University of Wyoming – National Park Service Research Station

43rd Annual Report, 2020



Michael E. Dillon, Editor
Professor and L. Floyd Clarke Chair
Department of Zoology & Physiology
Program in Ecology
University of Wyoming

Shawna Wolf, Managing Editor

Location and Contact Information



UW-NPS Research Department 3166 1000 E. University Ave. Laramie, WY 82071

Telephone: (307) 766-4227

Summer Address: UW-NPS Research Station PO Box 170 Moran, WY 83013-0170

Telephone: (307) 543-2463

Contents

UW-NPS Research Station Information	j
Location and Contact Information	j
The Mission	iv
Our Vision	iv
2020 UW-NPS Research Station Personnel	iv
Director's Column	V
Research Project Reports	1
Geology	1
Quantifying rates of Quaternary landscape evolution in Grand Teton National Park using in situ cosmo- genic ¹⁰ Be, ¹⁴ C, and ³⁶ Cl dating Alia Lesnek and Joseph Licciardi	1
Ecology	8
Rewilding the night sky: Mitigating the costs of light pollution for bats and insects Hunter Cole and Jesse Barber	8
Effects of wolf and grizzly bear recovery on cougars in the Southern Greater Yellowstone Ecosystem Jennifer A. Feltner	18
Developing a baseline understanding of gill lice distribution, prevalence, and infestation intensity in the Upper Snake River Watershed William Fetzer, Robert Al-Chokhachy, Jeffrey Baldock, Clark Johnson, Diana Miller, Annika Walters, and Chad Whaley	26
Variation in seasonal movements, habitat selection, and demographics of an irruptive, facultative migrant Katherine Gura, Bryan Bedrosian, and Anna Chalfoun	32
Multispectral unmanned aerial system remote sensing to detect Dalmatian toadflax in a mixed sagebrush steppe on the South Fork of the Shoshone River Chloe M Mattilio, Urszula Norton, and Dan Tekiela	41
Behavioral plasticity of large mammals in the Rocky Mountain to variation in temperature Rebecca R. Thomas-Kuzilik, Justine A. Becker, and Jerod A. Merkle	48
Understanding food web structure in high-elevation streams of the Teton Range Lusha M. Tronstad, Scott Hotaling, Karen Jorgenson, Taylor Price, Shannon Weld, Sarah Collins, Trinity Hamilton, Rebecca J. Bixby, and Debra S. Finn	56
Predictability and stability of sagebrush-steppe restoration in a changing climate Sienna A. Wessel, Laura Jones, Erik Kramer, Christian Stratton, Lauren Shoemaker, and Daniel Laughlin	63
Can phenotypic plasticity buffer organisms from environmental change? Arielle Wimmer and Amy Krist	74

Human Dimensions and Cultural Resources	80
Greater Yellowstone Ecosystem wildlife approach study Stephanie Freeman, B. Derrick Taff, Ben Lawhon, and Peter Newman	80
An analysis of the Greater Yellowstone Ecosystem archaeological assemblages of lithic raw materials Chase Mahan and Todd Surovell	96

Our Vision

Our vision is to promote stewardship of Wyoming's iconic landscapes by:

Inspiring Discoveries

Advance the frontiers of knowledge by creating unique opportunities for scholars in Wyoming's iconic landscapes

Elevating Experiences

Enhance and expand opportunities for place-based learning for UW students, community scholars, and the public

Connecting Communities

Share research and learning opportunities that cross boundaries and foster cooperation, understanding, and discourse.

The Mission

To achieve our vision, UW students and faculty partner with the National Park Service and others to increase opportunities for research, scholarship, creative and cultural activities, and courses connected to Wyoming's iconic landscapes and ecosystems, its Native American culture and heritage, and its traditions from ranching to recreation.

Availability of Research Project Reports

The following project reports have been prepared primarily for administrative use. The information reported is preliminary and may be subject to change as investigations continue. Consequently, information presented may not be used without written permission from the author(s). Reports from past research at the Research Station are available online. For reports 1954, go to the Jackson Hole Research Station Archives (https://journals.uwyo.edu/index.php/jhrs/issue/archive), and for reports 1977-present, visit the UW-NPS Research Station Archives (https://journals.uwyo.edu/index.php/uwnpsrc/issue/archive).

2020 UW-NPS Research Station Personnel

Michael E. Dillon, Director Bryan Shuman, Interim Director Anne Guzzo, Associate Director Bonnie Robinson, Office Manager Shawna Wolf, Office Assistant Gordon Richman, Facilities Superintendent Ben Read, Facilities Staff Anna Cressman, Summer Staff Celia Karim, Summer Staff Tim Uttenhove, Summer Staff

2020 Proposal Review Committee

Michael E. Dillon, Director, UW-NPS Research Station
Associate Professor, Department of Zoology & Physiology and Program in Ecology
University of Wyoming

Bryan Shuman, Interim Director, UW-NPS Research Station Professor, Department of Geology and Geophysics University of Wyoming

> Gus Smith, Chief Science and Resource Management Grand Teton National Park

Simeon Caskey, Chief
Physical Science Branch
Grand Teton National Park & The John D. Rockefeller, Jr. Memorial Parkway

Jerod Merkle, Assistant Professor Knobloch Professor in Migration Ecology and Conservation University of Wyoming

Drew Bennett, Professor of Practice
Haub School of Environment and Natural Resources
University of Wyoming

Frieda Knobloch, Professor American Studies Program and the Creative Writing Program University of Wyoming

> Hillary Robinson, Deputy Chief Center for Resources Yellowstone National Park

Jessica Richards Yellowstone National Park

Director's Column, 43rd Annual Report 2020

The UW-NPS Research Station operates a field station facility at the AMK Ranch on Jackson Lake in Grand Teton National Park (GTNP). UW-NPS provides researchers in the biological, physical and social sciences and cultural resources an enhanced opportunity to work in the diverse aquatic and terrestrial environments of GTNP, Yellowstone National Park and the surrounding Greater Yellowstone Ecosystem (GYE). Station facilities include housing for up to 60 researchers, wet and dry laboratories, a library with internet access, boats, and shop facilities. The station is available to researchers working in the GYE regardless of funding source, although priority is given to individuals whose projects are funded by UW-NPS.

The Research Station continues to administer a small grants program to fund research addressing applied and basic scientific questions, often related to park management. Research proposals are reviewed and evaluated by the Research Station's proposal review committee, which is composed of University faculty and National Park Service representatives and is chaired by the Director of the UW-NPS Research Station. Research contracts are usually awarded by early April.

Due to the global pandemic, University of Wyoming (UW) and GTNP operations were severely curtailed beginning in March 2020. The station was shut down for the 2020 season, preventing many researchers from conducting planned research in the park and surrounding area. However, the small grants program continued, with additional flexibility provided to researchers with regard to the timing of work and of grant periods. As such, annual reports were still completed by many of the small grant recipients, providing continuity in documenting ongoing research during this challenging time. The reports herein are therefore for grants awarded in 2020; due to reporting extensions, they may include data from 2021.

Following on a new 20-year General Agreement between UW and GTNP, negotiated and signed in 2018, the University has made substantial investments in infrastructure, including replacing multiple building roofs, extensive pest mitigation, and building a new water and wastewater system. In parallel, a UW task force has engaged dozens of faculty and administrators across campus to re-envision the role of this unique facility, resulting in a new vision and mission and elevating the facility to be a key priority for the University.

When I accepted the Director position for the UW-NPS Research Station in 2016, I took on the role because I had a vision to transform the station into a world-class facility and the premiere place of scholarship in the Greater Yellowstone Ecosystem. The tireless work of our outstanding staff with limited resources, the engagement of UW administrators passionate about the station's success (in particular, William H. Mai), and the warm, productive, and long-running collaborations with our Grand Teton National Partners have put us squarely on the path to that vision. Now that the station is on that path, I have decided that it is time for me to step down. I look forward to watching the station continue to grow and to joining Harlow summer seminars as an audience member.

Hope we meet on the dock soon,

Michael