

# Preserving Heritage Resources Through Responsible Use of Southern Nevada's Lands

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## Introduction

Southern Nevada's cultural resources (heritage resources) include archeological remains, sacred sites, historic sites, and cultural landscapes of significance to Native Americans and many other groups. Locating, maintaining, and protecting these special places are part of the mandate of Nevada's Federal and state agencies. This chapter addresses Sub-goal 2.2 in the SNAP Science Research Strategy, which is to preserve these resources through responsible use of southern Nevada's lands (table 1.3; Turner and others 2009). It explores non-destructive means of identifying, recording, and protecting cultural resources. Cultural resources at risk, risk factors, and needed measures to protect them are discussed, with a focus on non-destructive preservation and protection measures. Selected methods of non-destructive identification, recording, and analysis of sub-surface remains are also reviewed.

## Cultural Resources at Risk

Nevada is one of the fastest growing states in the country. According to the 2010 U.S. Census, the population grew by 35 percent since 2000 and by 66 percent the previous decade. Nevada is the only state that has maintained a growth rate of 25 percent or greater for the last three decades ([www.census.gov/prod/cen2010/briefs/c2010br-01.pdf](http://www.census.gov/prod/cen2010/briefs/c2010br-01.pdf)). In southern Nevada, the population of Clark County (1,951,269) grew by 42 percent from 2000 to 2010. In-migration from other states has contributed strongly to these growth patterns, with newcomers often having little knowledge of the role and importance of the state's history. These population growth trends have considerable influence on how the state preserves its past (NVSHPO 2004, 2012).

Agency reports identify both natural and human-caused threats to heritage sites (USDI BLM 2000: 5-7):

- Increasing visitation,
- Increasing use of public lands for permitted projects,
- Insufficient staffing and funding for cultural resource programs and law enforcement,
- Looting and vandalism, and
- Urban sprawl and development.

Urban growth and development in and surrounding southern Nevada cities impact the heritage resources in the area. Development can lead to resource destruction as construction increases and homes and businesses are built on previously undeveloped lands. In addition, urban growth has increased recreation pressure on public lands. According to the Nevada Comprehensive Preservation Plan (NCP) (NVSHPO 2004, 2012), increased

pressure on resources from urban growth, recreation, and the use of all-terrain vehicles (ATVs) has resulted in increased vandalism and illegal looting (collecting artifacts and/or excavating on an archeological site without a permit) on previously remote and inaccessible sites.

As one senior Bureau of Land Management (BLM) official noted: “BLM has complete regulatory ability to control the impacts on cultural resources of its permit applicants; however the greatest threat to cultural resources today is coming from the rapid increase in recreational access, with essentially no regulatory control, or enforcement capacity in place to deal with growing impacts” (Jarvis 2006: 7). Another official indicated that increasing visitation to public lands is resulting in both intentional and unintentional damage from collection, vandalism, and surface disturbance. “Remote areas, once protected by their distance from populated areas, are now within easy reach of the hardy and well-equipped hiker, off-highway vehicle user, and urban and suburban resident” (Jarvis 2006: 27).

Adding to the problem is the fact that law enforcement officers and cultural resource staff are unable to monitor activity on all the archeological and historical sites across the vast landholdings of the Federal agencies. A report describing Federal agency site protection efforts (Swain 2007) describes the approximate ratio of acres per agency law enforcement officer. The figures are for the BLM, U.S. Forest Service (FS), National Park Service (NPS), and U.S. Fish and Wildlife Service (FWS). While this ratio varies within subunits of the agencies, it serves to indicate the degree of police presence on the public lands. Each of the four agencies employs professional cultural resources management staff and Law Enforcement Officers (LEOs). These professionals have a wide range of tasks, which ultimately result in a relatively small percentage of time in the field visiting or monitoring archeological sites. The BLM and FS manage about 455,000,000 acres (184,131,967.22 hectares) between them but have only one LEO per 1,000,000 acres (404,685.64 hectares). The NPS manages ca. 84,000,000 acres (33,993,593.95 hectares) with one LEO for every 56,000 acres (22,662.40 hectares) and the FWS has 93,000,000 acres (37,635,764.73 hectares) with one LEO for every 104,000 acres (42,087.31 hectares; Swain 2007).

Although the exact level of enforcement that would be needed to reduce looting and vandalism across the Federal landscape is uncertain, a project from Joshua Tree National Park, located in the Mojave Desert to the east of Los Angeles, sheds light on the topic. During 1993, the park received special archeological protection funding for the systematic monitoring of cultural sites. A long-term volunteer with extensive knowledge of the park and its archeological sites was hired to conduct the monitoring. The site monitor spent each workday visiting archeological sites and documenting their condition. He visited sites near front country campgrounds as well as sites 5 or more miles from the nearest road. After 1993, the Park received no additional funds for site monitoring (Swain 2007).

From 1985 to 2005, excluding 1992 and 1993, an average of 9.6 looting incidents per year was documented. By contrast, in 1992 and 1993, the average number of documented incidents per year was 101. Over 200 Archaeological Resources Protection Act (ARPA) violations were documented during 1993 alone. The data from Joshua Tree National Park tend to show that only a very small percentage of the looting activity on the public lands is actually discovered and documented during any given year (Swain 2007). Intensive monitoring can lead to a much higher discovery rate, with presumed positive impacts for site protection. The visibility of regular monitoring and LEO presence also can serve as a deterrent to looting and vandalism (McAllister, personal communication 2012).

“Threats to archaeological and historical sites (are not) confined to looting and vandalism, as recreational activities, urban sprawl, overuse and natural erosion are increasingly taking their toll on our Nation’s irreplaceable treasures” (USDI BLM 2000: 4). Historic structures, both in the cores of urban areas and in rural areas with severely declining populations are also at risk from destruction by development and lack of funding for maintenance and restoration. Some structures also have been destroyed by arson (NVSHPO 2004, 2012).

## **Cultural Resource Protection Measures and Organizations**

Federal agencies in southern Nevada use and recommend a number of measures to assist in protecting heritage resources (Jarvis 2006: 27-28). Chief among them are the following:

- Public education and outreach programs.
- Cultural resource site monitoring.
- Law enforcement for cultural resources.

### ***Public Education and Outreach***

Public education and outreach efforts range from preparing sites and structures to receive visitors with trails, signage, and other protection measures such as fencing, to active public involvement programs like Passport in Time operated by the FS (USDA FS 2011). Rapidly increasing recreational access requires public education concerning the importance and fragility of archeological and historic sites. Cultural resource professionals express enthusiasm for the positive effects of their education programs on recreational users, believing that education will reduce potential negative impacts of increasing visitation to public lands. Many feel most of the inadvertent damage to resources could be averted by various current education programs. There is the belief that when the public is made aware of the fragility and uniqueness of these resources, they will be careful not to damage them (Jarvis 2006). Some of the most successful programs involve public participation, like Passport in Time, but they reach a more limited audience. Brochures and information kiosks can also be effective teaching tools by reaching a wider audience. They are especially effective when they are attractive, current, and appropriately placed near the resource in question.

BLM uses two non-profit partners—Tread Lightly, Inc. and the Leave No Trace Center for Outdoor Ethics, Inc.—to educate visitors concerning proper treatment of cultural resources, as well as the public lands in general (Jarvis 2006). However, many southern Nevada BLM managers think that there is insufficient funding to support education programs and direct protections like closing roads and trails, building enclosures and fences with gates, and other physical barriers to prevent site damage (Jarvis 2006).

Several agencies have long-running, successful, national public involvement programs. These include Passport in Time Program (USDA FS 2011), Adventures in the Past, which includes Project Archaeology (USDI BLM 2011), and a relatively new Geotourism Partnership project (USDI FWS 2008). The National Park Service (NPS) has a long history of both cultural and environmental education efforts. As examples of these efforts, the U.S. Forest Service, Passport in Time Program (PIT) pairs professional agency archeologists and historians with volunteers on national forests throughout the country. PIT projects include archeological survey, excavation, rock art recording and restoration, archival research, oral history gathering, and many others (USDA FS 2011).

Project Archaeology, a part of Adventures in the Past, is a national education program for teachers of upper elementary and mid-school students that trains the teachers and provides curriculum materials for teaching the students to value and care for their archeological and historic heritage (USDI BLM 2011). These education programs attract a substantial number of volunteers and are very favorably received. Several agencies also have participated in the Preserve America Grant program administered by the NPS (Advisory Council on Historic Preservation), which provides matching grants to support preservation efforts through heritage tourism, education, and historic preservation planning. However, the Preserve America Grants were not funded for 2011 and funding for 2012 is uncertain (USDI NPS 2011a).

A Nevada-specific program, Preserve Nevada, is a non-profit organization dedicated to preservation of the state's cultural, historic, and archeological heritage. The Board of Directors is selected from different parts of the state and is designed to bring the perspective of a committed and experienced group of preservationists to the task of meeting the special needs of Nevada's resources. Preserve Nevada works with the Public History program at the University of Nevada, Las Vegas, and provides the opportunity for graduate students to gain experience and training by working closely with the Board of Directors on many of the organization's projects. The students meet with National Trust leaders, represent the organization at a variety of functions, and work with both state and local governments on planning and development issues. This work provides the students with experience and contacts for their future careers in preservation. The Preserve Nevada project builds bridges between the community and the university, between education and advocacy, and between methods and practices, training a new generation of preservation professionals (NVSHPO 2011).

It should be noted that the Nevada Comprehensive Preservation Plan (NCP) (NVSHPO 2004) also recommends the use of college interns to assist the Nevada State Historic Preservation Office (NVSHPO) and Federal staffs in archeological, architectural, and historic surveys and in preparing National Register nominations.

Other examples of creative outreach and education programs come from Lake Mead National Recreation Area, which has an active education and interpretive program featuring educational programs, field trips, and volunteer experiences. Education programs include not only cultural resource activities but also activities from other science programs for students and teachers. There is a Hispanic outreach program and a Hispanic community partnership program involving all the SNAP agencies, such as the BLM, FS, FWS, and, of course, NPS. There are also Professional Development Education opportunities that have been developed by the SNAP Education Staff for teachers. Some specific examples of historic and cultural programs for students include "Hiking Through History" focusing on Hoover Dam and the U.S. Government Railroad and "Puzzle Pieces of the Past" focusing on archeological sites and artifacts (Rowland, personal communication 2012).

The NPS Submerged Resources Center in Denver has worked at Lake Mead in cooperation with the Woods Hole Oceanographic Institution filming underwater archeological sites in the lake. These include an airplane that crashed into the lake and infrastructure related to the construction of Hoover Dam. These are used in a program to teach children not only about the submerged archeology of the lake but also about other issues related to the lake such as water monitoring and problems with the invasive quagga mussel (Seeb, personal communication 2012).

### *Cultural Resource Site Monitoring*

Monitoring the condition of heritage resources is an important part of agency responsibilities to their lands. Unfortunately, there is rarely sufficient staff to undertake

comprehensive site monitoring on a realistic scale and time frame, as mentioned previously (Swain 2007); volunteers are often used to meet this need. In its comprehensive plan, the NVSHPO recommended establishment of a site stewardship program to accommodate the public's desire to become involved in historic preservation activities and to take into consideration the small size of state and Federal heritage and preservation staffs and budgets (NVSHPO 2004).

In 2004, the Southern Nevada Agency Partnership (SNAP) Interagency Cultural Site Stewardship Team created the SNAP Cultural Site Stewardship Program (CSSP). Partners in the SNAP CSSP include NPS, BLM, FWS, FS, and U.S. Bureau of Reclamation (USBR), Nevada Department of Cultural Affairs (NDCA), Lost City Museum (LCM), and Nevada State Historic Preservation Office. The program is managed under a cooperative agreement with the University of Nevada-Las Vegas, Public Lands Institute (UNLV-PLI). The UNLV-PLI Program Manager provides a variety of services including recruitment of volunteer site stewards, standardized training, reporting of monitoring results to the appropriate Federal agency, and public outreach. The program is composed of volunteers who serve as site stewards to monitor at-risk sites for natural or man-made damage, which is reported to the responsible land manager (USDI NPS 2007).

The volunteer site stewards participate in training sessions and monitor their assigned sites at least four times per year. To date, over 540 volunteer site stewards have been trained. They have donated over 16,100 volunteer hours and driven over 212,000 miles. Stewards have reported over 645 significant impacts that have resulted in criminal investigations, and have informed management actions including closing of unapproved roads, development of a Road Designation Plan, and removal of graffiti from rock art sites. The program has been very successful and has received several awards including the 2007 U.S. Department of the Interior Cooperative Conservation Award, Certificate of Commendation from Senator Harry Reid, and the Preserve America Steward Award from First Lady Michelle Obama in 2010 (Phillips 2011).

Effective site monitoring should include frequent site inspections that are apparent to site visitors and are undertaken by well-trained and enthusiastic volunteers, who are adequately supervised by agency staff (Livingston and others 2005). As discussed in the Sloan Canyon Plan (Livingston and others 2005), since agencies depend upon volunteers to accomplish the monitoring, they are faced with the problem of administering volunteers who have few sanctions to correct inappropriate behavior. The vast majority do an outstanding job, while a few do not. The plan also points out that site monitors themselves should be monitored by agency staff because stewardship programs can provide a good cover for looters and a place to discover previously unknown information on site locations. Despite these cautions, the majority of site stewards do an enthusiastic and valuable job of extending the "eyes and ears" of Federal staff to protect fragile heritage resources.

### *Law Enforcement for Cultural Resources*

Federal agency law enforcement plays an important role in protecting archeological and historic remains from looting and vandalism. However, Federal heritage resource professionals believe that there are far too few agency LEOs (Swain 2007; USDI FWS 2008). Agencies work with other law enforcement partners, such as other Federal enforcement agencies, state and local police, and sheriff's departments, to augment their numbers, although many local police and sheriff's departments are not trained in ARPA enforcement. In general, most law enforcement personnel from the Federal agencies have basic ARPA training (McGaha, personal communication 2012), as recommended by Swain (2007).



There have been various successful ARPA prosecutions in recent years that have increased awareness of the problem of looting on archeological sites. BLM enforcement personnel have had some highly publicized and successful enforcement actions taken against organized thieves stealing archeological artifacts from public lands (Jarvis 2006: 28). The USFS has successfully prosecuted an ARPA case resulting in replacement of a petroglyph to its original location. The NPS had a successful prosecution of a man sentenced to time in Federal prison and ordered to pay restitution for defacing petroglyphs with paintballs in the Grapevine Canyon area of Lake Mead National Recreation Area. "This sentence comes as a result of the hard work of park rangers, special agents of the National Park Service Investigative Services Bureau and the U.S. Attorney's Office. We are pleased with the result," said Bill Dickinson, superintendent of Lake Mead National Recreation Area. "What's important about this case is that it started with a visitor calling 911 to report the illegal activity" (USDI NPS 2011b). Despite such successes, there are still too few law enforcement officers to protect the cultural resources on the extensive public lands of the state (USDI FWS 2008). As discussed in a BLM report on Cultural Resources on Public Lands (Jarvis 2006: 28): "For every criminal caught in an ARPA (Archaeological Resources Protection Act) violation, it is believed that many more violations go un-discovered, much less un-prosecuted."

In addition, as public access and criminal activity increase on public land, LEOs are spread even more thinly. Law enforcement priorities are now being focused on drug interdiction, homeland security issues, and control of undocumented immigrants (Jarvis 2006). To assist in closing the gap, Federal land managers have not only turned to volunteers but some are developing and using remote protection technology such as concealed video surveillance cameras, especially in remote areas that appear to be secluded and may lead thieves to feel that they will not be detected (Livingston and others 2005; USDI FWS 2008).

## **Non-Destructive Techniques for Identifying, Recording, and Analyzing Archeological and Historic Remains**

Standard non-collection archeological survey remains the preeminent technique used to identify surface remains and features. These techniques are well documented and will not be reviewed in this discussion. The focus here will be on select geophysical surveying systems that non-invasively and non-destructively map subsurface features. The following techniques are presented:

- Ground penetrating radar (GPR)
- Magnetometry
- Soil resistivity

These techniques are useful where excavation is undesirable, too costly, or otherwise not possible. They can assist managers in determining which areas to avoid during construction or other land-disturbing activities and which areas may require additional testing or excavation. Non-invasive methods do not destroy the archeological record as it is investigated, but they do require special equipment and training and can be costly (Archeology Mapping: <http://www.archeologymapping.com> 6-2-2011; Shott 1996). In addition, the land coverage rate is low owing to the nature of the methods and the time needed to implement them. Thus, they are mainly practical at small scales and are not cost-effective in replacing standard archeological survey techniques. They are better for defining features within known archeological sites than conducting large-scale surveys. Natural variations in soil texture, moisture, and soil inclusions affect the efficacy and

reliability of these techniques. Because they record archeological features as anomalies against the background soil, they must be recalibrated for each set of local soil conditions (Bevan 1996; Shott 1996).

### *Ground Penetrating Radar (GPR)*

GPR is a geophysical method that uses radar pulses to image the subsurface, generating cross-sectional views of underground features. GPR is able to detect a wider variety of buried materials than other geophysical instruments. It can detect metal, wood, stone, brick, and air-filled voids and is suitable for locating lenses of debris as well as refilled pits and ditches (Bevan 1996). As such, the technique has been used to locate graves, occupation surfaces, walls, floors, and foundations. The technique works best in sandy, weakly stratified soil or soil with horizontal strata. If the soil is clayey or is saline, the depth of penetration is so low or shallow that the technique is not useful. The radar antenna operates best when close to the ground, so areas with considerable brush or boulders are more difficult to survey (Bevan 1996).

As an example of GPR use, a study was conducted in southern Utah to examine the buried remains of religious/ceremonial architecture in one valley (Conyers 2009). The investigator thought that large circular depressions might be the remains of large kivas (ceremonial structures), indicating a connection to the influential Chacoan area to the south. The GPR analysis of the features showed that they were small, family-sized kivas with associated roomblocks, which did not support strong connections to Chaco Canyon. The study's author states that the GPR analysis allowed placement of the structures within the landscape context of their local valley, facilitating the examination of prehistoric social context and inter-regional interaction without excavation (Conyers 2009).

### *Magnetometry*

Magnetic surveying, or magnetometry, is one of the most popular of the geophysical methods used for rapid, non-destructive assessment of subsurface features. Magnetometry provides archeological information because various human activities can alter the local magnetic content of the soil. Every type of material has singular magnetic properties, even those that are not commonly viewed as magnetic. Distinct subsurface materials can cause local disturbances in the earth's magnetic field, which are then detectable with magnetometers. The main limitation of the technique is that subtle features of interest may be obscured by highly magnetic geological or modern materials, such as iron. The technique is not affected by soil moisture or temperature. The only climatic problem is the decreased performance of batteries in very cold weather (Weymouth 1996).

Magnetic surveys are especially useful for locating ferrous materials; fired materials such as brick, roof tiles, kilns, hearths, and burned daub; middens, pits, trenches, activity areas, and graves. The technique also is able to locate structural features including walls, floor surfaces, and foundations (Archeology Mapping: <http://www.archeologymapping.com> 6-2-2011).

A large-scale magnetometer survey in Germany mapped subsurface features dating to the period from 7500-6900 BP (5550-4950 BC) representing longhouses (Posselt 2002). The maps produced from the survey showed considerable fine detail including postholes and small ditches related to the wood and plaster walls. This type of detail can be used to target future excavations or reduce the need for and/or the extent of excavations (Posselt 2002).

## *Soil Resistivity*

Soil resistivity survey, or resistivity survey, has grown in use since it was first introduced for archeological work in the mid-1940s in England. The technique can be used to locate compacted surfaces; graves; trails and pathways; structural features such as walls, floor surfaces, and foundations; and differences in soil compaction (Archeology Mapping: <http://www.archeologymapping.com> 6-2-2011; Gaffney 1996). Problems with the technique include the fact that archeological features may be masked by later activity at the site and some agricultural activities such as plowing may increase “soil noise” to the point that anomalies produced by buried features are not recognized (Gaffney 1996).

In most systems, metal probes (electrodes) are inserted into the ground to obtain readings of local electrical resistance. Most systems use four probes mounted on a rigid frame. Soil resistance is affected by the presence of subsurface features that are higher or lower in resistivity than the surrounding soil. The patterns of soil resistance are recorded, plotted, and interpreted. Information from resistivity survey is often used to complement other geophysical methods, such as magnetometer surveys. Areas of beach on Rapa Nui (Easter Island) were successfully examined using this type of combined technique to locate subsurface features associated with the island’s large ceremonial platform and statues (Larson and others 2003).

## **Knowledge Gaps and Management Implications**

Southern Nevada’s heritage resources are at risk from a variety of factors including large-scale urban development and sprawl, as well as increased recreation use and access to previously remote, undisturbed areas. The Federal agencies that manage these vast acreages and irreplaceable resources remain understaffed and underfunded resulting in substantial management challenges. Nonetheless, they have implemented public education and outreach projects, volunteer site monitoring efforts, and law enforcement programs in attempts to protect the areas at risk. Continued research is needed to assess the effectiveness of these programs and develop additional means of cultural resource protection that can be implemented with limited funding (Lancaster and others 2006, 2007).

When implementing projects, managers must address issues associated with protection and preservation of known sites as well as identifying and protecting any newly discovered sites. There are significant knowledge gaps relating to southern Nevada’s past, as derived from the archeological record. Only 783,756 acres (317,174.8 hectares), or 7 percent of the lands under consideration, have been surveyed for archeological resources (fig.8.1). Thus, a large portion of the area has received no survey coverage.

Because of the sparse nature of archeological survey coverage, basic inventories of cultural resources are needed. In particular, inventories that are not associated with planned development projects are desirable to expand the acres of surveyed lands and address gaps in coverage. Complete coverage of the public lands in the study area is not a realistic goal owing to the cost involved and because SNAP offices manage over 7 million acres (2,832,799 hectares), a huge area to meet the “complete survey” expectation. That would be over 500 man-years to survey with 30-meter (32.8 yard) transects at 2 miles (3.22 kilometers) per hour (Ronning, personal communication 2012). In addition, cultural resource recording standards, as well as the sites themselves, will continue to change over time. A more realistic goal for regional-scale inventory would be to expand and improve the sample of lands that have been examined and of sites that have been located and recorded. Because cultural resources represent finite, non-renewable



resources that must be protected for the future, an important goal of inventory is to provide baseline information for measuring changes in the condition of sites through time (Lancaster and others 2006, 2007).

By its nature, archeological survey locates surface remains, while additional information may lie buried beneath the surface. The geophysical surveying systems discussed in this chapter may prove useful in augmenting cultural resource information and assisting managers in determining which areas to avoid during construction or other land-disturbing activities and which areas may require additional testing or excavation. However, these methods are limited in applicability and do not replace standard archeological surveys.

A major recommendation from the working group on the Information and State-of-the-Science Summary developed for the Ecosystem Health Assessment of Southern Nevada Project was to prepare a new Historic Context for the region to structure and promote research important to the agencies (Lancaster and others 2006). Such a context has been prepared in draft form (Roberts and Ahlstrom 2012).

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