

immediately before drying further.

The preferred consolidant was the acrylic emulsion Rhoplex AC53. This would be used by mixing it 1:3 with distilled water and then immersing the pot (wrapped in a soft hairnet) slowly and completely into the solution in the container. After two days the pot would be slowly lifted, drained and allowed to dry. When this process is used, the ceramic object is stabilized but acquires a shiny, plastic appearance. Immersion in Rhoplex also eliminates the possibility of future carbon dating. Fortunately, however, the pot did not deteriorate and it was never necessary to use this non-reversible chemical consolidant.

Future Use. The Isle Royale pot is stabilized and ready for exhibition and further interpretation.

Archeologist Pat Martin concludes "Many questions remain to be answered. We need to determine if an occupation site is located nearby the discovery site. We need to carefully study the residues in the pot to see if any fragments of bone or seeds remain, clues to the diet of the pot's owners. In addition, we are seeking funds to have a radiocarbon date run on the carbonized residue, to determine whether our dating on stylistic grounds is accurate. Finally, plans are afoot to find the best possible way to interpret the pot for the public, to offer insight into the lives of prehistoric visitors to Isle Royale."

Bruce Weber, Park Naturalist, Isle Royale National Park, Michigan. □

A Needs Assessment-Based Review of the National Park Service Science Program in the Rocky Mountain Region

Katherine Phelps Kitchell

(Since Ms. Kitchell's thesis appeared in 1985, it has been rather widely read (for an unpublished paper) by those concerned about park management—especially USNPS managers and scientists. The FORUM is seeking ways and means to make available copies of this important work to the park management community; the 161-page typed document would consume about 80 pages of FORUM, however. We present here the abstract of Ms. Kitchell's thesis, and two reviews—one from an historical perspective by William E. Brown, and one from a scientist's viewpoint by J. Robert Stottlemeyer...Eds.)

Abstract

The National Park Service science program, which provides research results to park managers for assistance in making resource decisions, was last reviewed in 1963 by a committee of scientists. That evaluation resulted in the establishment of an agency science

program under the direction of the Office of the Chief Scientist the following year. This study, using the needs assessment approach to evaluation, reviews the effectiveness of the National Park Service science program in the Rocky Mountain Region from the perspective of its clients, the park superintendents.

Data from interviews with 21 superintendents and 10 park biologists representing 50% of the region's natural, historical and cultural, and national recreation areas were analyzed to determine strengths and weaknesses in research generation and utilization. The analysis of participants' comments, supplemented by interviews with 16 science administrators in the regional and national offices and eight resource management specialists from the Rocky Mountain Region, examines the roles of the parks, the Rocky Mountain Regional Office, the Washington Office, and alternative institutional arrangements in obtaining and fostering the use of research results; the responsibilities of park managers and scientists; and resource decision making and the research process.

Barriers to effective research generation and utilization in the National Park Service may be attributed to conflict between the Washington Office and the parks over the control of personnel and funds, failures in communication between the parks and Washington Office and between managers and scientists, the lack of agency and managerial commitment to research, and lack of program continuity throughout the Service and over time. Although past program evaluations questioned agency commitment to research and recognized problems in long-term continuity in the science program, this study provides more detailed explanations for these organizational phenomena and identifies the sources of conflict over program control and inadequacies in communication. In addition, the importance of clear research problem definition and dialogue among participants in the research process was verified.

Contrasts between managers and scientists which were discussed by project participants revealed that scientists have a difficult role to play in the National Park Service. National park managers' expectations of research personnel include far more than research. National Park Service scientists perceive these expectations and assignments that result from them as threatening their performance of their primary role as researchers as well as their professional growth.

Katherine Phelps Kitchell is Resources Management Specialist for Canyonlands Complex, U. S. National Park Service, Moab, UT. □

Historical Perspective

William E. Brown

Kate Kitchell's 1985 review of the science program in Rocky Mountain Region relies largely on interviews with park managers and

their research-science and resource-management agents in a fifty percent sampling of the region's parks. From these sources—plus observation of park science programs and interviews beyond regional boundaries—she gives us a transect cutting across the flow of science-program history. From that transect she generalizes for the region and beyond to larger science-program concerns throughout the Service. Very purposefully, it seems to me, she uses the transect, the moment in time she has captured, to depict the dynamics of our institutional ecosystem. In the polarities of that system—time-and-money constrained management at one end, endless study of timeless scientific processes at the other—she revisits tensions that have plagued the Service since its founding.

The sentiments Kate elicited from her sources were heard when wind-up phonographs broadcast Caruso across the campground: science hobbyists versus uninformed management pragmatists; ecological wisdom pitted against political decision making; analyzed data first, action later. And so on. The question of the park manager's control over scientists, as against professional control from the region or Washington, continues to agitate. As does the scientist's need for insulation from operational drudgery, if he or she is to perform long-term research, which itself is always prey to budget cuts and the uncertainties of annual funding. Arguments over integration or independence of research science and resources management recall earlier litanies. And so on.

It seems that research science is some added organ, a kind of appendix in reverse, that cannot be grafted into the Park Service body. Why is this?

Operational management deals so largely with people and the facilities and services they need that the park's living landscapes tend to become backdrops for the "real world" of management concerns. Subtle ecosystem processes rarely produce catastrophes equivalent to a road washout or a life-threatening fire. The decades-long theft of a plant community by disease or exotics cannot compete with car theft or campground burglary. Yet, precipitate management actions in response to immediate or short-term needs can disrupt the backdrop, robbing the park of its reason for existence. These, too, are old thoughts.

Kate Kitchell evaluates the origins and backgrounds of park managers and research scientists to trace the biases and mind sets that contribute to disabling tension. From her interviews she cites the pressures on managers for action dictated by funding windows, political pressures, and other encumbrances of a public-service agency. And she notes the felt contempt of the superior scientist who, though not responsible, seeks dominion over park management, which must be saved from itself. Adding spice are the case-study horrors, implicit here, resulting from developmental and other management actions that have destructively altered park resources. These matters, too, have been adduced in the past.

The value of this study is its hard-core inductive validation, by current sampling, of the persistence of old dilemmas that the Service

cannot seem to shake. With few exceptions, both managers and scientists conceptually accept the complementary nature of their distinct disciplines and functions. But at the level of execution, with all of the day-to-day exigencies at work, the field of agreement erodes. In her final chapter, Kate advocates a new look at the resolving elements of control, communication, continuity, and commitment. This discussion offers both practical and theoretical help to people who know that they must work together, but haven't yet found the combination.

In 1975, Dr. Garrett A. Smathers, then Chief Scientist at the National Park Service Science Center (Mississippi), summarized the history of scientific endeavor in the National Park Service. He showed that in the 1920s and 1930s, under the guidance of Chief Biologist George Wright, the integration of science and park management approached working partnership. During World War II and through the Mission 66 era, both national and Service priorities weakened science, often to the detriment of park resources. As a result, outside pressures led to the 1963 Leopold and Robbins reports—the first presenting ecosystem management recommendations, the second the research and resource management means to get ecosystem management. A renaissance of scientific influence in park management followed. Major results included the Resources Basic Inventory program, improved organization for scientific endeavor, and increased funding incident to environmental and cultural resources compliance responsibilities. The recent, short-lived resource management trainee program focused new attention on science as a management tool. Regional and park offices continue to experiment with organizational variations—centralizing, decentralizing, and changing lines of authority and reporting. Environmental law suits bring scientists to the fore and spur affected managers to declare that they need adequate science to define and defend their resource management programs...Yet still today, as evidenced by Kate Kitchell's paper, rigidities and antipathies—newly compounded by budget cuts and competition for funds—continue to obtrude. A sense of confusion over Park Service science policy is widespread. A new science charter is needed to properly order long-term basic research, mid-term compliance and resource management, and short-term management emergencies. It is indeed time for a new look, of a depth and breadth that expands upon the Leopold-Robbins reports of 1963.

In the process of making these studies—called for in Director Mott's 12-Point Plan of Action—special attention should be paid to the history of the Service's more productive scientific periods. What were the combinations of control, communication, continuity, and commitment that worked then? Can they be revived and enhanced to work now?

William E. Brown, Historian, Alaska Regional Office, USNPS,
Anchorage, Alaska. □

Review of Needs Assessment

J. Robert Stottlemeyer

Ms. Kitchell does a credible job in what I largely must view as still another assessment of NPS science difficulties and needs. Any inductions to a larger perspective are considerably limited by the regional scope of her data base. However, these 'outside' assessments are most important for they further fortify the already well documented case against continuance of the status quo with regard to the role and function of science in the USNPS.

Rather than review the structure and detailed content of this thesis, which I am certain will be done by others, I would rather pull out and comment briefly on what I see as important points raised by the author. They are noteworthy especially coming from an outside observer.

Ms. Kitchell states that the primary clients of the NPS science program are the park managers. This is a common but inaccurate statement. The clients are the American public. Research must serve in carrying out, both in the short and long term, the broad mission of the Park Service (see Sudia 1986). The laws that created the National Park System decreed that the resources be managed and administered for the common benefit of the people of the United States. Sure, some study or, more accurately, consultation is necessary to meet individual park-specific short-term issues. But the futility of setting and executing national research priorities based strictly on a park-by-park derived list of needs, as from the resource management plans, is intuitively obvious. This point was very eloquently brought forth by Regional Director Boyd Evison at the recent Conference on Science in the National Parks.

The author correctly identifies four major and recurring problems with research in the NPS: program control, communication, continuity, and NPS commitment to research. The debate over program control—should it be under local management or by the scientist—is ages old, and has taken place at some time or another in virtually every public and private organization that has a research function. This has been made an overly complex issue. By its nature research is basically a quality control function. In time the results from it will challenge the status quo. Thus, at times local management has reason to believe that research may not be very useful. Also much research is inductive and, for NPS, has to be long-term in nature. This requires continuity beyond the relatively short term of a park manager or resource management specialist. Because of these characteristics research must have considerable independence from local management to succeed.

The organization of research in the NPS is different—perhaps unique—from other public and private agencies. Usually NPS has attempted to direct research as part of day-to-day park operations. One only need to assess the approach used by other organizations, public

and private, to see that a remarkably uniform organizational structure and role and function (i.e., niche) for research emerges. It would not take great imagination to implement such a program in NPS.

I agree with the author's points on communication. However, she fails to fully point out the need to also communicate with the outside scientific community. The NPS science program essentially is not peer reviewed. The NPS does not even have a standing science advisory group. The author's suggestions on the need for research continuity are also timely. It was the recurring theme at the recent Ft. Collins meeting. And the weak NPS commitment to science is of long standing and clearly documented in the percentage of the NPS budget which goes to research and resource management.

Is there a common element among these recurring problems? Probably so. It may be the central point brought out quite clearly in the recent reclassification of the 025 series by the Office of Personnel Management (see GS-025 Park Ranger Standards, August 1986).

Ms. Kitchell concludes that "Without strong support from the