

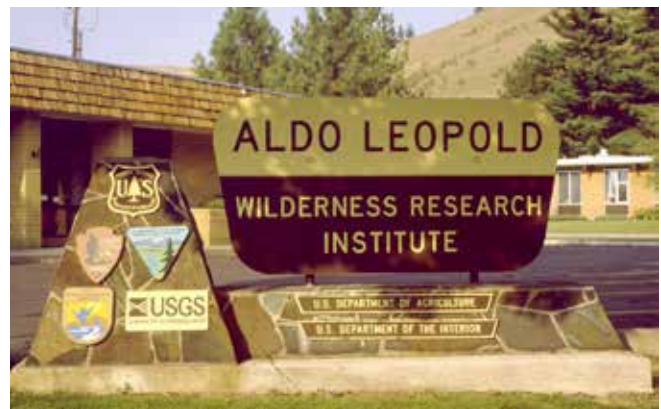
PERSPECTIVES FROM THE ALDO LEOPOLD
WILDERNESS RESEARCH INSTITUTE

The USGS Northern Rocky Mountain Science Center

BY PAUL STEPHEN CORN and SUZANNA C. SOILEAU

The Aldo Leopold Wilderness Research Institute (ALWRI) was conceived as an interagency partnership, and its founding in 1993 coincided with the creation of the National Biological Service (NBS), from the biological research programs and staff in the Department of the Interior. NBS research zoologist Steve Corn moved to Missoula to join the staff at ALWRI in 1996, at about the same time that NBS was merged into the U.S. Geological Survey (USGS). USGS scientists in Montana were ultimately incorporated into the Northern Rocky Mountain Science Center (NOROCK). Dr. Corn retired in August 2014, but the USGS presence at ALWRI is continued by Blake Hossack, who joined Corn's project in 1999, earned his PhD in biological sciences at the University of Montana in 2011, and was hired as a research zoologist with USGS in 2012.

The USGS presence at ALWRI has been mainly tied to the study of amphibian populations in protected areas. Early USGS efforts at ALWRI included a workshop on the effects of stocking nonnative fish in wilderness lakes, culminating in several papers published in the journal *Ecosystems* in 2001. However, since 2000, most USGS activity has been funded through the USGS Amphibian Research and Monitoring Initiative (Corn 2001). The explicit relationship of this work to wilderness generally falls under the category of "wilderness for science" (Parsons 2007) and includes long-term monitoring of status and trend in the national parks on the Continental Divide and research on factors influencing change in amphibian populations. Monitoring data from Glacier, Yellowstone, Grand Teton, and Rocky Mountain National Parks composed a portion of an analysis of national trends in amphibian populations (Adams et al. 2013). Research, although specifically addressing amphibians, has examined issues such as fish



stocking (Pilliod et al. 2010), wildland fire (Hossack et al. 2013), and climate change (McCaffery et al. 2014) that are directly relevant to understanding the current threats to wilderness values.

Headquartered in Bozeman, Montana, NOROCK also incorporates field stations in West Glacier, Montana, and Jackson, Wyoming. Given the physical setting of the northern Rocky Mountains, it is not surprising that many of the studies conducted by scientists at NOROCK also use wilderness as the setting for research, and considerable information is generated on a broad range of topics directly useful to wilderness managers. Emeritus geographer Carl Key focused on building capabilities for the remote sensing and evaluation of wildfire (Lutes et al. 2006). Scientists with the Climate Change in Mountain Ecosystems program, led by research ecologist Dan Fagre, focus on mountain ecosystem research with an emphasis on glacier studies, snowpack and avalanche events, landscape change photography, and alpine climatology. The team's research is also part of the Western Mountain Initiative, a collaboration between USGS and U.S. Forest Service scientists to study and predict responses

of montane ecosystems to climatic variability and change (Baron et al. 2008). Research ecologist Greg Pederson has developed tools for assessing recent and historic changes in temperature and snow in the northern Rockies that can be used to assist wilderness managers in developing adaptation strategies (Davison et al. 2012). Climate change is a major component of research ecologist Clint Muhlfeld's research. For example, there are strong links between climate change and hybridization of native cutthroat with introduced rainbow trout (Muhlfeld et al. 2014), causing decreased fitness and increasing risk of extinction. Grizzly bears are an important symbol and component of wilderness ecosystems in the northern Rockies, and research supporting their conservation is a focus of much of NOROCK's work in the Greater Yellowstone (GYE), Northern Continental Divide (NCDE), and Cabinet-Yaak (CYE) Ecosystems. In the NCDE and CYE, emeritus wildlife biologist Kate Kendall and her team conducted extensive sampling for bear DNA in Glacier National Park and nearby wilderness areas and provided the first-ever population estimates for grizzly bears in these regions (Kendall et al. 2008). Research ecologist Tabitha Graves continues these studies from the West Glacier field station.

NOROCK scientists, including many not named here, are actively engaged in research partnerships that enhance the ecological understanding of wilderness areas across the

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West. Key partners in these efforts include the Interagency Grizzly Bear Study Team, Wyoming Landscape Conservation Initiative, Montana Institute on Ecosystems, National Park Service Inventory and Monitoring Network, Intermountain West Wetland Working Group, USGS National Research Program in Water, and, of course, ALWRI. For more information on specific projects and complete lists of publications and other products, visit the ALWRI (leopard.wilderness.net) and NOROCK (nrmsc.usgs.gov) websites.

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