

Wilderness Science in a Time of Change: A Conference

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At the dawn of the twenty-first century, environmental, social, and technological change continues to accelerate, creating new challenges and opportunities for humans and the world they inhabit. In the latter half of the last century, one of the important responses to these rapid changes has been the preservation of wilderness lands. In the Wilderness Act of 1964, which codified wilderness preservation in the United States, there is tension between challenge and opportunity, and between wilderness as reaction and wilderness as proaction. That wilderness designation was reactive in nature is clear in the Act's purpose statement, "to assure that an increasing population, accompanied by expanding settlement and growing mechanization, does not occupy and modify all lands." Wilderness was viewed as a refuge from human-caused change, and managers must meet the challenge of protecting wilderness from the changes going on around it. But the Act also speaks proactively—to the use and enjoyment of wilderness and to opportunities for wilderness lands to provide important and unprecedented values to our ever-changing society.

Science is critical to meeting the challenge of preserving wilderness resources for future generations. It is equally critical to realizing the opportunities that wilderness provides for unique human-nature relationships, for the acquisition of certain types of information and understanding, and for enriching the world in which we live. The relationship between science and wilderness should be viewed as symbiotic. Our capacity to preserve wilderness is enhanced by application of the results of scientific studies, and basic scientific understanding is enhanced by research conducted in wilderness.

Given the importance of wilderness in society and the importance of science to wilderness, in early 1996 a small group of people began planning for an international conference on wilderness science. As conceived, the conference was to be both a followup and an expansion of the first National Wilderness Research Conference, held in Fort Collins, Colorado, in 1985. That conference brought together many of the scientists in the world working on issues related to the

management of wilderness and resulted in literature reviews and compilations of research that remain critical references today (Lucas 1986, 1987). Our intent was to bring scientists together again, along with wilderness managers, to produce an updated compendium of the current state-of-knowledge and research. In addition, we sought to increase the array of scientific disciplines represented at the conference and to expand the range of topics beyond the challenges of managing wilderness. Finally, we hoped to use plenary talks to highlight controversy, divergent viewpoints, and management dilemmas—to challenge participants' belief systems—in the hopes that this would stimulate interaction and personal growth.

Conference Organization

The conference consisted of plenary talks presented before the entire conference, as well as more narrowly focused presentations organized around three conference themes and presented in concurrent sessions. The conference's plenary talks were organized into four sessions. The first session was devoted to global trends and their influence on wilderness. In separate talks, Peter Vitousek and George Stankey discussed important environmental and social and technological trends, respectively. Both papers explored the influence of global change on wilderness and its management, as well as on the values and meanings of wilderness. The second session was devoted to contemporary criticisms and celebrations of the idea of wilderness. Baird Callicott explored a variety of recent criticisms of the wilderness idea, challenging the traditional belief systems of many wilderness advocates. Dave Foreman provided an alternative perspective, both promoting the value of traditional wilderness concepts and suggesting ways in which the wilderness idea has evolved over time. The third plenary session was devoted to exploring the capacity of science to meet the challenges that wilderness faces and to realize the opportunities that wilderness presents. Jill Belsky and Dan Botkin provided thoughtful talks from the perspectives of a social scientist and a life scientist, respectively. The final plenary session was devoted to concluding talks related to conference themes. Reed Noss talked about wilderness in relation to biological conservation. Dan Dustin discussed the unique human experience of wilderness and the challenges to understanding it. The paper prepared by David Cole and Bill Hammitt explored fundamental dilemmas facing wilderness management. The final talk, prepared by Perry Brown and Dave Parsons, challenged attendees to work to further increase the capacity of wilderness science in the twenty-first century.

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The bulk of the conference was organized around three themes. The first theme was "Science for Understanding Wilderness in the Context of Larger Systems." Wilderness lands are embedded in larger ecological and social systems. Conditions within wilderness influence and are influenced by adjacent land uses and communities. The contribution of wilderness to maintenance of regional ecological integrity depends on the types of areas designated as wilderness and their spatial distribution and connectedness. In addition, wilderness lands influence regional social systems, such as local economies and life styles. The emphasis of this theme was better understanding of the linkages between wilderness and the social and ecological systems (regional, national, and international) in which wilderness is situated.

"Wilderness for Science: A Place for Inquiry" was the second theme. The unique characteristics of wilderness make it the best place to conduct certain types of science. Relative lack of human disturbance over large areas makes wilderness an important laboratory for understanding natural processes, particularly those that operate at large spatial scales. Remoteness, solitude, and the relative lack of technological intrusion make wilderness a useful laboratory for studying psychological and social phenomena in such situations. The emphasis of this theme was increased recognition of wilderness as a place for scientific inquiry, as well as better understanding of what we have learned from studies that have utilized wilderness as a laboratory.

The third theme was "Science for Wilderness: Improving Management." Wilderness is to be managed such that natural conditions, cultural values, and wilderness recreational experiences are protected and preserved. This is a complex task, requiring knowledge about threats to these wilderness values and the efficacy of management interventions designed to mitigate the impacts of these threats. Although hopefully informed by science, management actions are determined largely by evaluative judgments and the compromises that must be made between conflicting objectives. The emphasis of this theme was better understanding of wilderness visitors, threats to wilderness resources and values, and means of planning for and managing wilderness.

We organized three types of sessions under each of these three themes. We invited 18 speakers to present overview papers on specific topical areas under each theme. Many of these speakers developed comprehensive state-of-knowledge reviews of the literature for their assigned topic, while others developed more selective discussions of issues and research they judged to be particularly significant. In addition, conference participants were given the opportunity to contribute either a traditional research paper or to organize a dialogue session. Most of the research papers (131 papers) were presented orally, but 23 additional papers were presented in a poster session. Fourteen dialogue sessions were organized to promote group discussion and learning about selected topics.

The Conference

The conference was held in Missoula, Montana, May 23 through 27, 1999. Well over 400 people participated in the conference, which began on a warm sunny afternoon with a celebration of wilderness, jointly attended by conference

attendees and the Missoula community. A wilderness fair, consisting of environmentally oriented educational activities, musical presentations and displays, was followed by a performance in the historic Wilma Theater. Gary Snyder's remarks and readings from his most recent book of poems, *Mountains and Rivers Without End*, drew over 1,000 people.

Conference attendees included a roughly equal mix of people from federal land managing agencies and from academia. There were also several representatives from state, local, and tribal governments. There were more than 30 attendees from 16 different nongovernmental organizations, as well as a number of private individuals, consultants, and members of the press. About 20 participants were from Canada, with about 20 more participants from other countries. We succeeded in attracting people from diverse disciplines, united in their interest in wilderness. As usually is the case, a large proportion of the researchers who attended specialize in the social science aspects of outdoor recreation. However, attendees also included other types of social scientists, philosophers, paleontologists, and life scientists interested in all scales of analysis from cells to the globe.

During the first three days of the conference, early mornings were devoted to plenary sessions, with the entire conference convening for two related talks each morning. Late morning was devoted to the invited overview papers organized around each of the three themes. Six overview papers were given each morning, with attendees choosing one of three concurrent sessions. Contributed research papers and dialogue sessions were presented in concurrent sessions in the afternoon. Attendees generally had to choose among six concurrent research and dialogue sessions. Poster papers were presented in a session on the first evening. On the fourth day, research papers were presented in the morning, and the final plenary session was held in the afternoon. Over the four days, 14 dialogue sessions were held, and 131 research papers were presented in 33 1.5-hr-long research sessions.

The Conference Proceedings

The proceedings of the conference is organized into five volumes. The first volume is devoted to the papers presented during the plenary sessions. Subsequent volumes are devoted to each of the three conference themes, with two volumes devoted to wilderness management, the theme with the most papers. Within each theme, papers are organized into overview papers, research papers, and papers from the dialogue sessions. The format of dialogue session papers varies with different approaches taken to capture the significant outcomes of the sessions. Research papers include papers presented orally and on posters. Within each theme, research papers are organized into broad topical areas.

We sought to include all papers of interest to researchers working on a focused topical area within the same volume, even if this meant grouping papers from different conference themes. Unfortunately, this also tended to result in separating papers presented by social scientists from those presented by biophysical scientists. For example, all papers dealing with fire are included in one proceedings volume. During the conference, however, papers that contribute to

our basic understanding of fire processes and regimes in natural ecosystems were presented under the theme "Wilderness for Science: A Place of Inquiry." Papers devoted more specifically to fire management were presented under the theme "Science for Wilderness: Improving Management." Some of these papers were presented in sessions devoted exclusively to fire; papers on fire restoration were included in sessions devoted to restoration of various ecosystem components.

Each research paper in the proceedings was reviewed by another conference attendee; overview papers were reviewed by a subject matter expert. Dialogue session papers were reviewed by Bill Borrie. Virtually all papers received copy editing by Jennifer O'Loughlin. However, because final revisions were not reviewed, the final content of these papers remains the responsibility of the authors.

Acknowledgments

Many individuals and institutions contributed to the success of the conference. Most of the conference planning was done by the conference Planning Committee located in Missoula, Montana. Additional ideas and support were provided by the conference's Steering Committee members and Sponsors. The conference program was organized by the Program Committee. David Cole and Steve McCool, co-chairs of the Program Committee, were responsible for plenary speakers, putting together the final program, and compiling the proceedings. For each of the three conference themes, two other members of the Program Committee invited speakers to give overview papers and organized the contributed papers. Becky Johnson and Reed Noss were responsible for the "Science for Understanding Wilderness in the Context of Larger Systems" theme. David Graber and Marty Lee were responsible for "Wilderness for Science: A Place for Inquiry." Jan van Wagtendonk and Dorothy Anderson were responsible for the "Science for Wilderness: Improving Management" theme. Bill Borrie and Alan Watson coordinated the poster session. Joan Brehm and Christine Ross from Continuing Education, The University of Montana, handled the lion's share of detailed logistical arrangements, making sure the conference ran smoothly. The Rocky Mountain Research Station, Forest Service, provided the majority of funding for publishing the proceedings.

Planning Committee

Joan Brehm, Center for Continuing Education, The University of Montana; Perry Brown, School of Forestry, The University of Montana; David Cole, Aldo Leopold Wilderness Research Institute, Forest Service; Wayne Freimund, School of Forestry, The University of Montana; Stephen McCool, School of Forestry, The University of Montana; Connie Myers, Arthur Carhart National Wilderness Training Center, Forest Service; David Parsons, Aldo Leopold Wilderness Research Institute, Forest Service.

Program Committee

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Sponsors

Aldo Leopold Wilderness Research Institute; Arthur Carhart National Wilderness Training Center; Bureau of Land Management; Forest Service, Research; Forest Service, Rocky Mountain Research Station; Humboldt State University, College of Natural Resources; National Outdoor Leadership School; National Park Service; Parks Canada; State University of New York, Syracuse, College of Environmental Science and Forestry; The University of Minnesota, Department of Forest Resources; The University of Montana, School of Forestry, Wilderness Institute; U.S. Fish & Wildlife Service; U.S. Geological Survey, Biological Resources Division.

Steering Committee Members

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National Outdoor Leadership School; Margaret Shannon, School of Law, State University of New York, Buffalo; Jack Ward Thomas, Professor, School of Forestry, The University of Montana; Hank Tyler, President, Natural Areas Association.

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