



## Rocky Mountains Cooperative Ecosystem Studies Unit

### NEWSLETTER Spring 2023

#### ***RM-CESU Announces the Annual Competition for Student Award:***

The Rocky Mountains Cooperative Ecosystem Studies Unit (RM-CESU) annually recognizes "above and beyond" accomplishments by student(s) involved in RM-CESU projects. Nominations may be submitted by any representative of the federal agency that sponsored the project, or by the student's academic institution. Nominations for Student Award are due May 26, 2023. The Award winner(s) will receive a citation and give a presentation on their project results at annual RM-CESU *Fall Meeting*. See [Nomination Instructions](#).

#### ***University of Montana Graduate Student Awarded 2023 Glacier National Conservancy – Jerry O’Neal Research Fellowship:***

The Rocky Mountains CESU, Glacier National Park Crown of the Continent Research Learning Center and the Glacier National Park Conservancy announce the selection of Holli Holmes as the recipient of the 2023 Glacier National Park Conservancy - Jerry O’Neal Student Research Fellowship for her study of Harlequin Ducks. Holli a master’s student in the Wildlife Biology Program and the University of Montana. Long term monitoring has shown a decline in breeding populations of Harlequin Duck (*Histrionicus histrionicus*) over the last twenty years. The objective of Holli’s research is to investigate three new non-invasive survey methods for assessing occurrence and reproductive success of the Harlequin Duck on its breeding range in the Northern Rockies. This work will serve as a basis for building a regional monitoring program that aims to identify and address the drivers of population declines.



***State of Yellowstone National Park report available on-line:*** Yellowstone National Park has released its [2023 State of the Park report](#). This report provides updates in each of the park’s strategic priorities and spotlights the immense progress made by the park’s teams and partners over the past two years. Many of the projects and programs described here were facilitated by our RM-CESU agency and university partners.



#### ***The National Park Service and Washington State University Collaborate to Study Change in Wildlife Behavior During Covid and to Determine Lynx Occupancy in Glacier National Park:***

Researchers with the National Park Service and Washington State University monitored mammal species via camera traps placed near trails throughout the eastern side of Glacier Park during the summer of 2020, when visitors were prohibited from accessing the area, and 2021, when visitation returned. The study, [published in the journal Scientific Reports](#), showed that 16 of the 22 species observed altered their behaviors to avoid humans. The citation is: A.K. Anderson, J.S. Waller, D.H. Thornton, *Partial COVID-19 closure of a national park reveals negative influence of low-impact recreation on wildlife spatiotemporal ecology*. *Sci Rep* **13**, 687 (2023).

The WSU and NPS team also published an article early in 2023 about the use of camera traps to estimate Canada Lynx populations in Glacier NP. The journal citation is: [A.K. Anderson, J. S. Waller, D.H. Thornton. Canada lynx occupancy and density in Glacier National Park. The Journal of Wildlife Management, 2023; e22383.](#) "Most surveys happen in the winter when you can use bait to lure the animals to live traps," said Alissa Anderson, a recent WSU master's graduate and first author on the study. "Glacier is sort of unique in the sense that it is a difficult place to survey in the wintertime. There aren't really maintained roads and you can't use snowmobiles." To address this challenge, the WSU researchers used a camera trapping method to determine the presence and density of Canada lynx in Glacier over the summers of 2018-2021. For the first part of the study, Anderson and National Park Service scientists set up an array of 300 motion-sensitive cameras about a kilometer apart on hiking trails across much of Glacier, including remote backcountry areas. Their analysis revealed that lynx are distributed not only across most of the park but also at lower elevations, which could prove useful as the climate continues to warm.

**Niwot Ridge LTER, Run by University of Colorado Boulder, gets Renewal by National Science Foundation for \$7.65 M:** The Niwot Ridge LTER operates out of the CU Boulder Mountain Research station, a 102-year-old extension of the CU Boulder campus, 26 miles west of Boulder, for which the LTER program supports a majority of the research. It is one of the original six NSF-funded long-term ecological research sites founded in 1980, one of only three that have been continuously funded since then, and the only mountain-based (and the highest elevation) site out of 28 sites across the country. A number of other RM-CESU cooperators are working at this long-term ecological research site. For more information about this grant renewal, see [CU Boulder Today article.](#)

**White-tailed Jackrabbits Color Change Studied by University of Montana and US Fish and Wildlife Service Biologists:** White-tailed jackrabbits can change their color with the seasons, growing snowy white fur in the winter and brown fur during the summer. But shorter winters brought on by rapid climate change can create color mismatch. *M. Ferreira et al.* determined the genetic plasticity of jackrabbits from Colorado who were studied by a team of international scientists led by University of Montana. They determined that three genes-controlled color variation from white to brown and that certain jackrabbit populations will be better able to adapt to future declines of snow cover. Scott Mills, a UM wildlife biology professor who was involved in the study, said this critical variation may help rescue white-tailed jackrabbits from population declines caused by climate change. The team's work was published March 23, 2023, in *Science Magazine* in an article titled "The evolution of white-tailed jackrabbit camouflage in response to past and future seasonal climates." The article is online at [Ferreira et al., Science 379, 1238–1242 \(2023\).](#)



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**Montana State University Researchers Join Forces with USDA-Forest Service and Montana Fish, Wildlife and Parks to Determine Resource Selection by Elk in SW Montana:** In the Journal *Ecosphere* a consortium of researchers pooled their elk location data for 10 years to determine the factors affecting elk densities on summer ranges. The article, *Ranglack, D., K. Proffitt, J. Canfield, J. Gude, J. Rotella and R. Garrott, 2022, Modeling Broad-Scale Patterns of Elk Summer Resource Selection in Montana Using Regional and Population-Specific Models. Ecosphere 13(12): e4311* concludes that habitat "greenness" (measured as NDVI) is the best predictor of elk locations and should be used by resource managers to determine elk abundance.

**Washington State University Researchers Collaborate with Numerous Agency and University Foresters to Assess the Decline of Western RedCedar:** There is a journal publication that will soon appear in *Global Change Biology* titled: *Canary in the Forest? – Tree mortality and canopy dieback of western redcedar linked to drier and warmer summer conditions*, by *Andrus, R., Peach, L., Cinquini, A., Mills, B., Yusi, J., Buhl, C.,*

Fischer, M., Goodrich, B., Hurlbert, J., Holz, J., Meddens, A., Moffett, K., Ramirez, A., Adams, H. (2023). These researchers used tree ring analyses to determine high mortality rates and partial canopy dieback of western redcedar (*Thuja plicata*, WRC), a culturally, ecologically, and economically important species in the Pacific Northwest. They sampled trees from 11 sites in coastal (maritime climate) and interior (continental climate) populations of WRC trees. In this study, WRC tree mortality was portended by on average 4-5 years of declining radial growth. Warmer and drier climate conditions in May and June that extend the annual July-September dry season reduced radial growth in 9 of 11 sites (1975-2020).

**Another Paper Explores the Interaction of Bark Beetles and Effects on Conifers in the Southern Rockies:** RM-CESU forest ecologists from Colorado State University and Washington State University collaborated with others to publish an article on forest insects: Tutland, N, Rodman, K. Andrus, R., and Hart, S., 2023, *Overlapping outbreaks of multiple bark beetle species are rarely more severe than single species outbreaks*. *Ecosphere*. 14. 10.1002/ecs2.4478. Starting in the late 1990s, outbreaks of multiple bark beetle species caused widespread mortality of three conifer species in the southern Rocky Mountains. To better understand the implications of such outbreaks, the study determined if overlapping outbreaks of multiple bark beetle species caused greater tree mortality than single species outbreaks in stands with multiple susceptible host tree species. They mapped stand susceptibility to outbreaks of spruce beetle, mountain pine beetle, and western balsam bark beetle by combining aerial survey data and forest composition variables in a random forest modeling framework. Stands affected by outbreaks of both MPB and SB had higher tree mortality than stands affected by one species alone, though stands susceptible to both MPB and SB were uncommon.



**UM's College of Forestry and Conservation Research Group Publishes Results of a Survey of Human-Grizzly Bear Interactions:** A University of Montana graduate student, Holly Nesbitt, led a study of how people in Montana view wildland grizzlies. The article was published in *Conservation Science and Practice* and was summarized: "We found overwhelming support for grizzly bears," said Alex Metcalf, a co-author of the study and associate professor of human dimensions at UM. "We found 80% to 90% of respondents think bears have a right to exist – that they make Montana special and that we need to learn to live with them. But also, that over 80% want to

see some form of grizzly hunting allowed." The reference is: Nesbitt, H., Metcalf, A., Metcalf, E., Costello, C., Roberts, L., Lewis, M. & Gude, J. (2023). *Human dimensions of grizzly bear conservation: The social factors underlying satisfaction and coexistence beliefs in Montana, USA*. *Conservation Science and Practice*, e12885. For more information on the publication by UM and Montana Fish Wildlife and Parks researchers, see the [press release](#).

**RM-CESU Partners Publish an Extensive Analyses in PNAS of Western Forest Regeneration after Wildfires:** Researchers from The USDA Forest Service, University of Montana and University of Colorado Boulder published a widely reported article in March 2023 in the *Proceedings of the National Academy of Sciences* on the topic of western conifer forests, wildfires and climate change. *Wildfires and climate change push low-elevation forests across a critical climate threshold for tree regeneration*, K. Davis, S. Dobrowski, P. Higuera, Z. Holden, T. Veblen, M. Rotherd, S. Parks, A. Sala, and M. Maneta, 2023, PNAS Vol. 120 No. 11 [e2208120120NAS](#). More than 50 fire ecologists, including a dozen with ties to the University of Montana, collaborated on the research, collecting data from more than 10,000 locations and hundreds of wildfires for the study. They concluded that increasingly intense wildfires and a warmer, drier climate make it more difficult for coniferous forests to grow back. For details of the multi-authored paper, go to [UM press releases](#). Kimberly Davis and co-authors published a [companion article in the Conversation](#) titled "The West's iconic forests are increasingly struggling to recover from wildfires – altering how fires burn could turn that around."

**University of Montana Graduate Student Joins with the National Park Service, Yellowstone Wolf Project to Link Parasite with Wolf Behavior:**

Connor Meyer, a Ph.D. student at the University of Montana, is the lead author on a paper with Yellowstone National Park biologists who had been collecting carnivore blood samples for many years since the reintroduction of wolves. The citation is:

*Meyer, C., Cassidy, K., Stahler, E., Brandell, E., Anton, C., Stahler, D., and Smith, D.. 2022,*

*Parasitic infection increases risk-taking in a social, intermediate host carnivore, [Communications](#)*

*Biology (5): 1180. [Toxoplasma gondii is a protozoan parasite capable of infecting any warm-blooded species and can increase risk-taking in intermediate hosts. In this analysis the authors used 26 years of wolf behavioral, spatial, and serological data to show that wolf territory overlap with areas of high cougar density was an important predictor of infection. In addition, seropositive wolves were more likely to make high-risk decisions such as dispersing and becoming a pack leader, both factors critical to individual fitness and wolf vital rates. Due to the social hierarchy within a wolf pack, we hypothesize that the behavioral effects of toxoplasmosis may create a feedback loop that increases spatial overlap and disease transmission between wolves and cougars.](#)*



## **REQUESTS FOR PROPOSALS**

### ***Effects of sound on wildlife, ecosystems, and visitors in units of the National Park***

In accordance with 54 U.S.C. § 101702(b) this funding opportunity is limited to public or private educational institutions, states, and political subdivisions of States. The primary objectives of the project include: 1) to advance sound source identification beyond its current manual state by developing and using machine learning techniques, 2) to provide scientific support to NPS staff in parks, regions, and national offices by analyzing park acoustic monitoring data, and publishing scientific reports and papers that elevate conservation, 3) to engage a cadre of trained students of varying levels to analyze, interpret, and research acoustic analyses, and 4) to support career development for young scientists. The expected award amount is a maximum of \$360,000 and minimum of \$100,000 to be spread over multiple years. Applications are due June 1, 2023, through Grants.gov. If you have questions after reviewing the [application information on Grants.gov](#), feel free to contact Christopher Kavanagh at [christopher.kavanagh@nps.gov](mailto:christopher.kavanagh@nps.gov).

## **JOB OPPORTUNITIES**

[Post-Doctoral Associate - 30-month appointment with focus on the evolutions of the symbiotic relationship between members of the diatom \(Bacillariophyta\) order Rhopalodiales and Cyanobacteria](#), University of Colorado Museum of Natural History, Boulder, CO (review begins 6.15.2023)

[Managing Director of the Idaho Water Resources Research Institute](#), University of Idaho, Moscow, ID (review begins 5.22.2023)

[Station Manager, University of Wyoming-NPS Research Station](#) in Grand Teton National Park, WY (closes 5.15.2023)

[Laboratory Coordinator, Natural Resource Ecology Laboratory](#), Colorado State University, Fort Collins, CO (review begins 5.8.2023)

[Botanical Field Biologist / Horticultural Technician - Pohakuloa Training Area](#), Center for Environment Management of Military Lands, , Colorado State University, Pohakuloa Training Area. HI (closes 5.8.2023)

[Native American Student Support Specialist, Max S. Baucus Institute and Alexander Blewett III School of Law](#), University of Montana, Missoula, MT (closes 5.7.2023)

[Research Faculty - Hydrologic Science and Water Management](#), University of Idaho, Moscow, ID (review begins 5.1.2023)

[Environmental GIS Analyst, Center for Environmental Management of Military Lands](#), Colorado State University, Fort Collins, CO (closes 5.15.2023)

[Assistant Professor of Native American Studies](#), Montana State University, Bozeman, MT (review begins 4.30.2023)

For details on these job opportunities, visit the [Jobs Page](#)

If you would like to post an announcement in the next RM-CESU Newsletter or on the website, please contact the RM-CESU Coordinator at [rmcesu@cfc.umt.edu](mailto:rmcesu@cfc.umt.edu).