation plan**
Gretchen Sneegas, *postdoctoral scientist*
- **Proactive development of chronic wasting disease outreach, education, and policy to guide disease management in Washington**
Gracie Rogers, *PhD student*
Meggie Callahan, *postdoctoral scientist*
- **Social science research in the Stillaguamish Watershed**
Molly Rambeau, *MS student*
- **The role of local ecological knowledge and perceptions in southern resident killer whale policy**
Nikol Damato, *PhD student*

Other

- **Interdisciplinary evaluation of grizzly bear reintroduction to California** (*supported by Re:Wild*)
Sam Kreling, *PhD student*
Ellen Pero, *postdoctoral scientist*
- **Linking deer behavior to forest health on Tribal lands** (*supported by McIntire-Stennis Cooperative Forestry Research Program*)
Molly Rambeau, *MS student*

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Photos, l to r: iStockphoto.com: JeffGoulden, Kelly Liu, sethakan



PROJECT IN THE SPOTLIGHT

Movements and habitat selection of black-tailed and white-tailed jackrabbits in Washington State

Principal Investigators: Lisa Shipley, *School of the Environment, Washington State University*

Graduate Student: Claire Kurlychek, *MS student, School of the Environment, Washington State University*

Funder: Washington Department of Fish and Wildlife

Washington's two native jackrabbit species, black-tailed (*Lepus californicus*) and white-tailed (*Lepus townsendii*), were historically among the most extensively distributed lagomorphs throughout the United States. Over the last half century both jackrabbit species have experienced large-scale population declines and are candidates for listing as state endangered, threatened, or sensitive. Only two previous projects have studied black-tailed jackrabbits in Washington, and no research has been conducted on white-tailed jackrabbits, leaving significant gaps in understanding their ecology, distribution, and population status, which hinders effective management decisions. Our study aims to examine daily and seasonal movements of black-tailed and white-tailed jackrabbits and determine their habitat use and selection across central Washington. From GPS collars, we analyzed daily and seasonal movements and habitat selection of 31 black-tailed and 25 white-tailed jackrabbits. Using integrated step-selection analysis, we determined individual step length and turning angles to examine the influence of categorical habitat types, elevation, slope, aspect, distance to edge habitat, shrub cover, shrub height, perennial and annual grass, and forb cover, and agricultural crop cover on movements and habitat selection in three study areas. Two study areas (Hanford Site, Yakima Training Center) are within federal energy and military reserves that have been mostly protected from conversion of sagebrush-steppe to agriculture, and the other site lies within Moses Coulee in Grant County with some intact sagebrush-steppe surrounded by a mosaic of agriculture and restored farm fields (i.e., CRP). We will also examine second-order habitat selection using resource selection functions and compare diurnal activity between the jackrabbit species. Findings from this study will inform state wildlife biologists on habitat features selected by jackrabbits, guiding the development of targeted surveys for mapping distributions and assessing population abundance throughout Washington.

Cooperating Faculty, University of Washington

National Oceanic and Atmospheric Administration

- **Development of orca occupancy model for Salish Sea for southern resident and transient killer whales**
PI: Trevor Branch, *School of Aquatic and Fishery Sciences*
Zoe Rand, *PhD student*
- **Refining statistical tools and analyses of ecological indicators for fisheries management**
PI: Tim Essington, *School of Aquatic and Fishery Sciences*
Julia Indivero, *MS student*

U.S. Geological Survey

- **Characterizing Chinook salmon genomic diversity in support of conservation and management**
PI: Kerry Naish, *School of Aquatic and Fishery Sciences*
- **Development of novel SARS-CoV-2 tools with applications for wildlife and human health**
PI: Ram Savan, *Department of Immunology*
Kim Somfleth, *postdoctoral scientist*
- **Modeling the potential effects of cumulative stressors on polar bear population dynamics**
PIs: Kristin Laidre and Eric Regehr, *Applied Physics Laboratory*

Washington Department of Fish and Wildlife

- **Application of the Shoreline Monitoring Database to address restoration effectiveness and protection evaluation**
PI: Jason Toft, *School of Aquatic and Fishery Sciences*
Morgan Arrington, *PhD student*
- **Coastal habitat protection through European green crab early detection, management support and monitoring**
PI: Kate Litle, *Washington Sea Grant*
Zachary Bengtsson, *PhD student*
- **Crab Team: European green crab management support**
PI: Kate Litle, *Washington Sea Grant*
Zachary Bengtsson, *PhD student*
Hannah Brown, *MS student*
Elyse Kelsey, *MS student*
Christopher Patrick Harris-Adams, *BS student*
- **Dispersal of steelhead fry in the Skagit River**
PI: Daniel Schindler, *School of Aquatic and Fishery Sciences*
Nick Chambers, *MS student*
- **Ecological effects of Graveyard Spit cobble beach revetment**
PI: Jason Toft, *School of Aquatic and Fishery Sciences*
- **Ecology of non-native fish**
PI: Julian Olden, *School of Aquatic and Fishery Sciences*
- **Evaluating eelgrass stressors to enhance conservation and management in Puget Sound**
PI: Megan Dethier, *Friday Harbor Labs*
- **Hierarchical distance modeling to estimate spatially explicit density (hot and cold spots of abundance) and to assess the marine factors driving changes in abundance in Puget Sound**
PI: Beth Gardner, *School of Environmental and Forest Sciences*

- **Impacts of small overwater structures on beach processes important for salmon and kelp restoration**
PI: Jason Toft, *School of Aquatic and Fishery Sciences*
- **Marine bird and mammal hot and cold spots in Washington's marine waters**
PI: Beth Gardner, *School of Environmental and Forest Sciences*
Sierra Gilman, *PhD student*
- **Potential impacts of future climate change on riparian ecosystems in Washington state: compiling the state-of-the-science**
PI: Phil Levin, *School of Environmental and Forest Sciences*
- **Tracking nitrous oxide emissions from Washington Department of Fish and Wildlife fish hatcheries: understanding contributions to climate change**
PI: Mari Winkler, *Civil and Environmental Engineering*

Photos, l to r: iStockphoto.com: Hailshadow, Kbpperry, Johnnieshin



Washington Department of Natural Resources

- **Evaluation of recreation impacts on ecological integrity of DNR-managed state lands**
PI: Spencer Woods, *School of Environmental and Forest Service*
- **Fire severity mapping across Washington state: Application of best practices to assess impacts on wildlife habitat and adaptive management**
PI: Susan Prichard, *School of Environmental and Forest Sciences*
- **Long-term monitoring and focus studies in shoreline biota: 2023–24 data analysis and 2024–25 data collection**
PI: Megan Dethier, *Friday Harbor Labs*
- **Long-term monitoring and focus studies in shoreline biota: 2025–26 data analysis and 2026–27 data collection**
PI: Megan Dethier, *Friday Harbor Labs*
- **Roads prescription scale effectiveness monitoring project**
PI: Erkan Istanbuluoglu, *Civil and Environmental Engineering*
Amanda Alvis, *PhD student/postdoctoral scientist*

Cooperating Faculty, Washington State University

Washington Department of Ecology

- **2026 Columbia River water supply & demand forecast**
PI: Sasha McLarty, *Civil and Environmental Engineering*
Sawsan Shatanawi, *PhD student*
- **Characterization of toxicity of 6PPD and alternatives**
PI: Jen McIntyre, *School of the Environment*

Washington Department of Fish and Wildlife

- **Advancing northern leopard frog recovery in Washington through reintroduction and habitat management: Phase III**
PI: Caren Goldberg, *School of the Environment*
- **Discovery of the gossamer-winged butterflies (*Lycaenidae*) of the Washington State University Collection (WSUC) through digitization**
PI: Elizabeth Murray, *School of the Environment*
Nathaniel Green, *PhD student*
Ana Cristina Garcia Cordon, *MS student*
- **Ecology and impacts of coyotes from shrub-steppe to alpine environments**
PI: Jeff Manning, *School of the Environment*
Taylor Miles Hopkins, *PhD student*
- **Estimating population status, size, and limiting factors of Mountain Quail in eastern Washington state and surrounding interior Columbia River basin area to inform translocation and habitat restoration efforts**
PI: Jeff Manning, *School of the Environment*
Georgia Isted, *PhD student*
- **Movements and habitat selection of black-tailed and white-tailed jackrabbits in Washington State**
PI: Lisa Shipley, *School of the Environment*
Claire Kurlycheck, *MS student*
- **Oregon spotted frog genomics**
PI: Caren Goldberg, *School of the Environment*

Washington Department of Natural Resources

- **Assessing pre-commercial thinning impacts on snowshoe hare habitat selection and survival**
PI: Dan Thornton, *School of the Environment*
Nathan Hooven, *PhD student*



Photos, above: Stockphoto.com (StandbildCA); below, l to r: Alan Schmierer; Stockphoto.com: Karen Hogan and Steven Pollard





PROJECT IN THE SPOTLIGHT

Artificial light at night (ALAN) effects on the distribution and predation risk of pelagic planktivores in Lake Washington, WA

Principal Investigator: Dave Beauchamp, *USGS Western Fisheries Research Center*; Mark Scheuerell, *Washington Cooperative Fish and Wildlife Research Unit, School of Aquatic and Fishery Sciences, University of Washington*

Graduate Student: Tessa Code, *PhD Student, School of Aquatic and Fishery Sciences, University of Washington*

Funder: U.S. Geological Survey; National Science Foundation

Daily and seasonal light-dark cycles are important cues for ecological processes and species interactions. Artificial light at night (ALAN) disrupts natural light cycles by extending twilight, increasing nocturnal light levels, and blurring lunar cycles. Artificial light at night (ALAN) is a persistent and growing concern along urban and suburban waterways, where it disrupts migratory behavior of fishes and increases their predation risk from visual foragers. Lake Washington, a large natural lake adjacent to Seattle, WA, is heavily urbanized with a dwindling population of sockeye salmon and ESA-listed Chinook salmon. Cutthroat trout, a major predator of juvenile salmon, improve their foraging ability exponentially with slight increases in ambient light during twilight. This project has three primary goals. First, we seek to understand the variability in the physical light environment of Lake Washington owing to changes in water depth, season, cloud cover, and land use. Second, we are developing and applying scenarios of different light environments to visual foraging models developed for salmon predators, thereby assessing predation risk under varying light regimes. Third, we aim to identify options for reducing ALAN, which include decreasing light intensity of direct overhead lights during periods of salmon outmigration. Importantly, solutions to reduce ALAN must be regional because we find that skyglow has a much larger impact in the pelagic area due to its diffuse qualities and regional sources.

Unit Staff & Contact Information

Unit Leader	Sarah Converse, sconver@uw.edu	206-221-5791
Assistant Unit Leader—Fisheries	Mark Scheuerell, scheuerl@uw.edu	206-543-5997
Assistant Unit Leader— Wildlife	Alex McInturff, amcintur@uw.edu	206-543-1491
Unit Administrator	Sarah Romero, sarahjh@uw.edu	206-221-5424
Unit Address	Washington Cooperative Fish and Wildlife Research Unit Box 355020 University of Washington Seattle, WA 98195 https://depts.washington.edu/wacfwru https://www.coopunits.org/Washington/	

Photo: iStockphoto.com: Vince Barnes





Photos, l to r: iStockphoto.com: Dmitri Toms, TT, GarysFRP; below:

Cooperators' Board Members and Contact Information

Washington Department of Ecology

Will Hobbs, whob461@ecy.wa.gov

Washington Department of Fish and Wildlife

Donny Martorello, Donny.Martorello@dfw.wa.gov

Ken Warheit, Kenneth.Warheit@dfw.wa.gov

Washington Department of Natural Resources

Joshua Halofsky, Joshua.Halofsky@dnr.wa.gov

U.S. Geological Survey

Kevin Whalen, kwhalen@usgs.gov

U.S. Fish and Wildlife Service

Vacant

Wildlife Management Institute

Jennifer Newmark, JNewmark@wildlifemgt.org

Washington State University, School of the Environment

Allyson Beall King, abeall@wsu.edu

Daniel Thornton, daniel.thornton@wsu.edu

University of Washington, School of Aquatic and Fishery Sciences

Tim Essington, essing@uw.edu

University of Washington, School of Environmental and Forest Sciences

Dan Brown, danbro@uw.edu

University of Washington, College of the Environment

Stephanie Harrington, stephah@uw.edu



