Rocky Mountains Cooperative Ecosystem Studies Unit

NEWSLETTER
Summer 2024

RM-CESU Graduate Students Receive Research Grants for Field Work in 2024

The Rocky Mountains CESU, Glacier National Park Crown of the Continent Research Learning Center and the Glacier National Park Conservancy selected **Ben Weber**, a M.Sc. student at Montana State University, as the recipient ($7500) of the **2024 Glacier National Park Conservancy - Jerry O'Neal Student Research Fellowship.** The goal of Ben's project is to assess the success of the bull trout translocation experiment at Grace Lake, Glacier National Park (GNP). The results of this research will immediately be used in conservation translocation planning efforts underway to preserve and restore threatened bull trout in GNP.


Ben Weber, M.Sc. at Montana State University

This year, the **Whitebark Pine Ecosystem Foundation** funded two $1000 student research grants. The two awardees were: **Enzo Martelli Moya**, a PhD student with Dr. Cara Nelson at University of Montana, will be studying the "effects of restoration on the primary seed disperser [Clark's nutcracker] of whitebark pine on the Sawtooth National Forest" in Idaho and Utah and **Ashley Miller,** a PhD student with Dr. Jane Stewart at Colorado State University, will be studying the "aerial spread of white pine blister rust in relation to host phenology in whitebark, limber, and bristlecone pine habitat" at nine sites in Utah, Wyoming, Colorado, New Mexico, and Arizona.

The **Evison Fellowship** for research in the Greater Yellowstone Ecosystem ($10,000) was awarded by Grand Teton National Park and the Teton Conservancy to **Albert Mason, Jr**. The award winner is an MS student at the University of Wyoming, and will investigate "A before-after analysis of the effects of restored bison on tribal lands managed for cattle production".

***Colorado State University Scientists Analyze 20-years of Data on Apex Predators in the Greater Yellowstone Ecosystem*:** A Colorado State University experiment spanning more than two decades has found that removal of apex predators from an ecosystem (Greater Yellowstone) can create lasting changes that are not reversed after they return – at least, not for a very long time. The study results, funded by the National Science Foundation and *published in Ecological Monographs,* challenge the commonly held belief that the reintroduction of wolves to Yellowstone National Park restored an ecosystem degraded by their absence. Researchers in CSU's Warner College of Natural Resources examined the effects of three apex predators – cougars, grizzly bears and wolves - carnivores at the top of the food chain in Yellowstone. Depleted populations of cougars and grizzly bears naturally recovered about the same time wolves were reintroduced to the park in 1995. The absence of these predators for nearly a century transformed the food web and landscape. Yellowstone's northern range shifted from willow and aspen stands along small streams with beaver activity to grasslands due to intensive browsing by elk. The widespread changes stabilized into an alternative ecological state that resisted returning to previous conditions once the carnivores were restored, according to authors of the study, **Tom Hobbs and David Cooper**.

A popular summary of their findings were reported in the New York Times in April 2024

Citation: *Hobbs, N. Thompson, D. B. Johnston, K. N. Marshall, E.C. Wolf, and D. J. Cooper. 2024. Does Restoring Apex Predators to Food Webs Restore Ecosystems? Large Carnivores in Yellowstone As a Model System. Ecological Monographs e1598.*

Long's Peak, Rocky Mountain National Park

RM-CESU Agreement Between Rocky Mountain National Park and Colorado State University Leads to Book on the History of Long's Peak: A book by **Dr. Ruth M. Alexander**, CSU, was recently published: *Democracy's Mountain: Longs Peak and the Unfulfilled Promises of America's National Parks*. This book, published in September 2023, by University of Oklahoma Press, outlines park management challenges on Longs Peak in the 1960s amidst changing recreation patterns and calls for more stringent resource management. Book review and a summary of the historical material.

University of *Montana Graduate Student's Work in Glacier National Park Uses Acoustic Recordings and Point Count Surveys to track Clark's Nutcracker and Whitebark pine Associations* UM graduate student, Vladimir Kovalenko and his co-authors from UM and the National Park Service, have published a paper describing traditional point count surveys and passive acoustic monitoring of Clark's Nutcrackers in Glacier National Park (GLAC). In GLAC, 30 sites were established for Clark's Nutcracker monitoring and whitebark pine stand assessments. Whitebark pine stem diameter size and site cone density were the strongest predictors of nutcracker occupancy. This highlights the importance of conserving areas with large diameter whitebark pines with high cone production as part of restoration efforts. He was awarded a Glacier National Park Conservancy - Jerry O'Neal fellowship in 2020 for his work in Glacier NP. He received his M.S. degree from University of Montana in 2023, based on this work.

Citation: *Kovalenko, V., J.W. Doser, L.J., Bate, and D.L.Six, 2024. Paired acoustic recordings and point count surveys reveal Clark's nutcracker and whitebark pine associations across Glacier National Park. Ecology and Evolution, 14(1), e10867.*

Waterton-Glacier Science and History Day is Back: Since 2014 the Glacier-Waterton International Peace Park has sponsored an annual Science and History Day. Due to Covid restrictions, this in-person meeting was suspended in 2019. This summer there will be an in-person meeting held at Glacier National Park on July 23, 2024 to highlight current research and historical topics related to Waterton-Glacier International Peace Park.
When: Tuesday, July 23rd, 2024 from 9:30am-3:30 pm
Where: The Community Building in West Glacier
What: Presentations will highlight work done by agency and university researchers in Waterton-Glacier International Peace Park. Each presentation will give viewers the opportunity to connect with scientists and historians from the Peace Park and get a unique look at archives, insights, and latest findings. No registration necessary. If you need additional information, please contact the Crown of the Continent Research Learning Center, Glacier National Park.

An International Team of Researchers Cooperates to Determine Strategies to Recover Southern Mountain Caribou Populations: Researchers and modelers from Canada, the United States and New Zealand collaborated to produce an extensive analysis published in *Ecological Applications* to aid in understanding how to save this species. Two of the authors are **Mark Hebblewhite and Sara Williams** at the University of Montana, Missoula. Habitat loss is affecting populations of the southern mountain caribou (*Rangifer tarandus caribou*) in western North America. The authors analyzed 51 years (1973–2023) of demographic data from 40 southern mountain caribou subpopulations to assess the effectiveness of recovery actions. Controversial management actions, such as wolf reductions, maternal penning and supplemental feeding were successful in growing populations when applied to four subpopulations.

Citation*: Lamb, C. T., S. Williams, S. Boutin, M. Bridger, D. Cichowski, K. Cornhill, C. DeMars, et al. 2024. Effectiveness of Population-Based Recovery Actions for Threatened Southern Mountain Caribou. Ecological Applications e2965.*

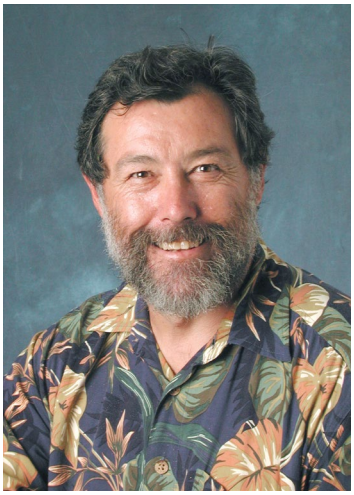
***University of Montana Experts Analyze Western River Flows Affected by Climate Change and Irrigation Practices**:* In a groundbreaking study of the management of water resources in the Western United States, **David Ketchum** and others at the Montana Climate Office at the University of Montana analyzed a 35-year record that quantifies the interconnected impacts of climate change and irrigation on surface water flows. The study, published in *Nature Communications Earth and Environment*, describes a dataset consisting of streamflow, climate, irrigated area, and crop water use to quantify the effects of both climate change and irrigation water use on streamflow across 221 basins in the Colorado, Columbia, and Missouri River systems. See University of Montana press release describing this study.

Citation: *Ketchum, D., Z.H. Hoylman, J. Huntington, et al. 2023. Irrigation intensification impacts sustainability of streamflow in the Western United States. Commun Earth Environ **4**, 479 (2023). https://doi.org/10.1038/s43247-023-01152-2*

Agency and University Partners Discuss Carbon Dioxide Mitigation Strategies in Yellowstone National Park: Researchers from RM-CESU partners, USGS and Utah State University, describe a case study quantifying tourist-associated emissions of carb**on** dioxide (CO2) generated by transit to and from Yellowstone National Park, along with emissions from transit within the park, accommodations, and park operations. Most of the emissions (almost 90%) were due to tourists' transportation choices getting to the park. Strategies that would most affect emissions would include a greater proportion of local or regional visitors, fewer visitors flying, and increased fuel efficiency of vehicles.
Citation: *Wilkins E.J., Dagan D.T., Smith J.W. 2024. Quantifying and evaluating strategies to decrease carbon dioxide emissions generated from tourism to Yellowstone National Park. PLOS Clim 3(4):e0000391. https://doi.org/10.1371/journal*.

***Rocky Mountain National Park (ROMO) Holds Biennial Research Conference to Hear from Partners about Research Conducted in the Park**:* On March 6-7, 2024 the Continental Divide Research Learning Center at ROMO hosted the Research Conference in Estes Park, Colorado, sponsored by the Rocky Mountain Conservancy. RM-CESU partners presenting their natural resource, cultural resources and social science research at the meeting included: USGS, National Park Service, USDA Forest Service, Utah State University, Colorado State University, University of Colorado Denver, University of Wyoming, University of Northern Colorado, University of Colorado Boulder, and Metropolitan State University of Colorado. See conference proceedings.

Special *Issue of Arctic, Antarctic, and Alpine Research on Snow Hydrology Planned to Memorialize Mark Williams, University of Colorado Boulder, who was an "Early Adopter" of the RM-CESU*: Paul Brooks, University of Utah, and other former graduate students of Mark Williams, have issued a "call for papers" on hydrology research topics pioneered by Mark during his time at INSTAAR, University of Colorado, Boulder. Mark Williams was at the forefront of quantifying the complexity of mountain hydrology and documenting its importance to water supply, water quality, and ecosystem structure, through his work in the Sierra Nevada, Colorado Rockies and high mountain ecosystems in Asia. Authors may submit articles by September 30, 2024 to the journal. For information on the special issue, "Mountain Hydrology in a Changing World: Building on the Diverse Contributions of Mark "Snobear" Williams" go to link.


Mark Williams

UPCOMING MEETINS

July 16-17, 2024: CESU National Network Meeting, National Conservation Training Center, Shepherdstown, WV.

August 25-31, 2024: 12th World Wilderness Congress, Black Hills, SD. Since 1976, the World Wilderness Congress has helped nature defenders from around the world gather to develop new strategies and actions for our wild Earth.

September 3-5, 2024: The 16th Biennial Scientific Conference on the Greater Yellowstone Ecosystem, Big Sky, MT.

September 30 - October 3, 2024: North American Invasive Species Management Association 32nd Annual Conference, Missoula, MT.

JOB OPPORTUNITIES

Professional Practice Assistant Professor in Statistical Consulting (with Ecology), Department of Mathematics & Statistics and the Ecology Center, Utah State University, Logan, UT (review of applications begins 8.1.2024)

Research Scientist – Wyoming Survey & Analysis Center, University of Wyoming, Laramie, WY (closes 6.14.2024)

Terry Abraham and Priscilla Wegars Professorship of Asian American Historical Archaeology, University of Idaho, Moscow, ID (review of applications begins 5.14.2024)

Associate Director of Montana American Indians in Math and Science, University of Montana, Missoula, MT (closes 6.13.2024)

Environmental Systems Project Lead – Remote (provides pollution prevention expertise), Center for Environmental Management of Military Lands, Colorado State University, Fort Collins, CO (closes 6/10/2024)

Environmental Scientist, Department of Civil, Environment and Architectural Engineering, University of Colorado, Boulder, CO (closes 6.10.2024)

CIRES/NSIDC Arctic Research & Community Engagement Coordinator, University of Colorado, Boulder (closes 6.5.2024)

Research Scientist, Asst – Terrestrial Ecosystems, Ecosystem Science & Management, University of Wyoming, Laramie, WY (closes 6.5.2014)

EcoPhys Postdoctoral Researcher (responsible for analysis of combined animal location data and physiological measurements collected from biologgers at fine temporal scales), Fish, Wildlife and Conservation Biology Department, Colorado State University, Fort Collins, CO (closes 6.3.2024)

Archives Coordinator and Public Services Supervisor, Special Collections and Archives, University of Idaho Library, Moscow, ID Pullman, WA (posted 5.21.2024)

Faculty – Anthropology, Department of Culture, Society and Justice, University of Idaho, Moscow, ID (posted 5.14.2024)

If you would like to post an announcement in the next RM-CESU Newsletter or on the website, please send to rmcesu@cfc.umt.edu.