

APPENDIX C

Cultural Resources Management Plan

The Sloan Canyon National Conservation Area Cultural Resources Management Plan

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January 2005

Report submitted to the Bureau of Land Management,
Las Vegas District Office

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INTRODUCTION

The cultural resources of Sloan Canyon National Conservation Area (NCA) were one of the primary reasons Congress established the NCA in 2002. This appendix provides three key elements for management of cultural resources during the first stage of implementation:

- A cultural context and relevant research questions for archeological and ethnographic work that may be conducted in the early stages of developing the NCA
- A treatment protocol to be implemented in the event that Native American human remains are discovered
- A monitoring plan to establish baseline data and track effects on cultural resources as public use of the NCA grows.

The primary management of cultural resources for the NCA is provided in the Record of Decision for the Approved Resource Management Plan (RMP). These management guidelines provide more specific guidance than standard operating procedures. As the general management plan for the NCA is implemented, these guidelines could change over time as knowledge is gained of the NCA, its resources, and its uses. All cultural resource management would be carried out in accordance with the BLM/Nevada State Historic Preservation Office Statewide Protocol, including allocation of resources and determinations of eligibility. Activity-level cultural resource plans to implement the Sloan Canyon NCA RMP would be developed in the future.

PART I: CULTURAL CONTEXT AND RESEARCH DESIGN

The relationship between cultural resources management and research significance has been defined at three interpretive levels (Hardesty 1995; Hardesty and Little 2000). The first and most basic level is the archaeological context. The archaeological context consists of the field observations of artifacts, features, and other physical remains in spatial relationships to each other and to the environment in which they are found. Contextual information of this type includes descriptions of provenience, associations, and physical matrix; site size and layout, relative abundance and diversity of physical remains, etc. The second level consists of the data required to address research questions derived from middle range theory that links archaeological context to past human activities (e.g., Binford 1980, 1983; Leone 1988; Schiffer 1987). Questions that can be addressed at this level include how sites are formed, how to distinguish different subsistence practices, past environments, population sizes, domestic architecture, and household form and activities. Middle range questions may also include questions of who made the artifacts (ethnicity), what are the artifacts, how were they made (technology), and when (chronology). The third level comprises the data required to address questions derived from general anthropological theory. Questions derived from general theory address issues such as the direction and pace of cultural evolution, historical materialism, and symbolism. The questions posed at this level are derived from theoretical paradigms that reflect the current understanding of the human past in a much broader perspective than an area the size of Sloan Canyon NCA, or even the southern Nevada region. Recent paradigms include such perspectives as cultural materialism, evolutionary ecology, world systems theory, structuralism, symbolism, Marxism, critical theory, and many others. The body of data that is relevant to questions posed under any particular paradigm can vary greatly, but tends to build on results of previous studies. That is, data requirements tend to become more inclusive rather than less inclusive in terms of the kinds of data required to address new questions.

These three levels of significance provide a guide for evaluating the importance of the cultural resources of Sloan Canyon NCA. In a literal sense, all cultural properties are important for addressing questions that can be posed from at least one of the three interpretive levels. But the issue for management of cultural resources in any particular area is whether or not it has potential for containing uninterpreted information. The goal of determining which cultural resources have important information value is to record all cultural properties and preserve a sample of the variety of information adequate for future theoretical, interpretive, and cultural explanations.

Meeting the goal of preserving a sample of the kinds of cultural resources adequate for future research entails preserving a sample of site types containing each category of uninterpreted information. Development of the widespread use of a Geographical Information System (GIS) within the National Register process is one potential way of expediting the recognition of uninterpreted information and revealing data gaps. The other way of recognizing what information is important for future research needs is development of a research design. Data are important and, in many cases, exist only in the context of interpretive frameworks (theories and paradigms). Thus, a research design that links data to an interpretive framework will identify what cultural properties are important. However, what archaeological information is important also depends upon redundancy. That is, at some point the answer to a significant research question requires no additional information, or where each additional bit of information adds very little to the answer (Hardesty 1995). In the following discussion we have attempted to identify broad research questions that remain at the core of most archaeological research in southern Nevada and the kinds of archaeological information that could be found on Sloan Canyon NCA that are important to addressing those questions.

Sloan Canyon NCA is on the boundary of several cultural and environmental regions. The Mojave Desert, the Great Basin Desert, and the Sonoran Desert, each afford a different suite of resources that have contributed to different cultural developments and that respond differently to climate changes. Consequently, the boundaries of prehistoric cultural groups have often been drawn along the boundaries that define the three deserts (which correspond to the boundaries of the distributions of many plants and animals). The basic material culture inventory of the prehistoric peoples in all three deserts exhibits broad similarities, allowing for differences in the native toolstones and other materials available in each area. But for each named prehistoric culture, artifact types have been identified through which the presence of a particular cultural group can be inferred when those artifacts are found. Cultural boundaries have often been defined on the basis of material culture, which has been inferred to reflect adaptation to environment.

Sloan Canyon NCA has the potential to provide cultural resources relevant to addressing a broad spectrum of research questions phrased in terms of current research paradigms. The research questions defined below are divided into seven very broad categories following Duke et al. (2004) (with the addition of a historic research theme). While the questions posed below provide a guide for assessing the importance of cultural resources known and expected in Sloan Canyon NCA, given our current understanding of the prehistory and history of North America in general, and Sloan Canyon NCA in particular, it must be recognized, as Hardesty has noted, “Research questions...change as new information and theories emerge. For these reasons, evaluating the information potential of archaeological properties requires tracking the dynamics of scientific and other scholarly research” (1995:7).

Archaeological studies in southern Nevada and surrounding regions have revealed the presence of people since at least the end of the Pleistocene and continuing into the present in a chronological sequence that currently has few, if any, temporal gaps when the region is viewed at a broad scale. The chronology and content of the archaeological record have been summarized and interpreted in numerous publications from a variety of theoretical paradigms appropriate for the time of their publication including, but by no

means limited to, Grayson (1993), Lyneis (1982a, 1982b), Warren and Crabtree (1986), Schaafsma (1986), Madsen (1986), and Pippin (1995). A theme that is pervasive in the interpretation of prehistoric archaeological sites in the Great Basin, including the Mojave Desert and immediately adjacent parts of the Desert West, is the relationship between people and their physical environment. This theme has its origins in the early work of Julian Steward, particularly his seminal volume *Basin-Plateau Aboriginal Sociopolitical Groups* (1938). Steward (1929) also completed the first systematic study of Nevada's rock art, rejecting the idea that it was a form of "art for art's sake" and instead argued that it was the residue of culturally meaningful practices in the past. Steward's study was influential in shaping the terminology used to characterize abstract imagery, as well as identifying the important research theme of the balance between schematic and naturalistic imagery in rock art assemblages as a characteristic of stylistic variation.

Starting from interpretation of the distributions of cultural groups on the basis of their use of natural resources, many subsequent studies have focused on developing a more detailed and accurate understanding of prehistoric, ethnohistoric, and historic distributions of cultural groups through time and their relationships to natural resources, and causes of change in the lifeways of different groups at different times. Many of the sources of cultural change that have been identified in the many studies since Steward's initial study are environmental, particularly climatic change and associated changes in the plant and animal resources used by people. But other changes entailed the relationships between indigenous groups and their neighbors, either in the sense of diffusion of important technologies (i.e., horticulture) or incursions of people(s) from adjacent areas. Because these mechanisms (climate change, diffusion of technology or migration of people) have been interpreted as the primary causes of cultural change, the chronology of the region has largely been structured around these events. A very brief synthetic summary of the southern Nevada cultural chronology as it relates to the Sloan Canyon NCA is presented in Table 1. Also included in Table 1 are one or more of the broadest research questions for the time periods defined. For the most part the questions in Table 1 address the issues that were considered in distinguishing the time period from preceding and succeeding periods. These are questions posed at both middle and general levels of theory that will help define what kinds of data at the level of archaeological context are important and should be considered in evaluating the eligibility of sites for the National Register of Historic Places. More specific questions relating to Sloan Canyon NCA are posed in the following text.

Most of the archaeological record for southern Nevada is a record of Archaic hunter-gatherers. The Archaic Period was preceded by a poorly known Paleoarchaic, and possibly even a Paleoindian Period. The earliest inhabitants of southern Nevada may have arrived as early as the end of the Pleistocene (ca. 10,000 BP), but the few artifacts that suggest their presence are generally isolated surface finds that cannot be securely dated, and there is not yet enough data to determine much about their lifeway in terms of subsistence, land-use, or other cultural behaviors. The primary research questions for this period address whether there was a single population of people represented by each of the distinctive projectile point types (fluted points and the various large stemmed point types), or if the different point types represent task specific technologies; and whether people focused on lake-margin resources, large game, or were already relying on the generalized use of resources as they became available in the environment (Basgall and Hall 1991; Jones and Beck 1999). Evidence of this period is usually found in areas where water was present, especially along ancient shore-lines (Campbell and Campbell 1935) making it unsurprising that no evidence has yet been found in the Sloan Canyon NCA given the lack of such water sources in the area. However, this may be a sampling bias as sites identified to this period have been found along a wash near Yucca Mountain (Pippin et al. 1984). Any artifacts relating to the Paleoindian/Paleoarchaic Period found in Sloan Canyon NCA would provide important information regarding this early and controversial period in southern Nevada.

Table 1. Cultural Sequence and Context for Southern Nevada Focused On the Area of Sloan Canyon NCA

Period	Time Range (in years BP)	Environments	Identifying Characteristics of Assemblages	Some Important Research Issues
Historic	150—present	Mechanical rather than climatic changes in the environment caused by mining, transportation routes, introduction of domestic livestock, and larger settlements	Artifacts of Euro-American manufacture and land alteration associated with activities such as mining (adits, shafts, etc.), transportation (i.e., roads), etc.	What has the impact of various activities associated with Euro-American settlement been on the local environment and the people who lived there before?
Ethnographic		Essentially modern	Southern Paiute, Chemehuevi, Mohave	Issues related to Native American perspectives and world view. What do particular places and activities mean to different tribal groups?
Numic	700—present	Essentially modern	Arrow-sized projectile points of the Desert and Cottonwood series	Were the Numic immigrants from the west or local people? Did they displace the horticultural Puebloan peoples or simply remain after horticulture was no longer practical? What environmental perturbations affected horticulture?
Ceramic/ Saratoga Springs	1500—contact	Essentially modern	Arrow-sized projectile points of the Desert and Cottonwood series; ceramics of Paiute, Puebloan and Patayan styles; evidence of Puebloan influence in house structures	When and why did the various cultural/ethnic groups arrive in southern Nevada? How did the various cultural/ethnic groups identified by different ceramic styles differ in their land/resource use patterns? What was the nature of interactions between/among these groups?
Middle Archaic/ Gypsum	4000—1500	Return to less xeric conditions	More varied medium-sized dart points of the Elko, Gypsum, and Humboldt series; increase in millings, larger sites	Was there a shift in residential settlement to a greater focus on specific locations rather than short-term occupation of general areas as before? Is the increase in biface production and the occurrence of non-local toolstone a reflection of trade, relocation of villages, or logistical foraging?
Early Archaic/ Pinto	8000—4000	Environmental drying	Pinto-type points, millings, curation and reuse of tools	Does this period overlap with the preceding period indicating an in situ shift in land-use patterns in response to environmental drying that reduced the distribution and abundance of previously used resources requiring a shift to greater reliance on small seeds?
Paleoindian/ Paleoarchaic Lake Mojave	Prior to 8000	Late Pleistocene fauna, lacustrine and riverine features	Fluted points, large stemmed points, crescents, steep-sided unifaces or scrapers	Were people focused on lake-margin resources, large game, or already relying on generalized use of resources as they became available in the environment?

Until the last decades the Archaic period was characterized as very long period of time during which there was no cultural change (Jennings 1957), which led to many researchers recognizing the major question for this long time period to be "...are there large-scale directional trends and changes that characterize this period?" (Lyneis 1982a:167). Cultural changes during the Archaic are generally characterized as responses to environmental change, and differences between areas are characterized as responses to environmental variability with flexible subsistence strategies regardless of whether the explanatory model in which interpretation is framed follows the lead of Steward's (1955) Cultural Ecology theoretical framework or the newer evolutionary ecology models (e.g., Bettinger and Baumhoff 1982). Flexible subsistence strategies also allow a population to accommodate short-term fluctuations in availability of plant and animal foods. More detailed knowledge of environmental conditions and the archaeological assemblages for time periods during which recognizable environmental conditions prevailed has allowed recognition of a tripartite cultural sequence for the Archaic Period in southern Nevada as shown in Table 1. The division is, however, a generalized pattern recognized over a broad area and may or may not be visible in localized areas such as Sloan Canyon NCA. Any archaeological resources that allowed recognition of fine-scale chronology within the Archaic Period would clearly qualify as important.

The Archaic Period essentially ends with the appearance of a number of material culture innovations, many or most of which originated in adjacent areas. Ceramic vessels of Puebloan and Patayan styles are the most common archaeological evidence that marks the end of the Archaic, but the appearance of ceramics is often accompanied by evidence of horticulture and changes in house structure. Sherds of ceramic vessels are commonly dated by reference to chronological sequences developed from sites in the Southwest. Artifacts that can clearly be affiliated with a cultural tradition from an adjacent region (i.e., the Southwestern ceramic traditions) provide important information regarding cultural interactions and chronology.

The arrival of peoples in the Great Basin speaking languages belonging to the Numic language family is thought by many to have occurred sometime around 700 BP (Warren and Crabtree 1986), though the exact timing is a matter of debate, as is what artifacts can be used to identify the Numic groups (Madsen and Rhode 1994). Numic groups are generally characterized as broad-spectrum foragers who used a greater range of resources that were more costly to collect and process than the larger game Archaic groups are thought to have relied on (Bettinger and Baumhoff 1982). Although various attempts to explain the relationships between Archaic, Numic, Puebloan, and Patayan groups have been proposed, the relationships between and among these peoples remain unclear. Consequently, any site with artifacts that can clearly be affiliated with one or more of these groups (again, potsherds are most frequently the artifacts by which the groups are recognized, but other artifacts may also be relevant) are important sources of information regarding population interactions and movements.

Class II and III inventories have already been conducted in the Sloan Canyon NCA (Duke et al. 2004; White 1998). The surveys provided a sample of the archaeological resources that occur in the NCA. Prior to conducting their archaeological inventory of the NCA, Duke et al. (2004) developed a research design that identifies six major categories of research issues that can be addressed with data from archaeological resources in the Sloan Canyon NCA. The six categories of research questions include: 1) chronology of human presence in the area; 2) land-use in marginal environments; 3) technological organization; 4) population interactions and replacements; 5) rock art; and 6) current Indian perspectives (Duke et al. 2004). We have also added a seventh: research issues for the historic period. The following research questions are based on the findings and recommendations reported from the survey (Duke et al. 2004) and ethnographic studies conducted at the same time (Bengston 2004). However, because environmental change is generally seen as the triggering mechanism of cultural change in most theoretical models of culture change in the Desert West, evidence of environmental change is important to addressing literally all archaeological and ethnographic research questions. Thus, environmental studies, particularly those that address environmental change as well as distributions of resources, are included

here as an underlying research category. Pollen, plant macrofossils from woodrat middens, faunal remains from woodrat middens, paleontological and archaeological sites, are critical sources of information that underlie most explanations of archaeological phenomena, and should be recognized as of high archaeological importance whether they are associated with cultural materials or not.

1. *CHRONOLOGY: HOW LONG HAVE PEOPLE BEEN USING SLOAN CANYON AND THE NORTH MCCULLOUGH RANGE?*

Determining the age of archaeological materials is a necessary first step in the interpretation of individual archaeological finds, synthesis, and regional interpretation. The currently available sites, assemblages, and artifacts from Sloan Canyon NCA for which age has been estimated indicate people have been using the area only during the late prehistoric and historic periods (Duke et al. 2004). However, the archaeological record elsewhere in southern Nevada has provided evidence that people were present as early as the end of the Pleistocene (approximately 10,000 years ago) and have been continuously present in varying numbers and habitats in the region for the entire Holocene (Grayson 1993; Pippin 1995).

Determining the chronology of use of any area in the Intermountain West is difficult due to the paucity of materials from which age of artifacts, and by association assemblages and sites, can be determined. The preferred material for dating is anything organic from which age can be estimated by radiocarbon analysis. Radiocarbon analysis is the preferred dating method because many of the issues with other dating methods are well known and have been addressed; most laboratories that do radiocarbon analyses have standardized ways of dealing with contamination, calibration, and other sources of error. Consequently, placing new archaeological materials into an existing regional sequence is relatively straightforward. Unfortunately, organic materials amenable to radiocarbon analysis are rare outside caves and rockshelters in most parts of the Intermountain West, including Sloan Canyon NCA. One of the most important issues that should be addressed in future archaeological studies in Sloan Canyon NCA is determination of whether the apparently short period of human presence is real or a result of taphonomic processes that have effectively hidden all earlier evidence. Because organic materials do not preserve well outside the protected environments of caves and rockshelters, it is important that all such locations that contain the potential for recovery of stratified artifact assemblages with associated organic materials be preserved for archaeological investigations.

Other methods of determining the age of archaeological materials are less precise and have sources of error that are not as well known and do not have standardized protocols for assessing errors and calibrating for their effects. These methods, however, have been used to determine the relative placement of the Sloan Canyon NCA archaeological record into the local and regional sequence. Methods that have yielded useful chronologies in southern Nevada include artifact typologies and obsidian hydration analyses.

Artifacts that have been classified into the most useful types for chronology building are projectile points and pottery, but even the presence of ground stone is often used to provide a gross estimate of the age of a site. Importantly, the typologies for both projectile points and pottery were developed in areas outside southern Nevada, in environmentally different settings where there is no reason to believe cultural development proceeded at the same pace or in the same directions as in Sloan Canyon NCA. The projectile point chronology was developed in the western Great Basin (Heizer and Hester 1978; Thomas 1981) where lakes and marshes were abundant throughout most of the Holocene, and contact with peoples on the west side of the Sierra Nevada clearly was common. A similar typology has been developed for

the eastern Great Basin (Holmer 1986). Differences between the western and eastern projectile point chronologies attest to the necessity of developing a similar sequence for the southern Great Basin-Mojave Desert area. The pottery typologies were developed in the Southwest where both dry land and irrigated agriculture was possible and contact with peoples of Mesoamerica occurred. Because both the subsistence technology of a people and their contact with neighboring peoples can greatly affect the material culture inventory and its stylistic attributes, there is no reason to believe that the currently available dates for individual projectile point types or pottery styles are directly applicable to the archaeological record for Sloan Canyon NCA.

Obsidian hydration is a method of assessing the relative age of artifacts made of volcanic glass and has been investigated in various parts of the Intermountain West for a number of years, with varying degrees of success. It has been viewed as having great promise for archaeological studies because it could potentially be used on any piece of obsidian that was clearly broken by people; not only formed tools such as projectile points but debitage and assayed cobbles as well. However, numerous studies have shown that obsidians from different sources have different hydration rates, and that hydration rates of obsidian from the same source will vary depending on the immediate conditions of the environment in which it has lain since it was broken. Therefore, before obsidian hydration can provide a useful source of age determinations for the Sloan Canyon NCA artifacts, a local sequence for the common obsidians must be developed. Obsidian studies should be encouraged as a means of obtaining temporal data (via hydration analysis) that can provide age estimates of events in the NCA, and the movement of people (via XRF analysis), as in many parts of the Desert West chronologically sensitive materials are rare.

Prehistoric pottery offers another, extremely useful, source of chronological data for archaeological sites where materials amenable to radiocarbon analysis are not present. For the most part the chronological data comes from stylistic traits of the pots. However, in Sloan Canyon NCA the absence of residential sites makes it unclear whether pottery was being made locally or transported from some distance, which begs the issue of time-lag in estimating the age of sites based on typologies of ceramic styles developed from other areas. Knowing the source of the pottery's clay could provide essential data for tracking population movements and calibrating the age estimates based on stylistic sequences from other areas where pottery is abundant. Neutron activation analysis studies of the fabric of pottery sherds and clay sources in and around Sloan Canyon NCA should be encouraged to address the issue of where pottery was being made.

Developing and testing additional methods of assessing the age of archaeological materials found in desert environments is a topic that should receive attention in future archaeological research projects. Some promising methods include optical luminescence of sediments containing archaeological materials, and growth ring analysis of desert shrubs found in deposits and growing on sites. Petroglyph dating is particularly challenging for rock art chronometric studies. The thematic research design described later in this Appendix for rock art reviews current methods most likely to apply to Sloan Canyon NCA and their data needs (Table 2).

2. LAND-USE: WHAT KINDS OF ACTIVITIES BROUGHT PEOPLE TO SLOAN CANYON AND THE NORTH MCCULLOUGH RANGE?

Most prehistoric peoples of the Intermountain West were mobile foragers. They moved seasonally to areas where the greatest abundance of food resources could be found. However, small groups would also travel significant distances to sources of materials necessary for making tools (lithic quarries), and

possibly to sacred places as well. Sloan Canyon NCA contains a variety of different landscape types. Each affords a different suite of resources that could potentially have attracted prehistoric peoples. The archaeological survey already done has provided baseline information regarding use of the different landscape types.

Although the currently available survey data provide a reasonable assessment of prehistoric land-use in Sloan Canyon NCA for the last 1500 years, the archaeological potential of area has barely been tapped. Given the rugged formation of the North McCullough Range, the possibility that unrecorded caves and rockshelters exist is significant. Such sheltered sites could provide important data for both chronology building (see above) and for reconstructing past land-use patterns, particularly in regard to subsistence activities, procurement of tool materials, and sacred activities. Sheltered sites throughout the Great Basin have yielded cached tools (nets, fish hooks, grinding stones) and objects of inferred ceremonial significance (e.g., feather bundles) (Jennings 1957; Loud and Harrington 1929). Nearby Gypsum Cave (Harrington 1933) contained a number of arrow shafts that, while not as old as originally thought, provide evidence that prehistoric people were visiting the cave and using it as a place to store hunting equipment that they did not immediately need, but had prepared in anticipation of future needs. Sheltered sites in Sloan Canyon NCA could provide critical data for reconstructing past lifeways.

Sheltered and buried sites can also provide invaluable evidence of past land-use practices in the form of faunal and floral remains. Although these organic materials are seldom found during inventory, the potential for them is often noted in areas where there is the potential for deep deposits that can contain them. Excavation at sites that have potential for having deep deposits recorded during inventory (Duke et al. 2004) could also provide evidence of human presence prior to the well-documented 1500 years found on the surface.

Other evidence of land-use can be found in the simple distribution of particular kinds of sites in different habitat types. Although three of the types of sites in the Duke et al. (2004) typology, and isolated finds in general, are not considered eligible for listing on the National Register of Historic Places, the mere occurrence of archaeological materials is critical information for developing an understanding of land-use through time.

3. *TECHNOLOGICAL ORGANIZATION: WAS TECHNOLOGY ORIENTED TOWARD THE LOGISTICAL REQUIREMENTS OF TIGHTLY SCHEDULED, PLANT-FOCUSED SUBSISTENCE ACTIVITIES?*

Throughout the Great Basin, in fact throughout the Intermountain West, late-period sites are more abundant than earlier sites, and late-period assemblages reflect greater use of seasonal resources through the more common occurrence of ground stone implements (i.e., milling stones and handstones assumed to have been used to grind seasonally available seeds) and reduced frequencies of hunting related tools (i.e., projectile points, debitage, and other flaked stone tools assumed to have been used to hunt rabbits and artiodactyls). Important research questions that should be addressed in future archaeological projects in Sloan Canyon NCA regarding the use of different technologies are:

- Whether the differences are temporal (i.e., more hunting tools in earlier sites, more grinding tools in later sites)

- Whether different technologies are found in different, but contemporaneous, settings characterized by different edible resources (i.e., more hunting related tools in the McCullough Range where mountain sheep are more abundant, more milling stones in the canyon where there are more edible plant resources)
- Whether different technologies are found in different, but contemporaneous settings characterized by different toolstone resources (i.e., more chipped stone hunting tools and debris near quarries where knappable stone could be obtained, more ground stone implements near sources of appropriate materials for grinding)

Three important, and closely related, issues must be addressed before the differences in technologies can be interpreted in terms of human behavior. First, because datable materials are rare in almost all sites, are sites with milling stones in the artifact assemblages being identified as late-period sites due to the presence of the milling stones? If so, the reasoning that milling is a late-period technology that replaces an earlier emphasis on hunting is circular. Sites hypothesized to be late because they contain ground stone implements must be independently dated using a method other than typological similarity to ground stone tools dated elsewhere to the late period. Radiocarbon analysis of plant materials floated from the matrix in which milling stones are found is one possibility for obtaining an independent date. Association with other typologically datable artifacts (i.e., potsherds, projectile points) is another (see previous research issue for more detailed discussion of dating issues).

Second, because early sites are rare, does the distribution of early sites reflect the manner in which people used the landscape, or is the known distribution of early sites biased by the likelihood of archaeological discovery or geological processes that have allowed sites to be relatively well preserved in some environments, poorly preserved in others, and completely erased in still others? Because late sites with milling technology tend to occur in depositional environments where sediments are deep enough to permit growth of plants that can be harvested for their seeds, and hunting sites are more likely to be dispersed in more rugged uplands where animals such as bighorn sheep are more likely to be found, hunting sites are more vulnerable to dispersion by natural processes and are less likely to be recognized during a sample inventory. If they occurred in the intervening valleys and drainages they are likely to be buried by the sediments that accumulate in lower elevation settings.

Third, most datable sites found during inventory are late-period sites. It is reasonable to assume the resources available in the environment today are representative of those available to the prehistoric inhabitants of the area. However, recognizing that there may have been earlier use of the area, it is important to know the environmental changes that have occurred, especially those that affected important prey animals and plants that produce edible seeds, and which resources were being used most frequently at different times.

4. POPULATION INTERACTIONS AND MOVEMENTS: CAN DIFFERENT ETHNIC GROUPS BE RECOGNIZED IN THE ARCHAEOLOGICAL RECORD OF SLOAN CANYON NCA AND THE NORTH MCCULLOUGH RANGE?

The origin of Great Basin peoples has been a significant research issue for archaeologists since the early 1920s when it was first recognized that the New World had a long prehistoric period, and that prehistoric peoples differed from the ethnographically recorded peoples of North America. The relationships of Great

Basin peoples with peoples from adjacent regions have also been important issues for archaeologists and ethnologists as culture areas began to be defined. Incursions of people from both the Southwest (Puebloan and Patayan) and from southern California (Numic) have been hypothesized for the late Holocene in the southern Great Basin. It commonly assumed that the horticultural people from the Southwest left when climatic conditions returned to more xeric conditions and dry land farming was no longer tenable, leaving the region once again to Numic peoples, descendants of whom remain in the region today.

The hypothesized population replacements and incursions lead to three interrelated issues for understanding the prehistory of Sloan Canyon NCA: 1) what archaeological evidence will allow recognition of the different groups, and do those kinds of evidence occur in Sloan Canyon NCA? 2) Did the population shifts really occur, or are artifacts generally associated with non-native cultures evidence of trade rather than population movements? 3) If the population replacements occurred, what gave one group of people a competitive advantage, or did two or more cultural groups coexist during times when there were population incursions from adjacent regions?

Data from the inventory provide generally accepted evidence that different cultural groups may, in fact, have been present in the Sloan Canyon NCA, although most of the archaeological record in the area is characteristic of much of the archaeological materials found throughout the Holocene in the Great Basin and during the Archaic Period in the Southwest. Three kinds of artifacts indicate extensive trade or population movements: pottery sherds (generally associated with Puebloan and Patayan cultures from the southwest, as well as the indigenous Southern Paiute brownware); obsidian (has been identified from widespread sources); and beads (made from Olivella shells that live in coastal water, but are found in Californian sites to the west, Hohokam sites to the east, and Great Basin sites to the north).

5. *ROCK ART: WHO MADE THE ROCK ART IN SLOAN CANYON AND ELSEWHERE IN THE NCA, WHEN AND WHY?*

Specific stylistic issues that relate to the ethnic identity of the prehistoric peoples who created rock art (particularly the emergence of Fremont and Puebloan cultural systems, and the dispersal of the Numic language family) have been discussed by Bettinger and Baumhoff (1982), Quinlan and Woody (2003), Schaafsma (1980, 1994), and Turner (1963).

Social Functions and Symbolism—The first systematic study of Nevada’s rock art was Steward’s (1929) analysis of the spatial distribution of rock art styles and themes in California, Nevada and Arizona. Steward (1929:225) rejected the idea that Nevada’s rock art was a form of “art for art’s sake” and argued that it was the residue of culturally meaningful practices in the past, although its precise meanings and functions were unclear. Steward’s stylistic analysis was influential in shaping the terminology used to characterize schematic imagery, as well as identifying an important research theme—i.e., the balance between schematic and naturalistic imagery in rock art assemblages as a characteristic of stylistic variation. This stylistic classification was subsequently elaborated by Heizer and Baumhoff (1962), who added a temporal dimension, and has remained in broad use, despite some critique (e.g., Hedges 1982), minimally shaping researchers’ general terminology and chronology. The relative balance between representational and abstract imagery is still used to define style types and has implications for understanding the social functions and interpretation of rock art (Bradley 2000; Layton 2000; Quinlan and Woody 2003).

The interpretation of rock art social functions and symbolism is characterized by divergent theories and opinions, in part because of the lack of direct ethnographic information relating to its production and uses (Quinlan 2000; Quinlan and Woody 2003). The rock art of Nevada has been interpreted from the general standpoint of hunting magic (Heizer and Baumhoff 1962), shamanistic (Whitley 1994), and landscape approaches (Woody 2000).

Rock art sites within the Sloan Canyon NCA may have considerable research potential to address questions of social structure, ritual, ethnicity and land-use in the Archaic, Puebloan and Fremont, and Prehistoric periods (Duke et al. 2004; Holmes et al. 2002:6; Lyneis 1982; White 2002:10). Themes, content, style and landscape context, all inform questions of site function and past meaning. Landscape context and portrayal of game animals can be used to determine whether Sloan Canyon's rock art is associated with hunting strategies, in the form of hunting magic (Heizer and Baumhoff 1962) and/or to educate young hunters about game animals (Matheny et al. 1997; Mithen 1988). Domestic archaeology and evidence of the daily routines of hunter-forager life occurring in association or close proximity to rock art sites could indicate that it was used in community-wide social practices (Quinlan and Woody 2003). As rock art interpretation has been skewed by the under-reporting of rock art's domestic associations, this spatial patterning at Sloan Canyon NCA offers an important corrective (Duke et al. 2004). Identifying prehistoric scratched art that defaces earlier rock art has been used to recognize the spread of Numic peoples through the Great Basin (Bettinger and Baumhoff 1982). Sometimes scratched art seems to embellish earlier art and may have been intended as a form of retouching (Woody 1997, 2000). Dating the advent of scratched art and its possible function as later retouching are important research themes rarely addressed in Great Basin rock art research because of the lack of data of sufficient quality. In addition, a qualitative and quantitative analysis of the themes and styles of Sloan Canyon NCA rock art imagery could address the expression of prehistoric ethnicities because of the ways cultural identities are potentially expressed through graphic arts (Layton 2000:179-181). Such data would also be of value for making evaluations of significance of rock art panels and/or sites.

Dating Rock Art—Estimating the age of rock art is important for establishing a panel's entitlement to protection under ARPA and other statutes, and is an important research issue in its own right. Although it is sometimes claimed that only direct dating provides the kind of evidence accepted in court for age determinations, this is not necessarily the case. Nearly all scientific dating techniques applied to petroglyphs are experimental and likely to be challenged as such in court. However, traditional stylistic dating techniques, whilst providing relative dates and broad estimates of age have been accepted in court cases trying ARPA violations of rock art in Nevada (Woody 2005).

Scientific (or direct) dating techniques usually require intrusive extraction methods, even if only microscopic quantities are required for analysis (Table 2). Therefore, their application usually requires consultation with Native American tribes. These techniques are expensive and only pinpoint maximum and minimum dates for the rock art design tested, rather than the assemblage as whole. In contrast, relative dating techniques are non-intrusive and relatively cheap to perform (Table 2). They only produce broad age estimates and general sequences of development. They are simple to apply, often requiring only a keen sense of observation and the recording of visual levels of repatination using a Munsell rock color chart. They have the significant advantage of paying careful attention to the physical condition of rock art motifs, reporting data useful for making an assessment of potential site impacts.

Duke et al (2004:120) used relative dating techniques to suggest that the rock art sites within the Sloan Canyon NCA date from the Middle Archaic into the ethnohistoric past. Their assessment is based on the visual appearance of repatination, themes portrayed in rock art, and archaeological evidence dating the occurrence of other activities in Sloan Canyon NCA. A general temporal sequence is proposed based on the growing frequency of representational motifs with time (2004: Table 42). Further study and the

inclusion of the rock art from the main Sloan Canyon Petroglyph site (26Ck2420/2621) in analysis has the potential to further refine this relative chronology.

Table 2. Rock Art Dating Methods and their Possible Relevance to Sloan Canyon NCA.

Method	Comments	Sources
Direct Dating Methods		
1) Radiocarbon analysis of mineral accretions (and/or their inclusions) that cover rock art	Provides minimum and maximum ages and has been used to date organic inclusions in desert varnish; it may have potential at Sloan Canyon NCA	Bednarik (2001, 2002); Watchman (1996, 2000)
2) Lichenometry—a calibrated dating technique using lichen growth rates to estimate ages	Rarely used, is only precise up to 500 years, and only provides minimum and maximum age estimates	Bednarik (2001, 2002)
3) Microerosion analysis—attempts to quantify weathering effects that can only be identified microscopically	Its use is restricted to erosion-resistant rocks, its accuracy is currently poor, and has rarely been used	Bednarik (2001, 2002)
4) AMS dating of organic materials contained in the residues of paint pigments	Its extraction techniques are intrusive and pictographs are rare at Sloan Canyon NCA	Chaffee et al. (1993); Watchman and Cole (1993); Watchman and Lessard (1993)
5) Cation-ratio dating—attempted to calibrate the leaching of soluble cations of rock varnish relative to the supposedly stable titanium content	This technique has now been abandoned by its inventor and never produced any accepted dates	Dorn (1983, 1996); Watchman (1992)
6) Cosmogenic radiation nuclides—determines maximum rock exposure ages by measuring the presence of cosmic ray-caused radiation products in rock	Does not actually date rock art, is poorly calibrated, and has produced unreliable results when applied to archaeology	Bednarik (1998)
7) X-Ray Fluorescence dating—an experimental method that measures the chemical thickness of desert varnish to produce an age estimate	Each site tested requires individual calibration. It is non-intrusive and is a practical way of testing all the designs at a site. Could be of potential for Sloan Canyon NCA	Lytle et al. (2004)

Method	Comments	Sources
Relative Dating Techniques		
1) Iconographic dating—dates rock art by identifying dateable subjects in its imagery	Restricted to representational designs and is most useful for dating contact period and post-contact period imagery—one way of identifying graffiti	
2) Stylistic dating—observable differences in style are related to different times or cultural identities	Useful for broadly determining the age and general sequence of rock art assemblage, but stylistic differences are also functional and therefore can not be simply equated with ethnic identities or chronological periods	Layton (2001:315); Ucko (1987)
3) Technique—useful for identifying graffiti produced with modern tools and materials (e.g., spray paint, knives)	The limited range of techniques that exist to make rock art may have been in contemporaneous use and so can not be used to estimate the age of prehistoric art	Bednarik (2001, 2002)
4) Excavation—estimating the minimum age for rock art that is covered by datable deposits (either through exfoliation or sedimentation)	Provides a terminus ante quem for rock art that is covered or has exfoliated into the dateable deposit. No such cases have been	Cannon and Ricks (1986); Ricks and Cannon (1993)

Method	Comments	Sources
Relative Dating Techniques		
	reported for Sloan Canyon NCA	
5) Proximity to other archaeological resources—provides potential evidence of rock art's continuing use even if it does not date the act of production itself	Relates rock art's use-life to other activities—it only provides the most general indications of rock art's age	Bradley (2000); Quinlan and Woody (2003)
6) Visual appearance of weathering and/or repatination—allows broad age estimates to be made—it is best used in combination with superimpositioning	This method could be used at Sloan Canyon NCA as superimpositioning and differences in levels of repatination are visually apparent	
7) Superimpositioning—discriminates older from more recent motifs, allowing a general sequence to be delineated	Works best when combined with a consideration of visual levels of weathering/repatination	Woody (1997)

Motif Typology/Key—To facilitate recording, evaluation and quantitative and qualitative statistical assessment of the rock art sites contained within the Sloan Canyon NCA, it is suggested that a motif typology or key is developed. The typology used by Duke et al. (2004) should serve as the basis of such a motif typology but with modifications and expansion as necessary (see also Nevada Rock Art Foundation 2003 [NRAF]). In constructing such a motif typology, interpretive labels should be avoided for all but the most readily identifiable subjects portrayed in a representational or naturalistic manner. This motif typology will enable rock art site types to be more securely defined and allow land managers to prioritize protective and conservation measures accordingly. Anthropomorphic and zoomorphic types should be subdivided into naturalistic and schematic types (allowing Basin and Range Tradition style simple stick figure types to be discriminated from elaborate Puebloan or Fremont-style types etc.).

Tortoise Cairns—(Duke et al 2004:107) reported the discovery of two human-made tortoise/turtle cairns located on a possible prehistoric trail on the rim of the canyon in Middle Canyon II. These are a unique feature, not represented elsewhere at Sloan Canyon NCA, or anywhere else in Nevada. Further research should attempt to elucidate the age of this unique feature. They were not observed in a previous survey that reported the trail they are located on as probably modern (White 1998) raising the possibility that they are a recent addition. Examination of previous survey photography or old tourist photographs may help resolve their age. If they are found to be modern it should be considered whether to dismantle these cairns to discourage copycat cairn construction and restore the site to its original condition.

6. ETHNOGRAPHIC CULTURAL LANDSCAPE

The ethnobotany, rock art, sacred lands, and lifeways of Native American people who used the area are not well documented. Some Native Americans believe the land, including that of the Sloan Canyon NCA, is alive. The Indians living near Sloan Canyon NCA have rituals, songs, and other activities that are associated with the land in general. A Chemehuevi elder commented, “It seems awkward to put these things in writing; however, it is important to document that the place has been visited and should be preserved.” The collection of this information would greatly enhance the Bureau of Land Management’s (BLM) ability to focus on Native American interpretation of the NCA. It would also aid the BLM in continuing consultation with the tribes throughout the RMP/EIS process and in the ongoing management of resources within the NCA (Bengston 2004). Some potential areas that could be incorporated into an overall ethnographic cultural landscape study of the Sloan Canyon NCA include: ethnographic/ethnohistoric study of the North McCullough Range within the boundaries of the Sloan Canyon NCA, an ethnographic study of the Sloan Canyon Petroglyphs Site (26Ck2420/2621), focusing

individually on the Southern Paiutes, Chemehuevis, Mojaves, Hopis, and Hualapais; and an ethnobotanical study of Sloan Canyon proper, focusing on the Southern Paiutes.

7. RESEARCH ISSUES FOR THE HISTORIC PERIOD

The historic period in the Great Basin is marked by a number of colorful and adventurous themes including trail blazing, mining, and railroad building. Associated industries included the introduction of domestic stock (particularly sheep and cattle) to support the other historic activities, and development of other businesses that grow up around mining, railroads and stock-raising communities. In Nevada, these businesses routinely included saloons, casinos, and brothels. Although there are numerous sites attesting to all of these activities nearby in southern Nevada, the only historic resources recorded during inventory (Duke et al. 2004) related to mining: numerous mining claim cairns and a small group of prospects, adits, shafts, habitation features, and road traces attributable to the Quo Vadis Mine which was in limited production in 1915, a placer mine at the south end of the central valley, an historic road, and a series of concrete dams built in 1942. No evidence of other historic activities was recorded. Future research should pay special attention to documenting other early historic activities in the area that could reflect other uses of the area by non-Indian peoples and the consequent interactions between Indian and non-Indian populations.

PART II: A TREATMENT PLAN FOR HUMAN REMAINS AND ITEMS OF CULTURAL PATRIMONY

Burials, associated funerary objects, sacred objects, and objects of cultural patrimony are often present in areas such as the Sloan Canyon NCA, and are of particular concern to local, living Indian peoples as well as being an important record of the presence of people in the area in the past. Their physical remains and any material culture associated with them provide evidence of many aspects of prehistoric lives. Burial places are broadly defined by the Department of the Interior Interagency Resources Division as “a location where the dead are prepared for burial or cremation, or where the remains of the dead are placed” without restriction on the size of the location or the complexity of the site, including the number of individuals interred or otherwise represented. Objects directly associated with burials, objects that at one time were associated with burials, sacred objects (items needed for the practice of traditional religion) and objects of cultural patrimony (objects that have ongoing historical, traditional, or cultural importance central to the Indian tribe itself, rather than to an individual tribal member) are included in the guidelines for treatment of human remains (Potter and Boland 1992:1-2).

Concern of Native Americans regarding the appropriate and respectful disposition of burial remains and objects has led to the passage of the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA, P.L. 101-601), which defines the rights of Indian Tribes and Native Hawaiian organizations regarding human remains, funerary and sacred objects, and other culturally significant objects for which they can demonstrate lineal descent or cultural affiliation. NAGPRA is intended to protect Native American graves and their related items and to control their removal. It encourages avoidance of archaeological sites that contain burials and makes Federal agencies responsible for consulting the appropriate tribes when such sites are encountered during planned excavations or inadvertently.

Although legislation exists, particularly in NAGPRA, regarding the protection and disposition of burials and objects associated with them, detailed guidance on identifying, evaluating, and documenting archaeological sites that contain burials and appropriate methods for studying them have not been issued. Burial places are recognized as reflections of cultural values and practices that contain important information about past people. Objective evaluation is not always possible because burials are often viewed with reverence and sentiment by families and cultural groups descended from the interred individuals. Consequently, special requirements are included in the evaluation of cemeteries and graves. Burials are not considered eligible for the National Register of Historic Places unless they meet special requirements. The specialized nature of investigation of burials, ongoing debates over the appropriate treatment of burial sites, and evolving policies and procedures relating to NAGPRA have all contributed to the lack of standardized guidance.

The complexity of the issue of treatment of human remains and items of cultural patrimony is vividly expressed in the statement of the Society for American Archaeology (1999) concerning the treatment of human remains. The SAA board adopted a formal statement regarding the treatment of human remains in May 1986 and reaffirmed it in March 1999. The SAA, like the DOI, opposes a Federal legislation that imposes a uniform standard for determining the disposition of all human remains due to the diversity of beliefs and interests in burial customs. The SAA acknowledges an ethical responsibility to advocate and aid in the conservation of archaeological data, recognizing that mortuary evidence is an integral part of the archaeological record that informs directly upon social structure and organization, and upon aspects of religion and ideology. They further recognize that human remains provide unique information about demography, diet, disease, and genetic relationships among human groups. In the statement it is argued that “research in archaeology, bioarchaeology, biological anthropology, and medicine depends upon responsible scholars having collections of human remains available both for replicative research and

research that addresses new questions or employs new analytical techniques.” However, the SAA also recognizes the diversity of cultural and religious beliefs regarding the treatment of human remains and that there are legitimate concerns about the treatment and disposition of human remains that conflict with legitimate scientific interests, and that those concerns must be recognized and respected. As with the DOI guidance for consultation with tribes, the SAA encourages close and effective communication between researchers and those communities that may have biological or cultural affinities to human remains. Conflicting claims concerning proper treatment and disposition of particular human remains must be resolved on a case-by-case basis through consideration of the scientific importance of the material, the cultural and religious values of the interested individuals or groups, and the strength of their relationship to the remains in question.

The following guidelines have been developed for the treatment of human remains found in the Sloan Canyon NCA by integrating the principles expressed in the NAGPRA regulations, concerns expressed by Indians, the values expressed in the SAA regulations, and guidelines for protection developed by the Bureau of Land Management.

Human skeletal materials, associated funerary objects, sacred objects, and objects of cultural patrimony must at all times be treated with dignity and respect. Regardless of whether they are left in situ or removed for protection, study, and reburial. Burials, including associated objects, sacred objects, and objects of cultural patrimony found in the Sloan Canyon NCA will be treated with utmost dignity and respect.

Commercial exploitation of human remains is abhorrent. Further, unauthorized removal of any archaeological materials on the Sloan Canyon NCA, including human burials and the matrix in which they are contained is illegal. Unauthorized individuals caught disturbing human burials on the Sloan Canyon NCA will be prosecuted to the fullest extent of the law. Further, any evidence of unauthorized tampering with human burials will be pursued with due diligence to apprehend and prosecute individuals who disturb burials, their associated objects, sacred objects that were placed in the NCA as part of a ceremony or for storage, or any object of cultural patrimony. This includes, but is not restricted to, human burials, rock art, cairns, objects cached in rockshelters, and objects buried in the ground.

All human remains and associated funerary objects, sacred objects, and objects of cultural patrimony found on the Sloan Canyon NCA should receive appropriate scientific study. This stipulation can be accommodated with minimal conflict with tribal concerns if handled in a timely, respectful, and conservative manner. Context description, inventory and metric description, and graphic documentation are the minimal data that must be collected for all human remains, associated objects. More advanced analyses such as radiocarbon dating, DNA and isotopic analyses must be negotiated on a case-by-case basis.

1. DISCOVERY SITUATIONS

In the event that human remains or associated cultural materials are found inadvertently during construction of trails, guzzlers, or other authorized activities, the party responsible for the discovery will cease the activity in the area of the discovery and make a reasonable effort to protect the items discovered. They will immediately notify the Sloan Canyon NCA manager and BLM law enforcement by phone (or in person) and in writing, of the discovery. BLM law enforcement will notify appropriate local law enforcement agencies and coroner to ensure that the discovery is not a crime scene. Upon determination that the site is not a crime scene, the authorized officer will implement the BLM/Nevada

SHPO Statewide Protocol and consider the feasibility of redesigning the activity to avoid the discovered items and preserve them in situ. Whenever possible, human remains exposed on the Sloan Canyon NCA will be carefully and immediately covered in the exact location and with the sediments in which they were found until final disposition is determined.

Human remains or items of cultural patrimony found exposed by erosion, activities of animals such as coyotes or bighorn sheep, or during archaeological research, will be immediately and carefully protected from further exposure by the individual(s) making the discovery. The individual(s) making the discovery will follow the notification process above. After release of the site by the coroner or appropriate law enforcement agency, if erosion or disturbance by animals cannot be curtailed in a reasonable manner, it may be necessary to remove the burial to prevent further exposure, disturbance and destruction.

Human remains that cannot be avoided and left in situ due to other land-use activities, or that cannot be protected from exposure by erosion, activities of animals, or other natural disturbances, must be carefully excavated and kept in as intact condition as possible given their present condition of preservation, until they are either reburied or curated.

2. *AUTHORIZED ARCHAEOLOGICAL EXCAVATIONS*

All archaeological excavations will include a treatment plan for human remains and associated materials specifically designed for the project as part of the Archaeological Resources Protection Act (ARPA) permit application. Interested tribes will be offered the opportunity to review and comment on the plan as part of the ARPA permit process.

3. *DISPOSITION OF NAGPRA MATERIALS*

If human remains are recovered rather than preserved in situ, efforts will be made to determine the tribal affiliation of the interred individual and the remains and associated objects will be given to the living descendants after appropriate, scientific documentation of the burial and its associated objects. All discoveries of NAGPRA materials will be subject to the current affiliation/repatriation process at the time of discovery. The validity given any claim by an individual or group regarding any particular human remains will depend on the strength of their demonstrated biological or cultural affinity with the remains in question. If the remains can be identified as those of a known individual with biological descendants, the living descendants will be responsible for appropriate permanent disposition of the remains. They may choose to rebury, cremate, curate, or otherwise dispose of the remains. However, if human remains are recovered from the Sloan Canyon NCA and repatriated to living descendants or an affiliated tribe, reburial cannot occur within the boundaries of the Sloan NCA. Vandalism and looting threaten the archaeological record, including burial sites, which necessitates cooperation between archaeologists, descendants, land managers, and others that may have an interest in the past (stewards, etc.). The Bureau of Land Management cannot legally provide protection for any interment outside authorized curation facilities; once they have been removed from the ground they no longer qualify as archaeological sites and are not covered under existing federal laws and regulations.

Once removed from their original burial place, human remains that cannot be clearly associated with a particular tribe and appropriately reburied according to tribal custom will not be reburied in a generic

manner. Unaffiliated human remains will be curated in an appropriate and respectful manner by the Nevada State Museum, Carson City, Nevada. Such materials will be made available for observation and study only to qualified individuals who will continue to maintain a dignified and respectful treatment of the remains. Curated human remains will be accessible only for legitimate scientific or educational purposes; they will not be put on public display.

PART III: A MONITORING PROGRAM FOR SHORT- AND LONG-TERM EFFECTS BY OTHER USES WITHIN THE SLOAN CANYON NCA

1. IMPLEMENT A SITE MONITORING/STEWARDSHIP PROGRAM

Southern Nevada's rock art and archaeology are at acute risk from the rapid urban growth of Las Vegas and increased leisure use of its hinterland. Damage is frequently manifested in the form of vandalism (defacement and graffiti), theft of portable rock art boulders (Holmes et al. 2002:9), and unauthorized excavation. Sloan Canyon NCA contains numerous rock art sites and other archaeological sites that are at risk from unsupervised public visitation. Rock art sites are particularly fragile cultural resources at risk from both environmental and human causes of deterioration, while buried archaeological deposits are at risk from unauthorized excavation or destruction caused by trampling. The monitoring program outlined below is applicable to all archaeological features present in the Sloan Canyon NCA; measures that are specialized to particular site types are indicated.

Site monitors inspect sites for changes in physical condition and identify whether observed changes are the result of natural factors or human intervention. Natural sources of deterioration include;

- Erosion caused by wind, rain, water runoff etc.
- Aabrasion from plants
- Deposition of minerals over rock art panels (the inclusions in these mineral skins can potentially be dated by direct dating methods)
- Exfoliation of rock surfaces from freeze/thaw cycles, water and salt action
- Surface retreat that is in the nature of the rock
- Animal activity (animals walking over rock art may scratch it with their hooves or claws; burrowing rodents may expose buried archaeological deposits etc.) (Loendorf et al. 1998:73-74)

Anthropogenic causes of site deterioration are both unintentional and deliberate. Unintentional impacts that are the result of site overuse, unsupervised visitation or lack of visitor knowledge can include;

- Abrasive dust thrown up by visitors (Gale and Jacobs 1987)
- Erosion caused by visitors repeatedly following the same trails
- Over-visitation resulting in changes to the natural environment of a site (Brunet and Vidal 1989)
- Repeated touching of rock art with hands, resulting in staining, soiling, and wear
- Walking over rock art panels or archaeological deposits
- Air pollution
- ATV users driving over archaeological sites and rock art (Holmes et al. 2002:9)

- Deposition of trash
- Introducing foreign materials in rock art (chalk, charcoal etc.) to enhance photography
- Making rubbings or latex molds of rock art panels (Loendorf et al. 1998:74)
- Rock climbing over rock art panels (Holmes et al. 2002:9)

Deliberate acts of site deterioration can include;

- Graffiti (either directly over, in association or near rock art) that visually mars a site
- Defacement of rock art (deliberate attempts to obliterate it)
- Use of rock art as target practice
- Theft of portable rock art boulders (and also attempts to remove larger boulders by using a rock saw to cut out the motif)
- Unauthorized excavation (Loendorf et al. 1998:74)

Site monitoring or stewardship programs are potentially an effective form of proactive site management that can manage these environmental and anthropogenic threats to site integrity. Because monitoring programs rely on public volunteers, agencies are faced with the problem of administering volunteers and avocational groups for whom few sanctions exist to correct inappropriate behaviors. Volunteers work on their own schedule and do as much or as little as they wish. Site monitors should be regularly monitored by agency staff as stewardship programs provide the perfect cover for looters and a place for looters to obtain information about sites not publicly known. It is for this reason that monitors should never discuss the site(s) they monitor (even to other monitors) and should never give directions to sites.

Effective site monitoring programs require frequent site inspections that are visible to site visitors, staffed by well-trained and enthusiastic volunteers, and adequately supervised by agency staff to make best use of the monitoring information that is thus derived.

Training—Site monitors should be trained in appropriate procedures and relevant background knowledge. They should learn about existing legal protection for archaeological sites (ARPA etc.) and the requirements for successful prosecution of violations. This will help them understand the reasons for what they are doing and the duties expected of them. Site monitors should be instructed in the methods required for carefully reporting changes in the condition of the site(s) they monitor. Monitors should be able to recognize new impacts (environmental or human) at sites (based on a preexisting thorough record of the site), record new impacts using photography and a sketch drawing. Site monitors need to have impressed on them that in no circumstances should they ever attempt to mitigate any vandalism they may observe. Monitors are trained in safety issues—they should never inspect sites on their own and never approach individuals they observe committing a crime at a site. Instead, they should record the actions observed and report them immediately to agency staff.

Monitoring practices—In general it is not desirable for a steward to monitor more than one site, unless they are in such close proximity that it makes sense to do so. Site monitors are expected to inspect their site once every three months—sites at high risk or which are highly visible should be monitored more frequently, particularly at weekends and other periods of peak activity. This can be achieved by either increasing the frequency of inspections individual monitors make, or by recruiting more site monitors for a particular site. Monitors inspect their site for any sign of human visitation (vandalism, graffiti, looters' pits, trash etc.) or natural erosion, and use a preexisting record of the site's condition on which to base their assessments. If they find evidence of visitation they should proceed cautiously—if the site was

visited in the pursuit of an illegal activity then the site steward's presence and actions can potentially contaminate a crime scene.

Changes to the physical condition of the site are carefully recorded by photography (including a photo-board that records site number, date time, etc.), sketch drawings and a detailed written description. A generalized site impact form could be devised to serve this purpose and distributed to monitors. If the change in site condition is the result of illegal activity monitors should not touch anything and retrace their steps before calling law enforcement or agency staff who will record the condition impact in detail. This is why stewards should always carefully inspect a site for signs of disturbance before clearing up modern trash. Any vandalism or graffiti should be carefully recorded in photographs, sketch drawings and sketch maps, and should only be mitigated by a trained conservator under the direction of agency staff.

Monitors are supervised by a site stewardship coordinator (also a volunteer) who is responsible for either a single site or a small area containing many sites. The coordinator provides monitors with the equipment necessary for them to carry out their tasks—a camera (disposable is acceptable), a photo-board, measuring tapes, drawing materials, notebooks and any necessary agency forms). These materials can be stored in a box that is taken into the field by monitors and returned to the coordinator at the end of the site inspection. Monitors must check-out and check-in with the coordinator before making their inspection and upon their return. The coordinator schedules the inspection rotation, assigns sites to monitors, collects receipts for reimbursement from monitors, and reports directly to the agency staff overseeing site monitoring.

In addition, the BLM will consider the feasibility of remote site monitoring through the use of concealed video cameras. This should be considered for areas of highest archaeological sensitivity and where landscape context contributes an air of seclusion that often makes perpetrators feel that they can be undetected.

All Sloan Canyon NCA site stewards will work under the direction of the NCA archeologist, and under a formal BLM volunteer agreement which sets standards, rules, and requirements.

Administration and training providers—The Nevada Archaeological Association (NAA) is the umbrella organization for archaeology site stewardship programs throughout Nevada. It provides training to volunteer monitors and membership of the NAA is not a condition of participation in its scheme. The NRAF provides training and site monitoring schemes that concentrate on the protection of rock art sites. Its monitoring program is open only to its members—volunteers have to join the NRAF before they can receive training or participate in a stewardship program. Both the NAA and NRAF liaise with the Clark County Heritage Resources Coordinator (a Southern Nevada Public Land Management Act [1998] funded position) who is responsible for overseeing site stewardship programs in Clark County.

2. CONSERVATION GUIDELINES

It is suggested that conservation of rock art sites should involve consultation with a professional rock art conservator. The very specialized knowledge and experience of rock art conservators allows them to: a) understand the structures and properties of a work; b) apply scientific knowledge to the conservation treatment; and c) perform procedures that minimize the loss of cultural material (Odegaard 1999). Conservation procedures adopted are carefully tailored to the needs of individual sites—one solution does not fit all sites or even all panels at the same site (Dandridge and Kane 1999:29). A suggested

conservation and mitigating process (once a conservator's services have been obtained) that could be followed is;

- Carry out a condition assessment of the site
- Conservator advises on the possible risks of proposed treatment measures
- Consult with Native Americans regarding their concerns about the proposed treatment
- Document the area to be cleaned before treatment
- Fully document the treatment used
- Always use the least aggressive treatment first before other options are explored
- Fully document the condition of the area after the treatment is finished (this allows comparison of the finished condition of the area with its condition prior to treatment)
- Monitor the condition of the area on a regular basis after treatment is completed (this allows problems caused by treatment to be identified quickly and before they cause further damage. If mitigating graffiti or other vandalism it is important to monitor the site regularly in case vandals try to restore their vandalism) (Loendorf et al. 1998:75)

Graffiti is usually removed or mitigated because it is seen as encouraging future acts of vandalism by “communicating that such acts are condoned” (Griswold 1999:42; Howard and Silver 1999:36). The pressure on conservators to remove graffiti is strong because the longer an applied material remains on the surface and exposed to the elements, the harder it is to remove (Dean 1999:22). However, the consequences of well-intentioned but un-informed efforts to remove graffiti are potentially as damaging as the original vandalism it is intended to mitigate (Dean 1999:23).

Visual reintegration of graffiti should only be attempted by a trained professional under the direction of agency staff. Additive (e.g., spray paint) and subtractive (e.g., scratching) graffiti pose different problems of mitigation and require different solutions (Griswold 1999:41). Scratched graffiti can be treated by reducing the contrast between the light colored graffiti and the surrounding surfaces. However, it is virtually impossible to completely eliminate scratched or incised letters or shapes by in-painting them as “they will always be picked out by the careful eye on close inspection, no matter how well the paint matches the original surface” (Griswold 1999:45). Some conservators believe that camouflaging or reversing graffiti by in-painting should only be used as a last resort because at best it only minimizes the appearance of graffiti and at worst gives graffiti “a venerable looking patina of “age”” (Griswold 1999:45).

It is suggested that removing or mitigating graffiti or other defacement that directly covers rock art should only be attempted by a professional conservator under the direction of BLM agency staff (Loendorf et al. 1998:76).

3. *PUBLIC EDUCATION*

Native American interpretation of cultural and natural resources should be included in public interpretation programs and media, in addition to archaeological interpretation of Sloan Canyon's archaeological features. A Native American perspective could include interpretations of the rock art, archaeology, plant resources and other features of interest at Sloan Canyon NCA. Native American interest in such a program was expressed during the ethnographic assessment (Bengston 2004). Continuing consultation with Native American tribes would be one way of achieving this indigenous participation in interpretive programs and the BLM has already hired an American Indian Coordinator/Lead Environmental Education Specialist to assist in this effort.

Public education could be attempted to preempt deliberate or unintentional damage to cultural properties. The most commonly applied public education tool is the strategic placement of signs. Signage is not endorsed at remote or inconspicuous sites as their reduced visibility offers them a measure of protection that would be reduced by the erection of signage (Jameson and Kodack 1991:238). Erecting signs will highlight fragile cultural resources and increase their visibility to potential vandals and thieves. While signage is not reported to usually result in an increase in on-site vandalism, the sign itself often becomes the focus of vandalism (Jameson and Kodack 1991:240). Signage should be monitored regularly and replaced for damage as necessary.

Signage can be erected in the Sloan Canyon NCA to correct inappropriate visitor behaviors and would not conflict with its status as an NCA or Wilderness Area. Sloan Canyon NCA is already well-known and the levels of site visitation are expected to increase—signs, if erected, would not be making more visible a currently inconspicuous cultural resource. It is a routine BLM practice to erect signs that identify federal lands and their accompanying archaeological sites as a law enforcement measure (Jameson and Kodack 1991:241-242). The absence of signage can make ARPA violations difficult to prosecute—also, protection statues U.S.C. 641 (theft of government property) and 18 U.S.C. 1361 (destruction of government property) are easier to enforce when a site is signed (Jameson and Kodack 1991:243).

Messages on signs are most effective when they describe the importance of the cultural resource, why it is fragile and irreplaceable, provide information of legal penalties, and end with an upbeat message (Jameson and Kodack 1991:243).

Visitor centers can serve as the locus for public education and need to be placed effectively so that they promote and interpret sites which are protected from visitors, and through which they must pass before experiencing the cultural resources. A visitor center could be used to monitor visitor numbers by housing a register. Interpretive kiosks could be placed at each entrance to the NCA. These should advise visitors on correct site etiquette, describe the laws and enforcement measures that protect the cultural resources they will encounter, and outline their cultural value to Native Americans and archaeological interpretation. They could also contain a visitor register.

Site tours are a common educational technique that can successfully manage public curiosity about archaeological sites in a manner where their behavior can be closely monitored. It is also a way of distracting public attention away from vulnerable sites or those that have little or no monitoring in place to protect them. Public tours need to be carefully managed because they can result in overcrowding at sites, leading to increased erosion of trails and abrasive dust being blown onto the rock art panels (Gale and Jacobs 1987:231-232). The size and frequency of public tours, if implemented, should be monitored for their impact on trails and archaeological sites, and modified accordingly if related increased erosion and/or deliberate damage are observed.

Protective measures that obstruct photography should be avoided where possible to remove a possible cause of public dissatisfaction that could lead to them being ignored or challenged by certain users “ who will take the opportunity to vandalize or destroy features meant to protect a site” (White 2002:34). Educational devices such as signage and trail guides should be first tried to keep visitors to the trail. If monitoring of land-use reveals that this is ineffective then low barriers could be erected to control visitor circulation patterns.

4. IMPLEMENT A FULL ARCHAEOLOGICAL DOCUMENTATION OF THE ROCK ART SITES

Thorough documentation provides the basis for all conservation and protection measures and is considered an important state goal in the Nevada Historic Preservation Plan (Baldrice 1995). Duke et al. (2004:148) recommend that a detailed documentation of the rock art panels should be done as time and monies allow. This would provide baseline data for management decisions, monitoring programs and enhance the prospects of successful prosecution of ARPA violations. The rock art sites at Sloan Canyon NCA are already suffering the negative consequences of site visitation in the form of graffiti and attempted theft (Duke et al. 2004:51, 145).

White (2002) outlines a three-tiered approach to rock art documentation, where each level is increasingly more intensive and detailed than the last. A Class I documentation consists of completing an IMACS form for each identified site. The most basic components of the site are defined (e.g., features, cultural materials and rock art panels) and a precise UTM and township and range location are taken. A site plan showing the location of major features or concentrations is made. Class II documentation includes the completion of IMACS forms as well as the supplemental IMACS form for each identified rock art panel. Photographs, either 35mm or digital, are taken and site maps showing the location of individual panels are made. Field sketches of each panel should also be completed during this phase. Class III documentation consists of the preceding methods in addition to measured scale drawings of each rock art panel and a precise site plan of the position of rock art panels and their relationship to each other (White 2002:24). White also recommends that a thorough site characterization be completed for each site that includes minimally the following elements;

- Site description including landscape context
- Description of the rock art (type, themes, suggested age and style and production techniques)
- Assessment of the site’s condition (including signs of vandalism, unauthorized excavation, presence of trash, natural causes of erosion etc.)
- Determine immediate and potential threats to site integrity
- Provide management recommendations for the protection, education, interpretation and appropriate uses of the site (White 2002:24-25).

The current level of documentation for the rock art at Sloan Canyon is at the level of a Class II survey because scaled field drawings have not been completed for all panels. These are a valuable management tool, particularly when dealing with hard-to-see panels, and they clearly indicate and interpret present and potential threats to image integrity (e.g., spalling, water runoff etc.). For a photographic record to meet existing Nevada SHPO archival standards minimally a black and white negative is required of each panel. In addition, all photographs should include a photo-board recording important contextual information (see

Photo-documentation section below) so they can be used to manage ARPA violations. Photography made during the random and non-random surveys is at a Class I or II level because of the absence of a photo-board and/or color calibration scale and North arrow. It may not be desirable to consolidate the data from previous surveys when making scale drawings to achieve a Class III survey of the rock art sites in the Sloan Canyon NCA. It is frequently difficult and time-consuming to re-identify panels in the field from photographs and some new photography is necessary to bring the photo-documentation to a Class III standard. Consolidation of existing survey data requires harmonization of panel numbering systems (and panels that are renumbered would need to be re-photographed with their new panel numbers). A Class III survey could also take into account the research themes identified in this Appendix and the techniques and data required to address them.

Recording guidelines are outlined in some detail as few published rock art recording protocols exist—most documentation manuals take the form of “gray” literature and are hard to acquire. It is also useful if volunteers are to be used to explain to them some of the rationale underlying non-intrusive methods and why accuracy is important.

Recording Methods—Because some rock art recording techniques currently practiced by rock art researchers are intrusive and/or inaccurate, a suggested recording procedure that is in accordance with the International Federation of Rock Art Organizations (IFRAO) standards is outlined below. Most argument regards the best method for making scale field drawings for which there are three main approaches, summarized below. These are assessed in the light of the IFRAO guidelines for accurate, non-destructive recording techniques (Bednarik 2001). Recording work should be directed by an archaeologist holding a BLM or Nevada State Antiquities permit.

Scale drawings. (a) Drawing from color slides—slides taken in the field are projected onto a wall to be copied onto paper or plastic sheeting. This technique is technically not a field drawing as it essentially is only the tracing of a photograph. Drawings made in this manner are then checked and corrected in the field. This technique is non-intrusive but is inaccurate and time-intensive because re-identifying panels in the field from drawings based on photographs can be a lengthy process, particularly as the scale drawings are drawn to variable scales (the scale is dependent on the position of the photographer when the picture was taken and the size at which the slide was projected onto a wall for the drawing to be made). If the image being recorded is not situated on a flat surface (very common) then the drawing will introduce inevitable distortions caused by tracing an image on an irregular surface from a flat photograph (this is also a problem for direct tracing). Also, when a site contains panels with similar motifs the chances of correcting a drawing against the wrong panel are quite high. All drawing techniques are interpretive and it is therefore always preferable to make scale drawings from the original in the field and not from a secondary medium such as a photograph. The inaccuracy and time-consuming nature of this recording technique make it inappropriate and not recommended.

(b) Direct tracing (as opposed to raised tracing where there is no direct contact between plastic and rock art) is still widely used in some parts of the world, and is used by some recorders in the US (e.g., Lever 2004; Loendorf et al. 1998). This technique involves placing a sheet of Mylar, acetate or other sheet of clear film, over the rock art to be recorded and directly tracing onto the plastic the shape of the motif underneath. It is potentially very time-consuming and results in a 1:1 scale drawing (both significant drawbacks) (Loendorf et al. 1998:61, 63). As this technique involves placing pressure on rock art imagery it is intrusive and potentially damaging, as well as inaccurate (Bednarik 2000; Kolber 2004:2; O’Connor 1999). Rock art researchers advise against any kind of contact with rock art panels (‘look, don’t touch’) as oils from hands touching rock art can be drawn into the rock and contaminate any future dating techniques. Therefore, direct tracing’s intrusive nature and inaccuracy recommend against its use in any circumstances. Indirect tracing (i.e., using a frame to support the plastic sheeting) is non-intrusive

but shares the same inaccuracies as direct tracing; it is also very time-consuming and therefore not recommended because a faster and more accurate technique is available (see below).

(c) The least intrusive and most accurate technique for making scale drawings currently practiced involves the use of string grids (Kolber 2004; Loendorf et al. 1998; NRAF 2003). Drawings are made in the field and can be corrected at the same time. A string grid (usually 1 x 1 m in size comprising 10 x 10 cm squares) is laid over the panel to be drawn. This means that the scale used (1:10) is consistent for each drawing—an important consideration for land managers when using drawings to subsequently re-identify panels in the field. The recorder strives to objectively copy on paper only what can be seen on the rock art panel. Any vandalism, graffiti, the removal of (or any attempt at removing) a motif are also recorded, as well as signs of exfoliation etc (NRAF 2003). Drawings include a North arrow, record the rock type, a Munsell color chart reading, the dimensions of the panel and any other applicable comments. If it is not possible to place a string grid over the panel to be drawn (for e.g., the panel may not be accessible) the absence of a scale should be clearly noted on the drawing. No artistic ability is required to make a scale drawing—it is the misperception that artistic ability is necessary that has probably been responsible for the popularity of tracing methods (either from a photograph or directly from the image). This technique is the recommended method for making scale drawings at Sloan Canyon.

Photo-documentation. Photographic techniques should be non-intrusive and non-destructive. Adding foreign materials (e.g., charcoal, chalk, paint etc.) to enhance the visibility of petroglyphs for photography was once a common practice—such practices are now recognized as destructive but some continue to be used. Loendorf et al. (1998:4) report that chalking, at least until 1988, was an approved documentation technique in Colorado and was stipulated on the state’s Historic Preservation Office’s rock art recording supplemental form. As accurate, non-intrusive photographic techniques exist there is no need for such destructive practices to be employed. However, land managers need to be aware of their existence as some rock art researchers do use destructive techniques despite the damage they cause.

All photographs should contain a photo-board in the picture (otherwise their value is the same as a tourist photograph) (Loendorf et al. 1998; NRAF 2003). Photo-boards provide contextual information that is essential for providing documentation of a site’s condition necessary to enable prosecution of ARPA violations and monitor the effects of natural erosion. Information on the photo-board must include: Site Number & Name (if any); Panel Number; Date; North Arrow and IFRAO Color Calibration Scale. Although “white boards and erasable markers” seem convenient, with time and in the hot sun it becomes more and more difficult to erase the marker fully. The black menu board with push-style white plastic letters (more commonly used as open/closed signs for shops) is a good medium for photo boards and is the most clearly visible in photographs (NRAF 2003).

Photographs should be taken of each individual panel and overall panel photographs to show the relationships of panels to each other (Loendorf et al. 1998:38). A photographic log should be kept and should record information such as roll number, exposure number, panel number, etc. The photographic record should minimally include black & white prints (proof sheets are generally made) of every panel—black & white print negatives remain the archival standard of both the Library of Congress and the Department of the Interior (Historic Register) due to their longevity (NRAF 2003). Color slides, color prints and color digital photographs should also be taken—these will be of most use to land managers. Cameras used should always be 35mm SLR and the digital camera should be SLR of least 5 Megapixel resolution. Kodak TMX 100 is an acceptable choice of black and white film. Color slides are of unproven archival quality—Kodak Kodachrome slide film is of good archival quality but Ektachrome can also be used (Loendorf et al. 1998:44). Color prints have a shorter archival life than color slide film and because of the expense of developing they can probably be omitted in favor of digital prints. Digital photographs should be taken in archival TIFF or RAW format—it should be borne in mind that if digital photography is proved in the future to be of greater archival quality than black and white photography, it

may become the new archival standard. Also, as digital technologies and techniques improve, slides may become less important, but currently they cannot be replaced (NRAF 2003).

Mapping. All panel locations and associated archaeological features should be plotted using a hand-held GPS device capable of sub-meter accuracy. (Graffiti and defacement should also be plotted to allow the identification of any new graffiti or vandalism). This will provide both UTM coordinates and allow internal site mapping (i.e., showing the relationships of panel locations to each other) (NRAF 2003). This is another valuable tool facilitating re-identification of panels in the field, and provides information necessary to prosecute theft.

5. *EVALUATION CRITERIA*

After identification and documentation rock art sites must be evaluated for significance. Not all sites or rock art panels are significant and criteria of evaluation of the heritage value of rock art panels/sites will allow the identification of those panels of sufficient significance to receive more protective measures than those of lesser significance. This also provides a management tool for estimating the scale of damage caused by any future vandalism or natural erosion. Rock art is usually nominated as eligible for inclusion on the NRHP under criteria C and D (White 2002:29). Duke et al. (2004:140) note that rock art is commonly highly esteemed by Native American groups and could be additionally considered Traditional Cultural Properties in accordance with Bulletin 38 guidelines (White [2002] makes a similar point). White (2002:26-27) lists a number of the properties of rock art sites/panels that should be taken into consideration when assessing their eligibility for inclusion to the NRHP;

1) Aesthetic value—topographic setting and landscape setting may have played an important role in past selection of sites for making rock art (White 2002:26).

2) Historic value—rock art sites may record important events or the actions of important people. They may also contribute to a people's continuing sense of place and history (Stoffle et al. 2000; White 2002:26).

3) Scientific value—rock art sites/panel may have scientific value because of their potential to address research themes regarding chronology (because of the potential for direct dating or relative dating studies), past social practices, past ethnic and cultural identities, and past population movements (White 2002:26-27).

4) Sociocultural value—rock art sites/panels potentially have social and cultural value to Native Americans because they are perceived as inherently sacred or have a continuing religious use for traditional ceremonial practices. This sacred quality should be recognized and respected by all users of rock art sites. Also, rock art sites/panels may be of importance because of their role in manifesting indigenous cultural history in the landscape and their educational role in teaching Native Americans about their cultural heritage (White 2002:27-28). In these cases rock art could be treated as traditional cultural properties (Duke et al. 2004; White 2002:28).

In addition to these general principles of evaluation the following more specific criteria should be applied to rock art sites and individual panels to assess their significance and the level of protective measures applied. Table 3 allows the varying significance of sites and individual panels to be assessed based on a quantitative and qualitative consideration of their content and current condition. Sites or panels that have already suffered degradation have reduced significance. A site or panel's evaluation is not permanent—

significance may be restored through conservation work and it may be lost or diminished by future degradation (natural or human-caused). It is suggested that management of Sloan Canyon NCA's rock art sites should attempt to protect a representative sample of its character and features, and protect sites and/or panels that express motif types or styles that are regionally rare and/or not well-represented in the NCA, and/or are unique to the NCA. The development of a motif typology (suggested above) would facilitate the evaluation process.

A consideration of site visibility may assist in prioritizing the intensity of monitoring and/or the nature of protective measures to be applied to sites evaluated as significant. A site or panel's proximity to well-used trails, or a prominent position in the local topography, makes it highly visible to visitors. The nature of certain sites makes them highly visible even if they do not occupy striking landscape positions, in particular sites with large numbers of motifs present. A site's landscape visibility can be heightened by the actions of the general public, in particular the posting to the internet of maps of sensitive archaeological areas.

Table 3. Typology of the Significance of Rock Art Sites and Panels.

Class	Size ^a Motif# Panel#		Condition ^b	Characteristics	Significance ^c
Ia	1	1	Very Poor to Good	Single prehistoric panel or motif in a well-defined and/or well-known regional or local style. The style and motif type is well represented at other sites in Sloan Canyon NCA	1
Ib	1	1	Normal to Good	A complex single prehistoric panel or motif that covers at least 5 m sq in area and/or comprises over 20 elements;‡ its scale and complexity make it potentially significant even if it is in a well-defined and/or well-known regional or local style. Not well represented at other sites in Sloan Canyon NCA.	3
Ic	1	1	Very Poor to Subnormal		2
Id	1	1	Very Poor to Good	A complex single prehistoric panel or motif that covers at least 5 m sq in area and/or comprises over 20 elements;‡ its scale and complexity make it potentially significant even if it is in a well-defined and/or well-known regional or local style—well represented at other sites in Sloan Canyon NCA	2
IIa	2-10	2-6	Very Poor to Good	Prehistoric panels or motifs in well-defined and well-understood regional and/or local styles which are well represented at other sites in Sloan Canyon NCA	2
IIb	2-10	2-6	Very Poor to Subnormal	Includes some prehistoric motifs that are of a distinctive and/or unusual localized style and/or are not well represented at other sites in Sloan Canyon NCA	2
IIc	2-10	2-6	Normal to Good		3
IIIa	11-50	≥7	Normal to Good	Prehistoric motifs that are representative are of well-defined and well-understood regional and/or local styles that are well represented in the Sloan Canyon NCA. The larger size of the assemblage makes it unusual for the local region	3
IIIb	11-50	≥7	Very Poor to Subnormal		2
IIIc	11-50	≥7	Subnormal to Good		5
IIId	11-50	≥7	Very Poor and Poor	Includes some prehistoric motifs that are either of a distinctive and unusual localized style, or are not well represented at other sites in Sloan Canyon NCA. The larger size of the assemblage makes it unusual for the local region	2
IVa	≥51	≥7	Subnormal to Good	Prehistoric motifs that are representative of well-defined and/or well-understood regional and/or local styles; are well represented in Sloan Canyon NCA. The larger size of the assemblage makes it unusual for the local region. May include some prehistoric motifs that are either of a distinctive and/or unusual style localized to Sloan Canyon NCA, or are not well represented at other sites in the NCA	4
IVb	≥51	≥7	Very Poor to Poor		2

Class	Size ^a		Condition ^b	Characteristics	Significance ^c
	Motif#	Panel#			
Va	≥2	≥2	Subnormal to Good	Site is dominated by prehistoric motifs that are in a restricted regional and/or localized style—may be unique to, or poorly represented, in Sloan Canyon NCA.	5
Vb	≥2	≥2	Very Poor to Poor		2
Vla	≥1	≥1	Subnormal to Good	Motifs/panels that portray historic themes or subjects and can be identified accordingly. Historic subjects are a rare motif in Nevada's rock art	4
Vlb	≥1	≥1	Very Poor and Poor		2

[†]Elements are defined as the constituent parts of a motif/design—it does not refer to the number of motifs

^aSite size is determined by whichever is greater: the number of motifs present or the number of panels. Duke et al (2004: Table 41) report that the average number of motifs per site surveyed is 41.3 and the average number of panels per site is 7.3.

^bCondition—**Very Poor**—Motifs or panels are superimposed by very prominent graffiti/defacement and/or more than 40% of the surface of the motif/panel has eroded away; **Poor**—Some graffiti/defacement superimposes motifs/panels and/or some erosion affecting 20-40% of the motif or panel; **Sub-Normal**—Graffiti/defacement is present but not superimposing motifs/panels—it is intrusive and pollutes the visual appearance of the site; **Normal**—no graffiti or defacement present—some signs of natural erosion (exfoliation or other) on motifs/panels but not posing an immediate threat to site integrity; **Fine**—No graffiti/defacement present—few signs of natural erosion; **Good**—No graffiti/defacement and no signs of natural erosion.

^cSignificance is an assessment of site condition and site characteristics—sites rated 1-2 are of no or low significance; 3 = normal significance; and 4-5 = sites of particular significance. Significance does not reflect a site or panel's NRHP status.

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