

## Managing Long-Term Ecological Monitoring Programs in the U.S. National Park Service

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### Beyond the Science

Natural resource monitoring, in a variety of forms, has been conducted in the U.S. national parks for decades. However, long-term ecological monitoring (LTEM) programs specifically designed to define the status and trends of park ecosystems or ecological communities have only recently been incorporated into a very few park science programs.

The benefits of both research and LTEM programs has been discussed at length in a variety of publications, culminating in the 1994 National Park Service Strategic Plan. There, listed as the first of the ten most important things the agency can do, is: "...develop a scientific basis for resource management decisions." Knowing the status and trends of park resources and the health of park and regional ecosystems should be the core of this scientific basis. In spite of this recent recognition, very little progress is being made. Although there are some inherent dangers in generalization, there is substantial evidence suggesting that there are three primary reasons for this lack of progress.

First, the science of developing LTEM programs is still evolving. It was only within the last decade that the scientific aspects of designing and operating these programs have been defined and tested in the field. However, several programs exist that are

successful enough to be used as models.

Second, the experimental nature of monitoring and associated high costs have caused a reluctance on the part of some science managers to attempt the development of comprehensive programs. As the scientific capability within the USNPS continues to improve, the resulting cost efficiency should increase, making cost less of an issue.

The last reason is the presence of agency barriers. Currently, these barriers are the most difficult of the three to remedy. What still needs to be done to make LTEM programs an integral part of park operations is to identify and successfully address USNPS institutional barriers to program implementation.

#### Identifying Agency and Institutional Barriers

If the need for understanding the status and trends of park resources has been known for decades by the

scientific community, why aren't effective LTEM programs found in most parks? Effective implementation strategies require the identification of goals and potential barriers to attaining those goals. The 1990 Inventory and Monitoring (I&M) Initiative was designed as a USNPS-wide implementation strategy. One of the reasons why this program is still struggling for support may be that the strategy lacked an analysis of existing barriers such as those created by agency culture.

### **Institutional Barriers**

Institutional barriers are often the result of organizational culture. The USNPS agency culture is very strong, conservative, and firmly based in a history of exceptional public service.

**Agency image.** The need for USNPS to view itself primarily as a protected area stewardship agency rather than a public service agency has been stressed by its critics, but has not been fully embraced by the agency's leadership. Nor is it very often evident in how priorities are established at the park level (Haskell 1994). The identification of resource stewardship as the primary mission of the USNPS in the 1994 NPS Strategic Plan is a large step in the right direction.

**Staffing Shortages.** While the goals of the recent agency re-structuring include improving field staffing levels and making central office functions leaner and more effective, little progress has yet been seen in improved scientific capability. Central-office science organizations, such as

the Air, Water, Mining and Minerals, and Biological Resources divisions, are being severely cut back in staff or are targeted to be eliminated, and System Support Office staffers engaged in natural and cultural resources will likely be fewer than smaller parks require to assist them with science issues. It remains to be seen if the positions eliminated from central offices will indeed be reassigned to the parks, or whether they will transfer to other agencies or be lost to early retirements.

The Natural Resources Assessment Program (RMAP) has identified relative science needs, but the agency has not yet developed a strategy to meet these needs. USNPS staffing levels over the past decade have grown substantially, but not in a way that addressed the highest-priority needs. A good recent example is the conversion in 1995 of over two thousand seasonal positions to term appointments, with future plans to convert most of these to permanent positions. Although the original intent of providing insurance and health benefits for temporary employees was sound, the actual implementation was largely uncontrolled. The long-term result may not be consistent with the greatest agency need for staffing increases at this time.

In contrast, only twelve science positions were added this year via the Resource Professionalization Initiative. The RMAP, completed in 1994, defined the shortages in all park natural science staffs. On the average, most parks are currently operating

with only 25% of the needed staff to effectively carry out essential natural resource programs.

Science represents perhaps the most quickly growing segment of unmet park staff needs. The quest for information gained through research and monitoring and the capability to effectively use this information increases as the complexity of park resource issues continues to intensify. Although park programs should be changed to meet changing stewardship needs, new science staff have been added to parks largely through special science staffing initiatives. In some cases, however, even these positions have not been filled by the park or have been diverted to other needs as directed by the park superintendent. Science-based resource management has still not been identified as a high priority in many parks. Where this need has been identified, the method by which budget priorities are established appears to be another very real barrier to developing science-based LTEM programs.

**Budget priorities.** Science program needs are being poorly met partly because of general budget shortfalls and how annual park operating budgets are derived. In spite of repeated efforts each year to obtain funding, only four out of the original ten pilot-park LTEM programs have been funded, with a total investment of less than \$2 million. Compared with the cost of recent professionalization initiatives based on visitor services, this has been a small investment. Science needs have not re-

ceived a high priority in agency budget packages, nor has the need for good science been articulated effectively to Department of the Interior officials and the staff of congressional committees. The advent and uncertain future of the National Biological Service have made things more difficult by suggesting that the needs of the USNPS will be met by this new agency (or its successor).

Budget-related resistance at the park level is manifested in several ways. The majority of park managers use past park budget percentages to arrive at how the next year's budget will be divided between the functional areas of operation such as interpretation, maintenance, etc. During the last decade of lean budget years, new program needs have not fared very well. Even the best managers find it very difficult to cut existing programs to accommodate new needs primarily since a large portion of park budgets are tied up in permanent staffing. Making significant staffing changes to meet new program needs is a slow and occasionally difficult process that few managers are willing to tackle. Budget priorities tell the whole story. Few, if any, park science and resource management programs receive more than 6% of the budget, while the public-service functions included in maintenance, ranger activities and interpretation usually total over 50%. There is an extreme reluctance by managers to improve science programs by reducing visitor services.

**Management tradition.** Many values held by park managers have remained unchanged for decades and form a part of the core of agency tradition. Few senior managers have extensive experience working with good science programs. Science has just not become an integral part of NPS tradition. There is an increasing number of excellent superintendents who would place more emphasis on science if their actions would be supported at higher levels. Since the US-NPS restructuring process began, there is more talk about supporting "feisty superintendents" who are willing to make tough decisions in defense of park resources. Many watchers eagerly await positive proof that this will become a reality.

Right now things are the way they are. The vast majority of park superintendents came up through the park ranger ranks. For the most part the people selected to become new superintendents continue to be chosen by the senior superintendents. This selection system has changed very little since 1916. People have a strong tendency to hire in their own image, to assure that their traditions and priorities will be continued unchanged. In many cases, superintendents specifically ask to be able to select their successor. There is a natural tendency for people to favor activities that they understand and relate to. Most superintendents, having come from the ranger ranks, understand the needs of visitor service programs very well, but frequently lack understanding of the needs and complexities of

good science-based resource management programs.

We are all a product of our past experiences. Some park managers have attempted to use science to improve management decisions, but have less-than-ideal experiences dealing with science programs. Unsatisfactory experiences often lead to ill feelings and a lowering of the value placed on the role of the other party. Some superintendents have been disappointed by park scientists who did not produce the needed information; conversely, some scientists have been exasperated by the poor understanding that many superintendents have regarding the benefits and needs of good science-based resource programs.

As an agency, the USNPS has done little to facilitate building a bond between science and management, to educate managers about the value of science, or to train managers in how to build and manage science programs.

### **Designing Strategies to Overcome Institutional Barriers**

Recognizing barriers for what they are is the first step in overcoming them. The USNPS barriers to developing park-based LTEM programs should not be underestimated. They are very real and present difficult challenges for science program managers.

In response to agency culture, there are several steps that are critical to the implementation of LTEM and other science programs. These are:

management education, a phased approach to program design, building program value, creating public-private science partnerships, and celebrating achievements.

**Education.** As park management becomes increasingly more demanding, the need for good information will become correspondingly compelling. However, this may not, in itself, result in a change of agency priorities relating to science programs. The agency must continue to focus management development programs on creating a vision of the USNPS of the future. In this vision, the USNPS is the guardian of what little remains of the natural and cultural heritage of this country. This nationally significant responsibility will by necessity place greater value and demands on effective science-based resource stewardship programs. As this process continues, top managers will more frequently be selected for their understanding of resource management programs and their ability to work with the scientific process. And so the traditions and culture of the USNPS will also change through time.

In addition to general education regarding the value of good science, a well-planned education program is needed to bring about a mutual understanding between managers and scientists as to the values, program requirements, expectations, and costs of LTEM programs. From the broad perspective, this training should occur in a formal program of management development.

**LTEM program design.** Excellent progress had been made in the past five years in the area of developing conceptual models of LTEM programs (Davis 1989, 1992). The best of these models guide program designers to incorporate the most important ecological elements into the program. What some of these models don't address is the importance of phasing the implementation of program elements so that the LTEM program can start building management value as early as possible. LTEM program implementation strategies must address a priority of management needs in addition to building meaningful scientific data relationships. If done correctly, this strategy will not only result in the production of the *right scientific information* but the information will more likely be available *when it is needed*.

**Building program value.** Building LTEM program value is the cornerstone of success. People will fight for what they value. In the USNPS, programs that are valued receive funding and staffing support; those that aren't get cut when finances get scarce. The requirement for LTEM programs to operate for the "long-term" is obviously critical, yet most difficult to assure. Capable science program managers may be able to generate enough energy to design and get a program started, but what assurance is there that it will be continued into the future? What can be done to make LTEM programs as secure as park interpretive and visitor-protection

programs? The answer, again, is value. Program managers must take every opportunity to make the information gained from LTEM programs available and useful for management as well as for scientific purposes. We cannot take it for granted that park managers will support science for its potential value to some future successor. Value, like beauty, is in the eyes of the beholder. Until the USNPS develops a much more sophisticated agency understanding of the need for sound science programs, it will be up to individual park science program managers to foster an appreciation for science at the local level.

As critical park management issues unfold, park scientists should immediately start looking for ways LTEM and research data can be used to develop and support the battle plan to protect the park resource being threatened. Each time that science "wins the day" for the manager, positive reinforcement occurs and value is generated. This science program philosophy cannot be left to chance. It must be a part of a well-designed, value-building strategy. Failure to do this can lead to the demise of even the most scientifically credible LTEM programs.

**Creating science partnerships.** The recent USNPS restructuring process generated a lot of discussion about the values of developing partnerships. Most references have been in regard to management partnerships with other agencies and the conservation community. Science managers should not overlook

opportunities to generate science partnerships. One of the greatest values of science partnerships is the diversification of both financial and staffing support. There is a strong desire to want to completely fund and staff an entire LTEM program with agency-funded personnel. This might be an ideal situation but it does not fit with the reality of today. LTEM programs are usually very labor-intensive and costly. Diversification of funding and staffing support makes these programs less likely to be affected by agency budget shortfalls during lean years.

Many LTEM programs have components that can be supported by partner funding or staff assistance. Examples of potential partners include other federal and state resource agencies, Native American tribes, undergraduate university programs, well-organized conservation groups, the Student Conservation Association, and private-sector cooperators such as "Friends of the Parks" groups, trusts, and park auxiliary cooperating associations. If carefully supervised, some types of data collection can be accomplished by the use of non-USNPS staff. Funds raised by cooperating associations and trusts can also be applied to supporting LTEM programs.

This type of diversification is not only beneficial for protecting programs from park-based funding shortfalls, but serves as an incredible educational tool and a way to involve more people in park science programs. Building highly supportive

constituents that have a true understanding of the natural and cultural values of parks is essential to the survival of the National Park System. A wide range of involvement in LTEM programs may turn out to be one of the best ways to build truly effective partnerships and caring constituents.

**Celebrating achievements.** This factor is closely related to building value. Science managers take the time to publicize events when science is used to improve resource stewardship or visitor experiences. This celebration should be carried out both internally and externally with park and agency partners. The media should be used fully to facilitate celebration and should be recognized as an integral part of the partnership-building agenda. Celebrating LTEM

program successes will help in building a widespread understanding of the relationship of science to park stewardship.

There is no substitute for good science in the design of park LTEM programs. Conversely, there is no substitute for developing a sound LTEM program implementation and maintenance strategy. To keep the "long-term" in the LTEM acronym, science managers must understand the importance of both. Managing successful science-based resource programs in national parks is not an easy task. The most difficult of all components may prove to be keeping an LTEM program alive and well within the constraints of government service and an agency struggling to re-define its mission.

### References

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Perhaps, after all, America never has  
been discovered. I myself would say  
that it had merely been detected.

—*Oscar Wilde*

Education . . . has produced a vast  
population able to read but unable to  
distinguish what is worth reading.

—*G. M. Trevalyan*

Today's public figures can no longer  
write their own speeches or books,  
and there is some evidence that they  
can't read them either.

—*Gore Vidal*