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P.O. Box 65
Hancock, Michigan 49930-0065 USA
1-906-487-9722 • fax 1-906-487-9405
www.georgewright.org

Basing Management Decisions on Science: How Does It Really Work?

Margaret W. Weesner, Saguaro National Park, 3693 South Old Spanish Trail, Tucson, Arizona 85730; meg_weesner@nps.gov

The National Parks Omnibus Management Act of 1998 directed the National Park Service to integrate study results into management decisions. How are parks and other protected areas accomplishing this? This session was developed to be a round-table discussion of how scientists, resource managers, and superintendents interact to ensure that the best scientific information is used in decisions affecting park management.

An issue we faced at Saguaro National Park in Arizona was how to protect a sensitive riparian area—a rare source of permanent water. It was in an area that had been virtually closed to all public use for 40 years, but was likely to experience more use from a new trail route and new homes being built on the park's boundary near the site. Using the model of a “pulse” study developed at Olympic and Sequoia/Kings Canyon National Parks, in Washington and California respectively, we developed a plan to have scientists and managers meet together at the site to conduct investigations and have discussions about the site's most sensitive resources. For five days in May 2003, a group of scientists (a hydrologist, aquatic entomologist, botanist, bat biologist, herpetologist, ornithologist), along with a recreation specialist, archaeologist, and historian, camped on-site and collected data on all the resources of the site. For two of those days, they were joined by about two dozen park management staff and specialists from other agencies and universities. Presentations and facilitated discussions identified the issues of greatest concern, possible management actions, additional research needed, and recommended monitoring strategies. Final products include a volume of scientific reports as well as an illustrated brochure for park staff, organizations funding the project, and the public. A key element in this successful transmission of information seemed to be the personal experience and interactions that resulted from having everyone on site together, gathering data, and discussing issues, threats, and solutions.

Issues at other park sites were discussed during this day-capper session. These included: how endangered freshwater mussels at Big South Fork National River and Recreation Area, in Tennessee and Kentucky, might be affected by upstream horse crossings; reintroduction of bears at Big South Fork; concerns of ranchers about the reintroduction of swift fox at Badlands National Park in South Dakota; unofficial guidelines for mowing roadsides at Badlands to minimize the spread of exotic plant seeds; adaptive management of water flow regimes from Glen Canyon Dam to benefit beaches and endangered species in Grand Canyon National Park in Arizona; how to determine the allowable number of cruise ships in Glacier Bay National Park, Alaska; and issues related to limiting vehicle numbers on the major road at Denali National Park, Alaska.

Through these discussions, the group identified several barriers and some possible solutions to transferring scientific knowledge to managers. The following paragraphs provide a brief summary.

Scientific information frequently is not understood by management staff. Resource managers need to be sensitive to the technical level of information being provided and find ways to translate between scientists and nonscientific park staff. Interpreters can frequently help in this arena, since they are trained to convert scientific information into presentations for the general public. One park is using a geologist in the U.S. Geological Survey's Geologist-in-the-Park Program to "translate" all the geology publications about the park. There was a suggestion that scientists work with park resource staff to develop "white papers" on certain issues to summarize scientific information for management. It was also noted that large projects funded through Natural Resource Preservation Program currently require that a certain percentage of the grant be used for an interpretive component. Finally, Jeri Hall, natural resource stewardship training manager at Albright Training Center in Arizona, is developing a new course in response to a needs assessment which indicated that superintendents feel unprepared to use science in complex decision-making. The course will be for groups of scientists, resource managers, and superintendents.

Another barrier is that some activities (such as routine operations and some maintenance procedures) are not being disclosed. Some participants felt that increased emphasis on compliance with the National Environmental Policy Act is driving us to be more up front about the use of science in decision-making. The newly implemented Planning, Environment and Public Comment (PEPC) system will increase this disclosure as parks begin to track all their compliance activities on a system that is available on the Internet.

The lack of access to scientific information and the need to improve record-keeping of scientific projects and of decision-making is a huge issue related to the use of science. This can be a barrier when information is not known or readily available. Developing systems for archiving information and indexing it for accessibility is crucial. Parks that can build an institutional memory of what has been tried previously are often more successful at incorporating scientific information into decision-making. The lack of documentation can also be a legal shortfall to implementing management actions. Most legal challenges to park decisions are based on procedures rather than on the validity of the science being used to support a decision. This makes good record-keeping even more essential.

Finally, there are issues of flexibility and costs. Monitoring the results of management actions takes money, but it is essential to know if the action taken is leading toward the intended result. Indicators and standards must be selected so that monitoring for them can be done economically in the course of regular business. And agencies need to build flexibility into their management systems, such as by using adaptive management. Such systems allow agency staff to review management objectives related to a specific issue, review indicators and standards being monitored, and make adjustments wherever needed so that objectives can be met.

In summary, there are a variety of barriers to integrating study results into management decisions, and there are many strategies for overcoming those barriers. Resource managers, superintendents, and scientists should be vigilant to ensure that communications remain open and that the best information is available and used in decision-making.