

Translating Scientific Information into Park Management at the Operational Level

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FROM MY PERSPECTIVE, SOME-where in the mid-levels of the vast bureaucracy that staffs Yellowstone National Park, the major objective of park science is to improve park management. Much attention has been placed, from the Leopold Committee to the recent NPCA Commission on Science and Resource Management in Parks, on improving the science program and budget in the National Park System. Park managers have an on-going need for, and derive great benefits from, receiving up-to-date scientific information. While efforts to build stronger science programs for parks are commendable, we must also keep the practical goal in mind—**improved management of and for park resources.**

I suggest that the question today is not "Do we need more and/or better research?" so much as "Are we making the best possible use of the research we have?" How well do we translate it into operations at the park level? And, if we are not doing this as well as we can, how can we improve the transfer of good science into better management?

Applications of Research to Park Management

In reviewing the classic branches of park operations, I will cite some examples of how we have successfully applied results of the park research program to each. The first of the traditional park disciplines is **Resource Management** (often, as in Yellowstone, branched with Visitor Protection). This is the division that: a) protects resources from visitors; b) protects visitors from resources; and c) protects visitors from visitors. Under present NPS policies, our resource management activities by design are more

monitoring than manipulation. Where human activities disturb park resources, we are directed to, wherever possible, **manage the human activities rather than manipulate the resource.**

Thus, when research from 1984–86 indicated that hikers displaced grizzly bears from prime habitat in Yellowstone's Pelican Valley, modifications were made in the permitted hours of human use. We are using results from a recently completed study on the effects of winter recreationists on elk behavior and physiology to reconsider placement of skier trails in elk winter range, and to suggest limits on how close recreationists may approach ungulates. Research is currently underway to test aversive conditioning on grizzly bears that frequent undesirable sites, such as park roadside and developed areas. This may give us a new management tool to use on the animals when managing the human activity is insufficient or impractical. And we have used data from long-term monitoring and research of Yellowstone Lake trout populations to develop and modify fishing regulations that promote angling and yet allow natural predators first crack at fish at critical areas and times.

Maintenance is the second traditional branch of park operations. Some people think this is only critical for visitor service and convenience. Indeed, the maintenance staff cares for the superstructure of the parks, but they also play an ongoing and understated role in resource management in these types of ways: a) maintaining and stabilizing historic structures, such as at Fort Yellowstone; b) inspecting and maintaining water and sewerage

systems, storing fuel, and treating or removing solid waste; and c) directing ground-disturbing activities such as road-building, laying powerlines, building trail waterbars, and bulldozing firelines.

Few of us are involved with research relating to maintenance operations, because generally industries develop and refine techniques related to construction and engineering activities. However, park research has assessed the effects on park flora of leaching from treated and untreated wood, providing recommendations for future boardwalk path construction. Our fishery research indicates that certain kinds of road culverts allow for unimpeded fish migrations, and we need to apply this knowledge to modifying existing structures that block spawning trout from suitable habitats. Research and monitoring in park geyser basins indicates that laying new plumbing pipes affected thermal activity. This information is used in planning additions and revisions to park development areas. And, research tells us that the northern entrance road to Yellowstone was constructed in an area that always will be subject to natural slumping. In considering where to relocate the road in a more geologically suitable area, we also will make use of wildlife research and monitoring in order to minimize disturbance to the adjacent bighorn sheep winter range.

And finally, there is the **Interpretive** branch of park operations, whose aim, according to Freeman Tilden's classic work (1957), is: "through interpretation, understanding; through understanding, appreciation; through appreciation, protection"—the same goal to

which the Resource Management branch aspires.

Interpreters typically use research to acquire new information for campfire and other educational programs. We rely on current facts and implications to use in printed information, museum displays, and wayside exhibits, such as those newly designed to help interpret Yellowstone's fires of 1988. But parks are also using research to investigate visitor characteristics and preferences; results from such studies will help interpreters evaluate their programs' effectiveness, and help them tailor future activities to meet both park management objectives and visitor needs.

Improving the Connections

These are some of the ways research has benefitted park resource management operations. But we must also admit to experiencing in Yellowstone the same gap that can exist anywhere between research and management—a gap characterized by managers who fail to apply research recommendations, or, sometimes, even to be aware of them, and by researchers who are frustrated because their work goes unused by the managers they hoped to benefit. Are the people who need to hear and use the results getting them? As an example, the translation of those most basic facts and research results to the park staff: the Chief Scientist of the Park Service's Southwest Region suggested, in a keynote speech to the George Wright Society (1988), that it takes an average of 8 years for research completed in a park to get into its interpretive programs.

The diverse agencies managing lands in the Greater Yellowstone Ecosystem (GYE) and their inter-

ested publics have recently emphasized the need for more and better coordination between different jurisdictions. This has resulted in establishment of the Greater Yellowstone Coordination Committee, the Interagency Grizzly Bear Committee, and other such interagency working groups to discuss common interests in species such as elk, trumpeter swans, and bald eagles. We have the same need for improved coordination at the operational level, among the 700+ employees working at the height of the season in Yellowstone, and between rangers, interpreters, engineers, and researchers in the state and federal agencies throughout the ecosystem.

Can we improve these connections between scientists and management, so that research is used to its optimum degree in park operations? I think we can, and to do so we must ask: What can researchers provide management that we are not yet getting enough of? What can management provide researchers to better the chances that scientific results and recommendations will be applied in the park? I think areas for improvement fall into three categories, which are defined in the following paragraphs.

Building a Sense of Shared Mission

Peters and Waterman (1982), in their bestseller *In Search of Excellence*, mention how successful organizations are characterized by a staff that has a "shared mission." To do so, managers and scientists must begin by defining a clear statement of goals, which should be available to park staff prior to initiation of the research. This is usually stated in the research pro-

ject plan. Ironical as it may seem, one of the daily challenges we face in Yellowstone is getting park staff to understand and thus support research, when often they are unaware of what's going on, let alone its potential value. Study plans must be consistently prepared and available so that interested park staff can use them to understand the "whats and whys" of park research projects.

Parks are required to have a **Resource Management Plan (RMP)** that addresses management issues and related programmatic needs—including research. Research must be tied to issues identified in the RMP. This document should be a critical reference for park staff wanting to place research into a management context, and for researchers seeking to develop meaningful study projects. Both researchers and resource managers must be involved in the planning to identify and develop projects related to protection of park resources. This can contribute to the feeling of "shared mission" among the participants.

Management must help researchers place their work in a meaningful **policy context** prior to initiation of a study project. This is not to say that management should prevent researchers from considering or experimenting with changes from current management policies. However, researchers who may be specialists in their field need also to understand the basic premises that guide current national park management. Traditional definitions of habitat "carrying capacity," which typically implies a particular state of health for the grazing species, may need refinement when applied

to wildlife management in a park context. In Yellowstone, a plant scientist charged with studying this century's apparent decline in aspen and willow communities should not necessarily expect that park management has a goal of increasing or "improving" such communities. Agee and Johnson (1988) address the difficulty in defining this term and setting management objectives within its context. Both park managers and researchers, typically used to a **species orientation**, struggle to move toward an **ecosystem orientation**. However, as we do so, the discussion can improve our sense of "shared mission."

Speaking the Same Language

Managers and scientists must build on having a shared mission, by improving the abilities of its staff to understand research and apply it, where appropriate, in parks. The State of the Parks Report (1980) and the more recent NPCA report (1989) stress the need for more specialized training for park resource management personnel. The "generalist" ranger, they suggested, no longer has the time or the technical knowledge to apply scientific principles to monitoring or restoring park resources. Yellowstone has tried to bridge that gap by creating a position in each of its four districts for a Resource Management Coordinator—a full-time person who works with the Resource Management Specialist in headquarters and his support staff (which includes three "new" Management Biologist positions) to apply research recommendations and sound methodologies where appropriate in resource protection, mitigation, and monitoring activities. Whether by increasing the number of specialists on staff, or by

upgrading the training of park rangers, we must teach managers to speak the scientists' language when talking about park resources and research projects.

To improve in-park communications, we established a resource management newsletter for the park staff, a code-a-phone employees can dial for timely resource news updates during the busy summer, and monthly "brown bag" seminars between the Research and Resource Management staffs. We have one full-time position designated as a "Research Interpreter," who presents research results to staff and the public in "layman's terms." We need even more support, in times of scarce dollars, for resource managers and park scientists to attend scientific meetings. Even with these efforts, a constant complaint is that employees "don't know what's going on in their park, or in their discipline."

Upon completion, all research reports and projects should conclude with: a) recommendations for a realistic **monitoring program** (this is often left for management to develop without the specialized expertise that a scientist can provide); and b) an oral or written presentation for the non-specialists on the park staff, including clear applications for resource protection, management, maintenance, and interpretation. On several of our recently completed research projects, we had a "wrap-up" meeting with the primary investigator and interested park staff. This kind of positive, informal exchange can do much to help bridge the gap that often appears between scientists and operations staff.

The effective transfer of information is a constant challenge. Many of these suggestions are a repeat of the basics, but I believe the basics always need working on.

Recognizing the Audience Reality

Both scientists and managers must constantly re-evaluate their effectiveness at communications. Are we getting through to our audiences, be they park resource management staff or the typical park visitor? Is the science getting translated into the public knowledge base? I believe that recent events suggest, unfortunately, not.

Fire history studies of the dominant forest types in Yellowstone indicate a fire regime characterized by large, infrequent fires followed by long periods of little or no fire. Yet, 1988 caught everyone by surprise—including much of the park staff. Our "scientific, rational" approach to land management today in general simply does not convey any message other than that humans can and should control their environment. The public doesn't believe that a nation "capable of landing men on the moon could not stop the wildfires in Yellowstone." This led to great frustration among the public, land managers, and firefighters, who saw that thousands of humans and millions of dollars had little noticeable effect on suppressing fires until the first snowfall of the season quieted their rage in one night.

In the 1960s, grizzly bear researchers recommended weaning park bears away from human garbage, along roadsides and at park dumps. Twenty years later, the public largely perceives bears as 1) having been taken entirely out of

the park, because "no one sees them anymore"; or 2) starving, because we're not feeding them. Sadly, the message we are probably tired of giving is not received as we intend it—that the animals are wild and most of all need habitat protection, a continuing, long-term effort to adapt our activities to minimally affect this threatened species.

Following the 1988 fires, but not primarily as a result of them, Yellowstone experienced its first major winterkill of wildlife in a decade. During and after a bitter arctic cold front, hundreds of ungulates died of malnutrition and/or winter stress, including up to 25 percent of the Northern Yellowstone elk herd. This herd has been the topic of controversy for at least 75 years (and may be for the next 75). And despite many persons' contention that the herd is too large for its range, a primary voice heard in the height of winter was the fear that the herd would be decimated. Would there even be enough elk left the following summer for visitors to enjoy? Scientific facts and figures may get lost in the emotional reactions of an audience more familiar with zoos and their cooperative captives than with a wild and ever fluctuating natural environment.

Thomas Dunlap, in *Saving America's Wildlife*, suggests that increasing numbers of Americans recognize the land and its wildness as basic to environmental conservation. Perhaps this is true, relative to earlier in this century. But I'm concerned that large numbers of park visitors and critics do not. If the message we've been hearing this last year is representative, most still envision Yellowstone as a static place—someplace to visit again and again without seeing change, whether

that be in the time intervals between Old Faithful's eruptions, or in the forests it desires to be perpetually green. The public doesn't like pine beetle epidemics, they don't like not seeing bears, and they didn't like burnt trees. They don't like change. Perhaps the best way research can help improve management is by studying, not plant succession or animal behavior, but better techniques for effective communication!

By improving our sense of shared mission, by speaking the same language, and by addressing the wide gap between our scientific knowledge about park resources and the reality of public perception and understanding of those resources, we can build even stronger programs of applied research in Yellowstone. I think it behooves persons in both disciplines to help see that good science contributes toward better operations of park maintenance, interpretation, and resource management.

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