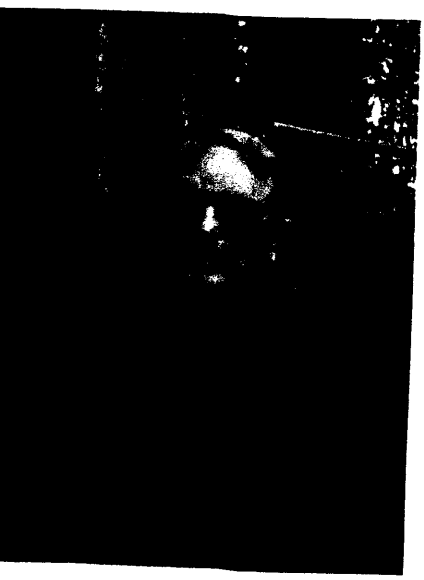
SCIENTIFIC ACTIVITIES IN WILDERNESS

A Workshop to Address Issues and Concerns

BY DAVID J. PARSONS

THE CONDUCT OF SCIENTIFIC ACTIVITIES (both research and monitoring) in U.S. wilderness, parks, and other protected areas presents a dilemma for both scientists and managers. Despite historic recognition of the value of protected areas as benchmarks against which to measure the effects of modern human activities (Leopold 1941; Beard 1960; National Research Council 1992), and explicit mention of the scientific values of wilderness in both The Wilderness Act of 1964 (TWA) and U.S. federal agency wilderness policies, managers frequently permit only those activities they judge to be critical to local management needs and which have no negative effect on the resource or user experiences. Such tight control has made many scientists reluctant to undertake activities in protected areas (Franklin 1987). As a result, opportunities to obtain the understanding necessary to assure long-term ecosystem sustainability and to obtain the full benefits of protected areas as benchmarks may be diminished.

A workshop called "The dilemma of scientific activities in protected areas" was conducted on March 21, 1997, at the George Wright Society's 9th Conference on Research and Resource Management in Parks and on Public Lands held in Albuquerque, New Mexico, USA. Headquartered in Hancock, Michigan, USA, the George Wright Society is dedicated to fostering research and management of protected areas. The purpose of the workshop was to examine issues associated with the conduct of research and monitoring on wilderness and other protected lands. Workshop participants represented the perspectives of both scientists and managers. Examples of concerns, frustrations, and successes were presented along with a proposed framework to facilitate decision making.



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Background

David Parsons, director of the interagency Aldo Leopold Wilderness Research Institute (ALWRI) in Missoula, Montana, USA, introduced the workshop by briefly reviewing the value of protected areas to science. For many years the designation as park, wilderness, or preserve was considered adequate to "protect" an area from change; "nature" could be trusted to take care of itself (Graber 1995). Management was largely limited to controlling fire, predators, pests and disease, or visitor use levels and impacts. Scientific benefits accrued largely from limited natural history observations and collections.

Only relatively recently have scientists come to recognize that natural ecosystems are dynamic entities, largely dependent on and responsive to periodic disturbances (Christensen 1995). Impacts of human activities, including the spread of exotic species, air pollution, recreation use, and habitat fragmentation, have become increasingly recognized as threats to the integrity of natural ecosystems (Cole and Landres 1996). Such recognition has led to the need to better understand and, in some cases, actively manage wilderness ecosystems (Christensen 1988). The decision on whether and how to manage these ecosystem requires information of the kind that often can only come from scientific study. Information on relatively undisturbed ecosystems has also proven critical to understanding the impacts of modern human activities on basic ecosystem properties (National Research Council 1992). Scientific activities often require instrumentation, manipulation, special access provisions, or result in other biophysical or social impacts that run counter to the perception of "wilderness."

Wilderness managers are thus faced with the dilemma of how to encourage scientific activities without destroying the resources and values an area was established to protect. They must decide what scientific activities are necessary and appropriate and how the benefits of improved understanding can be balanced against the impacts of obtaining the information. They are often asked to pass judgment on research proposals designed to provide information critical to issues extending far beyond their local areas. However, these managers are frequently not trained in science and do not have the ability to evaluate the importance of the data to be collected, the accuracy of data required, or the quality of the science proposed.

Despite recognition of the importance both of science to wilderness and wilderness to science (Brower 1960; Franklin 1987; Graber 1988), many scientists view parks and wilderness as inhospitable to their interests. Concerns include a perceived hostility to manipulative research, lack of security due to frequent administrative changes, and a lack or inconsistency of clear policy guidelines (Franklin 1987). Scientists frequently perceive a lack of appreciation for the value and importance of science. Stories of frustrations in negotiating with agency bureaucracies to receive permission to carry out research in protected

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areas are not uncommon (Eichelberger and Sattler 1994).

A lack of consistency in policies and practices related to wilderness science within and between the federal land management agencies presents challenges for both managers and scientists. Little direction is provided on how decisions should be made or on the importance and appropriateness of science activities. Similarly, little direction is available to scientists regarding the expectations and concerns of agency managers. As a result, managers and scientists often find themselves in conflict: Neither understands the perspectives or priorities of the other. Clearly, there is a need to bring management and science into a partnership. Improved communication and mutual understanding of values and needs are essential if the best possible science is to be available upon which to base future decision making.

Aquatic sampling in a high mountain lake. Photo by David J. Parsons.

A Manager's Perspective

A manager's perspective on scientific activities in wilderness was presented by Linda Merigliano, natural resources specialist for the Bridger-Teton National Forest in Jackson, Wyoming, USA. Linda sees the role of the wilderness manager as managing human activities (including science) to ensure the spirit and intent of TWA are met. To her, this requires that managers evaluate each scientific proposal by asking: (a) Is the research necessary to meet wilderness objectives? (b) Can the research be done outside wilderness? and (c) If the research is necessary and can't be done outside wilderness, how should it be carried out to have the least impact?

Linda suggested that impacts be evaluated on the biophysical resource (e.g., effects of soil pits or increment cores), on the experiential resource (e.g., impacts of visitor surveys or the viewing of equipment), and on the resource of "wildness" itself (e.g., the use of high-tech equipment). Impacts on wildness are the most challenging to assess as they revolve around questions about the value of the unknown and the preservation of primitive skills. Linda saw a key question as being, "How far should we deviate from 'wildness' to accommodate science?" She emphasized that such questions focus largely on values, including how "wild" we want wilderness to be. Such questions address some of the most fundamental issues regarding the role of wilderness in society (for example, as Linda asked, "If visitors don't complain, is it OK?").

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A Scientist's Perspective

The perspective of an academic scientist was presented by Tom Swetnam, associate professor at the Laboratory for Tree-Ring Research at the University of Arizona. Dr. Swetnam reviewed his own experiences with fire history research in wilderness and parks. He recognized that his work can include potentially significant and long-lasting impacts (e.g., destruction of snags or use of chain saws to remove fire scar wedges from downed trees) that push the envelope of acceptability. He has justified the need for such techniques as, at times, being the minimum tool necessary to obtain the quality of data required to fully understand past fire regimes, allowing for the development of management prescriptions to assure the long-term preservation of an area. He has been frustrated by the inconsistent response of agency managers to requests to conduct fire history research. It is his perception that approval or denial depends more on personal philosophies of individuals than a consistent definition or application of policy.

Dr. Swetnam argued that the scientific and educational values addressed in TWA deserve more explicit recognition—even equivalency with other values (e.g., recreation). He argued that science, by informing and guiding management, is necessary to assure long-term preservation and sustainability. He also argued that impacts resulting from scientific studies need to be placed in the context of others that are often more routinely accepted in wilderness (e.g., wildfire suppression techniques). He is most concerned by what he sees as an inconsistency in policy interpretation both between and within the wilderness agencies. He is also concerned with what he sees as a lack of understanding of the scientific and educational

uses of wilderness and their importance to ecosystem management and restoration.

A California Case Study

David Graber, senior scientist for the National Park Service at Sequoia and Kings Canyon National Parks in California, USA, reviewed several examples of scientists and managers successfully working together to develop mutually beneficial objectives and acceptable approaches. The success of Sequoia and Kings Canyon National Parks in encouraging, facilitating, and benefitting from cutting-edge research in such areas as air pollution and acid deposition effects, fire history and ecology, seismic geology, and wildlife studies has been widely recognized (Tonnessen 1992). These parks utilize a process for documenting and evaluating the benefits, impacts, and potential mitigation actions of proposed scientific activities in designated wilderness (Parsons and Graber 1991). This process has resulted in denial of permission to conduct activities judged not to be beneficial enough to merit the expected impacts. It has also led to approval of selected proposals to gauge stream flow, dig soil pits, use chain saws to extract fire scar wedges from dead trees, and utilize helicopters for equipment transport. Dr. Graber emphasized that these decisions, although probably affecting experiences of some wilderness visitors, are justified by the long-term benefits of the scientific knowledge obtained.

Experimental meadow clipping (herbage removal) studies. Photo by David J. Parsons.

Much of the success of the Sequoia and Kings Canyon process can be attributed to efforts by the staff in these parks to bring managers and scientists together at the early stages of problem identification and planning. This interactive dialog assures that scientists understand the needs and concerns of agency managers and that managers understand the options and potential impacts for acquiring the desired information. In most cases such dialog has resulted in an understanding and cooperation that assures all parties are involved in the decision-making process. The physical presence of a park-based science staff, once common in the National Park Service, has helped in the facilitation of such information exchanges.

Research Proposals Considered

In recognition of the lack of clarity and consistency in the application of guidelines for evaluating scientific activities among the four federal wilderness management agencies, Peter Landres, research ecologist with the ALWRI, proposed a process for considering research proposals. Dr. Landres proposed a structured set of issues and questions to guide the comprehensive evaluation of scientific proposals by weighing the negative impacts (both social and biophysical) of the proposed work against the potential benefits of the information to be obtained. The proposed process will not provide cookbook answers, rather it will provide a thought process to facilitate decision making.

The proposed process is based on four basic premises: (a) every activity (including science) in wilderness causes some impact, (b) evaluation decisions need to consider tradeoffs between benefits and impacts, (c) a structured set of questions ensures that both benefits and impacts are fully considered, and (d) the proposed process will allow the merits and detriments of the decision to be openly and fully discussed.

To evaluate scientific proposals, managers should try to answer four questions: (1) What is the legal and policy context for the land unit? (2) What is the issue of concern to the land unit? (3) What are the benefits of the proposed studies? and 4) What are the potential impacts of the proposed activities? A suggested means for weighing benefits against impacts in a two-way matrix was presented as a way to facilitate decision making. Activities that create no impacts should be easy to approve (even if there are no direct or discernable benefits; [Graber 1988]). Activities with significant impacts but no discernable benefits would most likely be denied.

Those activities for which both benefits and impacts are anticipated will require more in-depth analysis. This analysis will include considering benefits to the individual wilderness and local managers, benefits to all wildernesses and to the National Wilderness Preservation System, benefits to national-level policy makers and to all lands managed for their natural amenity and commodity values, and society-at-large that benefits from these values. Analysis of impacts will include evaluating both ecological and social effects of the proposed scientific activity. Dr. Landres suggested that understanding who and what benefit from the research and what these benefits are will help the decision maker evaluate the desirability of specific activities. This approach should facilitate consideration of benefits beyond the specific area in question.

Summary and Conclusions

The workshop presenters and participants agreed that scientific studies are critical to guide management decisions, evaluate the effectiveness of management actions, understand how natural systems work, and improve understanding of people's relationships to nature and the benefits that people and society accrue as the result of such relationships. The dilemma comes in deciding how such benefits should be weighed against the impacts—biophysical and social—that occur from the conduct of the investigations. It is clear that

there are varying perspectives on just how the value, appropriateness, and thus necessity of such activities should be evaluated.

The idea of increased communication between scientists and managers, coupled with a process to facilitate evaluation of benefits and impacts, was endorsed by all in attendance as critical to resolution of this dilemma. The exchanges that occurred during and after this workshop, together with the process outlined by Peter Landres, appear to be productive first steps in this resolution. The ALWRI will continue to provide leadership in addressing these issues by working with the land management agencies in refining policy interpretations and guidelines, working with the scientific community to improve understanding of concerns and constraints of the management agencies, and refining the proposed process for evaluating scientific proposals. As was stated by David Brower nearly 30 years ago, "Wilderness is necessary to science, and science is necessary to preserve the wilderness" (Brower 1960). **IJW**

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Paleoecological sampling of meadow sediments for pollen, plant macrofossils, and charcoal. Photo by David J. Parsons.

REFERENCES

Beard, Daniel B. 1960. Plants and animals in natural communities. In D. Brower, ed. *The Meaning of Wilderness to Science.* San Francisco: Sierra Club:3–17.

Brower, David, ed. 1960. *The Meaning of Wilderness to Science.* San Francisco: Sierra Club.

Christensen, Norman L. 1995. Fire and wilderness. *IJW,* 1 (1):30–33.

Christensen, Norman L. 1988. Succession and natural disturbance: paradigms, problems, and preservation of natural ecosystems. In J. K. Agee, and D. R. Johnson, eds. *Ecosystem Management for Parks and Wilderness.* Seattle: University of Washington Press:62–86.

Cole, David N., and Peter B. Landres. 1996. Threats to wilderness ecosystems: impacts and research needs. *Ecological Applications,* 6 (1):168–184.

Eichelberger, John, and Allan Sattler. 1994. Conflict of values necessitates public lands research policy. *Eos, Transactions, American Geophysical Union, 75* (43):505–508.

Franklin, Jerry F. 1987. Scientific use of wilderness. In R. C. Lucas, comp. *Proc. of the National Wilderness Research Conference: Issues, state-of-knowledge, future directions,* USDA Gen. Tech. Report INT-220:42–46.

Graber, David M. 1995. Resolute biocentrism: the dilemma of wilderness in national parks. In M. E. Soule, and G. Lease, eds. *Reinventing Nature?* Washington, D.C.: Island Press:123–135.

Graber, David M. 1988. The role of research in wilderness. *The George Wright Forum,* 5 (4):55–59.

Leopold, Aldo. 1941. Wilderness as a land laboratory. *The Living Wilderness,* 1 (1):3.

National Research Council. 1992. *Science and the National Parks.* Washington, D.C.: National Academy Press.

Parsons, David J., and David M. Graber. 1991. Horses, helicopters and hi-tech: managing science in wilderness. In P. C. Reed, comp. *Preparing to Manage Wilderness in the 21st Century,* USDA Gen. Tech. Report SE-66:90–94.

Tonnessen, Kathy. 1992. Anatomy of a success. *Courier* (September):18–19.