Brian C. Kenner

Blasphemy from the Hinterland:

Using NPS History to Improve Science and Natural Resources Management

At the last George Wright Society conference (the Ninth Conference on Research and Resource Management in Parks and Public Lands, Albuquerque, New Mexico, March 1997) frustration and despair over the state of natural resources management in America's national parks were evident among the National Park Service (NPS) natural resource managers in attendance. These emotions were apparent in discussions in formal sessions, as well as conversations at breaks and other social gatherings. An evening session was devoted to "Rebuilding and Strengthening NPS Science and Resource Management"; the title of the session suggests a program in ruins, or at least very weakened, and is itself evidence of the mood.

Reasons for these emotions are many and varied. They can be traced back to tightened federal budgets and downsizing since 1994. Resource management budgets at the park level have stagnated or declined and are often only a small percentage of park base budgets. Despite recent professionalism efforts, staffing remains inadequate to address needs. Funding for research, always inadequate, has fallen far behind the need; in 1993 NPS scientists and much of the agency's meager science budget was transferred to the newly created National Biological Survey (NBS), now the Biological Resources Division of the U.S. Geological Survey (BRD). All this has occurred in a time when, according to Assistant Interior Secretary George Frampton, resource management is supposed to "flourish" in the national parks (Krumenaker 1997).

While those of us in the NPS may tend to think of our problems as a fairly recent turn of events, Richard West Sellars' *Preserving Nature in the National Parks* (1997) provides a historical context. Sellars traces the evolution of science and resource management in the NPS, and shows that the problems we see today are a continuation of those encountered through the decades by our forebears in the agency. While there have been many discussions and analyses, and various solutions have been proposed through the years, the problem remains. Now, the new NPS director, Robert Stanton, has stated a priority "to rejuvenate natural resources," and established a work group to develop a strategy to strengthen natural resource management and protection (Krumenaker 1998). With this in

mind, it would seem like a good opportunity to examine our situation in a historical context, clarify issues, and propose new ways to address them. This paper is a contribution to the discourse from the perspective of a resource manager in a small park in the hinterland of the National Park Service, far from the centers of power in the agency. It proposes that much of our problem may lie within ourselves—the natural resources realm of the NPS—and that we must learn from our agency's history in order to choose new ways to address long-standing problems.

What is Resource Management in the NPS?

Too often the terms "science" and "resource management" are used interchangeably or melded together as "science-based management" or "ecologically sound management" without clear definition. These terms in fact encompass two separate roles which require clarification.

To illustrate this point, consider the popular television show "Law and Order." Each episode begins with a voice-over against a black background:

> In the criminal justice system, the people are represented by two separate, yet equally important, groups: The police, who investigate crime, and the district attorneys, who prosecute the offenders.

The statement very simply and concisely explains the fundamental difference between two important societal roles. In much the same way, the separation of function within America's national parks can be stated:

> In national parks, the natural resources are represented by two separate, yet equally important groups: The research scientists, who gather and analyze ecological data, and the resource managers, who integrate resource information into park management.

This separation of function, although often overlooked or ignored, is a fundamentally important concept. The research aspect is one of *objective investigation and analysis*. It is a non-advocacy role, other than advocating the proper gathering and interpretation of data. The resource manager, on the other hand, is an *advocate* for the natural resources within the context of the scientific evidence, the agency's legal mandates, and established policies. This advocacy in the decision-making process is fundamental to integration of research results into management to establish ecologically sound (science-based) management. The *Natural Resources Strategic Plan Professional Development Program* (NPS 1994) recognized the importance of this "integrator" role of resource managers. Blurring these roles, where the research scientist advocates policy beyond what the data supports or the resource manager offers analysis without proper scientific investigation, opens the door for politicized science and diminished credibility for the agency. Our society is awash in politicized science; very often the public recognizes it and distrusts research, scientists, and associated organizations because of it.

Furthermore, although there are separate roles, science (including re-

search, as well as monitoring and technical expertise) is, in fact, a vital part of resource management. It is an essential tool for the resource manager—as are the pertinent laws, policies, and public opinion—for protecting ecosystems for which the NPS is steward. The research scientist and the natural resources manager work together, within their roles, to ensure scientific information effectively influences decision-making.

Parks as a "Social Construct"

If we recognize these roles, it follows then to clarify the importance of going beyond data gathering and analysis to integrating it into management. Why don't we just act on the results of scientific study of park ecosystems?

The answer is simple, yet disconcertingly complex. Historian Richard White effectively argued in Albuquerque that "nature" (including parks) is a "social construct" (White 1997). In other words, the concept is a creation of society, and as such is the product of human values. Yellowstone National Park is more important than a urban vacant lot only because our society has placed a greater value upon the physical and biological features of that system. Without human values the concepts of "native" and "non-native" species, "resource degradation," "pristine," and "biodiversity" lose their meaning. Broken down to the most elemental concept, divorced from human values, ecosystems are merely suites of organisms, each struggling for survival within the physical setting in which they exist; no species is more important than another, no state of the system is more desirable than another.

The national parks, therefore, reflect conditions our society (at least a vocal segment of it) desires, and our attitudes toward nature. They are democratic institutions rather than intact ecological systems. In fact, as Sellars (1997), Runte (1979), Ise (1961) and many others have described, the early parks were established to protect scenery and "desirable" animal populations. Only as scientists learned more about the complexity of natural systems and developed the principles of ecology, and these principles became accepted, did preserving *ecosystems* become a recognized goal in national parks.

Many in the NPS, while extolling the national park idea as one of the finest expressions of democratic society, are repulsed by the political realm within which the parks were created and exist. They believe in the importance of science, and are contemptuous of decisions based on "politics" and those who work within that realm. One former NPS scientist, addressing a group of NPS resource managers, stated with disdain that the toughest part of his job was dealing with "resource management *politicians,*" leaving no doubt he was referring to his audience. Nonetheless, science cannot be divorced from societal values. Lautenschlager (1997) cites Wicklum and Davies (1995) ar-

guing that the concepts of "ecosystem health" and "ecosystem integrity" are not inherent properties of an ecosystem supported by empirical evidence or ecological theory; rather, they are concepts derived from our perceptions of what is "good" in an ecosystem. These concepts are, in fact, the incorporation of our social construct of nature into a framework for scientific study. It follows, then, that science generally does not provide clear answers to our social issues; it provides information necessary (along with non-scientific considerations) for decision-makers to make informed decisions. It is these non-scientific considerations that makes the NPS a *land management agency* rather than a *research agency.*

Perhaps nowhere is the conflict between social concerns and scientific investigation more evident in the NPS than in wildlife management issues. The Park Service has recently been pummeled by criticism of its wildlife management policies, most vehemently by Chase (1986) and Wagner et al. (1995). In particular, management of Yellowstone elk has been controversial for nearly forty years. What is clear, and what critics seem incapable of accepting, is that there is no single paradigm for wildlife management in the national parks (Huff 1997a). Instead "the NPS exercises a wide continuum of approaches" (Huff 1997b) reflecting various social concerns expressed in laws and policies for individual parks. Criticism, even from acknowledged experts, often seems less rooted in empirical science than in the values from which the individual develops a framework for examining the issue. Opinions often seem to reflect training and experience as "range" or "game" biologists, favoring stable, sustainable harvested populations (deer, elk, etc.) over more dynamic populations in constant struggle with other species and their habitats as described by Botkin (1990).

Yet, it is our values that give significance to the parks and prevent a single paradigm for management across the range of park units. When they conflict with science they cannot be dismissed as "anti-intellectualism," as is done by Coonan and Schwemm (1995). While the values that give rise to appreciation for charismatic species or concern for animal rights often create conflict for the NPS, they cause us to see resources as more than food or data, and they may be our deepest expression of intellectualism. They are essential to the social construct, and must be acknowledged and considered along with scientific information in managing natural resources.

However, recognizing nature and national parks as social constructs does not diminish their importance nor require a change in our perspective. It only provides a means of recognizing the connection between the scientific and the social (political) realms. There will always be friction between the two—it is inherent in the system. The key, then, is to maintain the proper relationship, where political influence is kept out of scientific

investigation, but results are properly integrated into political discourse in order to influence decisions in park management and society in general.

Identifying the Problem

If we accept the role separation of research scientist and natural resource manager, and the concept of the parks as a social construct, it is then possible to more correctly identify the root problem facing natural resource management in the National Park Service.

For most of the Park Service's history, various entities have cited the need for more science. In 1916 Joseph Grinnell wrote of the need for national park management to have a firm scientific basis (Sellars 1997). In the 1930s, NPS wildlife biologist George Wright recognized this critical need and personally funded the first attempts to obtain important baseline data (Sellars 1997). In 1963 the Leopold Report (Leopold et al. 1963) and the Robbins Report (NRC 1963) both cited the need for stronger research programs, and *The Vail Agenda* (NPS 1991), the National Academy of Sciences (NRC 1992), Wagner et al. (1995) and Sellars (1997) made the case in the 1990s. In Albuquerque, most of the "Rebuilding and Strengthening" session was focused on a $2.4 million initiative the Park Service was presenting to Congress to create a pilot program of Cooperative Ecosystem Study Units (CESU). This initiative was essentially a plan to regain NPS science capability "lost" to the BRD. Many believe that improving resource management in the parks can be accomplished by increasing the number of scientists and the amount of research in the parks.

However, if our goal is more ecologically sound (science-based) management, the lack of research, or scientific investigation, is *not* the root problem—it is a conspicuous symptom of a deeper problem. The real problem today, as it has been for most of our agency's history, was perhaps best stated by Krumenaker (undated): "Natural resource programs remain outside the mainstream of National Park Service culture." In other words, natural resource programs, including both roles of scientific investigation and advocacy of ecological concerns, have not become fully integrated into park management *at all levels*. While it may seem like a minor distinction, our history of treating the symptom rather than the problem itself has led us to ineffective or inappropriate courses of action.

If we recognize the need to strengthen natural resource programs in order to effect more ecologically based management, then we need to look at the organization as a whole in order to determine the best means to bring it about; in order to become part of the mainstream culture, we must first examine the mainstream culture.

Since the creation of the National Park Service, the mandate from the Organic Act (16 U.S.C. §1 et seq.), "to promote and regulate use" and "to conserve the scenery and the nat-

ural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations" has been framed as dual purposes. This dichotomy of preservation versus use has too often forced false choices of one or the other. And, in fact, in two amendments to the Organic Act in the 1970s Congress explicitly directed the NPS that "management ... shall not compromise these resource values," and keeping them "unimpaired" was a "paramount duty" (Mantell and Metzger 1990). The mandate, then, can be more correctly framed by conceptualizing a continuum with human-focused, or *anthropocentric,* management on one side and ecosystem-focused, or *biocentric*, management on the other. Anthropocentric management seeks to increase public use; social considerations predominate over biological or ecological concerns because of the perceived human benefits to be derived (Hendee et al. 1978). Biocentric management emphasizes preservation of the natural system in order to protect the recreational and scientific values placed on the preserved system and processes; human benefits are derived from the preserved system and its processes (Hendee et al. 1978). Clearly the NPS mandate is for biocentric management, located somewhere on the continuum away from extreme anthropocentrism (the Disneyland experience) and toward extreme biocentrism (absolutely pristine wilderness) (Kenner 1985). Law, NPS policy, and ecology all dictate a management goal toward the biocentric end, but often beyond what management achieves; historically, management has focused more on providing recreational tourism than on protecting ecosystems. The proper role for the natural resources manager, then, as advocate for the resources, is to encourage management toward the biocentric end of the continuum—toward the goal set by law, policy, and science. One measure of success can be the extent to which management efforts are focused on maintaining or restoring ecosystem processes.

From the natural resources perspective, then, the problem is that NPS mainstream culture does not strive hard enough to attain the goal. Thus, in order to ensure ecologically sound, science-based management, the mainstream culture must be oriented toward a more biocentric management philosophy.

How Can We Address the Problem?

If our goal is to move NPS mainstream culture toward a more biocentric management focus and thus more ecologically based management, we must address the problem of a lack of integration of science and natural resource management concerns into management at all levels of the organization. The following are three steps that can be taken by NPS leaders *within the natural resources realm* to address the problem and reach our goal:

Encourage grassroots, instead of top-down, management. Knight and Meffe (1997) describe most resource management agencies as hierarchical, top-down organizations. In some ways the NPS has generally followed this model through its history. Sellars (1997), Runte (1979) and others have described the power of strong NPS directors from Mather through Hartzog. "Mission 66," the massive Servicewide development program of the 1950s and 1960s, was perhaps the grandest example of a top-down initiative, with the greatest impact on the National Park System. However, the evolution of the system does not favor top-down management. The first parks were established before there was any management agency. Most parks have been created with individual legislation, while others were created through other legislation such as the Antiquities Act (16 U.S.C. §§431-33). Many park organic acts have special provisions for hunting, trapping, and commercial fishing, consumptive activities generally prohibited by law or policy. Also, throughout NPS history many different types of units have been added to the system: historic sites, battlefields, and birthplaces; recreation areas; lakeshores and seashores; preserves and scenic rivers. The entire park concept has been expanded to include new kinds of cooperative protection involving state and private groups. Further, parks have local political environments within which managers must function.

Even as the NPS has evolved as a decentralized agency (formalized as a goal of the recent agency reorganization), nearly all of the calls to improve science and natural resources management in the NPS have followed the top-down model. Many have come from outside the agency, some have come from within, but nearly all have promoted a centralized, Servicewide approach, and criticized the NPS for not having a centralized science program. In the past ten years several Servicewide science initiatives have originated from within the NPS (Targeted Parks Program, Global Climate Change Program, Inventory and Monitoring), but have had limited success. These initiatives, if funded by Congress at all, have been underfunded, and arguably have had little direct benefit to the majority of parks.

Many central office personnel distrust park individualism. Wagner et al. (1995) quote Carol Aten (at the time chief of the Office of Policy Development in the NPS) as stating that "at the park level there is no System view." Many feel superintendents have too much autonomy, leading to "Balkanization" of the parks, and that trying to get parks to take a "Systemwide" perspective is akin to herding cats. Regarding the recent agency reorganization, Sellars wrote that "the emancipation of the parks from the leadership and oversight of well-staffed central offices reduced the park superintendents' accountability to higher authority and to national standards of park management," and it "has created a situation

where, with less oversight and fewer constraints, traditional attitudes may be reinforced and flourish."

However, Knight and Meffe (1997) offer a contrasting perspective. They propose a more grassroots model of natural resource management, based on an ecosystem approach that "emphasizes individual initiative and input from all levels." "Because ecosystem management encourages partnerships, cooperation, and risk-taking," they state, "it contrasts sharply with the linear command-and-control approach of traditional resource management that encouraged hierarchical decision-making and risk aversion." Knight and Meffe recognize that "a one-size-fits-all approach issued from the top often clashes with specific needs of individual projects." In examining histories of various natural resource agencies, they found that

> accumulation of power at the top of agencies, and the painfully slow ability for bureaucracies to adapt to change, meant that resource issues were not always addressed in a timely fashion. Employing a decentralized approach with feedback loops acknowledges the intricacies inherent in managing landscapes and allows for greater flexibility and efficiency in meeting the multiple challenges of management.

This flexibility is in contrast to traditional management where agencies create long-term plans and stick to them regardless of societal changes or new information. The ecosystem model, they argue, "promotes continual revisitation of decisions, their revision based on a review of initial results and new information, and the confidence in the spirit of continually improving the mission of land stewardship."

The Cooperative Ecosystem Study Unit (CESU) proposal discussed at "Rebuilding and Strengthening" in Albuquerque was met with skepticism from park resource managers. It was essentially a traditional, top-down concept that established a research bureaucracy for generating research projects but did not provide project funding. More important than internal skepticism is the fact that Congress refused to fund the proposal. In today's political environment, it is clear that proposals for more bureaucracy will not find favor; a decentralized approach directly impacting parks is certain to find more favor. A more grassroots approach would be to develop a project fund with specific goals and parameters, and make it available to the parks, who would utilize their contacts with bioregional research entities to develop and accomplish studies.

Furthermore, Park Service evolution favors a grassroots approach to natural resources management. This is particularly true today because of the recognized need for superintendents to be more active beyond park boundaries in cooperative ecosystem management. "The concept of managing in the context of entire ecosystems is critical to the long-term preservation of national park lands" (NPS 1993). The past has shown that science and natural resources management will not flourish if imposed

from above. It must be supported and encouraged *at the park level*, where it can take root, grow, and expand up throughout the System. The recent agency reorganization was intended to decentralize and empower parks, but lack of funding and agency inertia have limited its success. The central offices still have a vital role to play, but they need to shift to a more *supportive* role rather than a *directive* one.

A new paradigm is needed for managing natural resources in the parks, emphasizing the ecosystem approach. It may be that we have been locked into the *System* perspective and need to focus more on the *ecosystem* perspective. Systemwide natural resources initiatives should be designed for maximum initiative and flexibility at the park level, within clearly stated parameters. Research funding should be disbursed via proposals that are peer-reviewed by NPS resource managers, using clearly established criteria. The central office role would be to provide essential feedback and ensure *accountability*, achieved through a technical review of study plans and project goal accomplishment. The Natural Resource Preservation Program (NR PP) operates much this way, and future funding initiatives should follow this model.

Properly executed, this approach demands quality, ensures accountability, supports partnerships and cooperation (not just with other landowners but with other national parks facing common issues), and rewards creativity in seeking to accomplish agency goals. The NPS natural resources leadership should recognize the viability of this approach and encourage grassroots efforts by park resource managers and superintendents.

Increase technical expertise and integration capability in the parks. The grassroots, or ecosystem approach can succeed because of two realities that did not exist when earlier top-down calls for improving science and resource management occurred: First, the Park Service has in place management policies (NPS 1988) and natural resource guidelines (NPS 1990) to provide detailed overall direction. Second, many parks have trained, professional natural resource managers.

Following the creation of the National Biological Survey and transfer of NPS scientists, one person commented that, in terms of science and resource management, the agency was right back to where it was when George Wright died in 1936. Wright's untimely death silenced a strong proponent of scientific management, and was followed by the decline and disappearance of science capability in the Park Service. However, this comparison is unrealistic. The "loss" of NPS scientists to the new agency has not ended science in the parks. Grassroots science continues. While underfunded, understaffed, and generally outside the mainstream culture, park resource management programs continue to provide a scientifically based influ-

ence in the parks. In the Great Lakes, for example:

- Apostle Islands National Lakeshore has implemented, with limited funding, a long-term ecological monitoring program based on the Inventory and Monitoring Program's Channel Islands model;
- Four Great Lakes parks are working cooperatively with BRD scientists on an important inland-lakes baseline study; and
- Strong advocacy by park resource managers has guaranteed continued logistical support and funding for Isle Royale's often-heralded long-term wolf–moose–vegetation relationships study, which has progressed for over thirty years with limited NPS funding—even through periods of tight budgets.

Also, Great Lakes parks have been hosting meetings with scientists from the BRD's Great Lakes Science Center in order to develop professional relationships and cooperative research projects. In fact, due to efforts by park resource managers, at least some of the parks have had more contact with BRD scientists than they had with NPS scientists.

The bottom line is that the importance of park resource managers must be recognized. Many parks now have professional staffs capable of identifying and prioritizing research and resource management needs, designing and administering research, and cooperating with partners in ecosystem management efforts. As NPS retiree William Brown commented in the closing session in Albuquerque: "The formula for success is the integration of science and resource management at the park site."

The Natural Resources Management Training Program (NRMTP) was begun in the early 1980s in response to a Park Service report that identified a need for trained resource professionals (Sellars 1997). It was a program that took experienced NPS employees and combined extensive, broad-ranged resource management training in a variety of settings with their regular duties over the course of 18-24 months. The NRMTP developed skills of trainees in parks throughout the system. Many trainees were placed in smaller parks where previously there were no resource management programs. The commitment of the trainees' time required that the park support the program. The program had no specific education or experience requirement. Trainees had a variety of educational and experiential backgrounds.

Some in the NPS disparage the NRMTP and natural resource managers in general. They note the lack of an advanced degree requirement and research credentials. One former park scientist, speaking before a regional group of park resource managers, decried the program as "a lot of money to teach people how to fill out forms." However, in 1990 (in a plenary session of the George Wright Society conference in El Paso, Texas) Destry Jarvis, then with the Student Conservation Association, called the program "the most important thing the National Park Service has done in the last ten years." These contrasting opinions are reflective of the ambivalence found within the NPS.

No doubt the program had its faults, and there is no claim that program graduates are any more competent than their peers who did not participate. However, the program did place trained resource managers in parks across the system, and significantly reduced their learning curve by providing training in environmental compliance, NPS policy and planning, inventory and monitoring, integrated pest management, geographic information systems and other activities integral to managing park natural resource programs. It exposed the trainees to NPS technical support centers capable of providing vital assistance in addressing air and water quality, mining, and other issues. A measure of the success of the NRMTP is that it produced over 100 resource managers, most of them in parks, many in smaller parks. Graduates of the program are now found at all levels in natural resources management and are moving into management ranks. Recent recipients of the National Parks and Conservation Association's Stephen Tyng Mather Award, the George Wright Society's Natural Resource Management Award, and the Trish Patterson–Student Conservation Award were all program graduates, located in parks from Alaska to the Virgin Islands. These awards recognize commitment to natural resources, and are evidence that the program is positively affecting parks.

As the NRMTP and other park resource managers who have been supported with training and funding have proven, one very effective way to directly affect natural resource management in the National Park Service is to get more highly trained natural resource managers *in the parks.* Professional training is vitally important to improving science and resource management. Diversity in education and experience must be recognized as important for developing resource managers with a broader perspective on park management issues and thus able to function in the mainstream. NPS natural resources leaders must recognize that continued training, career development opportunities, and attendance at professional conferences are essential to maintaining a highly skilled, effective cadre of resource managers. The leadership must focus more effort toward supporting park resource managers and their professional development.

In developing resource manager positions, parks need to be more creative and look at shared positions among smaller parks with similar issues or technical needs. They must determine if the position needed is an "integrator" or "specialist" role as described by the *Natural Resources Strategic Plan* (NPS 1994), and determine the education, skills, and experience most suitable. Park resource managers must be effective both within their park to promote ecologically sound management and within the agency in pushing for a more grassroots, park-focused perspective within Servicewide policy.

Finally, we must recognize that

parks will never have enough on-staff expertise to effectively address the myriad of complex ecological issues that must be faced. Central office expertise will continue to be essential. The Natural Resources Program Center offers an excellent model of technical support for parks for research and monitoring development, planning, and policy formulation and implementation.

Change the NPS leadership culture. The early proponents of the agency, including Directors Mather, Albright, and Drury, as well as Interior Secretary Lane, were connected by California backgrounds. They were the first "leadership cadre" and they established a foundation for the Park Service that exists to this day. Sellars (1997) shows how the "leadership culture" has evolved. From the beginning of the agency engineers and landscape architects were brought into the agency to plan and develop the parks. Their influence grew after World War II, and culminated when Conrad Wirth, a landscape architect, was made director. Wirth initiated the Mission 66 program, an engineer and landscape architect's dream—more than a billion dollars to develop roads and facilities across the National Park System. Perhaps just as important as the physical changes brought about in those years was the culture change within the agency. The landscape architects and engineers became the "leadership cadre" in the NPS for a generation, and remain highly influential to this day.

At about the same time as Mission 66, the NPS began to strengthen the ranger corps. During the 1960s the corps grew, and by 1970 social upheaval had reached the parks, forcing the NPS to recognize the need for more rangers with more professional law enforcement training. The NPS responded: anyone wanting to work for the agency during the 1970s and early 1980s knew the best way was through law enforcement. In the mid-1970s a group of rangers started the Association of National Park Rangers (ANPR), intended to articulate concerns of the growing ranger force. By the late 1980s the ANPR had grown considerably in strength, in part due to the rise of its proponents to positions of power in the agency. Rangers were becoming the new leadership cadre, and by the 1990s ranger power led to the "Ranger Careers" initiative. This program has meant significant improvements in ranger salaries, as well as twenty-year enhanced retirement for law enforcement personnel.

The lesson to be learned from the ascendancy of engineers, landscape architects, and rangers is that, in order to effect dramatic change within this agency, the leadership cadre of the future must come from the natural resources realm. If we truly believe in the need for more ecologically sound management, natural resource managers must not merely become part of the mainstream NPS culture—they must dominate it. This change cannot be imposed from above or created by well-intentioned directives. It will only be achieved through a long-term

effort to get NPS personnel with strong natural resources backgrounds into the management ranks.

Throughout the history of the agency, much of the power has resided with park superintendents. As Sellars showed, many of the initiatives for improving science and natural resources have failed because there was little support at the park level; conversely, park natural resource programs flourish if the superintendents are committed to them. In order to effect change, there must be (to paraphrase comments made by Jon Jarvis, superintendent of Wrangell-St. Elias National Park and Preserve, at the "Strengthening and Rebuilding" session in Albuquerque) natural resource managers willing and able to step into superintendencies and make the hard choices of funding and staffing when natural resource issues must be weighed against other park needs.

To accomplish this will require a concerted effort to provide resource managers with training and skills to enable them to recognize and deal with the complexities of managing a national park. One official in the higher levels of NPS natural resource management once told a group of park resource managers that "not only should all resource managers have Ph.D.s, but all superintendents should have Ph.D.s." This thinking fails to recognize that academic credibility does not always transfer well to the political realm. Other knowledge and skills are needed. In the political realm, equally important to education in science in establishing credibility is the ability to understand law and policy, and to effectively communicate with people with no technical expertise or opposing viewpoints.

This is particularly important now, because the new focus on decentralization and ecosystem management will empower superintendents and demand more of them. There must be a new model for superintendents. New realities will favor cooperation with other parks and agencies, effective advocacy beyond park boundaries, science-based decisions, and strong, professional support staffs. Many natural resource managers, by training and experience, are well-suited to this model. Natural resources leaders in the NPS should develop a strategy for ensuring that natural resource managers willing and able to move into management ranks receive the training and support necessary to be successful.

Conclusion

In essence, the challenge for the National Park Service as it enters the twenty-first century is to move away from the anthropocentric management exemplified by Mission 66 toward a more scientifically sound, ecosystem-based management that is more reflective of its preservation mandate. Pronouncements from the new director are encouraging, and may initiate the needed culture change. However, NPS natural resources leaders, as outliers from the mainstream culture, can take positive

steps *within the natural resources realm* to assist the change.

First, there needs to be a change in strategy from the top-down, Systemwide focus aimed at increasing science. In this era of ecosystem management and cooperative partnerships, the grassroots orientation should be seen not just as a reality, but as a strength. There needs to be more effort focused on park-level programs, allowing creativity, initiative, and risk-taking to protect resources. Systemwide natural resources initiatives should be focused directly at providing funding and trained personnel at the park level, with central offices providing strict quality control requirements and constant feedback to ensure positive results and accountability.

Second, the leadership should be working to increase integrators who will work within the framework of their positions to change the culture. Park resource managers should be recognized as trained professionals capable of viewing their park within the context of its bioregion, as well as the National Park System. They should be empowered to establish research and resource management priorities, cooperate with regional partners to effect ecosystem management, and expected to show positive results. Project funding should be directly tied to creativity, initiative, and scientific soundness through peer review. Strengthening park resource management programs should be a top priority and viewed as the fundamental step toward "mainstreaming" natural resources programs into NPS culture.

Finally, the natural resources leadership must recognize the need to get resource managers into the primary decision-making positions, and must direct more effort toward supporting and encouraging resource managers to make the move. The long-term goal of the natural resources realm should be to infuse the NPS leadership culture with a stronger natural resources orientation in order to effectively promote more ecologically sound, biocentric management in the national parks. When the George Wright conference is packed with superintendents, we will know that culture change has occurred.

References

Botkin, D. 1990. *Discordant harmonies: A new ecology for the twenty-first century.* New York: Oxford University Press.

Chase, A. 1986. *Playing God in Yellowstone: The destruction of America's first national park.* Boston: The Atlantic Monthly Press.

Coonan, T. J., and C. A. Schwemm. 1995. Dealing with in-park controversy surrounding resources management actions: A case study of the island fox monitoring program at Channel Islands National Park. *The George Wright Forum* 12:3, 19-25.

Hendee, J. C., G. H. Stankey, and R. C. Lucas. 1978. *Wilderness management.* USDA-Forest Service Miscellaneous Publication #1365.

Huff, D. E. 1997a. Memorandum posted on NPS Natural Resources electronic bulletin board, 22 April.

Huff, D. E. 1997b. Wildlife management in America's national parks: Preparing for the next century. *The George Wright Forum* 14:1, 25-33.
Ise, J. 1961. *Our national park policy: A critical history.* Baltimore: Johns Hopkins Press.
Kenner, B. C. 1985. The philosophical basis for national park management. *The George Wright Forum* 4:3, 22-37.
Knight, R. L., and G. K. Meffe. 1997. Ecosystem management: Agency liberation from command and control. *Wildlife Society Bulletin* 25:3, 676-678.
Krumenaker, R. J. Undated. Draft essay taken from NPS Natural Resources electronic bulletin board.
———. 1997. Are we flourishing yet? In *Natural resource year in review 1996.* Denver: NPS.
———. 1998. Memo on NPS Natural Resources electronic bulletin board, 12 January.
Lautenschlager, R.A. 1997. Biodiversity is dead. *Wildlife Society Bulletin* 25:3, 679-685.
Leopold, A. S., S. A. Cain, C. M. Cottam, I. N. Gabrielson, and T. L. Kimball. 1963 [1974]. Wildlife management in the national parks. In *Readings in wildlife conservation,* J. A. Bailey, W. Elder, T. D. McKinney, eds. Washington, D.C.: The Wildlife Society.
Mantell, M. A., and P. C. Metzger. 1990. The Organic Act and the steward ship of resources within park boundaries. In *Managing national park system resources: A handbook on legal duties, opportunities, and tools.* M. A. Mantell, ed. Washington, D.C.: The Conservation Foundation.
NPS [National Park Service]. 1988. *Management policies.* Document #1989-0-773-038/00. Washington, D.C.: U.S. Government Printing Office.
———. 1990. *NPS-77: Natural resources management guidelines.* Document #1991--524-709/D06411. Washington, D.C.: U.S. Government Printing Office.
———. 1991. *National parks for the 21st century: The Vail agenda.* Montpelier, Vermont: Capital City Press.
———. 1993. *Science in the parks II: Adapting to change.* Document #1993-839-570. Washington, D.C.: U.S. Government Printing Office.
———. 1994. *The draft natural resources strategic plan.* N.p.
NRC [National Research Council]. 1963. *A report: Advisory Committee to the National Park Service.* Washington, D.C.: National Academy Press.
———. 1992. Science and the national parks. Washington, D.C.: National Academy Press.
Runte, A. 1979. *National parks: The American experience.* Lincoln: University of Nebraska Press.
Sellars, R. W. 1997. *Preserving nature in the national parks: A history.* New Haven: Yale University Press.
Wagner, F. H., R. Foresta, R. B. Gill, D. R. McCullough, M. R. Pelton, W. F. Porter, and H. Salwasser. 1995. *Wildlife policies in the U.S. national parks.* Washington, D.C.: Island Press.
White, Richard. 1997. The natural is cultural and the cultural is natural. Keynote address to the Ninth Conference on Research and Resource Management in Parks and on Public Lands, Albuquerque, New Mexico, 17 March.
Wicklum, D., and R. W. Davies. 1995. Ecosystem health and integrity? *Canadian Journal of Botany* 73:997-1000.
Wright, R. G. 1992. *Wildlife research and management in the national parks.* Urbana: University of Illinois Press.

Brian C. Kenner is resource management specialist at Pictured Rocks National Lakeshore, Munising, Michigan. The author thanks Bob Krumenaker and Richard Sellars for their review of this paper.

Reminder: this column is open to all GWS members. We welcome lively, provocative, informed opinion on anything in the world of parks and protected areas. The submission guidelines are the same as for other GEORGE WRIGHT FORUM articles—please refer to the inside back cover of any issue. The views in "Box 65" are those of the author(s) and do not necessarily reflect the official position of The George Wright Society.