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Guide to Effective Research-Management Collaboration at Long-Term Environmental Research Sites

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Cover

These images represent some of the variety of ecosystems and human engagements in long-term, Forest Service research properties across the country.
Photos by Forest Service staff.

Abstract

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The Forest Service system of experimental forests and ranges (EFRs) and other sites of long-term silvicultural, watershed, and ecological research have contributed to science and natural resource management for more than a century. An important aspect of the success of EFR programs is strong collaboration between the research and land manager communities. This guide offers suggestions for effective research-management partnerships based at EFRs and other long-term research sites. Keys to success include mutual understanding and respect, shared commitment to learning, and joint projects and communications programs.

Keywords: Experimental forests, experimental ranges, adaptive management, guidelines for management, technology transfer.

Purpose of this guide

This guide is intended to help build strong relationships between researchers and land managers, especially, but not exclusively, for those who work in connection with lands dedicated to long-term study. It is the hope that better relationships will lead to more effective and efficient natural resource management and research studies. This guide seeks to provide a balanced look at the roles of researchers and land managers and to provide ideas for reducing problems that can occur on jointly managed properties and programs, increasing the quality and relevance of studies, and enhancing the transfer of research results. This guide is not meant to apply only to the Forest Service or only on national forest land. Although this guide focuses on EFRs, it is meant to pertain to all sites of place-based study, including research natural areas and one-of-a-kind designations, such as the Mount St. Helens National Volcanic Monument, Washington and the Glacier Lakes Ecosystem Experiment Site, Wyoming, or even on lands with no special designation.

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Introduction

For a century, the Forest Service network of experimental forests and ranges (EFRs) and other sites of place-based study, including long-term research, have proven to be vital sources of new knowledge for science and management of the Nation's forest, grassland, and water resources. From its simple beginning, in an exchange of notes between Gifford Pinchot and Raphael Zon in 1907, to the present system of approximately 80 EFRs, the Forest Service has built a system of long-term records of environmental change, carried out applied studies to support natural resource management, and conducted basic research. The continent-spanning distribution of EFRs (fig. 1) has well served their initial objective of developing new management systems and restoration strategies for forests, ranges, and watersheds in the context of local circumstances (Lugo et al. 2006, USDA Forest Service 2009). The EFRs have been the sites of important discoveries with wide-ranging impact, such as recognition of acid rain, the ecological characteristics of old-growth forests, and long-term outcomes of different silvicultural practices. Increasingly, and into the future, the geographic spread of the EFRs position them to function as sentinels for environmental change and a foundation for science to help mitigate and manage effects of global change on natural resources. The history and current status of EFRs are described in Adams et al. (2004), Lugo et al. (2006), an EFR poster (USDA Forest Service 2008), EFR success stories (USDA Forest Service 2009), and EFR Web pages at Washington office, station, and individual EFR levels (http://www.fs.fed.us/research/efr/).

Differences in culture and mission, however, make work at the research-management interface challenging (USDA Forest Service 1997). Managers tend to work on shorter time horizons, seek the best solution to local problems, and operate with greater public scrutiny and less freedom to let curiosity guide their work. Researchers tend to take a longer and broader view, value open debate about ideas, and are rewarded for publications and other achievements in a system of peer review. The mission of managers is to manage natural resources in a legal and socially acceptable manner; scientists strive to develop new knowledge using the tools of science. But, together researchers and managers share the objective of learning how natural systems work and how they can be managed sustainably to meet human needs.

The long-term, place-based work at ERFs and similar sites has been an important foundation for research-management partnerships. Responsibilities for conducting important long-term studies of subjects like basic ecological processes,

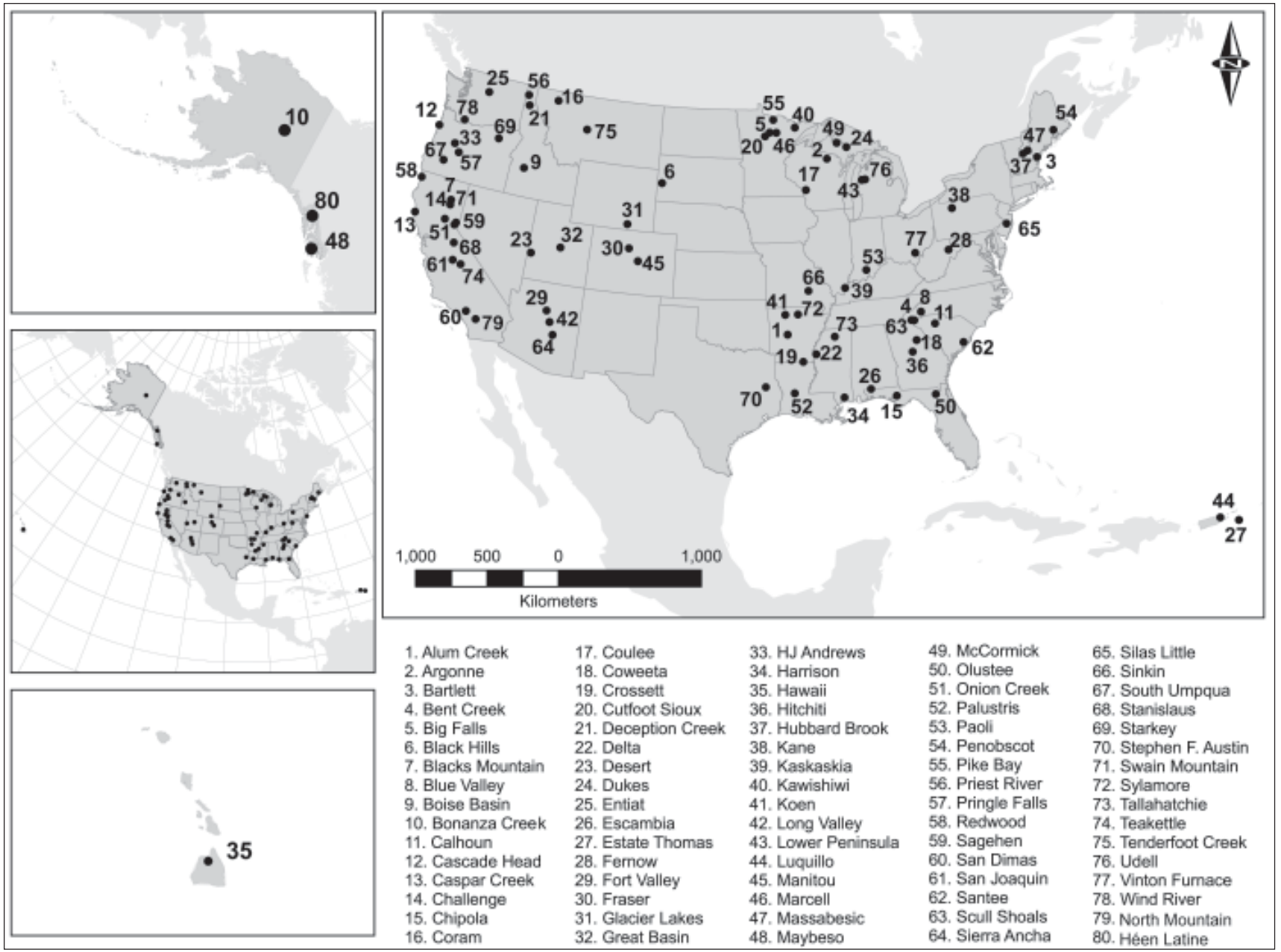

Figure 1—Experimental forests and ranges. Note that this guide also pertains to research-management collaboration associated with other long-term research properties, such as Mount St. Helens National Volcanic Monument and research natural areas not shown on this map.

silviculture, hydrology, fish and wildlife ecology, and landscape management can be shared by researchers and managers. Shared communications programs can facilitate exchange with many other groups, including fellow land managers and scientists, students, policymakers, general public, forest landowners, and the media. These common activities can build strong personal and institutional relationships that support the collaborative search for solutions when problems or potential conflicts arise.

This guide builds on the fine work summarized in a publication from the 1994 and 1996 meetings held at the Rensselaerville Institute in New York (USDA Forest Service 1997). Set in the context of a series of one-time, bioregional assessments and planning efforts, discussions at these meetings arrived at 13 guidelines for effective collaboration among managers and researchers in the Forest Service (see box). This guide expands on these general principles to address challenges that accompany management of long-term research properties.

Guidelines for research-management collaborations (modified from USDA Forest Service 1997). See the original publication for elaboration.

1. Build close personal relationships.
2. Understand cultural differences.
3. Pick the right person as a collaborator.
4. Invest in joint arrangements.
5. Collaborate in planning for the future.
6. Share responsibilities for identifying issues and involve both researchers and managers early and often.
7. Develop an organizational structure for collaboration.
8. Staff the interface with a liaison individual or team.
9. Bring in new staff interested in partnership work, including hiring in both research and management organizations.
10. Provide sufficient time and resources to address the issues that are identified.
11. Develop and implement a charter that commits research and management to address shared issues.
12. Clearly identify roles and responsibilities.
13. Develop a communications, public involvement, and media plan.
14. Specify legal and policy constraints.
15. Capture and share lessons that are learned.

Mission and Authorities of Experimental Forests and Ranges

The place of research on the land and within the Forest Service as an agency has evolved over the past century. Research on national forest lands has roots in the first studies initiated in 1908 at places now known as Fort Valley Experimental Forest, Arizona and Wind River Experimental Forest, Washington. Passage of the McSweeney-McNary Act of 1928 and its implementation by the 1930 Regulation L-20—Experimental Forests and Ranges, Natural Areas and Primitive Areas, gave research a recognized separation from national forest administration. This act provided for the establishment of a network of experiment areas that would be dedicated and used for research. It was under this policy that most EFRs have been established. This direction was reaffirmed with the passage of the Forest and Rangeland Renewable Resources Research Act of 1978, which authorizes the Secretary of Agriculture to "establish and maintain a system of experiment stations, research laboratories, experimental areas and other forest and rangeland research facilities."

Forest Service code of federal regulations 36 CFR 251.23 set forth broad direction for establishing and administering experimental forests, ranges, grasslands, and watersheds. General authorities and responsibilities based on these regulations can be found in Forest Service Manual 4062, which under Objectives (4062.02) states, "Experimental forests, ranges, grasslands, and watersheds provide lands for conducting Research and Development that serves as a basis for the management of forests and rangelands." The planning process provides an excellent opportunity for research and management to review issues and together develop general direction and standards and guides that protect these valuable research assets. In some cases, it may be useful, if not essential, to have planning documents signed by both Research and Development and National Forest System leaders.

Some issues present significant challenges in interpreting the mission and authorities for land-use practices and research studies at EFRs. Although the importance of EFRs is very clear in the legislative and regulatory record, assignment of administrative responsibilities has been somewhat ambiguous. This ambiguity has sometimes led to decisions by land managers about nonresearch use on EFRs that have disrupted current studies and restricted future research. Also, the need for learning and research may recommend use of practices that deviate from the current management standards and guidelines for national forest lands. That can cause anxiety for managers who, more often than researchers, must deal with

public scrutiny of what happens on federal land. Dealing with that scrutiny requires flexibility on the part of management staff and knowledge about the goals of the research. On the other hand, the research community may need to flex in cases where issues that have been seen only as threats to long-term field studies may also need to be embraced as new subjects of research, such as effects of urban encroachment and invasive species. Consequently, interpretations of mission and authority for EFRs will likely evolve as the issues of concern to researchers and managers change over time in an ever-shifting societal context at a range of scales. Flexibility in approaches, good communication, and cooperation are essential for EFRs to sustain the values and successes of the past 100 years.

Research and Management Relationships and Roles in Collaborative Efforts

The strength of relationships between managers and researchers reflect two main factors: (1) the level of mutual understanding of various authorities related to management of research properties and (2) the interest of the involved parties in working together for common goals. The resulting partnerships can be viewed at five levels of collaboration. In the worst case, active antagonism and conflict may exist between the two groups, although this is extremely rare and may reflect misunderstanding and differences in culture. A second, more benign relationship involves ignorance and obliviousness of one another, which commonly stems from profound differences in roles and workplace culture. The third case is a neutral relationship in which managers and researchers operate quite independently, but information does flow through standard technology transfer paths. A fourth, more advanced stage of collaboration has researchers and managers helping each other to do their respective jobs, and technology transfer is an important means of interaction. Fifth, in a very intensive partnership, each group assertively seeks ways to help the other with their duties, and together the partners conduct shared studies that are mutually beneficial. They also together conduct communications events, such as field tours, and workshops, and produce communication products such as publications (fig. 2). Attention to serving the diverse users of findings that result from the partnership can intensify the collaboration.

The traditional “technology transfer” model of research-management relationship implies that science products take the form of “technology,” which is transferred from scientists to managers via one-way communication. In this model, scientists develop hypotheses, design and conduct studies, publish results; and then

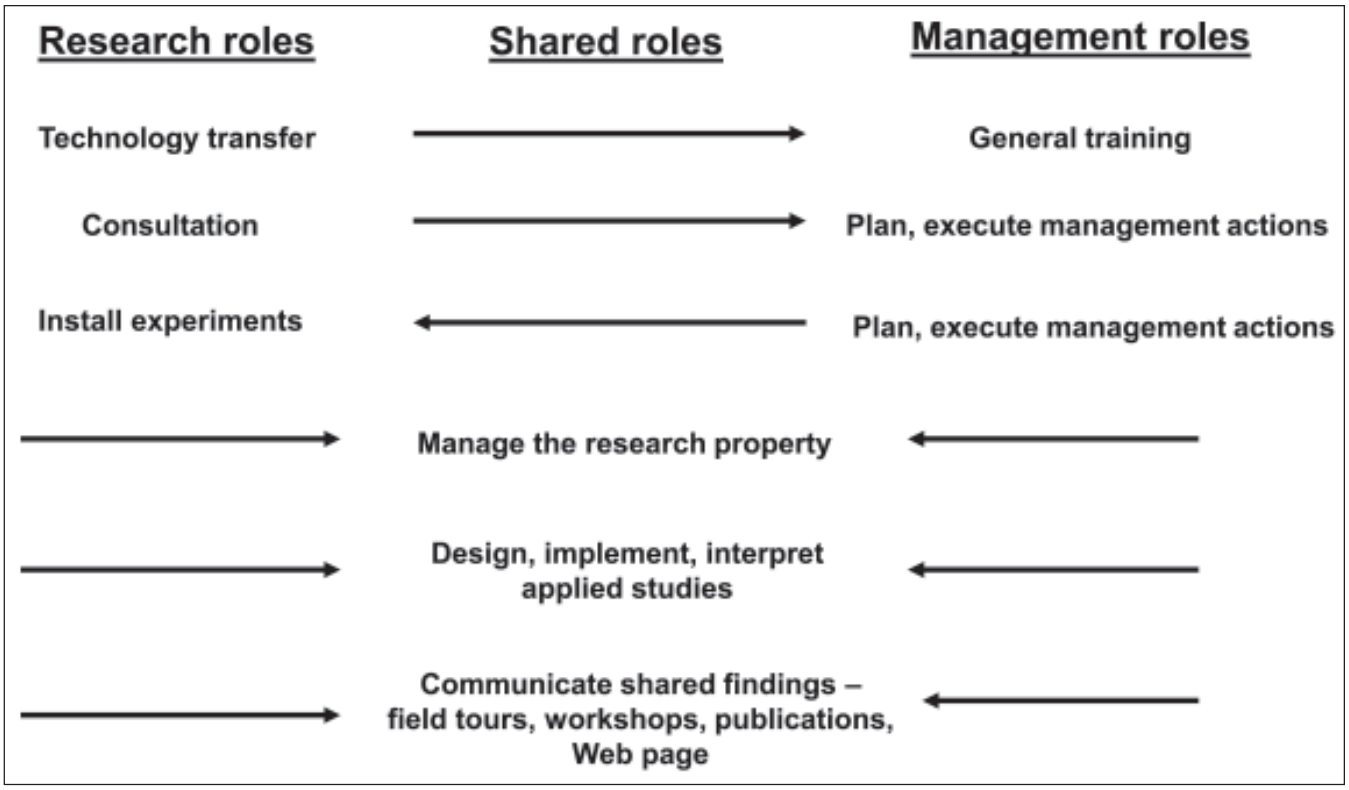

Figure 2—Roles of research and management in a highly collaborative partnership.

managers receive the information via technology transfer products, and adjust management accordingly. In more intensive partnerships, each community helps the other accomplish their respective tasks and work collaboratively to carry out shared tasks, including some with learning objectives that involve distinctive roles in a common setting. This high level of partnership is the essential setting of a strong adaptive management program, which requires constant feedback between management and research.

Roles of Management

The management organization generally has day-to-day responsibilities for routine management of lands where research is carried out. These responsibilities can differ depending on agreements between research and management, but usually include activities like road maintenance, law enforcement, fire management, recreation, and other activities for which it may not be logical or efficient for research to duplicate the capability.

Research is often dependent on national forest personnel to conduct environmental analyses for research projects, and scientists frequently use management projects, such as timber sales and stream restoration work, to conduct research projects. In some cases, it may be possible to use cooperative funds from national forest projects to install studies. Historically, it was possible to use funding from Knudson-Vandenberg (funds derived from timber sale receipts), brush disposal, coop funds like road maintenance deposits, and similar sources; other, more current or innovative approaches are now needed, such as stream restoration or hazardous fuels reduction treatment funds where appropriate.

Management may also participate in framing research topics and approaches. The world of the land manager brings specific information needs and a breadth of perspective that may lead to better, more integrated science studies than would occur otherwise. The management world demands integrative thinking across a broad range of issues, which often contrasts with the tendency of the science culture to narrow the focus of research questions. By quickly adopting and adapting new science findings, managers can help improve research outcomes because researchers can immediately see real-world implications of their studies and modify the study and interpretations, if appropriate.

Roles of Research

A critical role of researchers is to frame questions in a manner that can be addressed by using the methods of science, including experimentation, and that contributes to the larger science enterprise. Researchers generally direct implementation of studies; analyze, archive, and interpret the data; and report results in the scientific literature. In the standard technology transfer model, researchers are expected to deliver findings to managers and the science community in a timely, understandable, and useful manner. Applied studies, of course, have immediate usefulness, but scientists may also undertake basic studies whose usefulness may not be known for many years. Where a strong research-management collaboration exists, results of research can be implemented well before any publication, thus speeding up the incorporation of research in management practice and more quickly improve on-the-ground resource management. Just as some management issues can help researchers think in broader, more integrative terms, researchers can help managers understand how research methods determine the range of inference, how uncertainty applies to a given result, and the tradeoffs that must be considered.

Shared Roles

A common issue across the system of EFRs is management of the properties—roads, facilities, trails, other aspects of field access, roadside salvage, fire management, pesticide use in experiments or for control of invasive species, and many other matters. Some of this work involves infrastructure, and some involves experiments themselves. Various administrative chores may be involved in organizing responsibilities for this work, including development of special use permits, memoranda of understanding, site operating plans, and similar documentation. The particulars of responsibilities among these infrastructure and administrative tasks differ from location to location, but amicable agreements are an essential foundation for the work that affects the land and society.

The shared development and conduct of studies can result in shared learning through projects conducted jointly at the research-management interface. These may involve projects that can be accomplished only through a cooperative effort. Roles within such projects may be distinguished; for instance, experimental design, data management, and analysis may be the responsibility of researchers, while experimental manipulations and field data collection may be done by management staff. Continuing discussions between managers and researchers may lead to modifications of the study design (e.g., supplemental components of the study to address new, but related questions) that may benefit either researchers or managers or both. Communicating the findings from collaborative studies is likely to be a shared responsibility, which is strengthened by the common vision of people who bring quite different perspectives to the project.

A key shared role is to find the optimum speed for adoption of new findings in management. The traditional technology transfer approach has been criticized for being very slow, whereas a tight partnership may run the risk of prematurely adopting new science findings. The critical issue is timing—when is a new idea ripe for adoption? The answer to optimum learning and improvement of resource management is a balance of uncertainties about the state of science and its transferability into management. This transfer sometimes involves willingness on the part of researchers and managers to take reasonable risks. An intermediate step may be useful, such as larger scale demonstration projects, before wide adoption of a new practice.

In addition to project-specific communications, a research-management partnership may also host public forums on topics of general interest to managers and

the public. These may occur as field tours or workshops that may take the form of a continuing dialogue with the public concerning the future of resource management in the region. In these contexts, managers and researchers can demonstrate how new findings can be applied in a real-world setting.

Benefits

The benefits of strong, effective, productive collaborations accrue to all concerned: managers, scientists, the land, and society as a whole. Each of these groups derives benefits distinctive to its roles.

Scientists find it rewarding to see their work used in a real-world context. Science projects benefit from the knowledge of managers who have a great deal of field and other experience. Ideas for new research and a push for more integrative thinking and studies may emerge from collaboration with managers. Involvement with managers and the public broadens the horizons of scientists.

Managers benefit from close collaboration with scientists because their proposed projects can be made more consistent with current science methods and findings, which is a requirement for federal natural resource management. Land managers' ideas about new approaches can be tested through studies conducted jointly with researchers. Research-management collaboration may also enrich the interaction with the public, which stimulates trust, an important foundation for the work of land managers. Also, some management specialists and line officers term themselves "science junkies" who enjoy being party to ongoing research.

Credibility of work is an important, shared benefit of close collaboration between scientists and managers. A continuing, place-based, research-management collaboration can develop management practices that have both science credibility and management credibility, so that when the policy window opens, we have good concepts and practices to deliver. Management credibility means practices are legal; economically, operationally, and environmentally feasible; and socially acceptable. Science credibility is founded on good experimental design, data analysis, and stringent peer review of plans, analyses, and communication products. Peer review should include land managers, who bring strong knowledge of ecosystems to the collaboration. The importance of strong collaboration is reinforced by the history of legal challenges that has brought the agency (indeed, any federal agency) to the point where research-grade monitoring is important so that management plans and practices are defensible in court and other venues of intensive, public scrutiny.

How to Do It—Suggestions for Building a Strong Research-Management Partnership

A key to successful partnership is having a shared commitment to the commons—the common land, common interest in learning, common program of work. At the core must be a strong commitment to the spirit of partnership. This requires creativity and openness to work across disciplines, across the research-management cultural divide, and with academics and the public. Common language and common experiences are part of the foundation. This all takes time—and if it's not happening now, now is the time to start.

These issues operate at personal, institutional, and public levels (see box on page 3). At the personal level, the guidelines are simple, but often ignored. Seek a friend on the other side. Appreciate the objectives, motivations, tasks, constraints, and reward systems of the other person and their home institution.

At the inter-institutional level, help one another get their respective tasks done. Carry out applied studies and communications programs at the interface of the management and research institutions (fig. 2). Long-term studies can be a valuable medium for cultivating long-term relationships. Staff the interface by designating a full- or part-time research coordinator/liaison position on the national forest or in the research work unit to help manage work and communications at the interface. However, this person does not have sole responsibility for communication and collaboration between research and management. Encourage multiple lines of internal communication channels and social networking, because communications redundancy can be helpful in complex situations where many points of view are involved and also buffer staff turnover. Hold regular meetings or other interactions to deal with day-to-day issues and build a strong base of interactions that will serve the collaboration when difficult issues arise. Regular meetings and field trips are a forum for taking a fresh look at ongoing work and generating ideas for new collaborative work.

Some dimensions of collaboration may benefit by formalization of a memorandum of understanding, study plans, a site operating plan, or other types of agreements. Formulating such documents is itself a collaborative process in part because roles are specified and they must mesh effectively. On EFRs, a "research land-use plan" may be a useful device for specifying control areas, historical experiments, primary field tour sites, areas for education activities where some level of site disturbance may occur, opportunities for future manipulative experiments, and other uses. Such designations may aid in protecting research installations, minimizing the human footprint in order to maintain future study options, concentrating

research activities to enhance potential for research synergies, and managing invasive species by concentrating the sites of most likely introductions.

Links with other personnel outside the collaboration, other institutions, and the public are critical to an effective partnership. External communications are strengthened when managers and researchers are elbow-to-elbow discussing their shared ideas and work with outside groups of other managers, scientists, media, public, and students. It is important to encourage engagement of academics, stakeholders, and other non-Forest Service people to broaden the perspectives and means of communication. These communications can become a continuing discussion of the future of forestry in the region via field trips co-hosted by managers and researchers. Repeating such public discussions helps managers and researchers get "on the same page," clarify their differences, and track change within the agency and its societal context.

Many interesting examples of these approaches exist across the EFR sites. We refrain from presenting specific case studies because approaches are quite context specific, often based on personal relationships, and may be transient. Nevertheless, the very differences in successful approaches are a testament to the array of options available to researchers and managers as they seek ways to work together; good communications is the key. The best way to find out about what works and what doesn't is to contact lead scientists and managers at EFRs and ask about successes and failures.

Closing Words

Building and sustaining collaborative relationships is challenging, yet valuable and rewarding work. This is true in all aspects of resource management and research. Research-management relationships are no exception. The challenges to strong, productive collaboration based at sites such as EFRs include differences in culture and mission, evolution of the participating institutions, turnover of workforce, change in administrative rules and interpretations of them, and change in societal context of land management.

Collaboration related to long-term research properties is especially important because of the magnitude of the work that occurs there, the visibility of the properties and programs, and the value of study results and their impacts on policy and management. The many examples of good collaboration associated with long-term research properties serve as models for what can occur more widely and create great benefits to the participants and society as a whole.

Working in strong collaboration is natural, because managers and scientists share a fascination and respect for these wonderful lands the public has entrusted to federal agencies. Strong collaboration builds credibility of both management and research in the public eye.

Our forests, rangelands, and watersheds face many uncertainties as a result of changing environmental and social forces. It is important to marshal all our capabilities to monitor and adapt. The need for strong collaboration in the context of these sites for long-term learning is greater than ever before.

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