

# **Ecosystem Management, Education, and the Idea of Cave Wilderness In Protecting Karst Resources**

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## **Abstract**

In planning for the use and allocation of, as well as the protection of, natural resources, land managers must consider both social variables and biophysical factors—an ecosystem approach. The sole use of ecological information in the protection and restoration of natural resources, such as karst aquifers, may be self-limiting, as it does not present a holistic understanding of an area, its people, and its resources.

Findings from a recent study on cave wilderness indicate the need for an ecosystem management approach in the stewardship of caves and karst resources. Education was emphasized as an important tool in such an approach

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## **Introduction**

Land use pressures now require protected lands to be linked to and managed in concert with decisions that affect the ecosystem of surrounding lands (Gray & Davidson, 2000). Managing the ecosystems of wilderness recognizes that most are too small to effectively be protected, (Christensen, 2000). The protection or enhancement of wilderness that will insure the continued existence of the values for which a wilderness is protected will depend on the development and implementation of an encompassing, ecologically oriented approach to management (Gray & Davidson, 2000).

The human dimension of ecosystem management, whether on managed land or in wilderness, is more difficult to articulate. Ecosystems are open to flows of matter and energy and to the flows of human values (spatial and temporal) (Christensen, 2000). In planning for the use and allocation of, as well as the protection of, natural resources, land managers must consider both social variables and biophysical factors—an ecosystem approach. The sole use of ecological information in the protection and restoration of natural resources, such as karst aquifers, may be self-limiting, as it does not present a holistic understanding of an area, its people, and its resources.

## **Ecosystem Management and Cave Wilderness**

An ecosystem management approach is a merging of the understanding of the biophysical components of an ecosystem and the human dimensions, providing a holistic perspective in developing management goals for the region. The human dimensions include a variety of people-oriented management considerations and a cross-disciplinary range of inquiry. These include culture, economics, history, and looks at the communities of place as well as the communities of interest.

Findings from a study on cave wilderness (Seiser, 2003) indicate the need for an ecosystem management approach in the stewardship of karst and cave resources. Education was emphasized as an important tool for the management and protection of karst and caves.

Wilderness exists regardless of legal designation. In establishing ecosystem management goals for karst and cave regions, it is the idea of cave wilderness that should be utilized in stewardship of cave and karst resources. If we cannot protect wilderness environments, how do we know that we are adequately protecting caves and karst resources for other uses? By providing for the potential of wilderness, it is possible to establish management plans that adequately protect the cave and karsts resources for other uses.

## Education and Community Outreach

Ecosystem management is participatory and knowledge-based (Gray & Davidson, 2000). "Public awareness of ecosystem potential is critical in developing achievable 'desired future condition' strategies for land management" (Jensen & Everett 1994, p 9). Education is critical in protecting caves and the potential of cave wilderness (Seiser, 2003).

"If we go through the process of trying to pursue some kind of designation, it should be for the purpose of creating broader community outreach and a broader forum for education about caves and karst, obviously, for the protection of cave and karst. But in order to protect you've got to educate" (research participant, Seiser, 2003).

The 1997 National Report Card on Environmental Knowledge, Attitudes, and Behaviors by the National Environmental Education and Training Foundation (NEETF) and Roper Starch, underscores the need for environmental education. In the study, only 32% of the survey participants received a passing grade (43% men and 20% women) for environmental knowledge. The 45 to 54 age group were the most knowledgeable. Those 65 and above showed the lowest levels of knowledgeable (NEETF, 1997). It is important to note that the level of knowledge is not simply age associated, these groups reflect the environmental education of their times. These groups encompass the baby boom generation, a significant portion of the population; they tend to be the ones who have the greatest impact on environmental decision-making processes (via votes and financial support). Although women, in general, scored the lowest on environmental knowledge, women generally displayed more support for air and water quality regulation and the protection of endangered species, wetlands, and natural areas (NEETF, 1997).

Research and education are critical for protection and management of our natural resources. The first step is the interpretation of scientific findings, defining what it means for management and to the public. For scientific research to have meaning we need to find ways to relate the findings to individuals' experiences and knowledge. The next step is to pass on this knowledge through education.

Educational programs need to be developed for natural resources managers (current and future) and local communities. They also need to be developed for regional visitors

(tourists and others) and nation-wide. These last two groups are often overlooked. Developing an understanding of karst and cave ecosystems in people who are not from such regions can impact how they behave when visiting these areas. It may also affect whether they will support program funding and legislation on a national level for karst and cave regions.

Karst and cave based environmental education needs to address both adult and child audiences. Project Underground is one program that can easily be adapted to reach a variety of audiences and age groups. Avenues in which educational programs can occur in are varied: schools, university based programs, agency and extension service programs, and community partnerships. The National Park Service and the U.S. Geological Survey are two agencies that have developed educational programs for school-aged children. In all cases, community involvement is essential for the programs to be effective.

Successful karst and cave environmental educational programs engage the audience in a variety of ways. Capturing the audiences' imagination is an important educational tool. The video *Water's Journey. The Hidden Rivers of Florida* is an example of linking adventure and fun with environmental knowledge. *Water's Journey* as well as Project Underground, does not advocate caving in teaching about karst and caves. While not promoting caving is one way to protect caves, there is value (time and expense) in these programs providing avenues for learning about karst and caves ecosystems without requiring a trip underground (especially appealing to those who do not care to visit caves).

In addition to teaching about karst and cave ecosystems, community outreach programs need to provide people with tools for protecting karst and cave resources as well as the knowledge of how to use them. Knowledge and access to tools to address environmental problems provide opportunities for citizens to take ownership and responsibility in resolving negative environmental situations.

## Conclusion

The human dimensions of an ecosystem change over time as values and understandings change. Education is an essential component of ecosystem management regardless of the environment. Activities that protect karst and cave environments help to protect cave wilderness, aid in the restoration of potential wilderness and may reduce the loss of existing wilderness sites.

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