

Taking Stock of the Past

It is estimated that there are millions of archeological sites in the United States. Archeologists have discovered only a fraction of them, and evaluated even a smaller percentage. Clearly, there is a lot of work to do.

In sites deep or shallow, archeological deposits offer an invaluable glimpse of how people interacted with ecosystems of the past. There is a wide spectrum of evidence—earthen, biological, atmospheric, and sociocultural. But to get the data, the sites have to be found.

There is no hard information on how many deposits are being destroyed by erosion, accidental excavation, or other factors. The inexorable dwindling of the *in situ* archeological record is one reason why site surveys are so important. In order to manage these nonrenewable resources, we need to know how many there are, where they are, what they are, what condition they are in, and why they are important.

To comply with Sections 106 and 110 of the National Historic Preservation Act, Federal agencies are required to evaluate the potential impact of their undertakings on significant archeological sites. For each land-impacting project permitted, an agency must have adequate information to judge its probable impact. The agency, in consultation with the State Historic Preservation Officer and the Advisory Council on Historic Preservation, uses the information to plan for the avoidance or mitigation of damage to the site.

The Minerals Management Service, for example, is answerable for protecting historic shipwrecks and submerged sites on the outer continental shelf. To assist in meeting its obligations under the Act, the Service supports extensive literature surveys and the development of predictive models to identify the probable locations of sites in its jurisdiction.

Frequently there is not enough information available prior to the required consultations, especially for agencies that provide funding or permits for projects on non-Federal lands, such as the Federal Highway

Administration and the Nuclear Regulatory Commission. Even land-managing agencies often have inadequate information to evaluate large projects. Field survey is a labor-intensive job, and labor costs money. Activities perceived to be less central to an agency's mission often have lower priority in expenditures.

Thus, organizations that need Federal permits—like private construction companies—provide “third party” assistance in collecting and evaluating archeological data, assessing possible impacts to sites, and devising plans for mitigation. These third party projects can be complex, involving several layers of private contractors working with local, state, tribal, and Federal offices. Two examples are reported in this section: the relicensing of dams along the Missouri River and the laying of gas pipeline from British Columbia to California. Integrating archeology into all the layers of management is the only way to ensure that sites in such projects are inventoried and protected.

Few areas in the United States have been surveyed intensively enough to identify all their archeological deposits, much less investigated with high-tech equipment. Yet archeologists make judgment calls every day based on limited information. They have a job to do. The more they know about the resources they manage, the easier that job will be. In the end, we all will benefit.

—Ruthann Knudson
National Park Service

Sleuthing for Sites

It's always worthwhile to know what you have in your coffers. Then you can at least try to use your resources wisely, without frittering them away.

Your bankbook tells you where you stand with creditors, but with most other resources, you need to take frequent inventory and continually reevaluate their worth. Federal agencies try to do that with archeological sites, but the sheer cost of surveying every square kilometer of public ground prohibits it. This despite the laws mandating that these sites be inventoried.

Some creative solutions to the dilemma have been advanced, most of them invoking strategies to characterize, if not every archeological site, at least the kinds, numbers, and probable locations of sites expected to occur on a given tract of land. The Bureau of Land Management's California Desert Plan, for instance, anticipated cultural resources in habitats tested only in part. More recently, the Fish & Wildlife Service, through predictive modeling, pinpointed likely land-use conflicts in Nevada's Stillwater Wildlife Management Area.

The work at Stillwater was predicated on the assumption that some landscapes change slowly and that, despite historic disturbances, it's possible to figure out where people went in the past and where the archeological sites are likely to be. Intermountain Research of Silver City developed a predictive model of Stillwater's site types, relative frequencies, and locations by taking a detailed soil survey of the management area (nearly 1,000 square kilometers), inferring the probable geography of prehistoric plant and animal communities, and calculating the expected human uses of various parts of the landscape. The model was tested by surveying a random sample equivalent to 5 percent of the study area. The model successfully predicted 85 percent of the 259 sites located by the survey.



Test excavations at the Missouri-Madison project (photo by Renewable Technologies, Inc./courtesy Montana Power Company).

The model is currently being expanded, with the goal of blanketing the entire territory of local indigenous groups irrespective of modern boundaries. The results should contribute substantially to coordinating agency efforts and help reduce the isolating effects that multiple jurisdictions impose.

For information contact the U.S. Fish & Wildlife Service, Portland Region, Division of Refuges (Attn: Anan Raymond), 1002 N.E. Holladay Street, Portland, OR 97232-4181, ph. 803-231-6214.

One for the Books

Over the past hundred years, the headwaters of the Missouri—a centuries-old water supply on the eastern face of the Rockies in western Montana—have provided power and recreation for millions of people. But the river's dams were last licensed five decades ago, before the National Historic Preservation Act, the National Environmental Policy Act, and other laws. So when the Montana Power Company filed for renewal with the Federal Energy Regulatory Commission, it had zero cultural resource information—now required—to put on the forms. Complicating the process were the overlapping political boundaries along the river's course.

The company's response to the challenge reads like a chapter in a compliance textbook. Not only does the renewal seem certain, but the region's cultural resources are getting the protection they deserve.

Nearly 2,000 acres and over 200 miles of shoreline lie within the company's jurisdiction in a region that people have used for at least 11,000 years. Historic sites dot the terrain—mined heavily in the 19th century—and the archeology and architecture of the earliest hydroelectric plants are significant in their own right.

The first step in relicensing was to thoroughly inventory archeological sites, historic architectural and engineering elements, and traditional cultural properties. The company undertook a broad cultural resource program, following a three-stage process prescribed by the Commission.

In the first stage, the existing literature was reviewed, along with other information on the sites. The company initiated consultation with various Federal, state, and local agencies and tribes, and planned the inventory.

The inventory took place in the second stage. Shoreline sites, which are affected by fluctuating water levels, were studied intensively. The company also consulted with the traditional religious leaders of the Wind River Shoshone, the Salish, the Kootenai, and the Blackfeet. Although no traditional Native American properties were discovered, twenty-two prehistoric and nine historic archeological resources were identified and evaluated for the National Register of Historic Places.

The third stage, not yet started, will recover the resources deemed significant and mitigate the effect of the fluctuating waters.

The project has already spawned nine cultural resource management reports for the pre-draft, draft, and final applications for relicensing. These reports plan continuing cultural resource management activities as part of operating the dams and developing the land. The company is also writing a programmatic agreement to foster cooperative efforts with the Commission, the Advisory Council on Historic Preservation, the Gallatin National Forest, the

Helena National Forest, and the Montana State Historic Preservation Office.

The rich cultural resources uncovered by the inventory will elucidate visitors for generations to come. On top of that, they'll find that the fishing is wonderful!

For information contact the Montana Power Company, Environmental Department (Attn: Jim Shive), 40 E. Broadway, Butte, MT 59701, ph. 406-723-5421 x73154.

Undersea Hunt

The outer continental shelf, nearly two billion acres along the nation's coastline, is strewn with historic shipwrecks and archeological sites. To protect these priceless resources from inadvertent damage, the Minerals Management Service has come up with a way to predict where they probably are in advance of mining projects.

As the agency responsible for leasing mineral rights to the shelf, the Service casts a wide net in compiling data for its computer models, which anticipate where the wrecks and sites will likely turn up.

To look for the ships, Service archeologists feed the computer information on the locations of shoals, capes, and other geographic landmarks. They also plug in data on historic shipping lanes, ports, and harbors and on where known wrecks are concentrated. For archeological sites, they key in the locations of known sites along nearby coastal areas (which often have associated sites offshore). Both models employ information on changes in shelf topography, sea level, and bottom sediment over time.

Before tracts can be leased, areas identified as "archeologically sensitive" require remote sensing surveys with amphibious gear. Potential archeological sites must be further investigated or avoided altogether.

For information contact the Minerals Management Service (Attn: Melanie Stright), 381 Elden Street, Herndon, VA 22070, ph. 703-787-1736.

Atomic Archeology

Although the Nevada Test Site, run by the Department of Energy, is best known for nuclear weapons testing, many kinds of projects take place on this 1,300 square mile tract of land. Since the late 1970s, the Department—in compliance with the National Historic Preservation Act—has required that archeological sites and historic properties be identified and evaluated in advance of any of these operations.

Plans vary depending on the particulars of the work. Projects range from measuring radioactivity in groundwater, to restoring contaminated areas, to installing power lines and taking seismic surveys.

In one of the larger, more complex operations, the Yucca Mountain area was studied as the nation's first potential site for storing high-level nuclear waste. A programmatic agreement between the Department and the Advisory Council on Historic Preservation spelled out how to identify, evaluate, and mitigate the waste's potential effect on cultural resources. (The Nevada historic preservation office was not part of the agreement; for consultations and reviews, the Department works directly with the Council.)

Cultural resources were identified within the 11 square miles directly affected by the project as well as at associated work sites. The Department, through sample surveys,

also studied how the increased traffic might affect other cultural resources in the vicinity.

After meeting with 16 Native American groups and preparing an overview of findings, the Department determined that avoiding the resources altogether was the best way to mitigate damage. The decision requires that the Department work with the Native Americans to monitor the construction's ongoing effects. Meanwhile, in the field, the project office ensures that all work plans, including surveys for historic properties, comply with quality assurance guidelines and incorporate a research design for cultural resources.

Cleaning up contaminated land does not usually demand a programmatic agreement. However, merely complying with the National Historic Preservation Act is a challenge because field workers are subject to various precautions, codified in a safety plan. They must wear anti-contamination suits (with voice-activated recorders), use disposable field equipment, and closely monitor radioactivity. The cleanup often destroys irreversibly contaminated sites and properties, so it is essential that they be surveyed beforehand.

Most of the other programs at the site follow standard compliance procedures under Sections 106 and 110 of the Act. Another programmatic agreement is now being developed for a study on how the site's groundwater may be affecting cultural resources. To promote uniform procedures and evaluations, the Department is preparing a cultural resource management plan that covers all of the site's activities.

For information contact Dr. Lonnie Pippin, Desert Research Institute, Quaternary Sciences Center, P.O. Box 60220, Reno, NV 89506, ph. 702-673-7306.

Managing Complexity

In the late 1980s, the expansion of a natural gas line between British Columbia and southern California posed one of the most complex management challenges for Federal archeologists to date. The project required 800 miles of pipe along a thousand mile right of way through Idaho, Washington, Oregon, and California. All told, the work took five years of planning and construction, the efforts of thousands, and more than 380,000 tons of pipeline. That plus a lot of earth moved—and sifted—in the process.

The project's sponsors, the Pacific Gas Transmission Company and the Pacific Gas & Electric Company, had to secure authorization from numerous agencies before work could proceed. The Federal Energy Regulatory Commission issued a Certificate of Public Convenience and Necessity, the Bureau of Land Management approved an amended right-of-way grant, and the offices of the Bureau of Land Management and Forest Service in three states issued permits under the Archaeological Resources Protection Act.

A programmatic agreement was key to coordinating the treatment of historic properties and archeological sites. In August 1991, an agreement was drawn up among the Commission, the Bureau, the Forest Service, the Advisory Council for Historic Preservation, and the State Historic Preservation Officers of Idaho, Washington, and California, with the two gas companies as concurring parties.

The agreement set forth procedures for identifying and evaluating cultural resources, required the development and implementation of a historic properties treatment plan and monitoring plan for construction, established procedures and schedules for review of archeological reports and related documents, identified curation standards, specified approaches for treating human remains, and outlined procedures to follow for changes in the project.

Archeological work began with a cultural resources overview and sensitivity model for the pipeline's proposed route. In 1989-90, on behalf of the gas companies, INFOTEC Research and its principal subcontractor, BioSystems Analysis, completed an intensive field survey, inventory, and preliminary assessment of 317 cultural resources within the project's "Area of Potential Effects." The findings were documented in a cultural resources assessment report. In 1990-91, work by the two firms led to an archeological testing and evaluation report/historic properties plan.

INFOTEC and another subcontractor, Far Western Anthropological Research Group, tested and excavated sites in 1991 under a contract with Pacific Gas Transmission and then under a subcontract with Bechtel, who laid the pipe, from 1992 through 1994. A second testing and evaluation report/historic properties plan was prepared for investigations after 1990.

From early 1991 through the summer of 1993, as project planning intensified and construction began, INFOTEC and Far Western did supplemental surveys, evaluated and excavated sites, monitored construction, and performed "emergency archeology," that is, for sites discovered during construction. Scores of brief, interim reports on the area's archeology came out of this work.

By the time pipe was laid in October 1993, INFOTEC and its subcontractors had recorded and investigated nearly 700 cultural resources, among them 243 prehistoric sites, 178 historic sites, and 61 sites with both historic and prehistoric components.

For the prehistoric sites, the archeologists studied how hunter-gatherers adapted to the land and environment of the past. The research encompassed a wide range of disciplines and tools: geomorphology, remote sensing, radio-carbon dating, paleobotany, zooarcheology, blood residue analysis, x-ray fluorescence spectrography, obsidian hydration measurement, human osteology, and lithic analysis. The research, which elucidated how the hunter-gatherers subsisted over 10,000 years, advanced knowledge in many localities where the archeological record was not well known.

In examining the historic sites, the archeologists created a picture of rural householders in the late 19th and early 20th centuries. The findings fleshed out how consumer products were distributed, used, and discarded. Studies of single-family farmsteads and communal work camps pointed up discrepancies in the historic record as well as identifying previously unknown occupants of the area.

A five-volume final report, now in preparation, will document the full breadth of the project's archeology, which spans thousands of years along the entire West Coast.

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