The Right: The light gray strata in the trench face at Mazama Restoration Dunes site, Fort Rock Basin, OR, is ash from an eruption of Mt. Mazama (now Crater Lake) about 7,000 years ago (Mehringer and Cannon 1994).

Taking the Long View

William D. Lipe

Like other archaeologists of my generation (I completed my Ph.D in 1966), I received my basic training at a time when ecologically oriented archaeology was just becoming respectable. The "cultural ecology" approach (Tayor 1948) was spreading to take hold, and as a result, archaeologists were beginning to routinely collect and analyze food remains and observe occasional pollen samples. The concepts of cultural ecology were reflected in the growing popularity of settlement pattern analysis (Steward 1955, Willey 1974). The "New Archeology" was actually new, and statements such as "change in the total cultural system must be viewed in an adaptive context both social and environmental" (Burford 1963) were considered essentially theoretical.

In the early 1970s, American archaeologists had become quite comfortable with the notion that human beings were part of regional ecosystems, and that people both affected and were affected by environmental variables, with culture as a mediator. The typical research framework had become the region rather than the individual archaeological site (Burford 1964).

Consequently, most archaeologists today are quite receptive to the idea of ecosystem management as a basic approach in federal land management, and can readily see the possibilities for a new, meaningful resolution between archaeologists and land managers. In fact, many of my own ideas about the subject (for example, Lipe 1974 and 1985) were stimulated by discussions with BLM managers and natural resource specialists in the Southwest in the late 1960s and 1970s (for a time, I was even a member of a BLM district advisory committee).

Actors on an Ancient Stage

Western civilization incorporates deeply held beliefs about the separation and independence of humanity and nature (Burker 1995, Ingersoll 1994). Such ideas may implicitly underlie the tendency of some to minimize the long-term human contributions to the evolution of ecosystems.

These views cannot assist in either understanding or managing ecosystems. To manage an ecosystem is to make choices about human mediated impacts with the goal of maintaining diversity and productivity (BLM 1994). As our ability to effect change increases, the managed ecosystem will become one maintained, and to some extent constructed, by human agency. Therefore, the "best scientific data" (BLM 1994) must be employed to understand the human side of the equation as well as the strictly biological and physical.

People did not wait for the Industrial Revolution or environmental catastrophe to become agents of change in their environment. History and archaeology show that human beings have shaped the
ecosystems of North America for at least 12,000 years, and those of Africa, Europe, and Asia for much longer.

Even if people could be written out of the equation, "restoring" ecosystems to some "original" condition is not a scientifically meaningful goal. Ecosystems are by nature dynamic; witness the competition among plants and animals, the weather, and erosion—not to mention volcanic eruptions, forest fires, and hurricanes (Oliver 1994, Winterhalder 1994, Barker 1995). Clearly, this evidence of past variability should inform the decisions we make about the future (Everett et al. 1993).

**Where Does Archeology Fit In?**

The ethic underlying ecosystem management finds a close parallel in conservation archeology, which considers archeological sites to be non-renewable resources valuable to society. Like natural resources, they require stewardship and management for future generations.

Conservation archeology is use-oriented in the sense that it justifies protecting and managing sites because of the values that society can obtain from them (Lipe 1984). By providing information about past cultures and environments, these sites can help inform both researchers and the public. Archeological sites and artifacts can also stand as symbols of particular histories or beliefs—for example, as national historic landmarks or as what have come to be called traditional cultural properties.

Because these resources are non-renewable, it is fortunate that many such uses have little or no effect on their physical integrity. The educational or symbolic value of Mesa Verde's Cliff Palace can be obtained by merely viewing it. With proper precautions, continued viewing does not erode the fabric of the site. However, if excavation is undertaken to provide new information, the site will be physically changed, and the same excavation cannot be repeated.

Conservation archeology promotes fragility in conservation uses such as excavation, but recognizes that providing new information is a primary social benefit of archeology, and hence must be a primary goal of resource management. That is, archeological resources must be protected and managed so that they can provide an optimal combination of information and other public benefits over the long term (Lipe 1974, 1985).

A continuing flow of information from research is also seen as essential to effective public interpretation and education, whether on site or in the museum, the classroom, or the media. Conservation archeology also recognizes the need to protect and manage archeological resources with symbolic value for specific cultural groups as well as the broader public (Barker and King 1992).

Because the primary threats to archeological resources come not from research or other public uses, but from development, looting, vandalism, and the forces of nature, conservation archeologists invest much effort in promoting protective legislation, educating the public, and involving the discipline early in the planning of construction projects. In short, the goals of conservation archeology dovetail quite well with those of other interests provided that land managers acknowledge the importance of archeological resources. Clearly, ecosystem management's focus on integrated, future-oriented goals—and on regional landscapes—is much more compatible with conservation archeology than fragmented resource-by-resource land management approaches, or those based on arbitrarily defined management units. Linked with paleoenvironmental studies, archeology can offer much to ecosystem management, and to public education as well.

**Smarter Ways to Manage the Planet**

Archeology can contribute to "smarter" ecosystem management in a number of ways. Most directly, archeology can provide time depth to our understanding of how the cultural, biological, and physical components of ecosystems interact. To understand and control the many aspects of ecosystems, land managers must first acknowledge they are not static. Then they need to learn more about their history and variation (Everett et al. 1993, Johnson et al. 1994).

It is also essential that land managers not assume that the 19th century state of an ecosystem represents its "natural" or "primitive" expression. For example, some major studies of Pacific ecology assume that human beings had little effect on the distribution of species until the 19th or 20th centuries. Steadman (1995) shows otherwise. Using archeological data, he illustrates that a thousand or more years ago, the settlement of various Pacific islands was followed by the rapid extinction of hundreds of bird species.

Archeological sites, and their patterns of distribution on the landscape, provide a potentially immense reservoir of information for understanding, and ultimately managing, ecosystems. Archeological evidence can work hand in hand with historic documents and photographs as well as with oral history. Archeology can also complement data drawn from non-cultural sources, such as bogs, ponds, alluvial sediments, packratt middens, old-growth woodlands, and so forth.

Kenneth Petersen (1988), for example, used pollen records from mountain ponde and tree-ring records from high altitude conifers to reconstruct the variations in climate that affected the Pueblo Indian agriculture and settlement of southwestern Colorado in the 600s through 1200 A.D. This work contributed greatly to an understanding of changes brought about by the Dolores Archeological Project, a large study funded by the Bureau of Reclamation in conjunction with the construction of the McPhee Reservoir.

Likewise, pollen and charcoal extracted from the sediments of ponds and bogs in the northwest has enabled researchers (for example, Mehlman 1985 and Mehlman and Wignall 1987 and 1990) to reconstruct a long, detailed history of changes in vegetation and the frequency of fires (Johnson et al. 1994). From this record, climatic and regional change can be inferred, and in some cases, can be used as an indication of what Native Americans to manage vegetation and game over large areas (for example, Burnett and Arno 1982).

Archeology and paleoenvironmental scientists need to understand the information needs of land and resource managers and work cooperatively to meet them. The pioneering Fort Rock Forest Ecosystem Health Assessment (Everett et al. 1993, Everett 1994) provides a model for this kind of cooperation. In fact, most of the site studies done as part of the assessment, Johnson et al. (1994) note:

By studying today's communities, without reference to the fossil record, we could not have known that the eastside's familiar broad distributions of woodland and steppe did not take shape until after 4,000 B.C. [before present], that northern Idaho's hemlock and cedar forests were even younger, or that a few centuries ago and many times during the past 4,000 years, the juniper woodland's expanse exceeded that of its historic spread. The remarkable rapid demise of the scablands' late-glacial woodlands shows the process and pace of total replacement, and the potential magnitude of future vegetation change with rapid global warming of 4 to 5° C (Ovverpeck et al. 1991).

A shift to ecosystems as management units should in most cases provide better contexts for managing archeological and paleoenvironmental resources than do the administratively drawn units currently in use. Many archeological resource managers have in fact long attempted to use regional or ecosystem contexts in making decisions. Still, one of the problems in complying with the section 106 dictates of the National Historic Preservation Act is overreliance on a site-by-site approach (King 1995). An ecosystem orientation should make it easier to develop larger-scale contexts for assessing archeological and historic sites, and may help justify greater protection for paleoenvironmental sites as well.

As the new orientation takes effect, archeologists will have to make themselves more useful to ecosystem managers. This may mean that some of the archeological resource will have to be conserved in excavations focused on the ecology of the past. Archeologists will also be called upon to work even more closely with paleoenvironmental scientists. Such research can be undertaken under section 106 of the National Historic Preservation Act as part of an agency's response to development. Or agencies can proactively pursue this work under other authorities such as section 110 of the Historic Preservation Act. Investigations by non-federal researchers can be integrated into the research through cooperative agreements or special contracts.

Archeology's Main Message

The success of ecosystem management will ultimately depend on the ability of resource and land managers to obtain wide public support.

Archeology can be a particularly useful tool in educating the public, and hence can help bring about better understanding of the concepts of ecosystem management. The archeological record is rich with examples of stable long-term adaptations of humans to their environments, as well as of significant ecological changes brought about by small-scale, low-technology, prehistoric cultures (Kolter 1994). Of course, the archeological record in the historic period documents the rapid environmental changes of the Anglo-European frontier and the Industrial Revolution.
A 6,559-year-old heart yielded the remains of waterfowl and fish at the Mazama Dunes, recently acquired by the Archaeological Conservancy. The work was a cooperative effort between BLM archaeologist William Cannon and Peter J. Mehriinger of Washington State University.

Marquardt (1994), for example, reports on how a large number of volunteers assisting with Booklet's prehistoric Colusa Indian culture learned about the environment as well as archaeology. He notes, "The story of the Colusa is also the story of the Chiliwack Harbor oyster system, a marvelously productive, shallow, brine-scented bay fed by two major rivers and surrounded by geologically young barrier islands. We teach both adults and children about the mangrove forage for denizens of the intertidal zone and the channels for waterfowl and fish. When the kids get new bird feathers, they learn about where birds get their food. They can see how much a healthy bay contributes to the life of the bay itself." Marquardt shows that the conservation concept with archaeology may have a synergistic effect, promoting wider understanding of both.

The most important message that archaeology can communicate in its uniquely tangible and dramatic way is emphasized in a recent book by Jared Diamond (1992). Diamond argues that because our cultures and technologies allow us to switch rapidly to new resources as old ones are depleted, we have an enormous capacity to degrade the ecosystems on which we depend. Archaeology can dramatize this by showing that the capacity is an ancient one, and hence part of the human condition.

In a chapter entitled "The Golden Age That Never Was," Diamond summarizes a number of cases of habitat destruction pre-dating the industrial era. In concluding the chapter, he says that "archaeological research is one of the best bargains available to government planners . . . We can't afford the experiment of developing five counties in five different ways and seeing which four counties get ruined. Instead, it will cost us much less in the long run if we hire archaeologists to find out what happened the last time."

Diamond argues that our ability to degrade environments poses a great threat to the future as our susceptibility to letting inter-group conflict escalate to violence. Both threats will require constant vigilance if we are to maintain a decent quality of life for the generations to come.

The educational potential of archaeology can be realized by on-site interpretation, museum exhibits, research involving adults and students, school programs, and both print and visual media. The increasing success of all these modes evidences a growing public receptivity to archaeology as a way of learning about cultures and environments. For example, the newsletter of the Society for American Archaeology's public education committee has attained a circulation of nearly 9,000 in less than five years, with a large number of copies going to teachers in the K-12 school systems.

Land managers must not fall into the trap of justifying the protection and management of archaeological sites only to the extent that they contribute to ecosystem-oriented research and education. Sites and artifacts document human history, whether or not they also contribute to a better understanding of past cultural ecology; these historical uses have long been recognized by federal laws and policies. Furthermore, many Native American and other groups see some archaeological sites as tangible expressions of their cultural traditions. Their claims as stakeholders in management decisions affecting these sites are therefore increasingly established by law, policy, and public opinion.

If these broader concerns are taken into account, ecosystems may get ruined. Instead, it will cost us much less in the long run if we protect and manage archaeological sites only to the extent that they contribute to ecosystem-oriented research and education.