

Improving the Role of Science in the National Park Service

By Jim Wood

Technical Publications Writer/Editor

Throughout the U.S. National Park Service, scientists and resource managers are becoming increasingly concerned about the relationship of science to the management decision-making process. What is the proper role of science within that relationship? How can it be improved to meet the park management challenges of the decades ahead, to the year 2000 and beyond?

The history of science in the National Park Service has been marked by questions concerning its effectiveness and usefulness to park management. Over the years, many park managers have said, "The Service's science and research programs are not meeting our management needs." And they're still saying it today.

If history were our teacher, she would ask us, "Why is it so easy to criticize and to identify deficiencies in a program, yet so difficult to change or restructure it to eliminate the deficiencies and truly increase its effectiveness?"

Research in the National Park Service has been accomplished in various ways over the years, with mixed results as viewed by management. One prevailing criticism is that too often the programs have been reactive rather than proactive. While this is true to a certain extent, I believe reactive management is often unavoidable in many cases. Then, too, I am skeptical about the proliferation of committees and task forces that are supposed to come up with panaceas that will lead us toward the promised land. Such exercises – when used sparingly and when conducted with a goal of rational change – are beneficial, but only up to a point.

If I want to be a good basketball player, I need to be well-versed in the fundamentals of the game – and I must apply these fundamentals to master my athletic skills through daily practice and game experience. If my teammates and I want to win games – certainly we want a good coach. Good basketball coaches know that if their teams fall short in fundamentals, talent, or experience – no amount of "brilliant pregame strategy" will consistently win future games.

So, too, it is with science and research. Successful research organizations are led by competent and experienced research administrators who know there are no shortcuts to success. They have proven research records. They have earned the respect of their colleagues in the scientific community. They know the fundamentals of good science. They know how to apply the scientific method, they know how to judge, recruit and lead capable scientists, and they are themselves scientists who have learned from their own past research experiences. They also know how to match the available skills of their research staffs to research needs and plan and adjust their programs accordingly. The result? Scientific information that is straight and unbiased, albeit not always what management might want to hear.

The point is that committees and task forces may be useful, but too often they lead to superficial understanding and broad recommendations that are hard to translate into specific actions. And all too often they continue to overlook the basics, the real problems.

Let's face it. Our National Park Service science and research program remains fundamentally fragmented,

hasn't built upon the lessons of past experiences, and has no coherent sense of direction, unity, and purpose.

Instead of beating around the bush and relying on still more "band aid" approaches, we need surgery. We need to establish a solid foundation for our science program. We can begin by first looking back at what we have done in the past and noting the successes. Several of these include:

- The development and use of Cooperative Park Studies Units . . . an extremely successful means of acquiring scientific research, the units have fostered close working relationships with university experts and have resulted in the effective use of time and money. Some coordination is needed, however, and proper management, operation and staffing is critical.

- The development of regional interagency and interinstitutional "clustered research" groups, both in the parks and at universities, to respond to multiple park needs. The Southern Appalachian Research and Resource Management Cooperative (SARRMC), for example, has proven contributed research funds and tools needed for success.

- The development of a few national, in-house scientific research units with generic responsibility to support multiple park, regional, and Servicewide research needs. Examples include the Water Resources Field Support Laboratory (now the Applied Research Branch of the Water Resources Division) at Colorado State University and the archeological research centers, where efficiencies and capabilities are achieved through a single support group.

- The development of regional-based science funds – i.e., the "cyclic science program." These funds support park-specific research projects that meet regional priority needs.

Despite these successes, much still remains to be done. During the recent Conference on Science in the National Parks (held on July 13-18, 1986 at Colorado State University, Fort Collins, Colorado), numerous approaches were suggested for restructuring the NPS organization to improve and optimize the scientific basis of resource management in the parks. The recommendations of the speakers and the panel and symposium discussions suggest a three-part process for developing an appropriate, responsive, well-directed and well-managed science program:

- First, deal theoretically with the role that research can and should play in the NPS administrative and management process;

- Second, reiterate the values of quality research, properly organized (vis-a-vis the natural, social and cultural sciences) to park management; and

- Third, implement a research structure that will fit within the management system of the National Park Service to directly recognize, utilize and support research.

It was also emphasized that any attempt to restructure the NPS science organization should be mindful of the following basic principles:

- Research does not make NPS policy, but it can provide the information base for policy formation.

- Research cannot (and should not) manage. But it can support or not support management decisions (in either case, the research information must be provided in an objective, unbiased fashion).

- Research cannot remain unbiased when it is managed by management or otherwise incorporated

too closely into the management structure.

At this point, four structural issues are identified as important: (1) who is responsible for research, (2) the relationship between research and resource management, (3) the nature and structure of resource management, and (4) the roles of the two functions (research and resource management) at the national, regional and park levels.

First, research must be responsible to research. In other words, principal investigators and field researchers must be responsible to a research organization – not a management organization. This is absolutely essential for continued scientific project and program support, review, and evaluation (this has been reiterated at all levels of government and holds true in the NPS). As the researcher must be held accountable for project success, so, too, the research administrator must be held accountable for program success. And this accountability, all up and down throughout the research organization, must be based on the principles of sound, ethical, unbiased science. Thus, research responds to two masters: peer review (for quality scientific products) and management review (the research program must meet NPS needs, both short- and long-term). In short, the NPS must have a responsible and technically qualified research administration. The research administrator is then responsible to NPS management at the appropriate level for structuring a research program that meets management informational needs. Research is not a line function of management and this relationship (separation of responsibilities) should not be distorted or forgotten.

Second, it is again stressed that research and resource management are separate and distinct functions. Trying to convince ourselves otherwise leads to problems. The cold, hard truth is: the fundamental purpose of research is to provide management with objective, unbiased scientific information. The fundamental purpose of resource management is to implement field operations that "... conserve the scenery and the natural and historic objects and the wildlife . . . in such manner and by such means as to leave them unimpaired for the enjoyment of future generations," based on adequate scientific knowledge and application of appropriate techniques. The fact that these two functions are inherently separate and distinct, however, does not mean that researchers and resource managers should not talk to each other or work together. What it means is: research should develop information, evaluate information, and provide expert scientific (not managerial) consultation to both planning and operations. Resource management is a line activity that acts on the scientific information supplied. It follows, then, that both organizations must be professionally and technically able and there will be some overlap and some conflict. This is not necessarily bad; but it can, and should, be minimized by clearly defined and agreed-to organizational responsibilities. (While one person can theoretically do both jobs, such an expectation often creates an impossible personal dilemma [viz, the need to meet the requirements of the Research Grade Evaluation process and should be avoided. The present tendency to combine these two functions has caused much confusion and has disrupted both research and resource management activities.]

Third, resource management – as a line function – should be structured, staffed, and funded to ensure

the operational capability to deal with resource issues. The role of research is one of assistance and can be either active or passive. The importance of capable research support is not diminished, however.

Fourth, any redefinition of organizational roles will always be risky, as "someone's turf will probably be stepped upon." Nevertheless, an improved research structure can be implemented within the existing NPS management structure with minimal disruption or change. How? By establishing:

1. Clear and definitive role and function statements;

2. A clear statement of policy on research. Under present conditions, it might be helpful to select a group of senior NPS scientists to work with top NPS management and the Director's Blue Ribbon Panel to set long-term goals and objectives;

3. A clear-cut separation of research from other management activities, including control of research budgets (but not without accountability to management);

4. A strengthening of the base funding for research (effective research cannot be accomplished with uncertain year-to-year funding);

5. Infusion of professional science personnel standards for all researchers (Research Grade Evaluation) and research administrators (Research Administration or Grants Evaluation) and enforce them;

6. Direct, functional ties between research levels (WASO, Regional Offices, CPSUs, parks, etc.) to ensure proper direction and evaluation from a centralized science program management standpoint; and

7. The return of the Chief Scientist (or equivalent) position in the Washington, D.C. office. This position should consist of a technically qualified, professional scientist/research administrator with a knowledge of the NPS.

Summary. Historically, the relationship between science and resource management in the NPS has always been a difficult one. The crux of the difficulty seems to be management's failure to fully understand the basic purpose of research and its need to be properly structured and supervised. By its nature research is a quality control function. Sooner or later the results of research will be critical of the status quo with regard to park management. Park managers are not professionally trained individuals when it comes to supervising science. They basically do not understand the modus operandi of a true researcher nor should they be expected to have such understanding. They certainly cannot be expected to constructively outline, let alone supervise the execution of, a research program. Yet over the years the Park Service has expected this of many. This is a unique organization of science research within a unique land management agency, and I know of no other such attempt in other government agencies or in the private sector.

The result has been little relative evolution of the quality or quantity of scientific research in the national parks since the adoption of the Leopold Report in 1963. This has been aggravated by the NPS management – leadership's perception of how science can be run in the organization. There are still many who think it can be done at a decentralized, local level. Our application of the Research Grade Evaluation Process has proved this will not work.

But all is not lost; we can, and must, do better. If we recognize the common sense reality of the need to examine the *basics* – as suggested in this article – we may be able to give ourselves an excellent chance to lay the foundation for a professional, responsive and competent science program for the National Park Service. Such a program will never attain

perfection – it certainly won't be without its problems and conflicts – but it will increase our opportunities to produce scientific products of better quality, objectivity and credibility. After all, we do need improved resource understanding, management and interpretation . . . don't we?

*The lame in the path outstrip the swift who
wander from it.* – Francis Bacon

Acknowledgments

I would like to thank Dr. Raymond Herrmann, National Park Service Water Resources Division, Colorado State University, Fort Collins, and Dr. Robert Stottlemeyer, Great Lakes Area Resources Studies Unit, Michigan Technological University, Houghton, Michigan, for many of the concepts of science program management expressed in this article. I also wish to thank R. Linn, G. Larson, S. Coleman, J. Ogle, F. Noe, P. White, S. Moore, and R. Dawson for their critical reviews and comments.