

ALWRI PROGRAM OF WORK: Science Delivery and Research Application

Problem Selection and Justification: (extracted from the Leopold Institute's Program Charter)

Problem 5. Improve delivery and application of scientific knowledge and tools pertinent to wilderness stewardship.

Federal land management agencies have long recognized the importance of incorporating scientific knowledge into management planning and implementation efforts. However, both managers and researchers have struggled to identify effective processes for doing this. Whereas scientists work to make their studies useful and available, it can be difficult to know exactly which managers need certain information, when they need it, what format is most useful, and what communication avenues are most effective. Managers also have limited time to search for research results, can be overwhelmed by a plethora of potentially relevant information, and have a variety of individual and organizational factors that influence how they learn about science and how they incorporate science into management. Facilitating the delivery and application of wilderness research can be especially challenging because wilderness management includes a broad range of ecological and social topics about which managers, policymakers, and the public must be knowledgeable, and many wilderness management problems require an in-depth understanding of interdependent resources. Additionally, wilderness information needs and communication networks vary among the four federal agencies that manage wilderness as well as other individuals and organizations interested in wilderness stewardship.

The Leopold Institute is dedicated to helping scientists and managers achieve effective delivery and application of scientific knowledge and tools developed through the Institute. Delivery efforts of individual scientists usually focus on specific results and concepts, often in response to requests by management units. Institute scientists do not have time to distribute and interpret all of their past research, other relevant research, or provide information to all target audiences. Consequently, the Leopold Institute has developed a dedicated Research Application Program (RAP) to complement the efforts of Institute scientists and to strategically investigate, plan, and implement approaches for the effective delivery and application of a broad array of wilderness related scientific information to a variety of management audiences. Since its inception in 2000, the RAP has summarized and synthesized research on a variety of ecological and social wilderness issues, developed an extensive web site, and begun investigating barriers to science delivery and research application. Barriers to the integration of science into policy and management include users not knowing what information is available or where to find it, cultural and communication differences between researchers and research users, and limited capacity to access, evaluate, and apply new research. In order to improve the effectiveness of science delivery and application efforts, the RAP will continue to investigate influences on the awareness, understanding, and use of science and to understand target wilderness management audiences across agencies, resource program areas, and administrative levels. Beneficiaries include managers who actively search for research as well as those who receive it through formal and informal communication networks. Other scientists and research application specialists will

also benefit from a greater understanding of target management audiences and influences to the success of science delivery and application. Full development of this problem will depend on continued availability of funding from partner agencies and programs.

Element 5a. Facilitate access to scientific knowledge and tools by compiling, summarizing, and organizing scientific resources.

Managers can inform decisions with current and relevant scientific knowledge only if they can locate such information when they need it. However, a plethora of available research, much of which is published in scientific journals that managers rarely have time to read, makes it increasingly difficult to find information relevant to specific management questions. Additionally, managers frequently express that increasing workloads and time are their biggest barriers to locating scientific information. With limited time to wade through scientific publications, managers may not be aware of relevant research and how it fits into their management objectives. To date, we have developed searchable databases of Institute publications and projects; compiled and organized internal and external research in the *Linking Wilderness Research and Management* series of reading lists; and developed brief summaries of both completed and ongoing Institute research projects that direct readers to project objectives, management implications, and associated products. We propose to continue to compile, summarize, and organize research on a variety of topics important to wilderness management. By working directly with scientists, we can better articulate how individual studies fit within a broader context of wilderness research and assure that research application products are scientifically accurate.

We propose to:

- Maintain and expand the Leopold Institute web site to facilitate access to scientific resources related to wilderness research problems. Output: those searching for information in these problem areas will be able to efficiently locate relevant scientific resources.
- Prepare and publish summaries and syntheses of scientific information on high priority wilderness management topics, and make them available through the Institute web site. Output: summaries of key wilderness issues will make it easier for readers to determine what research has been done on a particular topic and to determine the relevance of specific publications; easy-to-read summaries will help readers determine whether to delve into specific scientific publications.
- Develop searchable databases that compile information from a variety of sources, and make them available through the Institute web site. Expand existing databases to address additional issues and to include updated information. Output: increased awareness of available data and resources; increased communication among managers and researchers who use the databases and realize they are addressing common issues.

Element 5b. Improve awareness and understanding of scientific information through proactive delivery and communication.

Many people do not have time, and some do not have the skills, to search for scientific information. Consequently, research and research application products will only be useful to those who actively search for and find them. We propose to improve awareness and understanding of relevant science through actively communicating and distributing research and research application products. As a result, managers will be more likely to be aware of pertinent scientific information when they need it.

We propose to:

- Develop and maintain relationships with managers responsible for wilderness, with an emphasis on the national and regional program leaders in the four federal wilderness management agencies and agency representatives at the Arthur Carhart National Wilderness Training Center. Participate in meetings and conference calls to share information about new resources and ongoing scientific efforts relevant to wilderness stewardship. Output: new research findings and tools will be available to be incorporated into national wilderness training courses and materials; increased awareness of wilderness research findings.
- Use electronic media to distribute updates about new Leopold Institute research and application products. Output: managers will become aware of products when they come out. This will also result in increased awareness of the Leopold Institute as a resource for scientific information.
- Provide guidance to scientists interested in developing “technology transfer plans” to increase the rate of adoption of specific research products by target audiences. For example, decision support tools that require additional training are not likely to be used without planned and targeted technology transfer. Output: increased awareness, understanding, and use of specific research products.
- Translate scientific findings to semi-popular formats for agency, web and other publications. Publish semi-popular articles or news briefs about wilderness research activities and products. Outputs: increased awareness of specific research and research application products; exposing casual readers to relevant research products may stimulate them to actively search for more information.

Element 5c. Investigate influences and develop improved approaches for effective science delivery and application.

Research application and technology transfer efforts often are based on the assumption that making information accessible and increasing awareness will lead to the adoption and use of scientific resources. However, there are a variety of reasons why individual managers may not know about or use these resources. There is a wealth of knowledge in communication studies, organizational theory, decision theory, social psychology, adult learning, and other

social disciplines that can provide insight into barriers that limit agency capacity to integrate science at both individual and organizational scales. This literature is dispersed throughout a variety of social science disciplines and has not been synthesized and integrated effectively to improve science delivery and application. There are relatively few precedents, guides, or proven methods for improving the ability of managers to access and use scientific knowledge. As a result, science delivery approaches are often developed on an ad hoc basis without an overall understanding of the entire research application process, without addressing cultural and communication barriers between researchers and managers, or addressing organizational capacity. There has been little formal strategic effort in either the research or management communities to address fundamental barriers to effective science delivery or application. Strategic questions include: “What influences whether delivery translates into awareness and use?” and “Are there ways science can be delivered to achieve more effective application?” We propose to use knowledge from social science disciplines and empirical investigations to evaluate existing delivery and application approaches and develop strategies for improving the communication of available research results to target management audiences. While the focus will be wilderness research application, this effort will contribute to the understanding and assessment of a growing innovative effort within federal agencies to span boundaries between management and research.

We propose to:

- Explore the underlying technical and social mechanisms that influence how and when agency managers apply new scientific knowledge and approaches, with an emphasis on understanding target management audiences with wilderness responsibility. Knowledge of how communication, organizational, decision, psychological, and adult learning theories apply to management audiences in different agencies and different resource program areas will result in more effective science delivery and application for these audiences. Output: increased knowledge of barriers to the effective delivery and application of science; recommendations to help researchers, upper level managers, and research application specialists prioritize limited science delivery resources.
- Network with other federal research application and technology transfer specialists to identify, evaluate, and promote effective research application methods, tools and techniques. Output: increased efficiency and reduced redundancy in researching or trying new approaches, across units and across agencies; increased partnerships among federal research application and technology transfer specialists.