



Gates of the Arctic Wilderness (Peter Landres)

ALDO LEOPOLD WILDERNESS RESEARCH INSTITUTE

Accomplishment Report | 2012-2013

Providing scientific leadership to sustain wilderness



Multi-Agency Collaboration - practical and cost effective

Wilderness Areas within the National Wilderness Preservation System are managed by the Department of the Interior's Bureau of Land Management, Fish and Wildlife Service, and National Park Service, and the Department of Agriculture's Forest Service.

Wilderness research, on the other hand, is primarily the responsibility of Forest Service Research and the U.S. Geological Survey.



Denali; Saguaro Wilderness (Peter Landres)

All managing agencies share common needs for wilderness science, and all contribute to identifying crucial science needs and funding the Aldo Leopold Wilderness Research Institute's science program. This multi-agency collaboration ensures maximum efficiency and application of research results to all the agencies. This is the exact model of agency cooperation the American public expects from government that leads to the best scientific discoveries, most effective and consistent stewardship of wilderness, and demonstrates maximum efficiency of resources.



Buffalo National River Wilderness; Steens Mountain Wilderness (Peter Landres)

The **Aldo Leopold Wilderness Research Institute**, in the spirit of its namesake, is the only Federal research group in the United States dedicated to improving wilderness stewardship and preserving wilderness values. Institute scientists, with managers and other university or partnering scientists, provide leadership in developing the knowledge and tools to improve wilderness stewardship and preserve the ecological and social values derived from wilderness and other protected landscapes. While remaining true to its core values, the Leopold Institute is actively changing with the times. This brochure summarizes who we are and what we do, illustrated with a few select examples of our recent accomplishments, and provides a look at what to expect in the coming years from the Leopold Institute.

Visit <http://leopold.wilderness.net> for publications, projects, staff pages, research library

Since its beginning more than 45 years ago, as the Forest Service's Wilderness Research Work Unit, the Leopold Institute has been a model of multi-agency collaboration and partnership, providing research central to the mission of the four federal agencies that manage 110 million acres of designated wilderness in the United States. The Leopold Institute was chartered in 1993 in response to the increasing need for science-based wilderness management practices. Science at the Leopold Institute is grounded in four central pillars:

Science for Wilderness – Research that improves wilderness stewardship

Wilderness for Science – Research that uses wilderness as a reference benchmark and laboratory for understanding ecological and social systems

Natural Capital and Ecosystem Services – Research that quantifies the social and ecological benefits of wilderness

Synthesizing and Applying Wilderness Science – Compiling, synthesizing, disseminating, and applying national and international wilderness science for wilderness managers, other scientists, and students



Death Valley Wilderness (Peter Landres)

Science for Wilderness

The Leopold Institute is a national and international leader in research focused on improving wilderness stewardship. This is a broad research area and Institute scientists are active in many diverse fields, including:

- Recreation ecology to inform education and restoration programs to reduce recreation visitor impacts to vegetation, soils and water quality in wild lands and on wild rivers



Gates of the Arctic Wilderness (Peter Landres)

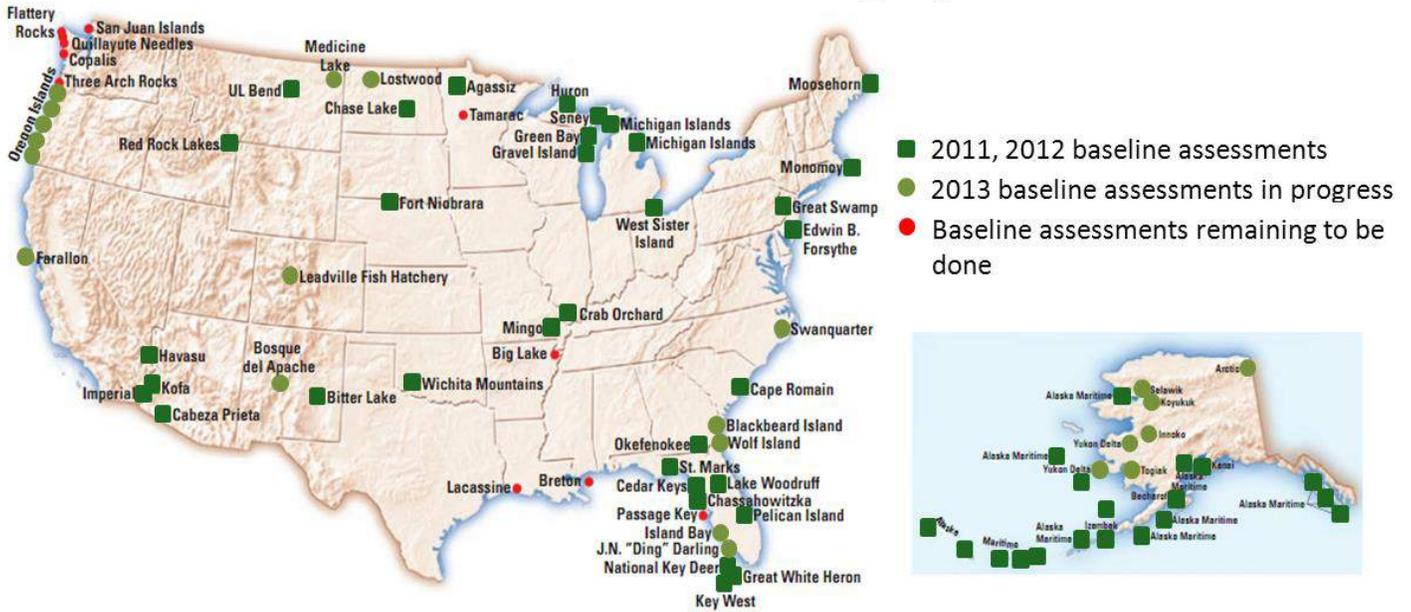
- Social science survey research to support backcountry recreation management planning, visitor management and determine trends in use and users
- Modeling the impacts of past fire suppression activities on wilderness vegetation and wildlife conditions

Highlights in the area of **Science for Wilderness** include:

- Leopold Institute Scientists played a significant role in the development of **Park Science Special Issue: Wilderness Stewardship and Science**, exemplifying interagency collaboration for finding new ways to improve wilderness stewardship.
- A framework to establish visitor capacity in wilderness and other high use recreational areas, to help agencies stem litigation regarding visitor use and capacity issues.
- Scientists at the Leopold Institute worked with NPS and FS managers to design visitor surveys to support planning at the Boundary Waters Canoe Area Wilderness and Sequoia & Kings Canyon National Parks in 2011-2012. Trends in use and users, trends in conflict, attitudes toward use of technology, travel patterns and perceptions of appropriateness of intervention for climate change mitigation were among topics studied at managers' requests. Pilot testing at the Arctic Refuge is complete and a study to support planning has begun.

- Practical strategies and tools to fulfill the legal and policy mandates of all four wilderness managing agencies to “preserve wilderness character”

Wilderness Character Baseline Assessments in the USFWS Wildlife Refuge System



- Scientists have advanced concepts to guide the stewardship of wilderness and protected areas in a time of rapid global environmental change.

Beyond Naturalness

In 2010, ALWRI scientist David Cole co-edited *Beyond Naturalness* (Island Press). The book explores the foundational concept of naturalness in wilderness. It suggests that naturalness has at least three different meanings: lack of human effect, freedom from intentional human control and historical fidelity. Although each of these meanings resonates with the wilderness ideal, they are not congruent; we must choose between them. Therefore, we need to go beyond naturalness in establishing stewardship objectives for wilderness in an era of rapid change. The book examines stewardship goals for wilderness and ways to more effectively plan for and respond to climate change.

Wilderness for Science

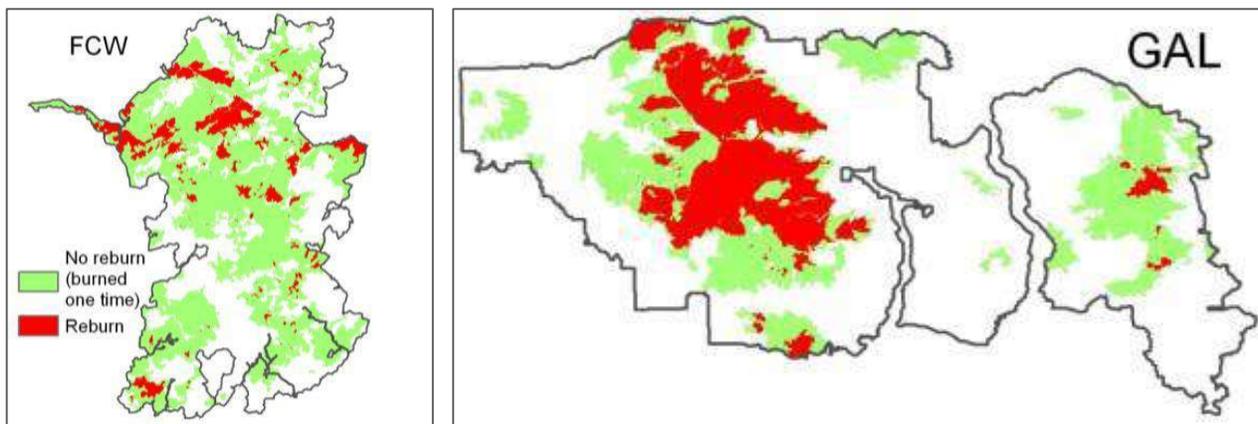
Wilderness and other protected areas are some of the best remaining places on the planet to conduct research that examines the causes and subsequent consequences of environmental change. It is in these places that we have largely allowed wildfire, annual flooding, and other natural disturbances to occur, providing a critical baseline to understand how natural systems function and how people respond to and value these systems. This wilderness baseline is more important than ever as enter a period of new and rapid environmental change.



Frank Church—River of No Return Wilderness; Selway-Bitterroot Wilderness (Carol Miller)

Fire research at the Leopold Institute is pioneering what we can learn from wilderness about fire and its management, including:

- Examining fire probability and location if fires were not suppressed
- Studying how the burned area can limit the severity of a subsequent fire
- Investigating whether wilderness fire sizes differ from more managed lands
- Identifying key environmental factors affecting natural fire regimes and regional variation



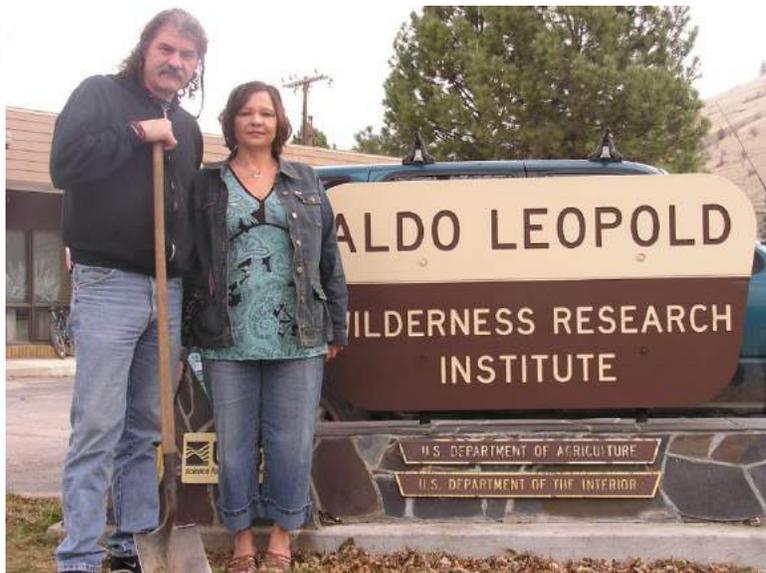
Modeling fire severity in relationship to burn frequency: Frank Church—River of No Return and Gila-Aldo Leopold Wildernesses (Carol Miller)

Fire and Wilderness

Wildfires have great potential to serve as fuel treatments because they consume fuel and alter vegetation structure. Leopold Institute scientists are evaluating the effectiveness of wildfires in their ability to limit the occurrence, extent, and severity of subsequent fires. They are also quantifying the longevity of these treatment effects. Information produced by this research will help managers formulate appropriate responses to wildfire events, especially as recent changes in policy and climate are likely to result in landscapes with more fire and repeated burns.

Leopold Institute scientists continue to develop resources describing the importance of wilderness to climate change adaptation and the challenge to wilderness stewards in dealing with climate change, including:

- Collaboration with the Confederated Salish & Kootenai Tribe to assess tribal and non-tribal beliefs about wilderness on the Flathead Reservation as a method of determining appropriate adjacent land management strategies. While non-tribal members see wilderness as an empty landscape, tribal members are more likely to describe it as a storied landscape, demonstrating the different cultural orientations our society has toward wilderness.



- Collaboration with American Indian academics, tribal forestry programs and climate change scientists to incorporate beliefs and scientific findings about climate change trends into long term forestry and fire management strategies across the landscape.

Amphibian populations world-wide are undergoing declines due to stressors such as habitat destruction, disease, introduced species, and pollution. Climate change is of particular concern. The USGS established the Amphibian Research and Monitoring Initiative (ARMI) to assess population declines, their causes, and to develop effective actions to stop or reverse these declines. Ongoing lines of research include:

- Studies on a pathogenic amphibian decline that is the leading cause of global amphibian decline.
- Evaluation of the impact of fire on amphibian populations, breeding site occupancy in burned vs. not burned areas and based on the severity of the burn over time.
- Climate change impacts to amphibian populations are another important area of concern specifically ultraviolet radiation. Scientists have found no damage from UV radiation to breeding. Research on reduced snowfall, potentially from climate change, show annual survival of some amphibian species is higher with less snowfall, suggesting some benefits from climate change. Impact of warming stream temperatures on amphibian populations is also being investigated.

Natural Capital and Ecosystem Services

One of the most under-appreciated facts about the American landscape is the socio-economic benefit of wilderness to people and surrounding lands. Wilderness is truly natural capital for the people of the United States from which such services as clean water, clean air, and spiritual renewal flow. Last year, government scientists, managers, representatives from non-governmental organizations and academic partners from Canada, the U.S., and Mexico, with an invited guest from Hungary, met at the Leopold Institute for discussions about challenges in accounting for ecosystem service values from wilderness and protected areas in North America.



Lake Clark Wilderness (Peter Landres); Eagle Cap Wilderness

- Scientists at the Leopold Institute are working with other scientists and Forest Service managers to supplement the physiological aspect of a climate change vulnerability assessment on the Shoshone National Forest with a social vulnerability assessment focused on water-based ecosystem services.
- Scientists at the Leopold Institute are working with BLM and other Alaska cooperators to extend collaboration throughout the Asia Pacific Region (particularly in Alaska, the Far East of Russia and the Republic of China) for research to support sustainable tourism development decisions and restoration of traditional relationships with nature-based ecosystems.
- Research on wilderness use has extended to Special Provisions described in the Wilderness Act. At managers' request, scientists at the Leopold Institute have recently compiled and summarized findings from research on excepted motorized access users, subsistence users, commercially outfitted and guided visitors, and the interaction of these users with recreation visitors to wilderness.

Synthesizing and Applying Wilderness Science

Since its inception, the Leopold Institute has been a leader in synthesizing scientific information and making this available to wilderness managers, other scientists, and the public. Scientists at the Leopold Institute are active in creating new ways to provide this information, in organizing and participating in conferences, symposia, workshops, and trainings, and in creating easily used and accessible web-based resources. The Leopold Institute website (<http://leopold.wilderness.net>) is central to synthesizing and disseminating new wilderness research and frameworks for making informed management decisions, and receives an average of 50,000 visitors each quarter.

Leopold Institute scientists work closely with the Arthur Carhart National Wilderness Training Center to ensure that the latest research findings are incorporated into national training programs.

Recent highlights in the area of **Synthesizing and Applying Wilderness Science** include:

- Establishing and leading a new Wilderness Fellows program with our National Park Service, Fish and Wildlife Service, and Forest Service partners to engage youth, build capacity within the agencies, and accomplish important wilderness stewardship tasks such as baseline assessments of wilderness character.



2012 Interagency Wilderness Fellows

- Contributing to Wilderness.net’s management tools by creating “tool boxes”—a compilation of resources—for wilderness managers on a variety of issues:
 - Research and Scientific Activities in Wilderness
 - Wilderness Character
 - Effects of Climate Change on Wilderness and Protected Areas
 - Recreation site monitoring
 - Wilderness and Backcountry Site Restoration
 - Visitor use management

- The Institute convened a group of wilderness scientists and managers for a workshop to review 50 years of research on wilderness visitor experiences and its influence on wilderness stewardship. The workshop proceedings, *“Wilderness Visitor Experiences: Progress in Research and Management,”* reviews the state-of-knowledge regarding wilderness visitor experiences.
- The Leopold Institute and its partners are proud to have cooperated in compiling, publishing, and distributing *“Science and Stewardship to Protect and Sustain Wilderness Values: Ninth World Wilderness Congress Symposium.”* The Leopold Institute is currently facilitating important science and stewardship contributions at the Tenth World Wilderness Congress (WILD10) in Salamanca, Spain in 2013.



WILD9 - Merida, Mexico (WILD Foundation)

- Decades of Research Data: The Leopold Wilderness Institute is archiving all wilderness data that Institute scientists and collaborators have collected over the past 40+ years. We are partnering with faculty and students at the Salish Kootenai College, with funding from the FS data archiving program. Archived data will be freely available via the internet to facilitate new research opportunities.



Cedar Breaks – recommended wilderness (Peter Landres)