Guidelines for the Field Collection of Archaeological Materials and Standard Operating Procedures for Curating Department of Defense Archaeological Collections

(Final Draft)

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for the Curation and Management
of Archaeological Collections

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We provide a review and synthesis of existing federal and non-federal guidelines for collecting archaeological field data and curating archaeological collections. Based on the review, we found a great deal of variability in existing guidelines, if at all present. Thus, using these variable guidelines, we fashioned Department of Defense (DoD) wide guidelines for collecting archaeological field data and standard operating procedures (SOPs) for curating DoD archaeological collections. The review process consisted of interviewing federal archaeologists, State Historic Preservation Offices, state Department of Transportation archaeologists, and technical experts from a sample of universities, museums, and archaeological contractors. Agency or institution based personnel responded to a questionnaire where they were encouraged to provide comments and suggestions toward developing standardized methods.

Interview data were used to construct a proposed two-stage strategy for archaeological fieldwork on DoD installations. The first stage consists of intensive prefieldwork research that comprehensively documents previous land uses. The second stage uses an archaeological fieldwork research design that emphasizes a statistical (probabilistic) sampling framework where estimates on precision and accuracy can be determined.

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(Final Draft)

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Executive Summary

We provide a review and synthesis of existing federal and non-federal guidelines for collecting archaeological field data and curating archaeological collections. Based on the review, we found a great deal of variability in existing guidelines, if at all present. Thus, using these variable guidelines, we fashioned Department of Defense (DoD) wide guidelines for collecting archaeological field data, and standard operating procedures (SOPs) for curating DoD archaeological collections. The review process consisted of interviewing federal archaeologists, State Historic Preservation Offices, state Department of Transportation archaeologists, and technical experts from a sample of universities, museums, and archaeological contractors. Each agency or institution responded to a questionnaire where they were encouraged to provide comments and suggestions toward developing standardized methods.

Interview data were used to construct a proposed two-stage strategy for archaeological fieldwork on DoD installations. The first stage consists of intensive prefieldwork research that comprehensively documents previous land uses. The second stage uses an archaeological fieldwork research design that emphasizes a statistical (probabilistic) sampling framework where estimates on precision and accuracy can be determined. The proposed curation SOPs follow the general requirements of the federal curation regulation 36 CFR Part 79, but in some cases have been adjusted to address the unique collections management challenges facing the DoD.

Acknowledgments

Without the cooperation of literally hundreds of individuals contacted by telephone during the project and their patience in answering our multiple questions, few relevant data would have been gathered. We thank the many individuals who sent copies of their field collecting and/or curation policies. The Illinois State Museum Collections Research Center staff assisted the Army Corps of Engineers' Mandatory Center of Expertise for the Curation and Management of Archaeological Collections (MCX-CMAC), St. Louis District, by collecting information from state historic preservation offices, state transportation offices, museums, universities, and private archaeological contractors throughout the U.S. We thank the multiple reviewers of previous drafts for their comments.

The MCX-CMAC thanks the U.S. Army Environmental Center for funding previous projects that resulted in draft protocols for

processing archaeological collections and associated records. These were instrumental in laying the groundwork for writing the procedures presented here and tailoring those procedures to military installations.

We thank the Legacy Resource Management Program for providing funds to perform the work described. We also thank the Deputy Under Secretary of Defense, Environmental Security, Ms. Sherri Goodman and her staff, for continuing to support efforts to address curation issues faced across the Department of Defense.

1

Introduction

The care of archaeological collections has been an ongoing responsibility for all federal agencies for almost 100 years. Collections are composed of archaeological materials and all documentation associated with the collecting, analysis, or interpretive use of those materials. With the passage of extensive environmental protection legislation in the 1960s and 1970s, particularly the National Historic Preservation Act and the Archaeological Resources Protection Act, the quantity of federal archaeological collections has risen dramatically as archaeological identification and evaluation studies have become integrated into agency planning and project implementation work. With agency archaeological projects occurring by the thousands across the U.S., a crisis quickly developed in the ability of existing repositories to provide adequate curation for the volume of collections generated by these compliance activities, much less for additional collections that will be generated by future projects.

This crisis is most apparent to those federal employees with the responsibility for curating these collections—the federal land managers and cultural resource managers working in local or regional offices of federal agencies. Many have responded with de facto, but unwritten policies that stipulate artifacts will only be collected in specific limited circumstances. At present, no federal agency has a national policy regulating how and why artifact collections should be permitted. As a result, efforts are piecemeal at best, and may be contradictory between offices in an agency.

Curation issues were also highlighted in 1990 with the appearance on the regulatory landscape of two new and far reaching legal requirements. The Native American Graves Protection and Repatriation Act (NAGPRA, 25 U.S.C. 3001 et. seq.) and 36 CFR Part 79, Curation of Federally-Administered and Managed Archeological Collections, were enacted or issued that year and affected all federal agencies responsible for managing archaeological collections.

NAGPRA requires that all federal agencies determine if their existing archaeological collections contained Native American, Native Alaskan, or Native Hawaiian human skeletal remains, funerary objects, sacred objects, and/or objects of cultural patrimony. These items were then to be offered for repatriation to lineal descendents or to culturally affiliated tribes. Similar items discovered in future intentional excavations or by inadvertent discoveries are also regulated by NAGPRA.

The federal curation regulation, 36 CFR Part 79, provides general guidance on the care of federal agency archaeological collections. The regulation defines archaeological collections as "material remains that are excavated or removed during a survey, excavation or other study of a prehistoric or historic resource, and associated records that are prepared or assembled in connection with the survey, excavation or other study (36 CRF Section 79.4(a))." The regulation outlines basic collections management procedures and standards, including access to and use of federal collections. It presents general criteria for evaluating curatorial

services provided by collection repositories and provides sample contract language that may be used by federal agencies in procuring curation services.

Implementation of the requirements of 36 CFR Part 79 is left to each federal agency. As the research conducted for this report demonstrates (see Chapter 2), few federal agencies have agencywide written curation policies or guidance. Many local or regional offices have developed policies in response to local shortages of collection repositories. Again, these policies and guidance are not standardized across the divisions, regions, districts or offices within the same agency.

In many cases, federal archaeological collections and their de facto administrative control were transferred to numerous repositories over the years. This was clearly demonstrated during federal agencies' attempts to locate their collections in order to comply with the assessments required by NAGPRA by 1993. Few agencies were able to meet the 1993 reporting deadline, simply because they did not know where all of their collections were located. The Army-wide NAGPRA compliance project funded by the U.S. Army Environmental Center found that approximately one-third of the Army's archaeological collections were stored at Army installations, one-third were stored at universities and museums, and one-third were being stored by archaeological contractors or in private hands (Mandatory Center of Expertise for the Curation and Management of Archaeological Collections 1996). The Army case is not unique. Similar assessments of Navy, Marine, and Air Force collections have produced similar results; archaeological collections are not being curated to the standards of 36 CFR Part 79 and there is a continually shrinking pool of available and adequate curation facilities.

Project Objectives

Faced with these issues, the Deputy Under Secretary of Defense, Environmental Security, created an Integrated Project Team (IPT) composed of cultural resource specialists from the tri-services (Air Force, Army, Navy/Marines) who were charged with reviewing DoD curation issues. The IPT is examining a variety of approaches to these problems including combining collections from the tri-services in selected repositories to achieve economies of scale, to formulating new policies and procedures that will standardize the way DoD curates its collections.

We address the latter goal by proposing a two-staged approach because we found that there were no existing DoD or federal agencywide guidelines based on our research. The MCX-CMAC suggests a policy that will guide future collecting of archaeological materials to minimize the volume of collections and that DoD propose department-wide standard operating procedures (SOP) for curating archaeological collections in accordance with the guidelines provided in 36 CFR Part 79. The first draft of a policy for generating future archaeological collections is presented in Chapter 4, Guidelines for Field Collection of Archaeological Materials from Department of Defense Administered Lands. The curation procedures are presented in Chapter 5, Standard Operating Procedures for Curating Department of Defense Archaeological Collections. The collecting policy seeks to minimize collections generation by assisting installation personnel in fashioning informed, scientifically based decisions on collections that are created as a result of mission-required archaeological fieldwork. The curation SOPs provide (1) guidance and criteria for obtaining curation services that meet the requirements of 36 CFR Part 79, and (2) procedures that address collections care from prefield planning stages through archaeological material and document processing for long-term storage, as well as guidance for use of collections for public interpretation. Together, the Guidelines and SOPs will reduce the future growth, by volume, of archaeological materials, create economies of scale by standardizing the care of collections, result in improved management of archaeological resources by installations and by services, and insure general comparability between the services in how they meet their curation responsibilities.

Project Methods

Before formulating either the Guidelines or SOPs, the MCX-CMAC developed a questionnaire (Appendix A) to collect information from a non-random sample of federal and non-federal sources on existing (1)

field collecting policies for archaeological materials, (2) policies and procedures used to prepare collections for curation, and (3) policies and practices for actual long-term curation and use of the collections. All interviewees were asked for copies of written policies as well as information on de facto unwritten policies. They were also asked for comments on the efficacy of the existing policies and for recommendations on changes or improvements.

Telephone interviews using the questionnaire were conducted with a non-random sample of agencies and institutions that currently collect, process, and/or curate archaeological materials. MCX-CMAC staff completed interviews with 99 federal agency offices (see Appendix B). All of these agencies have land management responsibilities, although the total acreage each manages, varies greatly. We contacted archaeologists or historic preservation officers at the national headquarters of each department and at other levels e.g., agencies, military major commands, and regional offices. We also contacted archaeologists or cultural resources management staff at the local office level at military installations, forests, parks, or state offices. The policy and guidance materials provided by these respondents were supplemented with information available on agency web pages.

Personnel from the Illinois State Museum Society (ISMS) were contracted to assist the MCX-CMAC in gathering similar data from non-federal agencies. The ISMS interviewed state archaeologists, State and Tribal Historic Preservation Offices (SHPOs/THPOs), the archaeologists in state transportation departments from each state, and a non-random sample of university and consulting archaeologists. The results of these calls and an analysis of the policies submitted by these entities are analyzed in Chapter 2.

Over 600 telephone calls were made during the Spring and early Summer of 1998, and a total of 77 written policies were received. The policies and completed questionnaires are on file in the MCX-CMAC archives at the U.S. Army Corps of Engineers, St. Louis District. Brief summaries of all written federal policies or procedures received by the MCX-CMAC are presented in Chapter 2. Chapter 3 summarizes the results of ISMS's interviews of non-federal agencies. Chapter 4 discusses the results of the total sample. Chapter 5 contains the draft proposed field collecting guidelines. Chapter 6 contains the draft standard operating procedures for curating collections. Chapter 7 presents MCX-CMAC's recommendations for implementing the proposed guidelines and standard operating procedures.

2

Existing Federal Policies and Procedures

Following are synopses of the existing policies or procedures that affect the way federal agencies produce and care for archaeological collections. These summaries are organized by (1) those federal agencies with land management responsibilities and (2) all other entities that routinely manage, contract, or perform archaeological investigations. Other agency guidance may exist, however, that guidance was not made available for review. At a minimum, all of the major federal agencies and the major entities that perform archaeological work for these federal agencies, have been included in this review. Again, this was a non-random sample and was never intended to collect every possible piece of curation or field collection guidance that is extant.

Department of Agriculture

Department-Wide Guidance

The MCX-CMAC contacted the Under Secretary of Agriculture for Natural Resources and Environment's office to determine if the Department of Agriculture had department-wide policies on curation and/or field collection. The USANRE is responsible for the U.S. Forest Service and the Natural Resources Conservation Service.

U.S. Forest Service

Archaeologists are present at the national, regional, and forest levels, and may be seasonally, although rarely permanently, present in districts. Each forest is required to have a Land and Resource Management Plan. Interestingly, *Cultural Resources and Archaeology* are not key words in the index to the USFS web site, nor are they mentioned in the service's mission statement (http://www.fs.fed.us/intro/mvgp.html). Service-wide policy is contained in the *Forest Service Manual* and implementing guidance is found in regional guidebooks.

Service-Wide Policy

1. Forest Service Manual (FSM), Chapters 2360-2363.5 (6/21/90)

The *Forest Service Manual* states that cultural resources inventories should be completed for all forests so that these resources will not be damaged or destroyed during USFS-related activities. Appropriate inventory levels include (1) statistical sampling for use in predictive modeling, and (2) complete survey to identify all cultural resources that are present in a project area. The manual states that sampling is useful to:

(a) estimate cultural resource potential in an area; (b) estimate inventory and mitigation costs; (c) provide a basis for project design and land management; (d) provide estimates of the potential impacts upon cultural resources by

proposed projects or plans; (e) determine the most cost effective methods for investigating the area for cultural resources; and (f) determine measures needed to mitigate present and further impacts on cultural resources (FSM 2361.22b).

However, the manual acknowledges that use of a sample survey may not locate all of the cultural resources in a project area or meet 36 CFR 800 requirements for each project.

Cultural resources should be preserved in place, but when avoidance is not possible, scientific investigations are required. Overview reports "shall include checking all available sources such as State site files, State historic preservation plans, museum and university records, Forest Service records, published and unpublished reports, historical society records, and other similar sources (FSM 2361.22a)."

In emergencies, forest service personnel can collect archaeological materials to avoid their loss or destruction. Documentation must be made of any collection. Cultural resources that are collected through "research, and other operations covered under permit, contract or cooperative agreement will be stored and maintained by the institution or agency involved or other designated depository (FSM 2361.29b)." Cultural resources [in this case, archaeological materials] collected by forest service personnel should also be curated in an authorized repository, preferably local. If no local repository is available, then the cultural resources should be sent to the Smithsonian Institution or another qualified repository. Records will also be sent to qualified repositories with copies made for the Forest Service. "Establishment and operation of a depository by the Forest Service is seldom justified. Funds and professional services are best used for inventory, evaluation, and similar cultural resource management tasks (FSM 2361.29b)."

2. Guide to the Curation of Forest Service Administrative History Artifacts and Records (June 1988)

Written national guidance is provided for the care and retention of USFS administrative and historical records and documents. Archaeological documents are not specifically addressed.

Regional Guidance

As a supplement to the national Forest Service Manual, regions within the Forest Service have produced region-specific Cultural Resource Management guidebooks on the procedures and techniques for managing historical and archaeological resources. The two regional guidebooks received by the MCX-CMAC are from the mid-1980s. They have a strong NHPA Section 106 focus and specify types of field investigations, but do not contain guidance on the types of artifacts to be collected or not collected, nor how they should be processed for long term curation. The guidebooks repeat the Forest Service Manual's guidance concerning curation services and provide a sample cooperative agreement for obtaining curation services.

Individual Forest Guidance

Individual forests use a variety of methods to address the collecting and curation of archaeological materials. These include scope of collection statements, individual contract stipulations, and written or *de facto* artifact collection policies. For example, the Scope of Collections statement from Superior National Forest (n.d.) requires that collection of archaeological materials should only occur when (1) they are significant or unusual; (2) they represent previously unrecorded archaeological resources; or (3) can contribute to an understanding of sites that have yet to be evaluated for eligibility to the National Register or sites already determined to be eligible. All records that are created are retained, whereas archaeological materials that are not relevant to the collecting goals of the forest can be deaccessioned. The purpose of the Scope of Collection statement is to be conservative in selecting what artifacts are added to existing collections.

Several forests have unwritten "no collecting" policies. A few have, or are in the process of writing, collecting policies (Eldorado National Forest n.d.). In most cases, these policies have been developed in response to a shortage of adequate curation facilities in the vicinity of the forests. These policies usually state that the preferred field strategy is not to collect archaeological materials or if they have been collected for analysis, to rebury them in

the backdirt on site. Exceptions are made for diagnostic prehistoric artifacts and historic artifacts of unique character (Eldorado National Forest n.d.). Some policies stipulate that bulk materials such as coal, stone, brick, mortar, plaster, shell, and fire cracked rock need only be sampled (Charles and Hight 1995).

Contracts for archaeological services have been used to guide field collecting strategies. For example, a Hoosier National Forest contract (n.d.) included a prohibition on collecting any historic artifacts except those that were in danger of being vandalized or were deemed important for research. Whatever the particular instrument used, the existing USFS collecting policies have been formulated, as needed, by individual forests.

Department of Defense

Department-Wide Guidance

One document provides instruction concerning archaeological materials. Collections documenting military history are governed separately as part of the military museums guidance and are not included here since archaeological collections are outside a military museums' mission.

1. Department of Defense Instruction 4715.3 (Environmental Conservation)(11/11/96)

The Instruction's purpose is to "implement policy, [and] assign responsibility (Section A. Purpose)" for managing cultural resources, and states the DoD's commitment to identifying and curating archaeological materials that occur on its lands or are generated as a result of archaeological activities (D.3.a). "Each DoD Component shall ensure that proven scientific data collection methods and sampling techniques are used to develop and update…cultural resources inventories (F.1.d)."

U.S. Air Force

Service-Wide Guidance

1. 13 May 1992 letter from CEV to All Air Force Major Commands Concerning Air Force Curation of Archeological and Historical Data, Signed By Col. Peter Walsh, Director of Environmental Quality, Office of the Civil Engineer

The brief two page letter emphasizes the need to curate archaeological collections according to the guidelines in 36 CFR 79, that repositories where these collections are located need to meet the same guidelines, that archaeological materials and the associated documentation should be curated in the same facility, and that use of the collections for research and ritual activities is permitted.

2. Air Force Instruction 32-7065 (6/13/94)

Each Major Command should have a complete and current Cultural Resources Management Plan (CRMP). Field identification studies for archaeological resources should be conducted using the Secretary of the Interior's Standard for Identification. The Instruction does not address curation as part of the CRMP.

Major Command Guidance

1. HQ Air Mobility Command, Curation Guidelines for Archeological Collections (Draft)

The guidance first defines basic collection management terms such as associated records, collection, and material remains. Criteria for choosing a repository are presented along with the standards that the repository should follow to properly care for collections. The guidance ends with suggestions for processing both material remains and associated documents to insure that they will be available in the future.

Individual Installation Guidance

1. Cultural Resource Survey and Report Writing, Policy and Requirements, Nellis Air Force Base, Nevada

Using the Cultural Resource Inventory Guidelines of the Nevada State Office of the Bureau of Land Management as a guide, the recommended content of reports is discussed including what constitutes a literature review for a project. Detailed information on previous archaeological work and other kinds of related activities should be described. From these data, research questions should be formulated and field methods must be fully described. Generally, artifacts are not collected. Exceptions are granted when the research questions justify their collection. Intuitively placed shovel or probe tests are required

if there is any question that there may be sub-surface archaeological deposits present.

U.S. Army

Service-Wide Guidance

1. Army Regulation 200-4 (1/8/98)

The regulation describes general policy requirements for archaeological resources and historic properties that all Army component agencies need to address as part of their environmental compliance programs. Curation is specifically addressed in a section (2-7) on compliance with 36 CFR 79. Installation commanders are responsible for compliance with the requirements of 36 CFR 79. AR 200-4 recommends against establishing curation facilities on post. Any requests to do so, must be accompanied by a cost analysis that demonstrates the cost effectiveness of on-post curation versus existing professional curation facilities. Procedures to reduce the amount of archaeological materials collected in the future should be incorporated into Integrated Cultural Resource Management Plans (ICRMPs) and other management documents.

2. Department of the Army PAM 200-4 (1/8/98)

The pamphlet is a companion to AR 200-4 and restates the regulation's guidance for curation (Chapter 3-8), but emphasizes that collections must not be stored in inappropriate facilities, that installation personnel should inspect repositories for adherence to 36 CFR 79, and that curation must be cost effective. A "no collecting" policy is stressed for initial identification studies, thus archaeological materials are described in the field, but not collected. This is intended to reduce the volume of materials to curate.

Individual Installation Guidance

Fort Carson, Colorado, and Fort Hood, Texas, have written field collection guidelines; Fort Lewis, Washington, includes them as archaeological contract requirements. Fort Carson and Fort Bliss, Texas, have written laboratory/collections management policies that provide step-by-step instructions for processing, cataloging, and analyzing archaeological materials and documentation (Dean 1992; Marshall n.d). Deaccessioning and disposal of artifacts are briefly discussed in the Fort Bliss policy though no regulatory justification for such actions is presented. A brief summary of field collecting methods at these three Army installations is presented in the following.

1. Fort Bliss

Emphasis is placed on the collection of diagnostic artifacts, whereas non-diagnostic artifacts are not collected and their location is drawn on the site map. This collection strategy is intended to prevent the removal of artifacts by unauthorized persons and reduce impacts by archaeological research on the archaeological record.

2. Fort Lewis

Contract stipulations state that a contractor will collect all artifacts encountered except for fire cracked rock, which after counting and weighing, can be discarded in the field. The contractor also must clean and catalog all collected materials. Once cataloged, the artifacts must be labeled and placed in labeled containers. An inventory of each container then should be made. Copies of all original documentation must be made and placed in acid-free folders that are appropriately labeled. Statistical sampling of sites is not recommended because statistical sampling cannot a priori establish what is the universe from which the samples should be drawn. Instead, small dispersed excavation units of equal volume are used as a testing procedure to establish the general characteristics of a site. These kinds of units provide a better indicator of the archaeological deposits that are present than more typical intuitively placed 1-x-1-m or 2-x-2-m units.

3. Fort Carson

Two different kinds of archaeological surveys are defined; small (less then one square mile) and large scale (greater than one square mile). Large scale surveys are divided into 160 acre quadrats to survey and collect previously unknown archaeological materials. Surface visibility can vary from good to poor. In those quadrats where surface visibility is poor, less than 20% of the surface is visible, shovel tests should be used to locate archaeological

deposits. Surveying of quadrats and the collection of surface archaeological materials are well-defined to ensure comparability of information across each quadrat. The only prohibitions to collection are tin cans and non-portable groundstone. For small scale surveys, artifacts are not collected during their initial recording. Regardless of the kind of survey, small or large, the collection of artifacts from a site is based on the number of artifacts present and the size of the site. A random sample is taken using transects across the site with the sampling fraction based on the number of artifacts present. Artifacts can also be collected outside of the random sample to gather additional information about the site. The collection of archaeological materials from historic sites is different than the above procedures for prehistoric sites. They are based on locating artifacts concentrations and assessing their relationship to architectural features.

U.S. Army Corps of Engineers

Corps-Wide Guidance

USACE tailors federal laws and regulations affecting the curation of archaeological collections to its civil works program through Engineering Regulations (ER) and Engineering Pamphlets (EP). Military activities follow the requirements set forth by Army Regulations (AR) and are not applicable to the Corps civil works program. Army requirements are discussed elsewhere.

1. ER 1130-2-540 *(November 15, 1996), Environmental Stewardship Operations and Maintenance Guidance and Procedures, Chapter 6, Cultural Resources Stewardship*

Chapter 6 "establishes the policy for the management and protection of cultural resources at operating civil works water resources projects for which the U.S. Army Corps of Engineers is responsible." Section 6-2 describes the function of the Mandatory Center of Expertise for the Curation and Management of Archaeological Collections (MCX-CMAC) as managing "Corps-wide curation needs assessments and design services." A Curation Field Review Group was previously established by the Director of Civil Works and provides comments on the MCX-CMAC Corps-wide curation programs.

2. EP 1130-2-540 *(November 15, 1996), Environmental Stewardship Operations and Maintenance Guidance and Procedures, Chapter 6, Cultural Resources Stewardship*

Chapter 6 "establishes guidance for management of collecting, preserving and curating archeological and historical materials at civil works resource projects…" Section 6-4 provides guidelines for access and use of Corps collections. Section 6-5, *Guidance for Collection Management*, includes standards for processing and placing collections into collections management centers as well as standards to be followed by the centers in providing curation services. The section concludes with the funding mandates for the care of archaeological collections.

District Guidance

Fifteen of the 38 domestic districts were contacted to request information on any collecting and/or curation policies that were being used. Information was received from five of the 15. Of these five responses, only one, the Galveston District, reported having a written curation policy, ca. 1988, and an *ad hoc* collecting policy whereby the decision to collect archaeological materials is project specific.

U.S. Navy and U.S. Marine Corps

Service-Wide Guidance

1. SECNAVINST 4000.35 (8/17/92)

The Instruction provides overall policy guidance for cultural resources, but does not specifically mention field collection of archaeological materials or curation. It does not reference 36 CFR Part 79.

2. OPNAVINST 5090.1B, Environmental and Natural Resources Program Manual, CH1 (2/2/98), Chapter 23 (Historic and Archeological Resources Protection)

A brief paragraph (23-4.22) describes how compliance with the National Historic Preservation Act can be accomplished using two fieldwork phases. Phase 1 consists of a historic structures review and/or archaeological survey. Phase 2 consists of detailed surveys of historic properties that may be eligible for nomination to the National Register of Historic Places. Every Archaeological

Resources Protection Act permit holder must ensure that all artifacts are properly curated (23-4.4). The Commander, Naval Facilities Engineering Command (COMNAVFACENGCOM) issues ARPA permits for Navy lands and is also responsible for the "disposition of archeological collections (23-6.2)." All shore installation commanding officers shall "provide for storage and professional curation of salvaged archaeological resources [and] provide for storage of records that might accrue in carrying out legal compliance activities (23-6.6.k)."

3. Marine Corps Order P5090.2A, Environmental Compliance and Protection Manual (7/10/98), Chapter 8 (Historic and Archaeological Resources Protection)

Compliance with the National Historic Preservation Act can be performed in two phases. Phase 1 consists of preparation of an installation overview to determine if any historic resources are known and to identify probable areas where these resources may be located. Phase 2 consists of intensive surveys to identify any National Register eligible resources (Chapter 8, Section 8104.3.b). Curation of archaeological resources and records is mentioned as one of the responsibilities of an installation's Commanding General or Commanding Officer (Chapter 8, Section 301, No. 11) for compliance actions.

Installation Guidance

Two Navy facilities were contacted to determine if individual facilities had developed their own guidance for field collection and/or curation. The facilities were the Naval Air Weapons Station, Point Mugu (NAWS-PM) which is responsible for San Nicholas Island off the coast of California, and the Naval Air Station, North Island (NAS-NI) in San Diego, which is responsible for San Clemente Island, California.

1. San Nicolas Island, Archaeology Field and Laboratory Manual (February 1997)

California State University, Los Angeles, developed written excavation and laboratory polices for the work they conduct on San Nicolas Island. The excavation polices only address mitigation activities on San Nicholas Island because the island has already been completely surveyed. The written laboratory manual focuses on identifying different kinds of artifacts. The NAWS-PM curates its own collections from San Nicholas Island on the island.

At NAS-NI, a written field collections policy is incorporated into contract specifications. These specifications include what to collect and what to discard in the field. The policy addresses surveys, testing, and mitigation projects. On San Clemente Island the policy works well. Instead of fully excavating shell middens, only column samples are removed. The material is then retained as a realistic representation of the shell species that are present in the midden. However, all faunal remains are collected because these remains are scarce on San Clemente. Generally, the collections are not curated at NAS-NI so no curation policies have been developed. A small holding area exists for collections recovered from compliance activities that will be transferred to a permanent repository once one is designated. The MCX-CMAC requested copies of the written policies that NAWS-PM and NAS-NI have, but did not receive copies from NAS-NI.

Department of Energy

Department-Wide Guidance

1. Environmental Guidelines for Development of Cultural Resources Management Plans (8/95)

The guidelines require that each Department of Energy (DOE) facility develop a Cultural Resources Management Plan (CRMP) that includes specific sections on past and present curation of archaeological materials from the facility (Sections 3.4.6; 3.5.5; 5.5; and 5.85). The CRMP should provide a description of the repositories where the materials are being curated, the existing collections management procedures, the current status of collections, and what kinds of collection use are occurring. For archaeological surveys, the guidance stipulates (section 4.2.4) that the field methods chosen should be appropriate for the research questions and that they should be conservative in their scope.

Individual Facility Guidance

Individual DOE facilities with extensive archaeological resources have developed written

policies and procedures for addressing collecting and preservation needs. Examples are discussed below.

1. Hanford Site, Washington

Hanford staff have written three documents on various aspects of collecting and curating archaeological collections from the facility.

a. Hanford Cultural Resources Laboratory Procedures Handbook (Dawson 1993)

The handbook applies to both field and laboratory work. It provides definitions of an archaeological site and an isolated find. Artifacts are surface collected only if there is the potential for unauthorized collecting. If the time to make a collection is limited, a grab sample can be made rather than complete surface collection of artifacts. Test excavations can be used to gather additional information during the initial recording of the site. All metal, glass, modified wood, plastic, bone, and chipped or ground stone should be saved.

b. Draft Curation Procedures, Hanford (Dawson 1997)

A curation room was established on the Hanford site for curating archaeological collections. Procedures for processing collections are outlined, as are the contents of two spreadsheet files used to track collections and summarize the fieldwork that created them.

c. Hanford Curation Strategy: Manhattan Project and Cold War Era Artifacts and Records (Richland Operation Office/ Hanford Laboratory 1997)

The Richland Operations Office's Richland/ Hanford Laboratory (RL) has a written strategy to address the curation of historic collections derived from the period 1943-1990. The strategy was prepared to implement the requirements of a programmatic agreement between the RL, the Washington State Historic Preservation Office, and the Advisory Council on Historic Preservation. It identifies which classes of artifacts and documents should be retained and which should be discarded based on their historic significance and interpretive value.

2. Savannah River Plant, South Carolina

The South Carolina Institute of Archaeology and Anthropology (SCIAA) at the University of South Carolina administers an extensive archaeological program at the Savannah River Plant (SRP) known as the Savannah River Archaeological Research Program. As part of the program, SCIAA has developed procedures for processing archaeological materials for analysis, use, and long-term curation.

a. Archaeological Research Program Guide to Curation Procedures (Crass 1991)

The guide provides instructions on how to curate both archaeological materials and documentation from archaeological projects performed at the (SRP). The SRP curates its archaeological collections on-site in the same building that houses the archaeological program.

Department of the Interior

Collecting and curation policies were obtained from the Department of the Interior (DoI), as well as from individual DoI agencies including the Bureau of Land Management (BLM), the Bureau of Reclamation (BOR), the National Park Service (NPS), and the U.S. Fish and Wildlife Service (USFWS).

Department-Wide Guidance

Department-wide policy and guidance for museum property are provided in two documents; (1) the *Departmental Manual* sets forth policy and (2) the *Museum Property Handbook* provides guidance on implementing this policy for management and care of museum collections. These two documents provide the basis for many of the bureau-specific policies discussed below. Neither document addresses policy or procedures concerning field collection of archaeological materials.

1. Departmental Manual (1993 with revisions 1997)

The *Departmental Manual* governs the way the department and its bureaus execute their many archaeological resources management responsibilities. The Manual is divided into *Series, Parts,* and *Chapters*. Under the *Property Management Series* is *Part 411: Museum Property Management*. Three chapters provide general standards and accountability for managing museum property. Museum property is defined as "personal property acquired according to some rational scheme and preserved, studied, or interpreted for public benefit (411 DM 1.1)."

A bureau may have museum property even though it has no museum facility. The bureau is directed to identify policies to manage its museum property by implementing a Scope of Collections Statement, Collections Management Plan, Emergency Management Plan, Conservation Survey (if needed), and a Museum Property Management Survey. Each bureau is required to submit an annual Bureau Museum Property Management Summary Report to the Office of Acquisition and Property Management, the Department of Interior office that is responsible for developing policies on museum property. Each bureau chief is directed to fund and staff a museum management program and to provide "bureauwide policy guidance [and] program direction (411 DM 1.3, D.3)."

2. Museum Property Handbook (two volumes)(1993), Volume I, Preservation and Protection of Museum Property, Volume II, Documentation of Museum Property

The handbook elaborates on the museum property standards described in 411 DM. It provides specific information on the treatment and care of museum property by material class, as well as general management procedures. Bureaus can use the basic information and guidance provided in the handbook to create bureau-specific museum property handbooks. Emphasis is placed on the process of museum property management rather than the creation of products. The Department also encourages bureaus to supplement the information provided in these volumes with the direct involvement of professional staff, other publications, and participation in professional organizations.

Bureau of Land Management

Bureau-Wide Guidance

Archaeological investigations are guided by the *Bureau of Land Management Manual*. The manual also addresses preservation and interpretive uses of archaeological materials.

1. Bureau of Land Management Manual

Section 8110, Identifying Cultural Resources, sets forth three kinds of inventories that can be used to identify cultural resources including Class I (Existing Information Inventory), Class II (Probabilistic Survey), and Class III (Intensive Field Survey). The existing information inventory consists of reviewing background information on previous land use, defining research questions, and synthesizing information on the archaeology that may be encountered during fieldwork.

Probabilistic field surveys can be completed in several stages. This approach is based on statistical principles that are used to characterize the density, diversity, and distribution of archaeological materials. An intensive field survey results in 100% of a project area being examined for the presence of historic properties.

The collection of archaeological materials during a field inventory is usually not authorized for permit holders. Subsurface probing may be permitted when the surface is obscured, but in general this is not considered as a regular field practice. Predictive modeling is encouraged in the early planning stages of projects as a tool for determining where to concentrate field surveys. The manual states that collections should be curated in appropriate repositories that meet the standards of 36 CFR 79.

2. Instructional Memoranda

Recently, the BLM national curator issued three instructional memoranda concerning archaeological materials to address the requirements of the *Native American Graves Protection and Repatriation Act*:

IM98-131 Describes procedures for NAGPRA repatriation

IM98-132 Describes procedures in the case of inadvertent discovery

IM98-133 Clarifies the role of law enforcement and NAGPRA objects in the case of litigation

State-Wide Guidance

Some BLM state offices have written state-specific guidance concerning field collecting and curation, including handbooks that follow or supplement the requirements of the *BLM Manual* sections on cultural resources. The New Mexico handbook is discussed below (see also Nevada (Bureau of Land Management 1990) and Colorado (Bureau of Land Management 1998)).

1. Bureau of Land Management, New Mexico State Office Supplement, 8144, Cultural Resource Collections Management and Curation

The New Mexico supplement to the Bureau-wide manual states that curation is an integral part of its archaeological programs. It provides guidance on why archaeological materials need to be curated to 36 CFR 79 standards and encourages partnerships and long-term curation opportunities to curate archaeological collections. "Outside of NAGPRA, no requirements exist for public review of collections decisions. In public review settings …the public [can] identify local concerns regarding collections management and designation of repositories to house collection…" (New Mexico, Bureau of Land Management, 8144.08.B.8).

Regional Curation Facilities

The BLM operates several regional curation facilities, each of which has formulated its own requirements for artifact processing prior to long-term curation at the facility.

1. Packaging Requirements for Collections Submitted to the Bureau of Land Management's Billings Curation Center

The Bureau of Land Management constructed and now operates the Billings Curation Center (BCC) in Billings, Montana. The BCC serves as the principal repository for archaeological and ethnographic collections recovered from Bureau of Land Management, the Bureau of Reclamation, Bureau of Indian Affairs and the Custer National Forest lands in Montana, North Dakota, and South Dakota. The center was created to meet federal curation needs and comply with the standards of 36 CFR Part 79. The BCC has written standards concerning how artifacts are to be cleaned, labeled, and packaged, and how to catalog a collection for long term curation at the center.

2. Requirements for Collection Organization, Packaging, and Delivery, Bureau of Land Management, Anasazi Heritage Center (1995)

The Anasazi Heritage Center (AHC) was constructed by the Bureau of Reclamation as part of the Dolores Dam project, but is administered by the Bureau of Land Management. The AHC accepts collections from the BLM's Montrose District, the Bureau of Reclamation's Upper Colorado Region, and from the San Juan and Rio Grande National Forests. Its written Scope of Collections (1993) states that AHC will only accept archaeological and natural history collections and its goals include preserving, managing, displaying, and interpreting archaeological materials from the northern San Juan Anasazi. Only collections that are professionally collected and documented, and are unencumbered by restrictions, are accepted.

The AHC has specific requirements for accepting collections including box size, box organization, artifact packaging and labeling, and documentation. A fee schedule is also included. The AHC encourages investigators to record ground stone while in the field and not collect it. No other proscriptions regarding field collecting are stated in the AHC policy.

Bureau of Reclamation

The MCX-CMAC contacted the BOR's federal preservation officer and several regional archaeologists (Appendix B).

Bureau-Wide Policy/Guidance

National policies restate the BOR's responsibility to identify and protect historic resources and to curate archaeological collections properly. They also outline three strategies for identifying cultural resources, but do not directly address the field collection of archaeological materials.

1. Reclamation Manual, Land Management and Development, Policy LND P01, Cultural Resources Management (3/13/98)

The policy affirms that the BOR is committed to administering a cultural resources management program, one that goes beyond compliance activities. Included in this commitment is its obligation to curate artifacts and museum property. It refers the reader to the "Directives and Standards" for a more complete list of laws, regulations, and guidance.

2. Reclamation Manual, Program Series, Land Management and Development, Directives and Standards LND 02-01, Cultural Resources Management (11/18/96)

General guidance is provided. The Directives and Standards define three types of cultural resources survey: Class I surveys address known cultural resources to assess the need for additional information, Class II surveys are performed to predict the type, density, and distribution of cultural resources, and Class III surveys are designed to locate all cultural resources within an area. Classes II and III may require test excavations, though no mention is made of artifacts per se.

Section E of the document assigns to the BOR Program Analysis Office the responsibility for developing museum property policy and guidance. It also mandates that all BOR offices implement the provisions of the DoI *Departmental Manual* (411 DM) to fulfill the requirements of 36 CFR Part 79.

Region-Wide Guidance

Based on conversations with three regional archaeologists, there appears to be no regional guidance.

National Park Service

Service-Wide Policy/Guidance

Of all federal agencies, the NPS has the most extensive and comprehensive written policies on collecting, preserving, and interpreting historic resources. This is true, in part, because it has the largest volume of federal museum collections outside the Smithsonian Institution. Its *Museum Handbook* predates and provided much of the information in the DoI *Departmental Manual*. The NPS is currently revising its internal guidance on many topics, including those related to curation:

> The National Park Service has detailed written guidance to help managers make day-to-day decisions. The first level, and the primary source of guidance, is contained in the publication Management Policies, last published in 1988. All NPS management policies must be consistent with the Constitution, public laws, proclamations, executive orders, rules and regulations, and directives issued by the President and the Secretary of the Interior. In the past, NPS management policies have been supplemented by staff directives, special directives and numbered guidelines. The National Park Service is currently revising and rewriting all of its documents that constitute these supplemental materials to form a second and third level of guidance. The second level is called Director's Orders, and the third level consists of Handbooks or Reference Manuals. Director's Orders may also include updated statements of NPS management policy. As Director's Orders and Handbooks or Reference Manuals are finalized, they will be made available through this web page. Until these new Director's Orders are finalized, the existing guidelines remain in effect. Previously-issued staff directives, special directives and numbered guidelines will be converted to the new Directives System by December 31, 1999. They will not generally be revised or amended, but will remain in effect until rescinded or converted to the new Directives System (National Park Service 1998).

1. Management Policies (1988) (currently being revised, Michelle Aubry, personal communication, 1998)

The existing *Management Policies* address NPS operations including land protection, natural resources management, wilderness preservation and management, and cultural resources management. Additional guidance can be issued by Regional Directors and by individual Park Superintendents as

long as the additional guidance supplements and does not supercede these service-wide policies. For cultural resources, features and structures are to be left in place when practicable, and research will be conducted using non-destructive methods as much as possible. However, there is not a blanket prohibition on the collection of archaeological materials (Chapter 5:3-5:5) as long as the research meets the individual park's management objectives for cultural resources. Museum objects will be preserved and protected from deterioration, damage, and theft, and will be acquired as long as they meet the Scope of Collections criteria. Consultation will be conducted with Native Americans and other groups, as needed.

2. Special Directive 80-1(Revised)(2/12/86), Guidance for Meeting NPS Preservation and Protection Standards for Museum Standards (includes "Inspection Checklist for Museum Storage and Exhibit Spaces" 1990)

In response to a DoI Office of Inspector General report, the NPS issued SD 80-1 to better account for its museum property. Every three years each park unit is required to conduct a self-assessment of how well it is meeting the NPS' various museum management requirements. The self-assessment includes identifying deficiencies and proposing how these deficiencies will be corrected.

The special directive also cites other NPS guidance for museum collections, particularly those contained in NPS-28, *Cultural Resources Management Guidelines* (see below). Specific recommendations are presented for a museum environment including relative humidity levels, temperature, light levels, security, fire protection, and housekeeping. Each NPS unit is required to write a Scope of Collections Statement that guides it in the acquisition of museum objects and/or documentation that can contribute to the unit's themes and resources (Golden Gate National Recreation Area 1997:2).

3. Special Directive 87-3, Conservation of Archaeological Resources (1987)

SD 87-3 outlines the objectives and procedures whereby NPS protects its archaeological resources. It sets as a goal the preservation of archaeological resources in an undisturbed context whenever possible. Although excavation is permissible, limits should be specified on the area to be excavated to recover the minimum amount of scientific information needed to determine significance or to prevent damage from authorized NPS activities or illegal activities. Limiting excavation also slows the growth of new material to curate. The costs for curation should be an integral of all NPS projects. Annual costs of curation should be derived from annual operating funds.

4. Systemwide Archeological Inventory Program (Aubury et al., 1992)

The Systemwide Archeological Inventory Program was created as a supplement to exiting NPS archaeological inventory programs to provide service-wide requirements, standards, and priorities for the identification of archaeological resources. Using the systemwide inventory as a guide, each region is supposed to develop a region-wide inventory program. It is the policy of the NPS to conserve, protect, preserve *in situ*, and manage its archaeological resources for future scientific research, and "for appropriate public interpretation and education (Aubrey *et al.* 1992:iii)."

5. NPS-28, Cultural Resources Management Guideline (1994, Release No.4)

The guidelines presented in NPS-28 are comprehensive and address all aspects of cultural resources management. Although cultural resources should be left in place, collection of data is possible when that data collection "serve[s] legitimate management purposes" (NPS-28 1994:2; see also 1994:73, 75, 87). Thus, research can be conducted either by qualified NPS personnel or by outside scientists (NPS-28 1994:17). The guidelines explain what archaeology is and the different kinds of activities an archaeologist engages in.

Archaeological and archival collections are defined and a Scope of Collections Statement and Collection Management Plan are required to be written. Collections must be cataloged and protected. They can be used in research and interpretation and can be loaned for legitimate purposes. The guidelines also reference the requirements and guidance provided in the NPS's Management

Policies, the NPS Museum Handbook (Parts I, II and III), and 36 CFR Part 79.

6. Museum Handbook, Part I (1990), Part II (1984, being revised), Part III (not yet published)

The three parts of the Museum Handbook provide guidance and instructions to NPS units on managing their museum collections. The 300+ national park units collectively have over 28 million museum objects and specimens, and 14,000 linear feet of archives (http://www.cr.nps.gov/crweb1/colherit.htm#MUSC). The objects are derived from ethnology, history, biology, paleontology, and geology, with the vast majority, over 70%, from archaeology. Parts I and II of the NPS's Museum Handbook were used as an aid in writing Volumes I and II of the Museum Property Handbook of the Departmental Manual (Rex Wilson, personal communication, 1998). However, both Volumes I and II are more generic to reflect their department-wide scope and applicability to all Department of Interior bureaus.

Part I briefly describes the history of the NPS's museums and the need to manage museum objects. It outlines the types of planning documents that each unit is required to create, all of which include caring for museum objects (e.g. Outline of Planning Requirements; General Management Plan; Resources Management Plan). It then presents multiple chapters on the many aspects (e.g. Handling, Packing, and Shipping; Conservation Treatment; Emergency Planning; Curatorial Health and Safety) of collections management to properly care for collections. The majority of the appendices discuss procedures for caring for various objects including those of metal and paper.

Part II, *Museum Records*, provides guidance on processing, documentation, and accountability for all museum objects. It also addresses "accessioning, cataloging, inventorying, marking objects, record photography, incoming and outgoing loans, and deaccessioning procedures (http://www.cr.nps.gov/crweb1/csd/handbook.html)."

Part III, *Use of Collections* (due to be published in Fall 1998) will provide guidance on "exhibits, research, interpretive and educational activities, motion pictures and photography, reproduction of original materials, office art, and publications (http://www.cr.nps.gov/crweb1/csd/handbook.html)."

Unit Guidance

At the local unit level, *Superintendent Directives* provide guidance on a specific topic that the superintendent believes needs to be addressed within the unit. For example, in the Southeast Utah Group (SUG) (Arches and Canyonlands National Parks, Natural Bridges National Monument), the Superintendent has issued two directives that address archaeology. Superintendent's Directive 1998 H-2, *Collecting of Park Resources*, stipulates that anyone, including NPS staff, collecting any kind of objects, including archaeological materials, must obtain a permit beforehand. Superintendent's Directive 1998 H-3, *Use of Archives*, discusses the availability, access to, and reading room policies for archival materials within a unit's collection.

Although Superintendent's Directives are a management option available to every NPS unit, not every unit issues directives. For example, Golden Gate National Recreation Area has its policies on collections use embedded in its Scope of Collections Statement and uses Standard Operating Procedures for guidance on the acquisition of collections and the loan of museum objects.

Other Guidance–National Park Service Archaeological Centers

In addition to individual units, there are several archaeological centers within the National Park Service that provide archaeological technical expertise to these units and to non-NPS clients. The Midwest Archeological Center (MWAC)(1995) has developed internal guidance for their staff for accessioning and preparing museum objects by creating a detailed laboratory manual for the staff to follow during processing. The manual also provides information on the use of their Resource Center that contains the center's archival materials and the library. The MWAC provides its archaeological technical services to park units in the Midwest and Intermountain Regions. The Southeast Archeological Center (SEAC) has written a three-volume supplement to the cataloging program used by the NPS, the Automated National Cataloging System

(ANCS). The supplement provides detailed information for use during cataloging of archaeological objects recovered from the southeastern U.S. that is in addition to the required fields in ANCS. The SEAC also has a written policy on the use of collections on loan to SEAC from other park units. The SEAC provides its archaeological technical services to park units in the NPS' Southeast Region. Although contacted, the Western Archeological and Conservation Center was unable to provide information on their curation or field collection policies.

U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service (USFWS) manages 91 million acres of public land through seven regional offices and 700 field units (wildlife refuges, fish hatcheries, ecology field offices, and law enforcement offices). The USFWS's Federal Preservation Office provides technical advice to the Director on numerous archaeological issues, including curation. Few USFWS units have professional archaeologists on staff, however, archaeological investigations are required as part of compliance activities.

Service-Wide Policy/Guidance

Two sections of the U.S. Fish and Wildlife Service Manual provide guidance concerning acquisition of archaeological materials and curation.

1. U.S. Fish and Wildlife Service Manual, Series 600, Cultural Resources Management, 614 FW 1-5 (11/18/92)

The U.S. Fish and Wildlife Service, by policy, will identify cultural resources located on its lands and protect objects for "present or future scientific study, public appreciation, and socio-cultural use" (614 FW 1.4.A). "Systematic inventories should be conducted at the necessary level of intensity to adequately document the nature, extent, and condition of significant cultural resources (614 FW 2.1). An inventory may be unnecessary when

> (a) areas where the surface of the land has been substantially altered, disturbed, or created within the last 50 years; (b) areas that have been previously covered by an appropriate field inventory and adequate records exist documenting the work; (c) activities where there will be no new ground disturbance and no change to historic structures; [and] (d) projects where a sufficient level of inventory, evaluation, and testing have been completed in adjacent areas with similar environments and cultural zones, indicating there is little likelihood of significant cultural resources occurring within the area affected by the proposed activity (614 FW 2.2.A.a-d).

Each field office is required to prepare a Cultural Resource Management Plan that contains a Cultural Resource Overview for the long-term management of cultural resources on USFWS lands. The USFWS uses the Department of Interior's Departmental Manual and 36 CFR 79 for guidance on curation. Collection of artifacts by employees is authorized only if the artifact is in danger of being lost by theft or erosion. In these cases, the employee should follow the procedures in the Cultural Resources Handbook.

2. U.S. Fish and Wildlife Service Manual, Series 100, Cultural Resources Management,126 FW 1-3 (11/18/92)

This chapter of the manual provides guidance and policy for archaeological museum property. A Scope of Collection Statement is required for all units that have museum property to guide the acquisition of that property.

> Management priority [of museum objects] must be directed to those museum property objects or collections that possess high scientific, artistic, cultural, and monetary value in need of preservation; are highly susceptible to environmental damage; are sensitive for traditional cultural or religious reasons; or whose care is specifically mandated by law (126 FW 2.1.A).
> …it is not the Service's policy to impose the detailed requirements and standards found in these chapters (U.S. Fish and Wildlife Service Manual) upon non-Federal repositories employing systems that meet acceptable professional museum standards and practices for accessioning, cataloging, deaccessioning, and preservation (126 FW 2.1.B).

Other standards exist for documentation, cataloging, loans, temporary custody, deaccessioning, and general environmental standards. A number of plans and surveys must be prepared including service-wide and unit planning for its collections, Scope of Collection Statement, Collection Management Plan, Museum Property Survey, and a Museum Property Survey Report. A 100% inventory of all museum property is required every year

(1) unless the collection is greater than 250 items, in which case, a random sample is drawn

(2) for all uncataloged objects unless there are more than 25, in which case, a random sample is drawn

(3) when a substantial loss occurs

(4) whenever the "designation of accountability for museum property changes (126 FE 3.4.A.5)."

The unit manager is designated the Museum Property Accountable Officer responsible for managing museum property including the annual inventories.

3. Cultural Resources Management Handbook (9/85)

Although the Handbook needs to be revised (Kevin Kilcullan, personal communication, 1998), it still provides basic guidance for the USFWS's cultural resource management program. The USFWS protects and manages cultural resources for the benefit of present and future generations. The Secretary of the Interior's Standards and Guidelines should be followed to determine the appropriate methods to use to identify archaeological resources. Survey methods can include the use of sampling and remote sensing. Three different levels of effort are described. These levels vary because of management needs. The levels include from least to most intensive (1) Background or Literature Search; (2) Reconnaissance; and (3) Intensive Reconnaissance.

Archaeological materials and the associated records must be curated in appropriate repositories. For existing collections the Regional Historic Preservation Officer (RHPO) should determine where collections are located, have an inventory prepared for all the collections, and determine the condition of each collection and if they need to be stabilized. For new collections, the RHPO must ensure that these collections are in repositories that can professionally curate the collections, that the collections are available for interpretation and research, and that some kind of contractual agreement with each repository is developed for curation services offered by the repository. Duplicate copies of all curation records should be made with limited access to the copies. Certain archaeological materials may be culturally sensitive and may require special care. Other archaeological materials may be monetarily valuable and steps should be taken to protect them properly.

Smithsonian Institution

1. Smithsonian Directive 600, Collections Management Policy (1992)

The directive includes general policy statements for collections care and maintenance, risk management, security, inventory, access, and loans. Each museum within the Smithsonian system is required to create a written collecting plan guiding the acquisition of new objects and a written collections management policy. Ideally these should be reviewed every three years. There is no written policy concerning field collection of archaeological materials.

Summary of Federal Agency Policies

Although each federal agency is charged with different public missions, all are similar in their hierarchical approach to archaeological resource management. Policies are set at the department level. Guidance is then provided department-wide for each agency within that department, but these agencies may also develop their own supplemental guidance.

Only one federal department, the Department of the Interior, has written department-wide policies or guidance for the treatment of archaeological collections. However, no department provides a comprehensive policy on the generation of these collections.

Few individual agencies or bureaus have developed or adopted policies on archaeological collections or their management. The U.S. Army has

recently rewritten its archaeological resources and historic property management regulation (AR 200-4). These archaeological management responsibilities are delegated to an installation commander and include insuring that the volume or extent of new collections is minimized, and all collections are curated according to 36 CFR Part 79.

The delegation to individual installation commanders of the responsibility for curating archaeological collections mimics similar situations in most other federal agencies. Whether mandated or through default, most extant collecting and curation policies are developed by local offices, facilities, or installations. The reason most often cited for creating these local policies is the lack of satisfactory curation facilities, either because none is locally available or it is too expensive. Faced with these problems, the local staffs realize that they need to reduce the amount of new collections generated and simultaneously, deal with the overall curation problem.

For some, the answer has been to develop curation facilities at the local office or installation, even though these are outside the primary mission of the agency. These local curation facilities often are satisfactorily operated, as long as the staff that created them remain at the agency or installation. When some or all of this staff depart, the agency

Table 1.
Federal Agency Responses

Federal Archaeologists	Yes	%	No	%	Contingency	%	Total	
1a. Field collecting policy?	24	26	57	62	11	12	92	
1b. If no, do agencies								
2. Written policy?	21	62	13	38			34	
3a. Policy subject survey?	25	93	1	4	1	3	27	
3b. Policy subject testing?	9	47	10	53			19	
3c. Policy subject mitigation?	10	48	11	52			21	
4. Different policy for prehistoric vs. historic	9	35	17	65			26	
5. Policy performance? Recommended changes?								see text
6a. Catalog artifacts?	18	33	2	4	34	63	54	
6b. Catalog documentation?	12	86	2	14			14	
7a. Written catalog standards artifacts?	13	81	3	19			16	
7b. Written catalog standards for documentation?	11	73	4	27			15	
8. Agencies prescribe different procedures?	2	33		0	4	67	6	
9a. Label individual artifacts?	7	70	2	20	1	10	10	
9b. Artifacts weighed?	8	67	4	33			12	
10a. Documents labeled?	6	60	3	30	1	10	10	
10b. Documents copied?	5	56	3	33	1	11	9	
11. Machine readable catalog?	12	92	1	8			13	
12a. Curate artifacts?	31	54	26	46			57	
12b. Curate documentation?	34	60	23	40			57	
13a. Project curation only?	2	20	8	80			10	
13b. Long-term curation?	19	100		0			19	
14. Written policy or mission?	19	58	13	39	1	3	33	
15a. Use compliance?	21	100		0			21	
15b. Use research?	21	100		0			21	
15c. Use exhibit?	23	100		0			23	
15d. Use teaching?	12	100		0			12	
16. Written use policy	11	37	18	60	1	3	30	
17. Where are objects and documentation stored?								see text
18. How is a curation facility selected?								see text

usually reallocates resources whereby the curation facility then suffers from a lack of institutional support, and curation once again is a problem.

When federal officials were asked if they had a collecting policy (Table 1), those that responded "Yes" often said it was a "No Collecting" policy. Upon further discussion, this was often qualified: "No Collecting" unless the artifact is endangered from natural processes, being looted, or if it is a diagnostic artifact. Some policies stipulate that only complete specimens should be collected or specific materials classes should only be sampled, not collected completely. In two cases where a comprehensive "No Collecting" policy existed on a military installation and a forest, these policies have been amended because they proved to be inefficient and costly. On the military installation, an entire area had to be resurveyed because the typological assignments made on artifacts left in the field were later questioned and could not be substantiated without relocating them. On the forest, a site that was not collected and revisited six weeks later had disappeared because it had been completely surface-collected by unknown persons, likely a timber crew working for the forest.

One third of the respondents catalog artifacts, whereas 86% catalog documentation. Of those that catalog artifacts, 81% follow written standards. Slightly less (73%) also have written standards for cataloging documentation. Many of the respondents are in the Department of the Interior and follow department-wide guidance. National Park Service units use the NPS museum handbook. Almost three-quarters (70%) of the respondents indicate they label individual artifacts. More than half (50%) label documents. Two thirds (67%) of the respondents weigh artifacts. A copy of documentation is made by slightly more than half (56%) of the institutions.

Ninety-two percent of the respondents have machine readable catalogs of artifacts and documents. More than half (54%) curate artifacts, whereas 60% curate documentation. Only 20% curate artifacts from individual projects. One hundred percent of the 19 respondents said they are involved in long-term curation, but only 37% have written use policies. The majority (12 of 18) of the offices that said that they provide permanent curation for archaeological collections are National Park Service units. For those with long-term curation facilities, all said they are used in research, exhibit, research, and teaching.

3

Non-Federal Agency Policies

Telephone interviews of non-federal agencies were conducted by the Illinois State Museum Society (ISMS) using the same questionnaire used for federal agencies (Appendix A). The government provided ISMS a list of the major groups involved in regulating or implementing cultural resource management laws and/or curating archaeological collections. These groups included the State Historic Preservation Offices (SHPOs), Tribal Historic Preservation Offices (THPOs), State Archaeologists (SAs), state Department of Transportation archaeologists (DOTs), a sample of archaeological consultants (ACs), and a sample of archaeologists associated with universities and museums (UAs). In addition to the questionnaires, respondents were asked to submit copies of any written policies concerning these topics. In all, 215 questionnaires were completed and 77 policies were forwarded to the Illinois State Museum (Table 2).

The responses provide a substantial cross section of those organizations most involved in cultural resource management in North America and provides a representative view of the current state of collecting and collections management policies. The analysis of the questionnaires and policies was compiled and reported by Wiant and Loveless (1998). Pertinent portions of this report are contained here and in Appendix E.

Table 2. Results of Illinois State Museum Society Telephone Interviews

Agency	Questionnaires Completed	Policies Received
State Historic Preservation Offices (including territories)	53	40
State Archaeologists (that are not SHPOs)	8	3
Tribal Historic Preservation Officers	14	0
State Department of Transportation	51	6
University-based archaeologists	48	17
Archaeological consultants	41	11
Totals	215	77

Conclusions Presented in Wiant and Loveless (1998)

Field Collecting Policies

Taken together, 54% (113/210) of the respondents have collecting policies for field data and another 16% (33/210) have policies tailored to a specific project. Sixty-eight percent (109/160) have written policies. Given their regulatory responsibility, we expected SHPOs to have the highest proportion of collecting policies and that they would be written documents. Of the 53 respondents 44 or 83% have policies, of which 91% (40/44) are written. THPO have the highest percentage of collecting policies (9/14 or 64%), but a smaller proportion is written (5/11 or 45%). Excluding the small sample of SA who do not serve in the SHPO, about 40% of both AC and UA have collecting policies, though substantially more AC have written policies than do UA (25/41 or 61% versus 13/27 or 48%, respectively).

In general, collecting policies address all phases of cultural resource management: survey (111/121 or 92%), testing (100/120 or 83%), and mitigation (88/120 or 73%). The downward trend in proportion of policies for each phase is likely due to two factors: (1) by far the majority of cultural resource management work involves survey and (2) under federal regulations, mitigation requires an approved research design.

Although most respondents indicate that their policies do not discriminate between prehistoric and historic sites, it is clear that there is a lively debate about the subject. On one side of the discussion, we find those committed to sampling strategies that provide a representative collection of artifacts that may be used to characterize artifact assemblage and enable confident comparison with other similarly collected samples. On the other side, many respondents questioned the need to collect large (e.g., bricks and milling stones) and/or common artifacts (e.g., whiteware sherds, fire-cracked rock, and flakes) from both prehistoric and historic sites. In the end, the scientific research potential of collections is at issue. Many respondents called for national collecting standards. The need for consistent standards is especially apparent among AC who increasingly find themselves working in several states with a variety of agencies and clients, many of which have different policies.

It is noteworthy that few of the 215 respondents mention issues such as walkover and shovel testing intervals or screen mesh size. These issues may already be addressed by SHPO or agency requirements.

Curation Standards

Curation standards may be divided into two primary components: (1) cataloging (or initial processing) and (2) collections management. In the context of archaeological investigations, cataloging is the intervening step in preparing new collections for analysis. In this context, cataloging refers to the treatment, classification, numbering, labeling, and packaging of objects. In a museum setting, cataloging refers to a systematic process of object acquisition, identification, condition assessment, and registration into an inventory system. Thus, collections management refers to a body of standards and policies regulating the acquisition, care, storage, use, and deaccessioning of collections.

About two-thirds of the respondents indicate that they catalog both artifacts and documents. Based on the policies obtained from less than half of the respondents, cataloging standards are broadly consistent and include instructions for artifact cleaning, numbering, labeling, packaging, and conservation. Respondents indicate that artifact subsets are often treated differentially. Most cite similar standards for choosing what objects receive more detailed treatment. In general, specimens that are culturally or temporally diagnostic are labeled. Material class samples, e.g., fire-cracked rock, whiteware sherds, or faunal remains, are not labeled. It appears that all documentation is preserved and organized in some fashion, though the standards do not appear to be as rigorous as those for artifacts.

Nearly three-quarters (111/149 or 74%) of the respondents indicate that they prepare computer-based catalogs of artifacts and documents. It is not clear from these data when this use of computer-based catalogs began; given the Illinois State Museum's own experience, it is likely that there are substantial backlogs of artifact and document

inventories that have yet to be transferred to an electronic format.

It is not surprising, given the nature and breakdown of the respondents, that a relatively small proportion is involved in curation. Less than half of the respondents curate artifacts or documentation. Of those, 45% (49/110) curate material short-term. As noted above, there is an inconsistency in the response to the query about long-term curation. Seventy-six percent of those who responded to the question indicate that they are involved in long-term curation. This may refer primarily to curation of project documentation.

Of those with written collections management policies, principally museums, most appear to be standard boiler-plate policy, although they vary considerably in detail. In general, they address collection acquisition and the terms of transfers, loans, and collection use. Of note is the increasing number of museums and repositories who charge curation fees.

4

Discussion of Existing Policies of Federal and Non-Federal Entities

Before the data were collected, the MCX-CMAC anticipated that SHPOs, universities, state archaeologists, state department of transportation offices, and archaeological consultants would have developed their own collecting policies and curation procedures. However, our research shows in almost all states, the SHPO serves as the arbiter of statewide guidance on cultural resources matters. Thus, for field collecting, SHPO guidance, when it exists, is applicable to all archaeologists working within a state. State requirements for fieldwork are also often cited by federal agencies.

At a minimum, all SHPO programs are evaluated every five years by the National Park Service for compliance with 36 CFR Part 61.3 in order to receive Historic Preservation Fund monies. This regulation uses the Secretary of the Interior's *Standards and Guidelines for Archeology and Historic Preservation* as technical standards. Some SHPOs have adopted and/or modified the Standards and Guidelines for their fieldwork requirements.

Historically, SHPOs have paid less attention to curation procedures or requirements, leaving these to individual repositories. However, archaeological contractors working for federal agencies must comply with 36 CFR Part 79, *Curation of Federally-Owned and Administered Archeological Collections*, and with agency supplemental procedures if they exist. These federal requirements take legal precedence over repository procedures, especially when the latter conflict with federal requirements.

Field Collecting Policies

For all respondents to the questionnaire, the two entities with the most relevant policies on field collecting are federal land managing agencies and State Historic Preservation Offices. In both cases, the majority of existing policies draw heavily if not directly from the *Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation*.

Table 3 presents the summary statistics for field collecting policies for non-federal agencies. Most SHPOs (91%) have broad, general written policies directing field collecting, few of which (4%) differentiate between historic and prehistoric policies. Archaeological consultants have the next best ratio: 93% have policies, however not quite two-thirds (61%) are written. Consultants are the most apt to have policies that differ for historic and prehistoric resources.

Because of the variation in policy at different administrative levels, all federal responses were tallied together, regardless of level. Twenty-six percent of all federal respondents have field collecting policies. This is a much lower percentage than that seen for non-federal agencies, but may well be explained by the variation in level. Most agencies do not have an agency-wide policy; policies tend to be created at the local level in response to a perceived need.

Table 3.
Field Collecting Policies for Non-Federal Agencies (data from Wiant and Loveless 1998)

Respondent	Have Overall Policy	Have Policy Tailored to Individual Project	Total with Policy	% Written Policy	Policy Addresses Difference Kinds of Archaeological Investigations	Difference Policies for Prehistoric/ Historic Resources
SHPOs	83%	NA	83%	91%	41%	4%
Tribal SHPOs	64%	8%	72%	50%	55%	NA
DOT	45%	11%	56%	74%	90%	18%
Consultants	44%	49%	93%	61%	78%	34%
UA	40%	NA	40%	48%	58%	29%
All Categories	54%	16%	70%	68%	73%	30%

SHPOs=State Historic Preservation Offices
DOT=Department of Transportation
UA=University-based archaeologists

Several patterns are similar for federal and non-federal agencies. Of the extant federal policies, 62% are written and 38% are de facto, as is the case among non-federal agencies. Ninety-five percent of the written federal policies focus on site surveys, 47% on testing of sites, and 48% address site mitigation. This too is the overall non-federal pattern. Federal agencies, however, are most similar to consultants in distinguishing between collecting prehistoric and historic resources: 35% of federal policies compared to 34% of consultant policies.

Curation Policies and Procedures

Most SHPOs have not developed their own curation guidelines, whereas all federal agencies should be following 36 CFR Part 79. For federal agencies, supplemental guidance may also exist within the agency. However, the supplemental guidance often varies widely across agencies and even within an agency depending upon the administrative level.

Non-Federal Agencies

Due to the lack of SHPO guidance on curation, non-federal entities other than SHPOs occasionally write their own curation guidelines. Consultants and university-based archaeologists are the predominant agencies responsible for cataloguing collections, and cataloguing practices follow the standards set by the intended repository (Table 4). Many consultants have minimum standard procedures they use to process collections sufficiently to enable analysis for report preparation, but only 55% of the consultants report that their procedures are written. Since consultants are not in the business of curation, they are more apt to catalog according to special requests made by repositories or agencies. In contrast, University-based archaeologists often curate collections at their own institutions.

Federal Agencies

The responses to the questions regarding cataloguing of associated documentation are less clear. Although overall responses show that nearly two-thirds of the federal entities surveyed catalog documents and that half of them have written procedures for cataloging documents, there was some confusion during the oral interviews as to what constituted associated documentation and cataloguing thereof. Based on personal observations by MCX-CMAC, we question these figures. While many federal offices or organizations may organize and label classes of documentation, seldom is there a consistent method for labeling and cataloguing all associated documentation (no matter the media). Rarely are all

Table 4.
Artifact Cataloging Procedures of Non-Federal Agencies (from Wiant and Loveless 1998)

Respondent	Catalog Artifacts	Have Written Policies	Use Other's Policies	Total Written Policies	Label All Artifacts	Label Subsets	Total Label	Weigh All Artifacts	Weigh Subset	Total That Weigh
State Historic Preservation Office	40%	71%	6%	77%	29%	62%	91%	14%	62%	76%
Tribal Historic Preservation Office	50%	57%	14%	71%	71%	NA	71%	67%	33%	100%
State Department of Transportation	41%	17%	45%	62%	50%	32%	82%	36%	36%	72%
Archaeological Consultants	100%	55%	*	55%	77%	*	77%	79%	*	79%
University Archaeologists	96%	72%	*	72%	64%	24%	88%	31%	31%	62%
All Categories	67%	57%	43%	57%	56%	28%	84%	41%	33%	74%

* indicates that data were not provided, but they may be a portion of the percentage listed in the previous column.

materials placed in archival quality containers, nor are finding aids or security copies routinely produced for each document collection. We suggest that the figures reported in Table 5 are not a true representation of the status of cataloguing for artifacts, and especially not for documents. Despite the fact that most federal agencies have agency-wide records management policies in place, few offices follow these policies, and in many cases, they are not appropriate for archaeological documentation. Strict interpretation would require retention schedules and disposal dates. Collection associated documentation should be retained in perpetuity. And, this should be specifically stated in future policies.

Table 5.
Document Cataloging Procedures for Non-Federal Agencies (Wiant and Loveless 1998)

Respondent	Documents Cataloged	Written Procedures	Documents Labeled	Documents Copied
State Historic Preservation Office	36%	54%	62%	47%
Tribal Historic Preservation Office	50%	57%	71%	57%
State Department of Transportation	39%	10%	75%	76%
Archaeological Consultants	98%	45%	80%	92%
University Archaeologists	81%	51%	53%	56%
All Categories	61%	43%	67%	67%

5

Guidelines for Field Collection of Archaeological Materials from Department of Defense Administered Lands

Department of Defense intends to create guidelines for collecting archaeological materials from DoD administered lands that meets all regulatory and compliance requirements, yet reduces the curation load of new archaeological collections. Given the diverse nature of archaeological resources across the nation and the variety of archaeological research topics and field methods that are used, department-wide guidance must be sufficiently generalized to be applicable nationwide, yet not so vague as to be ineffective. Consequently, we have proposed guidelines that follow common archaeological investigation activities used to locate, identify, and extract information from archaeological resources. These activities consist of (1) background research and field survey to identify and locate archaeological resources, (2) testing resources to determine National Register eligibility, and (3) mitigating adverse effects. In some areas of the country the terms "phase" or "class" are used to describe different field practices. Regardless of the terminology, these activities may be carried out sequentially as separate tasks or in combination.

Every archaeological investigation, no matter the outcome, results in the creation of an archaeological collection (36 CFR Part 79.4.a). The collection may consist solely of associated documentation such as correspondence, field notes, maps, and/or the document that reports the results of the investigation, or it may also contain archaeological materials (artifacts, soil samples, etc.). The collecting guidelines presented here apply to any archaeological investigation conducted on DoD lands. For leased or withdrawn lands, the documents created by an investigation are the property of the federal entity performing the work and need to be properly curated. Ultimate responsibility for curating the archaeological materials that are removed from withdrawn and/or leased lands is beyond the scope of this project. This issue must be addressed in the legislation that authorizes the withdrawals and/or leases or at the time that interagency agreements are created.

Although emphasis is placed on general standards that are applicable across the U.S. for all DoD facilities, additional requirements may exist such as those established by individual State Historic Preservation Offices (SHPO) or facility commanders. These additional requirements should be based on the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation which complement the national focus of the guidelines presented here.

Suggested Department of Defense Collecting Guidelines

I. Objectives

A. To guide the collection of archaeological materials from investigations on DoD lands such that collections are a representative sample of the historic properties and archaeological resources identified during a given project.

B. To limit collections to the administrative and scientific minimum needed to comply with the Congressional mandate to preserve the past for the benefit of future generations.

II. References

National Historic Preservation Act, as amended (16 U.S.C. 470 *et seq.*)

Archaeological Resources Protection Act, as amended (16 U.S.C. 470aa *et seq.*)

Native American Graves Protection and Repatriation Act (25 U.S.C. 3001 *et seq.*)

36 CFR Part 79, Curation of Federally Owned and Administered Archeological Collections

III. Definitions

Alaska Native – of or relating to a village, people or organized group defined or established pursuant to the Alaska Native Claims Settlement Act.

Archaeological Investigation – Efforts to locate, evaluate, document, study, or recover a prehistoric or historic resource. Investigations may consist of archival research, oral interviews, field survey, excavation, photodocumentation or other efforts to document or analyze archaeological resources. Investigations result in the production of a report which details the objectives, methods, and results of the effort as well as recommendations for future action.

Archaeological Resources – any material remains of past human life or activities which are of archaeological interest, as determined under uniform regulations promulgated pursuant to the Archaeological Resources Protection Act (16 U.S.C 470bb, 32 CFR Part 229).

Archaeological Interest – capable of providing scientific or humanistic understandings of past human behavior, cultural adaptation, and related topics through the application of scientific or scholarly techniques (32 CFR Part 229.3).

Archaeological Materials (see Material Remains)

Archival or archivally sound – non-technical terms that denote a material or product is permanent, durable or chemically stable, and that it can therefore safely be used for preservation purposes. The phrase in not quantifiable; no standards exist that describe how long an “archival” or “archivally sound” material will last.

Associated Records – original records (or copies thereof) that are prepared, assembled and document efforts to locate, evaluate, record, study, preserve or recover a prehistoric or historic resource. Some records such as field notes, artifact inventories and oral histories may be originals that are prepared as a result of the field work, analysis and report preparation. Other records such as deeds, survey plats, historical maps and diaries may be copies of original public or archival documents that are assembled and studied as a result of historical research (36 CFR Part 79.4.a.2).

Collection – material remains that are excavated or removed during a survey, excavation or the study of an archaeological resource historic property, and associated records that are prepared or assembled in connection with the survey, excavation, other study (36 CFR Part 79.4.a).

Curation - managing and preserving a collection according to professional museum and archival practices (36 CFR Part 79.4.b).

Curation Load – the total amount of cubic feet of archaeological materials and linear feet of documentation requiring professional collections care.

Diagnostic – An artifact whose characteristics of form and material are thought to be indicative of a specific time, place, or cultural period; much the same as type specimens in botany.

Geomorphology – a science that deals with the relief features of the earth (Merriam-Webster on-line, http://www.m-w.com/)

Historic Artifact –in the New World, an object that was manufactured by European populations after 1492.

Historic Property – or historic resources is any prehistoric or historic district, site building, structure, or object included in, or eligible for inclusion on the National Register, including artifacts, records, and material remains related to such a property or resources (16 U.S.C. 470w).

Indian Tribe – any tribe, band nation, or other organized group or community of Indians, including any Alaska Native village which is recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians (25 U.S.C. 3001.2.7).

Material Class – a group or set of archaeological materials that share common attributes such as ceramic, glass, metal, chipped stone, ground stone.

Material Remains – artifacts, objects, specimens and other physical evidence that are excavated or removed in connection with efforts to locate, evaluate, document, study, preserve or recover a prehistoric or historic resource (36 CFR Part 79.4.a.1).

Material Samples – artifacts and non-artifacts, where a limited number of objects may be collected and retained for later analysis instead of collecting all the objects.

Native American – of, or relating to, a tribe, people, or culture that is indigenous to the United States (25 U.S.C. 3001.2.9) (see also Indian Tribe and Native Hawaiian).

Native Hawaiian – any individual who is a descendant of the aboriginal people who, prior to 1778, occupied and exercised sovereignty in the area that now constitutes the State of Hawaii (25 U.S.C. 3001.2.10).

Negative Findings – when archaeological investigations do not locate any historic properties.

Prehistoric Artifact – an object that was manufactured by indigenous populations prior to the arrival of European populations.

Provenience – is an archaeological term used to denote the specific location or context within a site from which archaeological material(s) are recovered.

Repository – a facility such as a museum, archeological center, laboratory or storage facility managed by a university, college, museum, other educational or scientific institution, a Federal, State or local Government agency or Indian tribe that can provide professional, systematic and accountable curatorial services on a long-term basis (36 CFR Part 79.4(j)).

Research design – a written document that describes the goals and methods to be used in the collection and analysis of archaeological data.

Sample – a finite part of a statistical population whose properties are studied to gain information about the whole (Merriam-Webster online, http://www.m-w.com). In archaeological contexts, a sample is an excavated portion of the total material remains that comprise an archaeological site, resource, or material class.

Security Copy – a duplicate copy of original documentation that is on archival paper and is stored in a separate location from the original

Statistical sampling – also known as probability sampling, is a mathematically based set of methods for selecting a subset of a population for study and then being able to characterize the population from the subset with a known amount of error.

Site Number – the unique identifying number assigned to each archaeological resource within a state. Many states use the Smithsonian alpha-numeric trinomial system consisting of a state code, county code, and unique site number within that county (e.g. CA-Sol-357 represents the 357th site recorded in Solano County, California).

IV. Guiding Principles

A. *Every archaeological project on federal land results in a collection that must be curated according to 36 CFR Part 79.* There is always at least an administrative record for every archaeological project especially when no archaeological materials are collected. The administrative record must be properly curated because this record documents the

decision making process. Documentation for historic properties that are eligible **and** are not eligible for nomination to the National Register must also be properly curated.

B. *Attempts to restrict the amount of archaeological materials generated by an investigation must be based on practical, scientific, and replicable principles.* A strict "no collection" policy is not recommended for four reasons.

1. Field identifications can rarely be verified by subsequent investigations and only at additional costs to relocate specific archaeological materials.

2. Certain kinds of analyses require physical samples (e.g., radiocarbon assays, elemental analyses, residue analyses, pollen identification and quantification, thermoluminesence, obsidian hydration studies, faunal or floral analyses). If suitable specimens have been collected and curated, they are available for immediate and future investigations, and can eliminate the need and cost to conduct additional fieldwork to secure new samples.

3. Strict "no collection" policies are difficult to police and result in statistically biased and skewed samples of archaeological resources. Research has demonstrated that most existing federal agency "no collecting" policies all have exceptions such as cases in which artifacts are endangered by environmental factors such as erosion or inherent fragility (see Chapter 2) or by unauthorized collecting.

4. "No collection policies" assume that the only way to conserve the archaeological record is to leave it in situ. However, a "no collection policy" that lacks intensive and aggressive management practices that constantly monitor all impacts to all extant archaeological resources, is insufficient by itself to conserve the archaeological record. These management practices are more costly than curation costs.

C. *Statistical (or probabilistic) sampling of archaeological materials can be used to address the objectives of each investigation.* Statistical sampling of archaeological materials can reduce the curation load while acquiring sufficient data to address cultural resources management issues. It can minimize negative impacts to the archaeological record by reducing the quantity of testing or intensive excavation needed to address compliance or research questions. Sampling can assess both natural and human impacts with a known level of statistical confidence, to justify and verify National Register eligibility statements with actual material remains, and to provide statistically unbiased information about the archaeological record. The project research design outlines the scope and objectives of the probabilistic sampling strategy that will provide data to address the research objectives of an investigation. Samples can be designed to address the objectives of each stage of field investigation inquiry, be it survey, subsurface testing, or mitigation.

D. The sampling strategy will be determined by the objectives of the investigation as well as the data generated by the background research conducted for each investigation.

E. Deviations from the collecting standards presented here must be justified by the research objectives of the investigation and detailed in the project research design.

F. Provisions for curation of collections generated by an investigation must be made prior to initiation of fieldwork and must comply with 36 CFR Part 79.

V. Collecting Guidelines

The following guidelines are based on how archaeologists typically prepare for and then conduct fieldwork. Although the guidelines are presented serially from tasks A through E, it is possible that some tasks may be omitted or combined if warranted. For example, after background research is completed, it is possible no additional fieldwork may be required, or subsurface testing may be a component of field survey.

A. *Background Research.* Conduct background research to identify potential archaeological resources, to assist in generating research questions used in the research design, and to predict the costs of fieldwork, analysis, and curation.

1. Identify previous land use. Consult local land records, installation real estate and public works records, histories, previous occupants, current or retired installation personnel, county histories, county and state archives, aerial photographs, and, hazardous and toxic waste surveys. Land-use research should also include discussions with local community members or interest groups, including Native American tribes. Past land use includes both physical changes to a property such as those from farming and construction, and uses that leave no physical remains, such as collection of plants or animals, or performance of rituals or non-religious ceremonies by historical communities.
Previous land use research can identify areas or locales within a project that may be eliminated from further examination and thus, excluded from fieldwork, or labeled sensitive due to the nature of the previous use. Certain areas may have been disturbed to the extent that archaeological materials no longer exist, or hazardous conditions may be documented that would prevent field survey or use of specific locations. These areas should be eliminated from fieldwork following consultation and agreement by the appropriate SHPO.

2. Identify geomorphological processes that have affected a project area. Examine soil surveys, geological surveys, and geomorphological studies. Before fieldwork begins, a geologist or a geomorphologist should determine which areas may be disturbed by previous geological processes, which areas may be buried by recent deposits, and which areas may be stable.

3. Coordinate research with the natural resources staff. Installation cultural resources staff should also work closely with the natural resources staff to avoid sensitive areas that include wetlands and/or endangered and threatened species that could be affected by archaeological compliance activities.

4. Review previous archaeological investigations within a project area and those that have occurred regionally. Each DoD facility should maintains a list of previous investigations of a property, noting the author, title, date published, and current location of the report. Additionally, SHPO records, state archaeological site files, state-wide archaeological overviews, and local informants should be consulted.

5. Examine existing archaeological collections from the project area. Each installation should maintain a list of repositories curating archaeological collections from the installation. The list should include archaeological site numbers and the types and volumes of materials curated for each site or locale. These data shall be evaluated for their ability to address current research questions. Note gaps in the archaeological record and predict likely volumes and kinds of materials to be encountered in future field survey.

B. *Research Design*

1. Identify research questions pertinent to the project area and that data needed to address these questions. These questions should address issues identified by statewide summaries that have been coordinated by the appropriate SHPO or through overviews generated by previous archaeological projects.

2. Formulate a research design and sampling strategy for the collection of archaeological materials.

a. Predictive modeling can be used as a planning, but not a compliance tool to estimate the type, distribution, and surface density of anticipated archaeological resources across an installation's landscape or within specific site types. However, any predictions must be verified by fieldwork on the property in question. A predictive model can estimate the number and types of sites to be encountered,

and the number and types of archaeological materials that may be present on the surface or per cubic meter or foot of sediment.

b. Use statistical sampling when making field collections so that characterizations of the number and kind of materials represented at a site are statistically describable and can be compared to statistical samples collected in other sites or investigations.

(1) Probability sampling permits estimation of error in the recovery of archaeological materials regardless of the sample size.

(2) Select a sampling strategy that is appropriate to the research design and the kinds of archaeological resources that may be present.

3. If the background research stipulated here has been conducted previously for a given parcel of land, summarize the results of that research and use them to design the research for the current investigation.

4. Retain copies of all data generated during the background research. These become part of the investigation's collection.

5. Secure curation services based on the estimated volume and kind of archaeological materials that will be collected and the estimated linear feet of associated records, prior to the start of a project.

C. *Fieldwork to Locate Archaeological Resources and Historic Properties*. Use the sampling strategy designed during the background research to guide field collection of archaeological materials. The fieldwork to locate previously unknown historic properties or archaeological resources may vary from being exclusively a surface only survey or may also include subsurface examination, when appropriate. Coordination with tribes should be an integral part of the preparations for locating archaeological resources and historic properties. Continued coordination should occur throughout a project.

1. Identify all National Register eligible properties. All National Register eligible properties should be identified unless the installation has reached a consensus with the State Historic Preservation Officer(s).

2. Collect surface artifacts only under the following conditions.

a. An artifact type is identified in the research design as necessary for analysis. This may be a particular material class (e.g., obsidian for sourcing analyses) or a particular type of artifact (e.g., fluted projectile points). The research design must identify the material kind and percent sample to be collected consistently from all locations with archaeological materials.

b. Collect temporally diagnostic artifacts including complete artifacts or those with sufficient integrity to allow typological and temporal assignment only when called for in the research design.

c. Collect endangered archaeological resources for management purposes to protect that resource. If an archaeological resource is in imminent danger from being lost due to erosion or illegal collecting or from damage from military training, the archaeological resource should be collected.

3. Record all noncollected, significant artifacts using drawings, measurements, and black-and-white photographs. Significant noncollected surface artifacts include large and/or heavy artifacts that are impractical or impossible to collect during the initial survey.

4. Record a provenience of all collected and noncollected significant specimens using appropriate methods and technologies. The level of provenience accuracy and thus, the kinds of methods and technologies to use are determined by the research design. Regardless of the provenience accuracy, note the provenience of the collected materials on the site map.

5. Document all field methods and observations. Retain original and security copy of field journals, photographic logs, photographs, feature and artifact drawings, field maps, soil profiles, etc.

6. If human remains and associated objects are inadvertently located, stop all work within 30 meters of the remains. Immediately report the existence of the remains to the installation law enforcement personnel and the individual responsible for managing cultural resources. Secure the area until the law enforcement personnel and cultural resources manager arrive. This should occur no later than 24 hours after the inadvertent discovery. The local coroner may need to be contacted. If the remains are not part of a crime scene, but are part of an archaeological site, consult with a qualified professional physical anthropologist and archaeologist to determine if the exposed remains are Native American or not. Do not move or remove any material from the site. If the remains are Native American, then the procedures required under the Native American Graves Protection and Repatriation Act shall be followed. If the remains are not Native American, procedures, such as those in a state's unmarked burial law, should be followed.

D. *Subsurface Testing*. Use shovel and auger tests, or hand excavated units to determine the nature of the deposit. In some circumstances such as when deep layers of sterile need to be removed, mechanical equipment, such as power augers and backhoes, may be appropriately used. The following guidelines assume that units are being hand excavated.

1. Screen soil from all test units, regardless of unit size, through no larger than ¼-inch mesh hardware cloth. Smaller mesh sizes and screening of non-hand excavated material may also be appropriate depending on the research design.

2. Document all field methods and observations. Retain original and security copy of field journals, photographic logs, photographs, drawings, field maps, computer disks and files, and all other documentation.

3. Sample redundant sets of artifacts or materials when called for in the research design. Retain a predetermined percentage of redundant materials or only those portions that will provide further identification. The sample selected should be appropriate to address the research at hand and be justified in the research design (see Table 6).

4. Document all methods and materials used in collecting, processing, and analyzing specimens and material samples.

5. The testing results can then be used as supporting documentation to determine if a site is eligible for nomination to the National Register.

6. For an inadverently discovered human remains, see above.

E. *Excavation.* When excavating National Register eligible sites, 100% excavation of small sites may occur or a representative sample may be made for larger sites. In either case, the following field procedures should be used.

1. Screen soil from all units, regardless of unit size, through no larger than ¼ inch mesh hardware cloth. Smaller mesh sizes and screening of machine-excavated deposits may also be appropriate depending on the research design.

2. Document all field methods and observations, retaining originals and one archival copy of field journals, photographic logs, photographs, drawings, field maps, computer disks and files, and all other documentation.

3. Sample redundant sets of archaeological materials when called for in the research design. Retain a predetermined percent sample of these redundant materials or only those portions that will provide further identification. Table 6 of these guidelines provides recommendations for minimum samples to be retained. These minimums should be adjusted according to the research design. In some cases no collections will be made; in others, complete collecting may be required.

4. Leave a predetermined percentage of material samples unprocessed for use in future studies, e.g., soil, radiocarbon, pollen, phytolith, microwear, residues on tools.

5. For an inadverently discovered human remains, see above.

F. *Disposal of Excess or Redundant Material*s. Currently there is no legal means for disposing of archaeological materials that are determined to be excess or redundant, once they have been collected from federal lands. Chapter 7 addresses the steps needed to implement these guidelines and includes a recommendation that DoD work with the National Park Service to revise the proposed rule for deaccessioning archaeological materials.

Lacking such a rule, numerous strategies are currently used in different states across the nation to address this problem. For example, some California contractors place a capped PVC pipe in the datum corner of each unit, prior to backfilling the unit. After debitage has been analyzed, a sample is selected for curation, the remainder is placed in the pipe in its unit of origin, the pipe is capped again, and covered with dirt. While this procedure meets the letter of the current law and is designed to make the analyzed sample available to future researchers, it requires additional expense and is of unknown efficacy. Other areas have developed different strategies, including disposal in the local landfill.

Presently, disposal strategies must be made explicit in the report documenting the fieldwork. Reports should also include the criteria used to select the retained versus disposed samples (e.g., Were all flakes greater than two grams retained or only complete bricks with makers mark?).

Once the materials have been accessioned into a federal collection, the only current legal means of disposing archaeological materials is through consumptive analysis or repatriation of items specified in the Native American Graves Protection and Repatriation Act. In such cases, complete documentation of the chain of custody should be maintained by the repository and ultimately by the federal agency accountable for the collection.

Table 6.
Guidelines for Collecting Redundant Archaeological Materials While in the Field.

Material Class	Collecting Guidance
Prehistoric Artifacts	
Bone, Antler, Ivory	Count, measure, and weigh all artifacts; retain all formed tools, ornaments, or diagnostic fragments.
Botanicals (textiles, wood)	Retain all artifacts. Weigh and measure all formed tools.
Ceramics	Count and weigh all specimens; retain all diagnostic specimens and a predetermined sample of redundant materials as specified in the research design.
Chipped Stone	Count and weigh all specimens; retain all formed tools and a predetermined sample of chipped stone artifacts (also debitage) for analysis.
Groundstone	Count and weigh all specimens; retain all complete specimens and those with reconstructable dimensions, residues, or other significant features; retain a representative sample of each rock material type.
Shell	Retain all modified shell, sort by species, and weigh all identified and unidentified shell, then discard all unmodified shell.
Historic Artifacts	
Ceramics	Count and weigh all; retain all diagnostic pieces (e.g. with markers marks, reconstructable forms, decorative patterns), and a predetermined sample of materials for analysis.
Mass Produced Products	Retain significant specimens as identified by research design (e.g., *diagnostic parts* of tin cans, leather, glassware, metal). Discard all non-diagnostic fragments.
Building Materials	
Brick	Weigh all; note reconstructable dimensions; retain all with maker's marks and a representative sample of those without maker's marks.
Coal	Weigh all; retain predetermined sample.
Daub	Weigh all; retain any with impressions
Glass	Measure thickness of all window glass; retain representative sample of types.
Lumber	Identify and record sizes present; retain unique or diagnostic specimens.
Metal	Retain any with diagnostic features; do not collect non-diagnostic fragments.
Mortar	Retain any specimens with diagnostic features.
Nails	Identify type and number of each type; retain a representative sample; discard remainder.
Shingle/Roofing Materials	Weigh all; retain representative sample of material types.
Prehistoric Materials Samples	
Fire Affected Rock	Weigh all; retain representative sample of rock material types.
Daub	Weigh all; retain any with impressions significant to interpretation.
Charcoal	Retain all samples having provenience data; discard any lacking provenience or compromised by contaminants.
Shell	Weigh all; retain predetermined sample for analysis.
Wood	Retain a representative sample of wood types.
Faunal	*After analysis*, retain representative sample of all identified fauna present, any modified bone, and a predetermined sample (e.g., selected column sample) of unanalyzed faunal remains.
Botanical	Retain all diagnostic specimens.
Soil	Retain all floated samples and a representative sample of unprocessed soil.
Historic Materials Samples	
Faunal	Weigh all; retain a predetermined sample for analysis and an example (e.g., selected column sample) of unanalyzed faunal remains.
Botanical	Retain all diagnostic specimens.
Shell	Weigh all; retain predetermined sample.
Charcoal	Note presence, do not collect any samples.
Soil	Retain all floated samples and a representative sample of unprocessed soil.

6

Standard Operating Procedures for Curating DoD Archaeological Collections

All federal archaeological investigations result in the creation of archaeological collections that require proper curation to insure long-term preservation (see 36 CFR Part 79.4(a)). Once archaeological materials are collected from a location, their actual spatial context is destroyed. However, information on the spatial context, characteristics of the archaeological materials, and the archaeological materials themselves continue to have great value. Similarly, records created during an investigation provide information not only about the field and/or laboratory investigations, the records also document the content and context in which any interpretations and conclusions are made.

By preserving archaeological materials and records together as complete sets, data can be repeatedly re-examined. Archaeologists, historians, Native elders and artisans, educators, property managers, and the public-at-large are interested in examining information derived from these data sets. This re-examination and reinterpretation can only occur if these data sets (the archaeological materials and records) are preserved.

From the moment archaeological materials are recovered or documents are created, every action, whether intentional or not, has an effect on their long-term preservation, as well as their suitability for future observation, analysis, or exhibition. The selection and combination of materials used to produce a record or recover archaeological materials, their primary and secondary uses, the conditions under which they existed until they were excavated, collected, or stored, all affect their condition and ultimate survivability.

Guiding Principles for Curation

Four principles should guide DoD's curation instructions to installations. These principles are as follows.

1. *Curation begins before archaeological materials are collected or a document is created.* Archaeological materials and documents reach an equilibrium with the environment in which they are located; if they are removed and placed elsewhere, they are subjected to new environmental factors such as temperature, humidity, ultraviolet radiation, air pollution, acidity, and visible light. They will eventually reach an equilibrium with the new environment, but may be subject to hydration, dehydration, oxidation, mold growth, pest damage, embrittlement, and other agents of deterioration including human use, once they have been removed from their original environment. Consult with a professional conservator before removing any unusual objects (e.g., waterlogged, sunken watercraft).

2. *Consider that all actions may have permanent rather than temporary effects.*
Every action or treatment associated with archaeological materials and records should be reversible if at all possible. Use only archival quality materials at all stages of an archaeological investigation regardless of whether the present action is intended to be temporary, such as the transfer of collections from the field to the repository, or whether the action is intended to be long-term, such as storage at the repository or exhibition in a permanent display. Many extant collections that initially used temporary measures to conserve the collections, until they could be treated with more permanent or archival measures, have evidence of the long-term use of "temporary" methods and materials. As a result, improper curation has decreased the survivability of these collections.

3. *Document each action.*
This principle can best be implemented by the creation of a Curation History for each collection that details how the collection was excavated, processed, created, labeled, and packaged and what products were used in each of these steps. Specific notations on individual specimen condition, treatment, destructive analysis, etc. can be recorded in the collection catalog. These are discussed below.

By documenting actions, installations maintain a chain of custody and administrative control of collections. In turn, these data may provide critical information to future users of the collection. Are specific specimens or collections suitable for particular research questions, analytical techniques, or public interpretation? Have previous conservation treatments, such as cleaning, mending, or repairing, contributed to the present condition of an artifact? Was an artifact found in a context that suggests it may be a funerary object or a sacred object?

4. *Curate collections in a repository that meets the basic standards required by 36 CFR Part 79.*
A repository must be able to provide curation services that are long-term and professional. Temporary storage provided by an archaeological contractor or by an installation are not suitable unless these two criteria are met. Many of the standards in 36 CFR Part 79 are listed in the most general terms. Table 7 provides DoD's recommendations for implementing these standards, which can be implemented to evaluate potential curatorial services and facilities.

Administrative Control of DoD Collections

Each DoD landholding installation is responsible for maintaining administrative control over collections derived from its property. Once the collections have been placed in appropriate storage repositories, the designated DoD installation point-of-contact is responsible for the following.

1. Know the location and condition of all collections (archaeological materials and associated documentation) and maintaining an up-to-date list.
2. Routinely inspecting the storage locations and taking immediate action to rectify any problems noted during the inspection or when problems are reported by the repository.
3. Making the collections available for appropriate uses.
4. Budgeting for long-term curation and conservation costs.

Each of these measures will insure that the ultimate goal of curation is achieved; archaeological collections are preserved and accessible. Collections that have been properly prepared, curated, and administered can be used over and over again to interpret the nation's heritage to the public, to provide research data for future investigations, or to assist native peoples conducting traditional religious ceremonies.

Significant public funds are spent generating collections. Significant sums are required to curate them. It is critical that these funds are well spent, from the inception of the archaeological investigation to the ultimate disposition and use of the collection materials and data.

Table 7.
Implementing the Requirements of 36 CFR Part 79

Applicable Section of 36 CFR Part 79	Archaeological Materials	Associated Documentation
Professional Museum Practices (79.9(a))	Maintain written policies and procedures for museum staff and prospective collection donors. Review policies every 5 years. Policies should include: Field Curation Procedures, Standards for Acceptance of Collections, Accession and Deaccession Procedures, Collections Management Policy (including care of collections; access policy; conservation procedures; use of specimens for research, ceremonies, destructive analyses, exhibit, loans, and publication), and an Emergency Plan.	Maintain a written records management plan. Review plan every 5 years. Policies to be included in the plan: Field Curation Procedures, Standards for Acceptance of Collections, Accession and Deaccession Procedures, Records Management Plan (including: policies for tracking records, processing and rehabilitating records, conservation procedures, creating finding aids, access policy, and use of records for exhibit, loan, and publication), and an Emergency Plan.
Accession	Create an accession record for each Collection. Assign a unique accession number; note the Collection owner, provenience, acquisition history, terms of the curation agreement, and a general description of the Collection. Create a file that includes the Accession Record and copies of all associated documentation from project management, project results, ongoing curation procedures, and uses of the Collection, and physical location(s). Cross-index all collections by archaeological site number.	Create an Accession Record (if one has not been created for the artifacts). Include all documentation associated with the original archaeological investigation (e.g., project administrative records, project field notes, project results). Add documentation of ongoing procedures used to curate the associated documentation (e.g. the initial inventory and assessment of the documents, preservation worksheets for documents that require special treatment, the storage location) Cross-index any associated artifacts.
Catalog	Assign a unique specimen number to each object or lot, and record the number and all associated data concerning provenience, condition, and description of object into a catalog list or computerized database. Index all associated documentation by format type and contents, and create a Finding Aid.	Assess all associated documentation for retention and condition. Organize and arrange documentation according to the guidelines in the records management plan, and assign a unique identification number. Create archives finding aid, and maintain both paper and electronic forms. Paper copies should be printed on acid-free paper with a laser printer. Create a duplicate or safety copy of each collection on acid-free paper, archival microfilm, or, if quick access is critical and affordable, on electronic media such as digital scanning onto CD-ROM
Label	Label specimens directly if feasible (use an isolating base coat, apply specimen # in indelible ink, and add an isolating topcoat). If indirect labels are necessary, they can be adhered or tied, or placed loose inside the artifact storage container. Use only archival quality materials – no white correction fluid or nail polish. Label all artifact containers and all storage units or containers. Loose labels on acid-free paper can be placed inside artifact containers such as bags or boxes. Also label the exteriors of all storage containers.	Label paper directly if feasible; label photographic media with foil-back archival labels, or label the photo sleeve or envelope. Attach labels to audiovisual and electronic media. Place in an archival quality document container suitable for each media, e.g., acid-free lignin-free file folders, boxes, or photo sleeves. Boxes should not be glued or of metal construction. Label box, folder, and other cross-referencing tools. These labels may be produced by direct labeling in indelible ink or with a #3 graphite pencil. Adhesive archival labels (generally, foil-backed) may be printed using a laser printer.

Table 7.
Implementing the Requirements of 36 CFR Part 79 (Continued)

Applicable Section of 36 CFR Part 79	Archaeological Materials	Associated Documentation
Conserve (see 36 CFR Part 79.11)	Perform initial condition assessment upon receipt of collection. Prioritize conservation needs; perform treatments as necessary; maintain records of all treatments of individual objects; and tie the conservation records into the master catalog so that all information concerning an object is centrally located.	Perform initial condition assessment upon receipt of collection and complete preservation worksheet for associated documentation. Identify and prioritize conservation needs and treatments to ensure physical survival of materials; maintain records of all treatments performed; treatments can also be recorded in an electronic system so that all information on a specific collection of associated documentation may be readily identified and reported.
Complete and Accurate Records (79.9(b)(1))	All records pertaining to the daily operations of the repository and those documenting any activities performed on the artifacts or specimens in a collection should be current, maintained, and accurate. Records of this nature that must be maintained by the repository include, at the minimum: acquisition, or accession, records; catalogs and inventory lists; collection condition records and conservation treatments performed; loan information; inspection records; records on lost, deteriorated, damaged, or destroyed property; records of destructive analysis conducted on specimens; deaccession, transfer, repatriation, discard records; and records documenting the physical location of the material remains (i.e., shelf addresses, loan agreements, and materials on exhibit).	All records pertaining to the daily operations of the repository and those documenting any activities performed on the associated documentation in a collection should be current, maintained, and accurate. Records of this nature that must be maintained by the repository include, at the minimum: acquisition, or accession, records; catalogs and inventory lists; collection condition records and conservation treatments performed; loan information; inspection records; records on lost, deteriorated, damaged, or destroyed property; deaccession, transfer, repatriation, discard records; and records documenting the physical location of the associated documentation (i.e., shelf addresses, loan agreements, and materials on exhibit).
	N/A	In addition to maintaining records documenting the collection within the repository, any materials that are compiled, created or generated during an archaeological investigation are considered to be associated documentation for the collection and must be preserved following the guidelines outlined above. It may include, but is not limited to: field notes, site forms, draft and final reports, analysis records, administrative records, maps and other locational information, photographic materials, survey records, results of literature searches, and any background material or historical data gathered or generated during the investigation.
Storage 79.9(b)(2) Storage space must not be used for non-curatorial purposes that would endanger he collection	Storage areas should be physically separate from offices, research areas, conservation areas, registration activities, or any other non-storage function. Access should be restricted and monitored. Lights should remain off unless personnel are in the storage area. No food or beverages should be brought into the storage area.	Same as listed for artifact and specimens.

Table 7.
Implementing the Requirements of 36 CFR Part 79 (Continued)

Applicable Section of 36 CFR Part 79	Archaeological Materials	Associated Documentation
Structural Adequacy 79.9(b)(3)(I)	The repository should meet all local, county, and state building codes. The repository should be inspected on a regular schedule by qualified personnel.	Same as listed for artifacts and specimens.
Fire Detection and Suppression 79.9(b)(3)(ii)		
Fire detection/suppression system	A fire suppression sprinkler system and a fire detection system (i.e., heat and smoke sensors) should be installed. A Halon fire suppression system should not be used. Fire detection/ suppression systems should meet all local, county, state, and federal fire and building codes.	Same as listed for artifacts and specimens.
Regular inspections	Storage areas should be inspected on a regular basis by qualified personnel.	Same as listed for artifacts and specimens.
Documentation storage in fire resistant cabinets, safes, or vaults	All repository-generated documentation of actions taken or performed upon specimens (see above section, Maintain complete and accurate records) should be stored in cabinets that are securable, insulated, and provide protection against fire, smoke and water damage.	Same as listed for artifacts and specimens.
Duplicate copies of records stored in a separate location and with a third party	All repository-generated documentation (see above) should be duplicated and stored in a separate location. These duplicate materials must include copies of site forms, artifact inventory lists, accession records, and any files on computer disks and tapes.	In addition to the requirements for the repository-generated documentation, a duplicate or safety copy, of the project-generated associated documentation should be created on acid-free paper or archival microfilm, and stored in a safe, environmentally suitable area, in a separate location if possible.
Security 79.9(b)(3)(iii)		
Intrusion detection/ deterrent system	Have appropriate and operational intrusion detection and deterrent systems.	Same as listed for artifacts and specimens.
Valuable item and document storage 79.9.b.3.v	Extremely rare or monetarily valuable items should be kept in a secure location such as a safe, vault, or securable cabinet, that is environmentally sound (i.e., temperature and humidity levels can be monitored and maintained).	Same as listed for artifacts and specimens.
Regular inspections	The storage facility should be inspected a minimum of once a month for any faults or lapses in security.	Same as listed for artifacts and specimens.

Table 7.
Implementing the Requirements of 36 CFR Part 79 (Continued)

Applicable Section of 36 CFR Part 79	Archaeological Materials	Associated Documentation
Security 79.9(b)(3)(iii)		
Limited access/control	Access to the collections area should be limited to authorized individuals. Visiting scholars to the collections area should be monitored at all times, and a record of the items they are using should be maintained and checked prior to their departure.	Same as listed for artifacts and specimens.
Duplicate copies of records stored	See above sections, *Documentation storage in fire resistant cabinets, safes, or vaults* and *Duplicate copies of records stored in a separate location and with a third party*.	See above sections, *Documentation storage in fire resistant cabinets, safes, or vaults* and *Duplicate copies of records stored in a separate location and with a third party*.
Inventories to account for collections	See Limited Access/Control above. Regular inspections of a sample of all collections should be conducted at least twice a year to determine whether any items are unaccounted for.	Same as listed for artifacts and specimens.
Emergency Management Plans 79.9(b)(3)(iv)		
Fire, Flood, Natural Disasters, Civil Unrest, Acts of Violence	A written policy concerning these topics should be generated and updated to reflect changes in general museum policy and industry standards. The Emergency Plan should incorporate the services and facilities available locally from city, county or state emergency agencies. All staff responsible for executing the emergency plan should receive annual training in implementing the plan. Periodic (no less than once a year) review of the emergency management plans should be carried out.	Same as listed for artifacts and specimens.
Structural failures	Regular inspections of the storage facility should occur and any hazards or structural inadequacies should be corrected. See *Structural Adequacy* above.	Same as listed for artifacts and specimens.
Mechanical systems failures		Same as listed for artifacts and specimens.
Qualified Museum Professional 79.9(b)(4)		
See 36 CFR Part 79.4.	At a minimum, a repository should have one full-time curator, one full-time collections manager, and access to a professional conservator. These personnel should meet the minimum qualifications as outlined in the *Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation* (48 FR 44716, September 29, 1983).	At a minimum, we recommend that a repository have on staff or access to a professional archivist and conservator

Table 7.
Implementing the Requirements of 36 CFR Part 79 (Continued)

Applicable Section of 36 CFR Part 79	Archaeological Materials	Associated Documentation
Environmental Controls 79.9(b)(5)(ii) Protect collection from:		
Adverse temperature changes and fluctuations in relative humidity	A heating, ventilating, and air conditioning (HVAC) system is recommended for a storage area to maintain adequate storage temperature (55-70° F) and relative humidity levels (30-50%). If a HVAC is economically infeasible, then portable humidifiers and de-humidifiers can be employed to help maintain relative humidity levels, and thus temperature levels. Hygrothermographs or thermohygrometers should be used to monitor temperature and relative humidity levels.	Same as listed for artifacts and specimens.
Mold and fungus	Keeping excessive temperature and high humidity levels down will prevent the growth of mold and fungus.	Same as listed for artifacts and specimens.
Dust and soot	Install filters on vents coming into the collections area to keep dust and soot levels down. Filters should be monitored and replaced at regular intervals or when needed, whichever occurs first.	Same as listed for artifacts and specimens.
Strong, excessive UV light	Ideally, there should be no windows in the collections storage area, thereby eliminating UV sunlight from damaging collections. UV filters should be applied on overhead lights; these must be changed routinely (annually) to be effective. Low wattage light bulbs can be used inside the collections area as well.	Same as listed for artifacts and specimens.
Pest Management 79.9(b)(5)(ii) Protect collections from insects and rodents	Use an Integrated Pest Management (IPM) program to monitor collections for signs of infestation; treat infestations if they occur; do not routinely spray or use chemical treatments if no infestation is evident. Focus on preventive care: identify how pests enter the repository, what they are consuming, and how to eliminate the specific pest. Use sticky traps to monitor insect infestation and set mouse traps for rodents. Inspect the traps routinely (at least monthly). Treat infestations if they occur; isolate infested objects, treat the objects and the affected portion of the storage area. Use freezing as an alternative to chemical treatment of infestations.	Same as listed for artifacts and specimens.

Processing Archaeological Collections for Curation

As each archaeological investigation is completed, the collection generated by that investigation must be prepared for long-term curation. All investigations will produce associated documentation, some may also produce archaeological materials (artifacts and material samples). All must be prepared for long-term curation. Whether a collection is being processed for the first time or is being "rehabilitated," (processed again to bring it up to current standards by reboxing, rebagging, or relabeling the collection), the concerns are the same.

The procedures begin with pre-field planning and continue through each processing step to the final placement of objects and associated records into short-term or long-term storage. These basic procedures are drawn from protocols developed by the MCX-CMAC for the U.S. Army Environmental Center (Mandatory Center of Expertise for the Curation and Management of Archaeological Collections 1998). Modifications and adjustments will be necessary to address the conditions and needs of specific repositories or regions of the United States, because each region produces distinctive sets of archaeological materials and has specific environmental factors that affect the kind of care needed for these materials.

Curation Procedures

I. Prefield Planning

Before any archaeological materials or data are collected, pre-field planning should estimate (1) the kinds of archaeological materials that may be present, (2) any conservation treatments that may be needed in the field, (3) the volume and kinds of archival materials that will be required to transport the collection from the field to the laboratory or repository, and (4) how data can best be collected so that they too will be preserved. Check with the intended repository for any special requirements it may have or advice concerning the ultimate organization of the collections prior to submission.

Preservation of archaeological materials begins prior to collection. Knowing what kinds of archaeological materials may be present at an archaeological site or region will assist archaeologists in planning the kinds of excavation techniques, conservation treatments, or special supports that may be necessary to transport objects from the field to the laboratory without incurring damage (Longford 1990; Sease 1987; Smith 1983). Use archival quality materials to collect and transport artifacts. Although they are more expensive, they do not add to the deterioration of objects during the interval between the time they are collected and processed, which can range from days to many years.

Anticipate the kinds of documents that will be needed in the field to record data and use archival materials to produce them (e.g., field excavation forms, field notes, photographic logs, transit data, maps, level records, videotape). Use archival quality materials in the field. This can reduce the cost of copying information onto archival quality media later. Remember that documentation on electronic media alone is not sufficient because of the lack of long-term stability of these media and their contents. Pre-field planning can also reduce the time and expense of making sure that all documentation has been compiled for submission with the collection. At a minimum, anticipate that the following types of associated documentation will ultimately be created for each archaeological investigation and consequent collection:

Administrative Records (correspondence, contracts, and curation agreements)

Background (reference materials that document previous work pertinent to the current investigation, e.g., site record searches, published and unpublished reports, title searches)

Field Records (data generated in performing current investigation fieldwork, e.g., level records, daily logs, mapping data, topographic maps used to record field data, photographs, videotapes, audiotapes)

Analysis Records (catalogs, databases, data printouts, analyses, laboratory reports)

Report Records (draft and final reports)

The documents in each of these categories may be comprised of one or more of the five documentation formats: paper records, cartographic materials, photographic media, audio and videotapes, and electronic media. Each of these formats has specific preservation requirements that are discussed in greater detail in Section V of this chapter.

II. Creating The Collection

Artifacts

Whether artifacts are collected from the ground surface or excavated from below surface contexts, care must be taken in handling and transporting specimens. Once an artifact is removed from its context and transported to another location, it may undergo significant changes in temperature and relative humidity that may affect the stability or condition of the specimen.

Recovering buried artifacts must always be undertaken with care, even when its condition appears to be stable. Many buried items reach equilibrium with the surrounding soil, thereby stabilizing the condition of the artifact and retarding further decomposition. When the artifact is removed from its soil matrix, it is exposed to an entirely new set of environmental conditions that will introduce agents of deterioration. The artifact condition may also be affected by physical damage incurred during its removal and transport to the laboratory. For example,

1. Extremely fragile artifacts should be photographed and sketched in place prior to removal.

2. Damp, wet, or fragile artifacts should be removed keeping them embedded in their surrounding matrix. This helps to stabilize the item and reduce the rate of deterioration until the artifact can be placed in an environment that best replicates the original surrounding environment. Place damp artifacts in closed plastic containers or bags that will not absorb the moisture and will best preserve the original environment. These items should be opened and processed as soon as they reach the laboratory. A professional conservator should be consulted concerning the care of any damp, wet, or fragile objects of any size.

3. Bulk samples are often also heavy and large in size. They require transport in containers that can sustain the weight with the least amount of damage to the specimens. Polyproplyene containers with lids or cloth bags may be used to transport the materials to the laboratory where they may be divided and repackaged for specialized processing, according to the requirements of the research design.

4. Other fragile artifacts may require special support or packaging to ensure that they do not move during transport (see Handling, Packaging, and Padding, below).

5. Artifacts that may be used in chemical analysis, botanical washes, flotation, or as chronometric samples, must be placed in sample-appropriate containers and marked clearly as potential samples so that they are not damaged accidentally or contaminated by mishandling. Greases, oils, dirty fingers, airborne pollen, plasticizers from polyethylene bags, etc., should not come into contact with these samples. Clean metal tools should be used to remove the samples and place them directly into a container that is appropriate for the intended sample.

6. Before going into the field, obtain clear collection and packaging instructions from those individuals that will be performing the analyses. Cleaning artifacts in the field is not recommended. Important data can be destroyed or the artifact condition can be compromised. If field cleaning is absolutely necessary, remove only the surface dirt with gentle brushing. Resist the temptation to wash artifacts, other than those already subjected to wet screening. Note which items have been treated by either method.

7. Some artifacts may require consolidation in the field prior to removal from the site. Consolidation should be undertaken in consultation with a professional conservator.

8. Document any and all special treatments applied in the field to each artifact.

9. Prominently label all containers with provenience, date, and recorder.

Associated Records

Although it is difficult to maintain clean, dry records while in the field, every effort should be made to minimize damage. Keeping records and maps out of direct sunlight, rain, and wind will reduce material deterioration from ultraviolet radiation and moisture and help prevent ink from fading. Using archival field journals, No. 3 or No. 4 pencils, and waterproof paper are some of the precautions that should be taken to reduce damage to records and maps in the field. Number 3 and 4 pencils (or H and 2H lead in mechanical pencils) are recommended because harder leads do not smear as much as soft leads and are considered more durable. For a truly permanent record, however, carbon-based permanent ink should be used.

As with artifacts, a little advance planning can prevent the destruction of records in the field. Temporary storage often becomes permanent storage. Do not use colored, or water soluble inks, avoid adhesives such as tape on paper, and do not use metal fasteners or rubber bands to keep records together. Whenever possible, keep documents in a closed container to reduce the damage created by dirt, dust, and other airborne particulates. Initial arrangement of documentation while still in the field will make the final arrangement of the documents easier and less prone to error. For more detailed discussions of field conservation issues see Longford 1990 and Sease 1987.

III. From The Field To The Laboratory

Whether archaeological materials are being transported from the field to the laboratory or from one repository to another, proper handling and packing will determine the condition of the collection upon arrival at its final destination. Archival-quality material should be used at all times, beginning with packaging materials in the field, through processing and final curation. Non-acidic archival packaging materials should be used when boxing or bagging materials, especially fragile objects. These containers will serve, at a minimum, as a temporary storage area for the materials (Figure 1). At a maximum, some field-packed collections might be stored "temporarily" for 20 years or more.

Figure 1.
Materials for Packing Collections

Do Use	Do Not Use
Acid-free boxes and folders	Cigar boxes, grocery boxes, manila folders, etc.
Polypropylene containers	PVC or "plastic" containers
Metal containers, rust-free, and well-sealed	Metal containers to contain moist objects
Glass containers (for samples that require clean glass environment) well-padded, and placed within a rigid container	Glass containers without padding and rigid support
Acid-free poster board or polyethylene foam to make rigid supports	Acidic cardboard or Styrofoam®
Polyethylene bags (minimum 4-mil thickness) with Ziploc® closure	Plastic sandwich bags
Polyethylene sheeting and chips	Plastic wrap, polyurethane chips
Acid-free tissue paper	Toilet paper, facial tissue, newspaper
Polyester batting	Cotton
Aluminum foil for C^{14}	Paper Envelopes
Spun-boned olefin (Tyvek®) for making internal labels for containers with moist contents	Unprotected paper

When preparing collections for transport, perform the following.

1. *Label everything*

It is vital to keep provenience information with the archaeological materials at all times, from the moment materials are removed or documents are created in the field until they reach the laboratory or repository where they can be permanently labeled. If an artifact is nested within several layers of padding, bag, and box, place a label inside the padding, on the bag, and on the box. The label should include sufficient information to relate the object to its original provenience e.g., site number, unit or surface collection location, field specimen number and date collected. Also note any special handling instructions. Polyester fabric (e.g., Tyvek7) can be used to make temporary water-resistant labels to accompany soil or midden that is being wet-screened or has not completely dried. It can also be used to make permanent labels since it is an inorganic

material that is resistant to mold and pest infestation, but can be fed through laser printers.

2. *Keep handling to a minimum*
Handle the object or records only as much as is deemed necessary, as excessive handling can result in damage.

3. *Artifacts should be kept in a storage environment that closely resembles their site conditions*
Label artifact containers clearly with special condition requirements, so that the artifact will be examined appropriately when it is unpacked at the repository. For example, if an item is removed in a dry condition, it should remain dry; likewise, wet or damp materials should remain wet until they can be stabilized professionally by a conservator.

4. *Isolate and place special samples in appropriate storage containers*
Check with the laboratory for recommendations on the proper excavation, handling, and packaging procedures. Each type of analysis is susceptible to particular contaminants, e.g., residues that will be analyzed using gas chromatography should not be touched with the human hand nor should they be enclosed in polyethylene bags. Organic materials that may be used for radiocarbon dating should be wrapped in aluminum foil, which in turn should be stored in rigid containers with a sealed lid and kept separate from the other excavated material.

5. *Dry soil and radiocarbon samples thoroughly to prevent mold growth*
Small holes should be punctured into the top portion of the polyethylene bag to provide ventilation and prevent the formation of mold. Exercise care in the drying process so that contaminants are not introduced.

6. *Treat human remains with the utmost care and respect*
Separate human remains from other materials and store them by individual and by provenience. Funerary objects or grave goods should be clearly cross-referenced with the individual.

7. *Use common sense in placing archaeological materials and associated records within boxes for transport*
Pack like materials together. Place the heaviest items at the bottom of the box.

8. *Label the boxes*
In addition to provenience information, each box should be labeled to identify contents that are fragile, heavy, or require other special handling. Clear and informative labeling prevents unnecessary opeing and handling when particular objects are being retrieved.

9. *Create a packing list*
Prepare a general list of the contents of each box, duplicate the list, and place one copy in the box and collate the second set to serve as the inventory against which the collection can be checked upon arrival at the laboratory or repository.

10. *Use common sense in transporting collections*
Protect collections from abrasion, crushing, vibration, and harmful environmental conditions with a cushioning layer of padding on the floor of the transport vehicle. Place the heaviest boxes on the bottom layer, toward the front of the vehicle. Pack the boxes securely so that they do not slide around. If the vehicle is also carrying field equipment, set aside an area for the collection, distant from any cans of fuel or water, and segregated from heavy field equipment. Do not enclose collections in a vehicle all day, especially in high levels of heat and humidity. If storage at a site must be in a vehicle, ensure that there is good air circulation. In cold weather, the artifacts should not be stored close to a heating vent inside a vehicle. Once at the repository, the artifacts should be promptly removed from the vehicle.

IV. Processing Artifacts and Samples

All artifacts undergo seven processing steps: (1) accessioning; (2) assessment; (3) conservation treatment; (4) cleaning; (5) cataloging; (6) packaging; and (7) record keeping (Figure 2). These are the basic foundations of good collections

Figure 2.
Basic Steps in Processing Archaeological Materials

Procedures	Comments
Accession collection	*Prior* to fieldwork obtain agreement to curate and, if necessary, conserve, the anticipated collection at a repository even though accessioning the collection itself occurs after the collection is physically transferred to a repository for long-term care; include funding for curation in the project budget; obtain copies of repository procedures e.g. required specimen number format
Assess collection	Segregate specimens that require special handling e.g., for conservation treatment, submission for analytical testing, "Do Not Clean", etc.
Perform conservation treatments	Minimal conservation treatments, such as construction of supports or padding, should be performed for fragile specimens. These treatments should provide temporary stability so that a specimen can be transported to a professional conservator for consolidation, repair, or specialized cleaning.
Clean objects as necessary	Apply appropriate cleaning methods to specific material classes of objects.
Catalog and label specimens	Sort specimens by material class within each provenience; assign catalog numbers to individual objects and/or lots; label specimens; enter descriptive data into catalog.
Package specimens	Place specimens in artifact and storage containers that are appropriate for the material and for frequency of access (immediate or long-term storage); prepare contents lists for each box and an overall listing of the containers in a collection.
Record keeping	Submit at least one acid-free hard copy of the catalog (as well as disk(s) if in electronic format) to the repository as part of the Associated Documentation.

management and curation. Each step is designed to build upon the previous one and seeks to establish the optimal environment in which to preserve artifacts for future use and study. Each of these procedures is discussed in detail in the following pages.

Accessioning

When a repository accessions a collection, it usually signifies that title (ownership) of the collection has been transferred to the museum; however, this is not the case for federal collections. *Title remains with the federal agency, no matter where the collection is stored at any given time*. The collection remains the responsibility of the federal agency.

A collection may consist of a single object or document, or many objects and documents. The collection may derive from a single site, or from multiple sites. Decisions on how collections are defined and accessioned are the responsibility of the repository in consultation with the federal agency.

Accession numbers are repository-specific. Any numbering system that assigns a unique number can be used to identify accessions, although there are several systems in wide-use throughout the museum world ; (1) sequential accession numbers (each new accession is assigned the next sequential number); (2) year/collection bipartite numbers (the year is used as a prefix, and is followed by a sequential number representing each new accession, i.e., 97-24 refers to the twenty-fourth collection accessioned in 1997); or (3) alpha/numeric combinations that may include a repository designation (e.g., NMNH-14, the fourteenth collection accessioned at NMNH). Some repositories use the accession number as the prefix for the specimen number that is assigned to each object, e.g., 97-14-1 designates the first specimen in the fourteenth collection accessioned in 1997 (see Cataloging below).

The purpose of the accession number is to match an object or collection with the original documentation that is maintained in an accession record. The accession record typically consists of the accession number, the date the object or collection was accessioned, the nature of the accessioned material's acquisition (e.g., gift, purchase, excavation), the source (e.g., who donated the object) provenience (geographic or cultural origin, maker, etc.), a brief description of the accessioned material, the condition, value, if applicable, and the staff member who accessioned the material. The accession record documents how the collection was

made and how it came to be curated at a given repository.

The accession record is the central location of information concerning a collection's previous history, how the repository acquired it, and any conditions attached to the use of the collection. It is also the place where notes concerning objects within the collection can be maintained or cross-referenced with other repository records, such as conservation treatment records, loan documents, photograph collections, citations of published references that include objects from the collection, etc.

Assessment

Two objectives are addressed during the assessment of the collections. First, the inventory list submitted with the collection is compared to the boxes/ specimens present to note any discrepancies and take remedial action. Second, individual specimens are examined by the curator, registrar, or researcher, in conjunction with a conservator, to segregate those that:

1. Require some type of immediate stabilization before they can be further processed
2. Need special cleaning treatments
3. Need no cleaning
4. Will be submitted for analytical testing
5. Will be set aside as unprocessed samples

As specimens are segregated or removed from the collection for special processing, care must be taken to ensure that all provenience data remain with the objects. These objects should receive specimen numbers immediately (see Cataloging below) so that their location and status can be tracked as they undergo special conservation treatment or analysis. Once these specimens have rejoined the collection or have been consumed during analytical tests, the collection catalog can be updated for each specimen to record the specific conservation treatments applied, the analytical results, or the specimen destruction during analysis.

A representative sample of each affected artifact type must always remain unaltered (36 CFR Part 79.9(b)(5)iii). All other specimens can be cleanedg and cataloged.

Conservation Treatment

Conservation treatments provided at this step in the processing should be restricted to minimal efforts designed to stabilize objects sufficiently so that they can be handled for cataloging and analysis. For many objects that require minimal stabilization, this will consist of the construction of a special acid-free support or box for the object (see discussion of preservation characteristics by material class). Any attempts to mend or consolidate the object or apply other chemical treatments should be referred to a conservator. Even minor conservation treatments should be documented including the materials and methods used should be recorded in the catalog for each affected specimen.

Objects that have been stabilized still require special handling and should be marked as such. By placing objects in boxes or supports, it becomes possible to continue processing the object by handling the container rather than the object. Again, care should be taken to ensure that the provenience data accompany the object at all times.

Cleaning

Artifacts are cleaned in order to permit analysis of the original surface and features of an object, to facilitate the application of a specimen number to the object, and to remove substances that might otherwise hasten the deterioration of an object. In general, cleaning should be kept to a minimum to reduce the possibility of destroying fragile surface features of an object such as impressions or decorations, and to prevent compromise or loss of use-related evidence such as residues, polish, and scratches. A conservator should undertake professional cleaning of an object intended for display.

Artifacts can be cleaned by dry, wet, chemical, or ultrasonic methods. The entire artifact may be cleaned or only the specific area to which the specimen number will be applied regardless of which cleaning process is used, the conservation treatments should be halted immediately if any damage to the artifact is detected. Provenience information should be kept with the specimen at all times. Residues produced during the cleaning (e.g., pollen washes or DNA samples) may be retained and added to the catalog, noting the link between the original specimen and the residue.

Dry cleaning can take several forms including dry brushing or dry vacuuming. *Dry brushing* involves using a soft-bristled brush to remove the surficial soil from an artifact. Consolidated soils should be removed by a conservator. *Dry vacuuming* is particularly useful in cleaning porous objects. The vacuum should have low-powered suction and a small aperture nozzle. A rigid nylon or polyester screen may be attached over the nozzle to further reduce the suction and prevent damage to particularly fragile objects. Vacuums suitable for these tasks can be obtained from conservation suppliers or from medical/dental equipment suppliers.

Wet cleaning with water should never be used for artifacts that are unstable or contain residues that may be useful for chemical analyses. Examples of fragile or unstable materials include organics such as bone, shell, hides, vegetative remains, either processed (e.g., basketry and textiles) or unprocessed, low-fired earthenware ceramics or ceramics with flaking or fugitive decorative surfaces, and metal objects. Residues found on ceramics, chipped stone, and other artifacts can be useful for phytolith, blood serum, radiocarbon, elemental analysis, macrofossil identification, DNA analysis, etc.

Wet cleaning should be restricted to stable artifacts such as ceramics fires at high temperature, glass, and stone. Artifacts should be cleaned in a tub or wash basin rather than under running water to prevent accidental loss down the drain. Only one artifact at a time should be washed. Stone artifacts and debitage can be cleaned by placing specimens in a screen or mesh bag and gently swishing the bag back and forth in the wash basin.

Ideally, wet cleaned artifacts should be air dried slowly and evenly. Under no circumstances should heat, either direct sunlight or a drying oven, be employed to dry the artifacts. Trays with raised, non-metal screen bottoms should be used to air dry the artifacts or artifacts can be placed on absorbent toweling and turned over to ensure thorough drying. If paper is used to dry artifacts, non-acidic sheets or rolls of paper should be used. Newspaper should not be used because of its acid content.

*Ultrasonic cleanin*g can be helpful in loosening stubborn deposits of soil or oxidation. Ultrasonic waves are sent through water in which the artifact is immersed to shake loose adhering dirt. This technique is restricted to stable objects that can withstand immersion and that fit within the ultrasonic cleaner. For example, ceramics and glass with mircofractures may break apart from high energy waves.

Although the ultrasonic cleaning process was not originally developed for archaeological purposes, it has proven to be effective at cleaning many items such as debitage, projectile points, and sherds. Approximately five minutes or less is needed to strip off stubborn oxidation deposits from artifacts, although more time may be necessary for some artifacts. The progress of the conservation treatment should be monitored regularly. When no further improvement is apparent, remove the artifact, rinse with water, and let dry thoroughly. Again, record in the catalog which objects were cleaned with this process.

Spot cleaning may be used in instances where it is preferable to clean only the spot on the artifact where the specimen number will be placed. Use a moistened soft-cotton tipped stick to wash an area the size of the intended label. Let the artifact dry completely before the specimen number is applied.

Chemical cleaning should be performed or supervised by a professional conservator. Chemical cleaning may be necessary to remove encrustations or the corrosion layer on artifacts, particularly on metals, but also on basketry, bone, or ceramics. The chemicals used are usually acids, bases, chelating agents, or sometimes other depending on the artifact being treated. These chemicals can cause irreversible damage to the artifact if not applied correctly. Also, the use of chemicals may require certain safety precautions and protective clothing. For example, some chemical cleaning should only be performed under a fume hood.

After the artifact is gently dry brushed, it may be immersed in water to wet it thoroughly, then suspended in the chemical solution for specified periods of time, rinsed thoroughly in changes of distilled or deionized water, and allowed to dry slowly. Artifacts that are chemically cleaned should be identified in the catalog, noting the chemical solution used, the time immersed, and the methods used to rinse and dry the object (Figure 3).

Figure 3.
Guidelines for Cleaning Archaeological Materials

Material Class	Recommended Cleaning Method
Bone	Dry brush
Organics (macrofossils, wood, etc.)	Do not clean. If absolutely necessary, dry brush softly or use low powered vacuum through a screen. Retain the soil for possible constituent analysis. Consult a conservator.
Ceramics	Do not clean ceramics that have use residues. Spot clean area to be labeled. If complete cleaning is desired, stable ceramics can be washed in water, or swabbed (or surface cleaned) with damp cotton swabs. If washing is necessary, dry thoroughly before labeling or packing. Unstable or crackled ceramics may require consolidation before processing. Consult a conservator. For ceramics with salt encrustations, consult a conservator.
Glass	Dry brush. Spot clean as necessary. Do not wash unstable, flaking glass. If washing is necessary, dry thoroughly before labeling or packing. Glass with thin films or iridescent glass corrosion should not be scrubbed or aggressively cleaned. Allow to dry.
Leather	Use preventative conservation including optimal storage conditions with a minimum of handling. Consult a conservator.
Chipped stone	Do not clean chipped stone if use-wear studies are to be performed or if there is a possibility that mastic, cordage impressions or other residues are present. Determine what portion of lot samples requires washing to prepare them for analysis. Wash tools and flakes in water; use gentle brush to loosen soil if necessary, or ultrasonic cleaning.
Metals-ferrous non-ferrous	Do not wash. Do not use heat or commercial polishes or dips. DO not remove corrosion crusts. Consult a conservator.
Paper	Do not wash. Consult a conservator.
Samples Bulk shell soil – flotation, heavy/light fractions	Decide what proportion of samples will be processed. Retain a portion of unprocessed for future analyses. Process as needed.
Samples for Special Analysis (e.g., archaeomagnetic, C^{14}, phytolith, hydration, residue analyses, etc.)	Do not wash. Consult analytical laboratory for required processing techniques.
Shell	Do not wash. Dry brush, after specimen has been checked for possible residues (e.g., mastic, cordage impressions, food, paint) May need consolidation before processing. Consult a conservator.
Textiles basketry cordage cloth	Do not wash or dry brush. Low powered vacuuming through a screen. Do not use home remedies for fabric cleaning, e.g., washing, spraying, steaming, lubricating, or waxing. May need special support and packaging. Consult a conservator.

Cataloging

Cataloging is the process of assigning a unique identifying number to an object and recording a description of the object, its dimensions, and provenience data. The object may also be photographed as part of its documentation. For the purposes of these protocols, the actual placement of the unique number onto the object is the next step in processing.

Specimen number (sometimes also known as catalog number) is the unique identifier that is assigned to each object within a collection during the cataloging process. It provides the link between the object and its associated documentation, including the accession record and any other information pertinent to the collection or to the specific object.

A *catalog* is the listing of all specimen numbers relevant to a single collection. The catalog may be electronic and/or in a paper format. It lists the number assigned to each object, a physical description of the object, often a typological assignment, and any specific provenience information for each object. Catalogs can also be

Figure 4.
Sample Catalog Data

Data Field	Example
Accession number	97-113
Specimen number	97-113-4531
Object description	Projectile Point
Material class	chipped stone; obsidian; Topaz Mountain
Form	Side-notched, basal fragment
Typological assignment	Desert side-notch
Analyst and date analyzed	William Henry Holmes 9/5/89
Quantity	1
Measurements	Length: N/A Width: 15 mm Thickness: 5 mm (note any dimensions that are fragmentary)
Weight (when appropriate)	1.2 g
Provenience: geographic location	26Wp2886
Specific location	Unit 14; 45 cm East, 63 cm South; 35 cm below surface
Associated features/artifacts	Hearth feature #4; adjacent to 97-113-4530.
Chronological Data	Obsidian hydration Rim: 3 microns
Collector	D.H. Thomas
Date Collected	6/12/67
Comments on condition, form, conservation treatment, etc.	Fracture is not new.

used to note or cross-reference other records documenting changes in an artifact's status or condition i.e., they can cite original condition, conservation treatments, use of an object for destructive analysis, changes in condition, etc. Copies of catalogs are generally filed with the repository's registrar in the accession record.

Some objects will undergo cataloging more than once. Some may be assigned temporary specimen numbers (sometimes referred to as catalog numbers) either in the field or during analysis, but then are assigned a final specimen number by the repository where the collection is ultimately stored. The final catalog should cross-reference any previous specimen numbers assigned to an object, and it is recommended that previous specimen numbers not be removed from an object when adding the final specimen number.

A *specimen number* may be assigned to an individual object or to a group of similar objects collected from a single provenience. The latter strategy is used when cataloging faunal remains, debitage, glass fragments, or other fragmentary, non-diagnostic remains from a single provenience. Generally, if the object will be analyzed as a single specimen, it should be cataloged individually as well. Materials that are analyzed in bulk, such as shell or chipped stone, can be assigned a single lot number. At a minimum, a catalog should list the following classes of information for each object (Figure 4).

No matter how the catalog data fields are organized, all data must be recorded in a consistent and uniform manner, particularly if catalog information is entered into an electronic data management system. Abbreviations should be avoided whenever possible, and if used, an abbreviation key must be kept as part of the catalog.

Labeling Artifacts

Once an artifact has been assigned a specimen number, a decision must be made on how best to associate the number with the object, whether to label the object directly or indirectly. Conservation principles dictate that any conservation treatment applied to an object, including the attachment of the identifying specimen number, should be non-invasive and reversible. Labels should be legible, neat, and unobtrusive. Extraneous writing on an object should be avoided.

Direct Labels on Artifacts

Directly labeled artifacts are less likely to lose their specimen number than artifacts that have separate specimen numbers on paper labels or labeled containers. Since the specimen number links the specimen with its provenience data recorded in the collection catalog and/or accession record, it is crucial that this number not be separated from the specimen. For this reason, objects that can be safely labeled directly, should be.

One possible exception to this admonition concerns human remains. Many Native American tribes consider it disrespectful to alter human remains in such a manner. Therefore, it is recommended that these not be directly labeled

Figure 5.
Steps for Direct Labeling of Artifacts

Step	Procedure
1	Clean, if necessary, the area to be labeled on the artifact.
2	Place a barrier coat on the area to be labeled; a thin narrow coat of clear acrylic resin dissolved in acetone (e.g., Paraloid B-72®) or solvent based acrylic varnish are recommended. If the artifact is dark in color, white ink can be used. An alternative that results in legible labels and avoids the problem of finding a white background for a dark object is to type the label information into a computer, using an easily readable font, perferably the smallest font size that is still readable. Print the labels out onto acid-free high cotton rag content paper, using a xerographic process such as a laser printer or a photocopier. Cut the labels out of the paper and dip them briefly in a suitable quality adhesive (Rhoplex® a Paraoid B-72 emulsion, or Acrysol,® a polyvinyl acetate emulsion). Remove excess adhesive or thin the emulsion with water if necessary, and allow to dry to a clear film. Mistakes then can be rectified by wiping the affected area with a wet cotton swab with acetone and a cotton swab after it has dried.
3	Let the buffer layer dry thoroughly, overnight if necessary.
4	Write the label information: the specimen number and any additional information required by the repository. Water-based ink, such as black india ink, is recommended (see Pencil and Permanent Ink below). White ink may be necessary on dark colored artifacts.
5	After the ink has dried, apply another coat of acrylic resin dissolved in acetone (e.g., Paraloid B-72®) or solvent based acrylic varnish (e.g., Soluvar®) to protect the label.
6	Let the label dry thoroughly before placing the artifact into an artifact container.
7	Record in the Curation History (see below) the methods and materials used to label the artifacts (chemicals, percentage solution, and solvent)

without prior consultation with the tribes or people that are most likely culturally affiliated with the remains.

Careful consideration is necessary for the placement of the label. Labels should not be applied over diagnostic portions of an artifact. For example, a stone tool should be labeled on the unmodified portion, or cortex, of the tool if possible. If a tool has been bifacially worked, label the least photogenic side. Sherds should not be labeled on the broken edges because accurate reconstruction would be inhibited and would prevent observations of the ceramic body. Labels should not cover maker's marks or design elements, if possible.

A "sandwich" method is recommended for labeling artifacts directly. This involves placing the specimen number in-between a reversible, isolating base coat and a reversible protective top coat. Archival quality solvents should be used and information documenting the chemicals used, should be recorded in the Curation History (see Figure 7). This will make it possible to safely remove the specimen number should it become necessary in the future. Also be careful to work in well-ventilated areas when using solvents (Figure 5).

Indirect Attached Labels

Some artifacts cannot be labeled directly because they are too small, e.g., small beads can often be labeled with acid-free tags attached with string. Other specimens should not be directly labeled due to unstable surface conditions or fragility. Basketry, leather, textiles, wood, and deteriorating ceramics, glass, or metal should not be directly labeled, but should have an acid-free tag attached if possible, or the object should be enclosed in a container that is labeled (see Loose Labels below).

Attaching indirect labels and tags requires careful thought so that the least damaging method is used (Alten 1996:2). Tags and labels can be attached to an object by tying or sewing. A few basic rules apply when attaching them to an object (Figure 6).

Figure 6.
Basic Rules for Labels Attached with String or Thread

1. The string or sewing thread should be softer than the artifact's surface.
2. The string/thread should not cut through or into the object.
3. The label should be attached loosely so that it does not cause constriction of the object, but not so loose that it will catch on other objects and result in a tear.
4. Colored string or thread treated with any substance should not be used.

The material used to attach the label or tag should be compatible with the artifact and its storage conditions. For example,

100% Cotton String, undyed. This is the most commonly preferred material, with the following exceptions; 100% cotton string should not be used on rubber or plastic artifacts because the aging by-products used to manufacture the rubber and plastic can destroy the cotton thread.

Plastic tie tags (Zap-Straps®) and nylon monofilament (fishing line) in polyethylene tubing are two acceptable ties that can be used for attaching tags to industrial machinery and large artifacts or outdoor displays. The polyethylene tubing protects the artifact from being abraded by the nylon.

Teflon® monofilament is stable, smooth, non-fibrous, does not stretch, and is recommended for attaching tags to greasy or oily artifacts or artifacts with fragile surfaces. Check that the monofilament is not the version that stretches. It is equally important that the material used to make the tags or labels is archival quality and of a material best suited to the object. Tags or labels with metal rims should not be used.

Acid-free 100% cotton rag paper is the recommended material type for most tags because it is pH neutral, lignin free, and inexpensive, though subject to damage if it comes into contact with moisture. Stationer's and jeweler's paper tags usually are not acid-free and will yellow, embrittle, become illegible over time, and can stain artifacts.

Japanese paper labels can be attached with wheat starch paste directly onto most baskets. The past is reversible, the labels are not excessively intrusive, and the labels can be fitted to the surface texture of the basketry. Paraloid B-72® can also be used to attach these labels and to apply a protective topcoat over the paper label.

Tyvek® is a proprietary polyester fabric that is waterproof and inexpensive, and can be used to make labels or tags for small or large items. Tyvek® survives well in the outdoors and is appropriate for labeling material such as farm or industrial machinery. It can also be sewn onto textile fabrics. For example, *Tyvek® #1422* is inert, soft, non-fibrous, and is recommended for attaching tags to plastic items, items stored or displayed outdoors, or oily objects with unstable surfaces.

Cotton twill tape, a soft inexpensive material, is recommended for textile objects. A length of the tape can be labeled with permanent laundry marking pen and sewn onto the textile using undyed cotton thread.

When labeling a tag or paper label, the writing medium must be easy to apply and able to survive light and water exposure. Felt-tip pens should not be used because these are usually composed of dyes that fade. Waterproof India ink is the preferred form of labeling tags. Black and blue ink are the only recommended colors; red should not be used because it is the least light-fast ink and some colorblind individuals cannot detect red (see below *Pencil and Permanent Ink*).

Loose Labels

When direct labeling or attaching a label/tag are not possible, an acid-free paper label should be placed in the artifact container, e.g., inside the polyethylene bag or acid-free box containing the artifact. Particularly fragile materials such as basketry fragments, textiles, or wood artifacts may be placed in acid-free boxes that contain inert polyethylene foam (Ethafoam®) that has been carved, shaped or otherwise modified to support the specimen. These custom supports make it possible to match artifacts with their idiosyncratic supporting structure in addition to having the specimen number visible on the exterior of the box.

Pencil and Permanent Ink

Although the principle of reversibility applies to the conservation treatment of artifacts (excepting those designated for destructive analyses), it is important

that artifact labels are inert, yet stable, and capable of withstanding normal use. Many inks, felt tip markers, etc. are labeled as being "permanent," but this often proves to be untrue given sufficient passage of time and/or exposure to ultraviolet radiation. Black india ink has been the standard medium used to label artifacts or artifact tags in many museums. However, not all black India inks are the same. (See Clark 1989). Test inks before using them for long-term couration contexts. Ink is inexpensive; testing is inexpensive. However, the process of labeling specimen is extremely labor intensive and costly, and unstable labels may compromise the link between specimen and associated provenience documentation.

Ink can be applied using a variety of pens including Crow quill pens, mechanical drafting pens, or ceramic tipped pigma pens. Crow quill pens are inexpensive and they can be inserted into a small block of Ethafoam® to keep the tip clean. Mechanical pens are favored for the ease with which the ink is applied to a surface; however, they are subject to frequent clogging and must be cleaned routinely by disassembling them and soaking them in cleaning solution, in an ultrasound cleaner, or in tap water. Pigma® pens are more expensive and each batch should be tested for ink quality before using them to label specimens.

It is recommended that any new procedures or materials be *tested first* before implementing or using them on a collection. It is important to document in a collection's Curation History (see below), all procedures and materials applied generally to a collection. Special conservation treatment of specific objects should be noted in the object catalog.

Packaging Artifacts for Storage

Artifacts stored loose within a drawer are subject to much more damage than those that are placed inside some type of protective artifact container, a bag, box, or special support. These artifact containers, in turn, are often placed within a storage container, e.g., drawers for easy access to type collections or boxes on shelving for long-term curation. The intended use of the specimens and specimen condition will affect how each should be packaged after cataloging. In addition to protecting the artifact, all packaging should be labeled clearly to facilitate access to specific specimens within a collection and to reduce excessive handling of the object.

Artifact Container Guidelines

Determining which container is suitable is influenced by the following.

1. Determine the anticipated use of the material.
Determine the frequency to access for the artifact. Should it be stored with type collections materials that are frequently used and therefore placed in drawers or stored in archival boxes that are located on shelving?

2. Segregate and store objects by their material class.
When placing specimens or samples in artifact containers, objects from only one material class should be placed in the artifact container. Each material class specifically has an optimal storage environment. This environment is easier to create if similar materials are stored together and can be segregated from the rest of the collection if necessary. For example, all soil samples should be stored under similar conditions; however, they can be arranged by provenience (by site number, excavation unit, level, etc.) within a soil sample storage area. The segregation by material class should extend to the final placement of artifact containers in storage containers. Fragile or lightweight materials should be kept separate from rugged, heavy artifacts.

3. Select the type and size of container appropriate for the kind and size of the object taking into consideration the frequency that the object will be used.

Polyethylene resealing (Ziploc®) bags. These have become the popular container for most small to medium-sized artifacts and for larger samples of a single material class such as faunal remains, soil samples, etc. They are economical, easy to handle, lightweight and compact, and can be directly labeled. Nevertheless, there are some precautions that should be exercised if polyethylene bags are used.

a. *Select the size bag that is appropriate for the object.* Do not force an object into a bag. Instead, select the next larger size. Do not overfill a bag simply to maintain consistency of bag size when processing a collection.

b. *Select the most appropriate bag thickness.* At a minimum, use bags with a thickness of 4-mil or greater. These provide a measure of cushioning of the artifact and are stronger than thinner bags. Thicker bags should be used for heavier objects.

c. *Ventilate the bag for hygroscopic mateials.* Ventilation is recommended only for hygroscopic materials. Small holes should be placed at the top of the bag, prior to placing the object inside. The holes will permit air circulation and thereby prevent mold or other organic fungi from developing inside a sealed bag. Although all polyethylene bags experience air exchanges over a period of time and none is airtight. Naturally, the holes should be smaller than the diameter of the contents. Generally, a hole punch can be used for most objects, although bamboo skewers are useful for making fine holes.

d. *Add padding when necessary.* Acid-free tissue, polyethylene foam sheets may be used to provide an extra measure of cushioning for objects or to cover a sharp object that might otherwise tear the artifact container.

e. *Do not store fragile objects* in a polyethylene bag. Organic remains and fragile objects should be placed in rigid wall containers (see below).

f. *Purchase polyethylene from reputable vendor.* There are many grades of polyethylene. Some polyethylene sheeting is produced from recycled scraps of polyethylene with unknown formulations and composition. All contain plasticizers and anti-oxidizing agents that are susceptible to leaching and degradation. If the bags are purchased from a supplier of archival materials, there is likely to be greater attention to consistent quality and to backing the product.

Polypropylene rigid wall containers. More and more containers are being produced in a range of standard sizes from polypropylene film vials to large lidded boxes. These can be used as artifact containers for heavy, bulky objects, and they can be used as the basis for supporting a fragile object needing extra protection. Follow the same principles outlined above for polyethylene bags.

Acid-free boxes. Although these are more expensive, archival acid-free boxes come in a variety of styles, sizes, and strengths, and they should not require repackaging as frequently as polyethylene bags. It is recommended that boxes with telescoping lids be used rather than flap-fold lids. Telescoping lids allow easier access and prevent the container from becoming damaged with use as often happens with flap lids. Custom-designed boxes can also be made for unusual shaped or sized artifacts. These can be hand-built using acid-free poster board adjoined with linen tape or hot melt adhesive. Care must be taken to ensure that the box strength is sufficient to support the weight of the object without any flexure of the container walls. Some vendors will make large lots of odd-sized boxes as well.

Metal containers. The advantages of metal are its rigidity, strength, and potential to provide sterile storage for an artifact or sample. The disadvantage of some metals is that they are susceptible to oxidation that in turn is exacerbated by the presence of moisture and/or heat, particularly if the container has a tight-fitting lid. Some metals are susceptible to chemical interactions with other metals.

Carved polyethylene foam. Artifacts stored in drawers can also be protected by carving object-specific shapes in a block of polyethylene foam (e.g., Ethafoam®)that has been cut to fit the drawer. Each object space can be labeled with the

specimen number or any other special information regarding the object.

Unacceptable artifact containers. These include, but are not limited to, brown paper bags, sandwich baggies, lightweight food storage/freezer bags, non-polypropylene plastics, film vials or pill bottles, or glass containers for which no special provision has been made to store them securely to prevent breakage. Artifact containers should not be closed with tape, twist ties, rubber bands, string, staples, or heat sealing.

4. Construct special packaging or support when necessary, and label it as well.
As mentioned above, some containers may need to be custom-designed to fit odd-sized objects. They can also be constructed to provide platforms for custom supports of fragile or broken objects that require special support in specific areas or to make portions of these objects visible without handling the object itself. Use archival quality materials in constructing the support and consult a conservator if in doubt as to which portions of the object are strongest or most fragile and require special consideration. Labeling the packaging/support will also reduce the amount of handling required to verify the object's specimen number.

5. Maintain provenience data at all times.
Label all artifact containers so that the contents can always be associated again should they become separated. All artifact containers should be labeled directly with permanent, indelible ink, and they should have an acid-free label placed inside the container.

Storage Container Guidelines

After the artifact has been placed comfortably and securely in its artifact container, the artifact container is usually placed inside a storage container, e.g., inside a larger polyethylene bag, a box, or a storage unit drawer. Many of the same principles listed for the artifact container apply here as well.

1. Determine the anticipated use of the material.
Determine the frequency of access for the storage container. Should the container be easily opened or can the group of artifacts stored inside be placed in a container that is designed for long-term preservation.

2. Segregate and store objects by their material class.
Heavy items such as brick, daub, groundstone, and fire cracked rock, should be stored separately from lighter artifacts to prevent damage caused by shifting when boxes are moved from the shelves or when drawers are opened or closed in storage units. Use archival-quality padding or dividers to help stabilize heavy objects to prevent movement.
Ideally, artifact containers should not be stacked atop each other in a box or drawer, but placed in a single layer only. If this is not possible, then the heaviest items should be placed in the box first with lighter items on top of them, even if this means that the artifacts are no longer in sequential order. Each storage container will have a contents list that will assist in locating specific artifacts within that container.

3. Select the type and size of container that is appropriate for the kind and size of the object.
The storage containers must not be overpacked, distorted by the contents, or made too heavy to handle easily. The maximum weight of a container should be between 20 and 30 pounds. Weights in excess of this range become unsafe to handle.

4. Construct special packaging or support when necessary, and label it as well.
Artifacts should not wrapped in packaging material so that the item's identity and size cannot be determined unless it is unwrapped. Instead, lay the artifact on a nest of acid-free tissue, then cover it with a protective layer of tissue that can be lifted off without handling the artifact. Segregate and cushion large heavy items that may cause damate if they shift position.

5. Maintain provenience data at all times.
The exterior of the storage container should list the provenience and the general contents or range of artifacts contained inside. Inside the

storage container, place a packing list or box inventory printed on acid-free paper. This list should contain the specific specimen numbers stored in the container. It will facilitate locating and replacing objects in their correct storage container. The storage container can be labeled directly with pencil or indelible ink or with an acid-free paper label placed inside a sleeve on the exterior of the box or shelf.

Record Keeping

Throughout the procedures discussed above, the importance of documenting every action affecting an individual specimen and/or on the collection as a whole has been emphasized. Each repository will undoubtedly have its own procedures and formats for documenting these data on specific forms or by direct entry into an electronic collections management or other centralized tracking system. Museums often refer to these data as *Administrative Records*. The format in which they are maintained is not as critical as the fact that they have been recorded and are accessible.

Safety Copies

Additionally, 36 CFR Part 79 mandates that these data be maintained in their original form and that a duplicate or safety copy be created and housed in a separate, fire-safe, and secure location. Safety copies may be made on archival microfilm, acid-free paper, or other media if deemed appropriate. Generally, microfilm and archival paper are used due to their proven permanence, rather than electronic media that are neither stable nor permanent.

Material Safety Data Sheets

One means of documenting the materials used to process collections is by using Material Safety Data Sheets (MSDS). Federal law requires manufacturers to compile a MSDS for each product listing (1) the non-proprietary ingredients in a product; (2) basic handling, use, and storage guidelines; (3) potential chemical interactions; (4) fire hazard; (5) toxicity; and (6) spill clean-up procedures. These should be requested with each order and retained on file until the next batch is received.

It is also prudent to purchase materials from reputable vendors with long-term commitment to archival preservation. Even though the initial expenditure may be costly for archival materials, the highest cost is in the labor to process each object within a collection. Inferior materials will result in shorter “shelf-life” and potentially may be damaging to the objects.

Prior to using new products or new shipments of products routinely used in processing collections, test them. Even reputable manufacturers occasionally have bad “batches.”

Curation History

The curation history of a collection informs future users of the collection not only about the original context or provenience from which an object came, but also notes the original condition and changes to the condition, conservation treatments performed and the specific chemical formulations used, the availability of photographs or analyses, the results of destructive analyses, and even the date an object was noted as broken or missing (Griset 1993). It establishes and assists in maintaining intellectual control over the collection.

The curation history assists future users of the collection in identifying specimens suitable for specific research questions, for interpretation, or for educational uses. It can assist curators and conservators in monitoring changes in collection condition and enables informed choices for future restorations or conservation treatments. It can even aid repositories in identifying curatorial practices that are advantageous, versus those that are deleterious for the long-term curation of collections, by documenting specific conservation treatments and practices.

The curation history should be collection-specific (Figure 7). Curation histories should be active documents that are routinely updated. As a matter of course, there should be a scheduled review, e.g., every two years, to ensure that they are up-to-date and that linkages between data management systems are operating in a consistent manner to track curation data.

Figure 7.
Curation History of a Collection

Procedures	Information Needed
Collection Acquisition	1. Date(s) that the collection was made, by whom, for what purpose, and other relevant details regarding the origin of the collection, such as a general description of the excavation/collection techniques. 2. Date that the collection was accepted by (each) repository and any conditions pertinent to the ownership, access, or curation of the collection. Record the name of the individual that accessioned the collection and the Accession Number.
Processing Techniques	1. Date collection was processed and by whom. 2. General procedures to clean or treat the collection (identified by material class). 3. Specific procedures to treat individual specimens (record each individually). 4. Products and/or formulations used to process the collection.
Collection Inventory	1. Field inventory (if present), and how produced. 2. Final catalog (note specimens that received conservation treatments, analysis, or were lost or damaged in transit or elsewhere) and how produced. 3. Periodic inventories by repository (note any changes from previous inventory).
Storage Conditions	1. General conditions for storing each material class in the collection. 2. Special storage conditions for specific specimens. 3. Type of pest management system used, name of inspector, and frequency of inspections; note any conservation treatments made. 4. Record any changes in these procedures as they occur. Add them to the Curation History. Do not remove previous procedures. 5. Note any natural or human-induced crises that affect the storage conditions.
Conservation Treatments	1. Record for each specimen treated. 2. Maintain list of specimens to be monitored for special conditions.
Collection Use	1. Record types of use (loans, exhibit, research, etc.) and place copies of any publications, photographs, exhibit catalogs, etc. in the collection file. 2. Note any destructive uses of specimens. Include all documentation including original request for use, Department of Defense point-of-contact approval, methods used, and results. 3. Note any restrictions on use (e.g., human remains).

V. Processing Associated Documentation

Associated documentation or records, by definition (36 CFR Part 79), are the documentary materials generated as a result of an archaeological investigation conducted on federally-owned or administered lands, no matter the scope of the investigation (archival, survey, excavation) or the results. Whether or not artifacts are collected or archival materials are generated, each investigation results in a collection that consists, at a minimum, of the report of results. Even a “negative-findings” letter provides information that may prevent future redundant investigations and waste of funds. If artifacts are recovered, the associated documentation preserves the context in which the collection was made as well as the context from which the artifacts were recovered. Without these contexts, the scientific and educational use of the artifacts and data are seriously curtailed.

Associated documentation contains both a variety of record types and formats. Common record types include administrative materials such as scopes of work, progress reports, and correspondence; background information such as historic oversize maps, historic photographs, and census records; field records such as photographs of excavations, feature and profile forms, and daily logs or journals; analysis records such as catalog cards, database-generated artifact analyses, and photographs of unique artifacts; and report records such as annotated

drafts, electronic and hard-copy final reports. Common record formats include paper, photographic records, electronic records, audiovisual materials, and oversize and cartographic records. It is important to note that any and all formats may be found in all record types. The content, or type, of record signifies the value of the record, whereas the format may dictate special storage requirements (e.g., large map flat cabinets for storage of cartographic materials).

The definition of associated records is independent of the investigating organization. The installation is responsible for any and all collections, whether made by installation personnel or contractors. Upon completion of an archaeological project, the contractor should deliver to the installation the complete archaeological collection—artifacts, associated records, and the final report—as all of these are considered to be government property. Administrative records generated by contractors may be retained by them; installation administrative records for each project are subject to permanent curation. The retention, disposal, and preservation of agency records should be conducted according to agency directives. Individual Records Managers, or Records Management Officers, are responsible for these records and for ensuring that regulations are followed.

Archival processing of associated records has two primary objectives: (1) to stabilize the collection so that future deterioration is prevented or minimized, and (2) to arrange or organize the records in such a manner that they are easily accessible. Deterioration of paper and other archival mediums (e.g., photographic materials, audio-visual materials, maps, and ephemera) can never be completely halted. It is possible, however, to slow the deterioration to an indiscernible rate and therefore extend the life of valuable information contained in these collections. However, having the information is not enough; one must be able to find the information, preferably in an efficient and timely manner.

The techniques described below may be used to preserve or rehabilitate any type of documentation collection. They consist of general procedures common to all records collections as well as procedures for specific classes of records, e.g., photographs, cartographic data, paper records, or videotape (Figure 8) and addressed in the following sections.

Accessioning/Registering the Documentation

The process of accessioning is also referred to as "registering" the collection, and the paperwork generated from this process may also be referred to as registration or entry documentation. In these protocols, these terms are used interchangeably (refer to Accessioning). All associated documentation, regardless of the format, should be accessioned, or registered, when the repository accepts the collection. Bear in mind that these protocols define an archaeological collection as all materials (documents and/or artifacts) generated or compiled during the course of a single archaeological investigation. In many cases, a collection will consist entirely of associated documentation.

Generally, one accession number is assigned to a single collection, and it is used to identify all collection components: associated documentation, artifacts, and any documentation that is developed during curation of the collection. All of this information is recorded in the accession file. The accession file should include information concerning the receipt of the collection and an initial listing or inventory of the associated documentation files in the collection and notes on any conservation treatments performed on the documents. The physical location of the records collection within the repository should also be noted in the accession file, along with any known requirements for preservation or conservation treatments. A Curation History of the associated documentation should be created, if one has not been submitted with the collection.

Once the collection is accepted and the accession or registration is complete, the association documentation must be archivally processed if this has not been done previously. The steps in processing associated documents for archival storage are discussed below.

Assessment and Conservation Treatment

Before any other measures can be taken to preserve the associated documentation, each type of documentation should be assessed for its current condition, necessary conservation treatments, and

Figure 8.
Basic Steps in Archival Processing

Procedures	Comments
1. Accession/Register associated documentation	Generally, associated documentation is assigned the same accession number as the accompanying artifacts. This ensures that the two elements of a collection, artifacts and documents, do not lose their association. In many cases the accession number is used as the collection number. Check with the repository prior to processing so that the documents may be properly numbered prior to submission.
2. Assess collection and perform minimal conservation treatments	Assess document condition, remove contaminants, and segregate documents that require special handling such as dry cleaning, humidification and flattening, mending, and encapsulation. Consult a document conservator if more than minor conservation treatment is required.
3. Arrange, refolder, rebox, and number documents	Archival processing mainly consists of the tasks of refoldering, reboxing, and arranging the documents in logical sequence (keeping in mind the principle of original order), and numbering appropriate elements (i.e., folders, documents, boxes) according to the specifications dictated by the curation repository.
4. Package documents	Place documents in containers appropriate to each media, and package according to repository's instructions for immediate access or long-term storage.
5. Create a finding aid for the associated documentation	The finding aid should enable users to quickly and accurately retrieve specific kinds of information from the associated documentation.
6. Keep records of all actions performed in processing the documentation.	Document any conservation treatments performed on associated documentation as well as any special information related to the documents. Submit copies (on acid-free paper) of conservation treatment reports, the finding aid, and registration documentation, to the repository (see Procedure #1, above).
7. Create an archival safety copy	An archival safety copy should be made of all the associated documentation, as well as the finding aid, conservation treatment forms, etc. This safety copy may be produced on acid-free paper or archival microfilm. Electronic media is discouraged because of questions concerning its survivability, stability, and technological obsolescence. The safety copy should be stored at a separate secure location. Safety copies of photographic materials should be made whenever possible.

general completeness. Separate each document format, if this has not been done previously. Segregate items that require special treatments before they can be handled. Some of these conservation treatments may be performed by a professional archivist; others may require the attention of a professional document conservator. Any materials that are separated, for any reason, should have their original location noted to ensure that cross-indexing may be recorded in the finding aid.

Paper

Documents that require mending, removal of adhesives, humidification and flattening, cleaning, deacidification, cleaning, or encapsulation should be set aside for treatment. Always note where the materials were pulled from in the original arrangement, to maintain the principle of original order.

Cartographic

Procedures and consevation treatments are generally the same as those for paper documents; however, the oversize format may require special support or handling to prevent additional tearing. Never force a tightly rolled document to lie flat without first humidifying and flattening it. Forcing the document open increases the chances of permanently damaging the item by tears and creases. For large format documents, always support the entire document when moving these items. These items should always be stored flat. For extremely long documents (over six feet), cutting the document is unacceptable. Rolling may be necessary, although it will complicate access to the material. We recommend the following.

Obtain two rigid, acid-free cardboard tubes or cylinders, one of no less than three inches in diameter and the other, at least two inches wider in

diameter. The smallest tube should be several inches longer than the document's shortest side and the longer tube should be several inches longer than the first tube. Wrap the smaller cylinder with a polyester sheet such as Mylar®, in order to protect the document from directly contacting the tube. Then, roll the document onto the tube in the direction of the document's longest dimension. Roll a second sheet of polyester sheet over the document, making sure it covered the document completely, and the leading edge overlaps the trailing edge. Tie the polyester sheet to the tube using a length cotton twill tape or with a self-adhesive Velcro coin under the leading edge. Finally, slide the smaller tube assemblage into the larger tube, ensuring that the twill tape or Velcro coin is not under the document, as it can crease the document. The tube must be labeled either with the number of the document on the roll or with an index number that can be used to index the storage location of the rolled documents.

Photographic

Black and white negatives manufactured prior to 1947 require special assessment to ensure that they are not composed of cellulose nitrate, an unstable and highly combustible material. As the cellulose nitrate deteriorates naturally, it becomes increasingly unstable; if these negatives are stored in high temperatures, there is the potential for spontaneous combustion. Nitrate negatives often may be identified by their format, age, and visible deterioration. Any negatives dating prior to 1947 should be treated as potential nitrate negatives. Many nitrate negatives are larger (four by five-inches and larger) and are often labeled on the edge as "NITRATE." When nitrate negatives begin to deteriorate they often have a silver or reflective sheen on the surface or they may appear iridescent. These materials should be copied, and the original nitrate negatives should be turned over to the local fire department for proper disposal. Cellulose acetate film which replaced cellulose nitrate film, also deteriorates through time, although it is not flammable.

Audiovisual

Check for any signs of damage due to high temperature (warping, embrittlement) or due to conditions of low temperature and high moisture (mold, embrittlement). Segregate these specimens for examination by a conservator specializing in audiovisual media. Note which items need immediate duplication in order to salvage the data. If a written transcript is not available, one should be created as soon as the material is stabilized.

Electronic

Use a machine-operating system such as DOS, Windows File Manager or Windows Explorer to identify the files present on each disk, and to verify the software format. After checking for potential viruses, open each file to insure that all are error-free. Always ensure that a hard copy, (paper copy) of each document is available to protect against irretrievable data loss.

Arrangement, Refoldering, Reboxing, and Numbering

Arrangement

Archival collections, like the artifacts they often accompany, are unique entities. Therefore, each document collection should be arranged according to its individual specifications. The principle of provenance is the key, but it often causes confusion to the untrained; "organization according to provenance precludes the uniformity of arrangement provided by library classification systems (Miller 1990:26)."

There is no one-size-fits-all arrangement that can be applied to all documentation collections. There are, however, certain principles and practices to help. The most common arrangements are chronological, topical, numerical, and alphabetical. Any or all of these systems may be used singly or combined, and should be suited to the type of document and the kinds of data present in each. Most often collections can be easily broken down into series and subseries. "Series is defined as file units or documents arranged in accordance with a filing system or maintained as a unit because they result from the same accumulation or filing process, the same function, or the same activity; have a particular form (2); or because of some relationship arising out of their creation, receipt, or use (Bellardo and Bellardo 1992:32)."

A *series* is a discrete unit of information, that often can be further divided into *subseries*. "A subseries is a body of documents within a series readily identifiable in terms of filing arrangement, type, form (2), or content (Bellardo and Bellardo 1992:34)."

For example, one collection may contain the following series: administrative records, survey records, analysis records, and reports. The administrative records can be further arranged in the following subseries: correspondence, meeting notes, and Section 106 compliance documents. Each of these series and subseries should be arranged in the most logical manner—chronologically, alphabetically, topically, or any combination thereof. In another collection, it may be more appropriate to arrange data from several archaeological sites into series, with subseries for administrative records, and survey records.

Once the files are physically arranged, the contents of each individual file must then be arranged. Standard archival practice dictates that each file's contents be arranged chronologically, from least recent to most recent (e.g., if a file contains documents dating from 1949 to 1970, the file, when opened, would begin with the 1949 data). Undated documents are placed last in the file. If, however, a more logical arrangement of the papers seems appropriate, it is permissible to supersede this practice.

Refoldering and Reboxing

As arrangement progresses, the materials are repackaged in archival quality materials (i.e., acid-free folders and boxes). This is the refoldering and reboxing stage, and the document medium will dictate the best archival document container (see Packaging on page 68 for detailed discussion by documentary medium).

The label information or description of each document should be legibly transcribed to the new document containers (e.g., folders or sleeves). At this stage of archival processing, different formats (e.g., photographic, audio-visual, electronic, and cartographic materials) that have not been pulled previously, should be separated from the rest of the collection and their removal noted and indexed in the new document container. Document format often dictates different storage requirements and thus indexing must be imposed and maintained to ensure that the materials are not intellectually separated from the collection (see Chapter 4 for more information on storage requirements).

Numbering

Unique identifying numbers should be assigned, both to a single investigation's associated documentation and to individual document containers, so that (1) the documents can be easily sorted, searched, and managed, and (2) the associated documentation can be linked to the accompanying specimen collections, if present. Often in the case of associated documentation, the accession number is assigned to the collection of artifacts and documents. The accession number is then used as a unique collection number for the associated documentation as a method of preserving the link between the artifacts and documentation from a specific investigation. In some cases, the accession number may be used as a prefix to the numbering system applied to the associated documents. However, some repositories have specific requirements for numbering document collections. Some repositories require that each document be indexed and numbered, but most require that documents be labeled/numbered at the folder level. Contact the repository for directions.

How these numbers are applied depends upon the format of the record. Some labels will be directly applied to the record, others will need to be applied to the document container. The repository may direct the preferred method of numbering and labeling.

Recommendations by Document Type

Paper Documents. It is imperative that all folders have clear label information. It must be legible and describe the contents of the file with clear, concise information. Folders should be of acid-free stock, or as close to pH 7 as possible. Labels can be typed or computer-generated on archival adhesive labels. If these labels are not used, it is permissible to write (i.e., print), LEGIBLY, on the file with indelible ink or #4 graphite (2H) pencil lead. When feasible, indelible ink is the preferred labeling medium. Basic information includes collection name and/or number, series, description of folder contents, and dates. Each folder should also be assigned a unique number

according to the numbering system used for the collection.

Cartographic/Oversize Documents. Oversize paper records such as cartographic documents (maps) should be labeled the same as smaller format paper records. Number and label each one. Both the map and the corresponding file from which it was originally separated from should be labeled clearly with the cross-index information. This information should be noted in the file, on the cartographic document, and in the finding aid.

Photographic Materials. Photographic records consist of several different media; negatives, prints, and transparencies from either black-and-white or color film. Each poses particular conservation requirements that are discussed in greater detail in the section below entitled *Preventive Conservation*. Photographic collections or series should be arranged according to format and numbered according to image. Each unique image receives a unique number, and duplicate images are noted in the finding aid. For example, a single image may be represented in several formats (i.e., a print, a negative, and a slide), but it is only assigned a single unique number. When labeling and arranging this sample collection, the print, the negative, and the slide will each be labeled with the same number (referring to the same image), and each format will be packaged and stored according to its specific requirements. Each image should be recorded in the finding aid, and the corresponding formats noted (see Figure 9).

Figure 9.
General Rules For Processing Photographic Materials

1. **Never handle photographic materials with your bare hands**. Always wear white cotton gloves. Acids present on human skin transfers to and eventually damages or destroys the image.
2. **Each image should have an unique identifying number.** Any corresponding duplicates, negatives, or slides should indicate this fact in the finding aid. It may also be appropriate to record this fact in the label information.
3. **Each image should be labeled legibly**, either directly or indirectly.

Photographic materials can be labeled either indirectly or directly.

Indirect labels may be used on all photographic media. Indirect labels can also be written on or attached to the exteriors of photographic document containers such as polypropylene or polyethylene sleeves or acid-free or buffered envelopes. Negatives should alway be labeled indirectly on their document container, never directly on the negative.

Direct Labels should be written in indelible ink on the reverse on photographic prints. When directly labeling photographic prints, it is recommended to record only the identifying number of the back of the print. More detailed label information should be provided in a log or other descriptive scheme. Care should be taken to write with minimal pressure so that impressions do not crack the emulsion on prints, thus hastening deterioration. Transparencies in cardboard slide holders should be labeled directly on the cardboard holder in indelible ink. As with photographs, care should be taken not to apply too much pressure when labeling slides. Slides should only be labeled on the non-emulsion side. Foil back labels can ve attached to the back of prints. These labels, available in a variety of sizes, prevent surface inks from penetrating the label and affecting the images and conversely, the adhesive cannot penetrate the foil and attack the ink, causing excessing fading. They may also be removed, in the short term, if there is a mistake or if they need to be replaced. However, over time, they will be very difficult to remove without damaging the photo.

The photographic log will provide the detailed information that can connect each image with its provenance or collection data, should the two become separated. All labels should be clear and in a consistent format throughout the collection. An example of a label format for photographic prints is provided in Figure 10.

Figure 10.
Sample Label for Photographic Materials

Field	Sample Data
Unique identifying #	434-P-1001
Date image was taken	5/30/77
Where image was taken	Site CA-Sol-357, Baker Estates
Photographer	Larry Jones
Image Format	4 x 5 color print
Any corresponding images	8 x 10 color print; color slide; 35mm color negative
Description of image	Overview of site facing northwest. Units 3 and 4 in foreground, at 0-20 cm level.

Audiovisual Materials. Audiovisual materials include a wide range of materials. Most common of these are audiocassette tapes, reel-to-reel tapes, phonographic disks, videotapes (including Beta, VHS, and ¾-inch), moving picture film (including 8mm, 16mm, 35mm, and larger format films), and audio compact disks. Many audiovisual (AV) disks and tapes can be directly labeled with indelible ink. If this is not feasible, use a foil back label and attach it to the tape/disk. The very minimum of information recorded directly on the tape/disk should include the collection number and a unique identifying number for that item. Each storage container should be labeled with the above information and more detailed information to ensure that the original item is not permanently separated from its storage container. Detailed information should also be provided in the finding aid, or in an AV log included with the finding aid. At a minimum, the fields described in Figure 11 should be included.

Figure 11.
Sample Label for Audiovisual Materials

Field	Sample Data
Unique identifying #	434-AV-101
Creation Date	5/30/77
A-V Format	16-mm black-and-white film
General description of contents, including interviewer and interviewee if applicable	Mabel Smith describing oral history concerning site CA-Sol-357. Interview conducted by Lee Jones and filmed by Larry Morris.
Location where tape/disk was created	On-site at CA-Sol-357
Transcript	Transcript 434-TR-001, 15 minutes.

Whenever possible a transcript of the recorded material should be made. Audiovisual materials are easily damaged, so a transcript will ensure the survival of the basic informational content.

Electronic Media. Electronic records present a multitude of problems for long-term storage. Computer disks and tapes can be partially or totally erased by proximity to magnetic fields. This damage can be caused by something as simple as laying a disk too close to a telephone. Dust and humid conditions can also affect the accessibility of the information, causing lost sectors of information on the disk or tape. Technical obsolescence, however, creates the primary problem with curation of electronic media. Computer technology changes so fast that there is no guarantee that information recorded in electronic form this year will be retrievable on new generation computers. Added to the hardware difficulty is the problem of software. Changes in software virtually guarantee that information stored in electronic form will not be readable unless that software is still operable. Ultimately, long-term storage of electronic formats is not particularly viable. Even in cases where "permanent" storage solutions such as scanning or digitizing have been used, there is no guarantee that the data will remain viable and accessible. Electronic format records should be viewed as access tools, but should not be used to "replace" the original documentation.

If electronic media is included with an associated documentation collection, every effort should be made to preserve the material. As with audiovisual media, each disk should be labeled directly with the collection number and a unique identifying number for each item. Detailed information should also be provided in the finding aid, or in an electronic materials log included with the finding aid. At a minimum, the fields described in Figure 12 should be included.

The best means of ensuring the survival of the data contained on electronic media is to provide hard copies of all electronic data, printed on acid-

Figure 12.
Sample Label for Electronic Materials

Field	Sample Data
Unique identifying #	434-E-007
Creation Date	5/30/77
Format	5.25 inch floppy disk
Software Used to Create Disk	Dbase III+, ver. 2.1–database tables and report formats
Creator	ARS, Larry Jones
General description of contents	CA-Sol-357 artifact catalog, obsidian hydration rims, and Final Report Tables
File name	SOL357CAT.db
Size of file	356,789 bytes
Date last updated	10/9/77
File name	SOL357.rpt
Size of file	47,097 bytes
Date last updated	11/12/77

free paper. Each printout should be labeled with the unique identifying number of its corresponding disk, as well as the file name and software name and version.

Packaging

Associated documentation should be packaged in archival quality materials to prolong the life of these records. As with archaeological objects, associated documentation is packed first in a document container; these are then placed within storage containers again, the choice of appropriate container is guided by the preservation requirements of the format (i.e., media), as well as the anticipated need to access each record format.

Document Containers

Document containers should be selected according to the preservation needs of each document format and to the particular size of the records. Do not place documents in containers too small for them. This causes folding and tearing. By the same token, however, placing documents in containers too large will also cause damage because it will allow shifting within the document container.

Paper Records. Paper records should be placed in acid-free or buffered files and folders of appropriate size. Polyethylene, polypropylene, and polyester (Mylar®) sleeves or enclosures are also acceptable document containers. Often collections will have varying paper sizes. A single collection may have documents that are letter size (8.5 x 11 inches) and legal size (8.5 x 14 inches). In this case, use legal size folders and boxes (document and storage containers) for both paper sizes so that all folders will fit snugly within the box without shifting from side to side as the storage container is moved.

Cartographic Materials and Oversize Drawings. Maps (cartographic materials) and drawings present storage problems related to space allocation. They tend to be nonstandard in size, often oversized, and require flat, horizontal storage. It is tempting to fold these and place them in legal or letter-size folders for storage. This practice, however, severely shortens the life span of these materials. Creases created by folding severely weaken the paper fibers and lead to tears or losses that are likely to obscure information. Even once folded, these materials can be humidified and flattened for long-term storage, but the material has been weakened by creasing. Fragile and/or frequently used materials may require encapsulation in Mylar®.

The preferred storage method for these materials is to place each inside an acid-free folder. This can be quite costly in time and money. At the very minimum, separate each map with a sheet of acid-free tissue or blotter paper before placing it inside the storage container.

Photographic Documents. Every image (print, negative, or transparency) should be stored in its own document container such as a photographic envelope or sleeve. Multiple images improperly stored in a single envelope or sleeve can scratch the emulsion and irreparably damage the image. Envelopes and sleeves should be constructed of either acid-free paper or an inert plastic. Acid-free paper sleeves are available from reputable archival materials suppliers and are made in a

variety of sizes to fit common photographic media formats.

Plastics that are considered archivally sound include polyester (Mylar®), polyethylene and polypropylene. Mylar® is commonly used to encapsulate very fragile documents, especially if they are handled frequently. Polypropylene sleeves pages come in a variety of sizes for single or multiple images as well as for slides or negatives and have become popular due to their low cost and ease of use.

Glassine envelopes, vinyl or other plasticized sheets containing polyvinylchlorides (PVC), and acidic papers including Kraft paper envelopes are unacceptable.

Each photographic document container should have proper label information. Envelopes and sleeves can be labeled directly with indelible ink on the exteriors; metal slide containers will have log sheets inside the container that identify the contents, as well as a label applied to the exterior of the container. See Labeling discussion above for specific details.

Electronic and Audio/Visual Records. Electronic disks can be stored within plastic containers made specifically for this purpose. These come in a range of sizes and can be selected to suit the size of the collection of disks per accession, or can be stored in sequence in a larger disk storage container. Video or audiotapes should be placed in acid-free boxes of appropriate size. A foil back label can be attached to the front of the box, and the spine can be labeled with the Collection and Identifying numbers. Electronic and audio-visual material should be kept in an area free not only from the hazards of nature, but also human-made hazards such as electromagnetic fields that can potentially destroy them (see Preventive Conservation section for more detail). Unless directed otherwise by the repository, each document container should be labeled with the kinds of information listed in Figure 13.

Figure 13.
Sample Document Container Label

Field	Sample Data
Collection or Accession #	434
Unique Identifying #s	434-AV-001 through 434-AV-010
Container contents	Cassette tape and 16-mm black-and-white film
Site Numbers (if relevant)	CA-Sol-357

Storage Containers

Once documents have been placed in material-appropriate document containers, they will need to be placed in storage containers that are suited to the anticipated level of use that will be required of each set of documents, while maintaining the requisite environmental conditions. For some materials that are rarely used, the document containers may be placed in acid-free boxes and stored in an off-site storage area or facility. Other document containers may be placed in metal storage furniture that permits easy and frequent access (i.e., archival boxes placed on baked enamel shelving units in an on-site storage area).

Paper Records. Paper records should be stored in acid-free or archival boxes of appropriate size. They may also be stored in baked-enamel metal file cabinets, but this practice is discouraged due to the warping of documents that occur in hanging files or even regular file cabinet storage. This warping may also occur in archival boxes, but can be prevented by the use of archival spacer boards.

Maps and Oversize Materials. Flat storage in a baked enamel metal map case is preferred for these materials. These materials may also be stored in appropriately sized acid-free or alkaline-buffered boxes. However, check with a conservator first before using buffered storage materials because using buffered materials may be detrimental to oversize materials produced with early reproduction equipment.

Photographic Documents. Photographic images that have been placed in paper or archival plastic sleeves can next be placed in either acid-free boxes, archival photograph notebooks, or in baked enamel storage cabinets manufactured specifically for photographic media. Prints should be stored flat, in either a horizontal or

vertical position, so long as they are kept on a single plane and not permitted to warp. Slides can be placed directly into metal slide boxes if so desired, but should be stored upright. The important issue in storing photographic media is to keep them out of ultraviolet radiation (especially sunlight) in a clean and particulate-free environment, and to maintain a consistent environment as far below <68º F as your HVAC will permit and dependent on human comfort, and a constant Relative Humidity (RH) of 30% (National Information Standards Organization 1995:1). However, it is even more important to maintain constant temperature and relative humidity because drastic swings in either can be extremely stressful to photographic materials.

Electronic and Audiovisual Materials. These materials may be placed in appropriately sized boxes or in baked-enamel metal cabinets. It is imperative that these materials be kept away from electro-magnetic fields and dust. Lower temperature and lower Relative Humidity (RH) will help increase the life expectancy of these materials. It is important to note, however, that "electronic data, even when it is well cared for, may suffer major data loss for no apparent reason" (Balough et. al 1993:31).

Record Keeping

After the documentation has been physically arranged, labeled, and placed into document containers and these in turn are placed in appropriate storage containers, a finding aid should be developed that explains the organization and arrangement of the collection. Also, the pertinent data concerning the contents of the associated documentation and processing techniques used for the collection should be placed in the accession file with the rest of the entry documentation.

Finding Aids

Finding aids are the tools archivists create to assure fast and accurate retrieval of information from document collections. Finding aids are also referred to as guides, registers, checklists, and indexes. An archival finding aid is an essential element in the preservation and research use of archaeological associated documentation. They may be simple or complex, depending upon the collection and the repository's policy on them. The common components of an archival finding aid are listed in Figure 14.

Figure 14.
Components of An Archival Finding Aid

Field	Sample Data
Introduction	An overview of the contents, origins, and research strengths of the materials.
Scope and Content Note	A narrative description, usually written by the processing archivist, of the collection's characteristics, strengths and weaknesses, and any particular notes on information or format contained within.
Series Description	A brief, precise overview of the files contained within the series; includes the series title, description, dates, and the size of the series being described.
Container Listing	A detailed table of contents that provides specific information on the filing order and the contents of the collection. Generally it is a list of folder titles and their identifying number listed in the same order as the physical arrangement of the collection. Also known as a box or folder listing.
Index	A rearrangement of the finding aid into an alphabetical, subject, chronological, or other sequential order to facilitate retrieval of files. With electronic finding aids, indexing is generally done automatically or with the "find and search" commands.

Not all finding aids will contain all of the above components. As many components as are needed to present the most complete information should be included in the finding aid. At the very least, a container listing should be provided. Often the curation repository will direct the components that must be included in the finding aid prior to its acceptance of the collection.

Word processing programs are often used to create finding aids because they allow unique information to be easily searched by name. However, it may be very tedious to use this method to search through a large collection of materials such as photographs, particularly if the collection contains multiple images of similar objects or large numbers of images. Retrieval of information can become an

extremely time-consuming task. Generally, databases work much better for large collections.

Curation History

Like objects, associated documentation is subjected to a variety of treatments and uses that may affect the preservation and usability of the specimens in the future (see Figure 7). Each of these areas also should be addressed specifically for the various media in the associated documentation in the collection. This curation history may be maintained in the accession file or in a master list maintained by the repository.

Safety Copies

A duplicate, or safety, copy of the associated documentation should be created for each collection. It is preferable to use the duplicate copy and store the originals in fireproof and archival conditions in a separate building.

Safety copies may be made on archival microfilm, acid-free paper, or other media if deemed appropriate. Generally, microfilm and archival paper are used due to their proven permanence and low cost. Electronic media that incorporate digital images do not have comparable proven stability or permanence, but are more easily searched. They are also more costly to produce and require more frequent migration or replication.

Decisions as to the appropriate media for security copies should consider the anticipated frequency of requests to access the data, initial production cost, maintenance costs (including routine migration if needed), as well as the stability of the media. Routine periodic inspections of the security copy should be made to ensure its accessibility and stability.

VI. Preventive Conservation for Artifacts and Records

The following discussion is an overview and is not intended to teach a novice how to be a professional conservator. The information presented provides cultural resource management personnel with the range of potential problems they may encounter in caring for archaeological collections. A professional conservator would be consulted in many cases to draw on their expertise.

Measures can be taken to slow natural deterioration by providing a sympathetic environment for the object or document. The rate of deterioration is dependent upon the inherent chemical stability of the material, in combination with external influences such as the environment, storage conditions, and handling procedures. Environmental factors that can hasten the deterioration include temperature, humidity, light, air pollutants, and biological agents.

Light

Organic materials such as paper, basketry, photographs, textiles, and floral remains must be protected from ultraviolet (UV) radiation and visible light, both of which cause objects to deteriorate and speed up chemical reactions. When possible, these light-sensitive materials should be stored in closed containers, away from sunlight or direct lighting. When they must be handled or exhibited, indirect low light levels, preferably non-UV, or with UV filters in place, should be used.

Temperature

In general, colder temperatures are best for the preservation of objects and documentary materials. However, maintaining collections at cold temperatures is impractical because people use collection areas. More critical than temperature level is temperature consistency. Dramatic changes in temperature, particularly those that occur frequently, are often more damaging than storage in a slightly overheated area. For example, "it has been estimated that the useful life of paper is cut approximately in half with every 10° F increase in temperature. conversely, with every 10° F decrease, the expected life of paper is effectively doubled (Ritzenthaler 1993:46)." However, many material classes have specific narrow temperature ranges that must be maintained for optimal storage conditions (see Conservation Criteria for Archaeological Materials section).

Relative Humidity

Low and high relative humidity speeds up the rate of deterious chemical reactions and encourages mold growth. More critical than relative humidity is

relative huimidity consistency. Dramatic changes in relative humidity, particularly those that occur frequently, are often more damaging than storage in a constant low or high relative humidity areas. Relative humidity is the measure of moisture in the air relative to the temperature. Archival materials, metals, and organics are very sensitive to moisture and will expand and contract with changing humidity and temperature. While this process cannot be seen with the naked eye, continuing expansion and contraction weakens organic fibers causing weak points that are susceptible to increased damage from handling.

Air Pollutants

Airborne pollutants can also hasten the deterioration of archaeological materials. Gaseous pollutants such as sulfur dioxide and nitrogen dioxide combine with moisture in the air to form acids that are deposited on objects and records. These acids can cause corrosion of metals or deterioration of organic materials. Solid particulates such as dirt and dust transported through the air cause damage through abrasive action as the archaeological materials are handled. In addition, many pollutants can leave permanent stains on objects and records. Air filtration systems can be designed to control the pollution levels from both gaseous and solid pollutants, in addition to prohibiting mold growth.

Biological Agents

Biological agents such as rodents, insects, and mold can rapidly affect the condition of archaeological materials and associated documentation through combinations of physical deterioration and chemical interactions. The best defense against these agents is implementation of an integrated pest management program (IPM) that routinely monitors conditions within the storage area as well as examinations of object and record condition. Infestations or outbreaks of mold can then be treated immediately, thereby reducing the amount of physical damage.

Conservation Criteria for Archaeological Materials

The following section provides basic information on the characteristics and consequent handling and storage requirements of object material classes commonly recovered during archaeological excavations in North America, as well as common associated documentation such as paper records, photographic materials, audio and videotape, etc. This information is provided as a reference for installation personnel so that they can make informed decisions on whether collections under their control are being curated properly. The information may also assist in discriminating between signs of active deterioration versus inadvertent aging of a specific material class.

We have provided ranges of temperature and RH for storing various material classes. These ranges provide the optimal conditions, however, any materials recovered from conditions that vary greatly from these ranges should not be subjected to drastic condition changes just to reach the optimums. Objects may be slowly brought into the optimal range or they may have reached equilibrium under the current conditions and should not be changed. These assessments will require consultation between the federal agency POC and repository personnel and may also require the assistance of a professional conservator.

Conservation treatments (e.g., repairing damaged objects or documents) should be performed by, or under the supervision of, a trained professional conservator. Some minimal stabilization efforts can be applied to prevent additional deterioration of a damaged item, but the best way to prevent deterioration of artifacts and documents is to employ the principle of preventive care. The information presented here can assist in planning the storage environment or selecting artifact containers suited to the particular needs of specific material classes. Archaeological materials are listed first, alphabetically. These are followed by an alphabetical listing of material classes within associated documentation.

Bone

All bone, whether human or animal, consists of both mineral (hydroxyapatite) and organic, or protein (collagen) components. These components combine to form different kinds of bone structure, depending on the part or function of the bone. Long bones, for example, consist of an external shell of dense,

compact material called lamellar bone which surrounds an inner spongy material known as cancellous bone (Sease 1987:56; Cronyn 1990:275–277; White and Folkens 1991:14).

These materials are preserved in most environments, but the condition and the level of their preservation can vary according to the environmental conditions of their discovery context. The effects of these conditions are further complicated because the two components of bone, inorganic hydroxyapatie and organic collagen, are best preserved at opposite pH levels. In acidic deposits the inorganic hydroxyapatite dissolves, leaving the soft collagen, which shrinks when it dries out. In alkaline environments the organic collagen hydrolyzes (decomposes due to chemical reaction with water) and is attacked by bacteria, leaving the hydroxyapatite brittle and susceptible to crumbling when dried out. In less alkaline deposits there is a softening of the bone surface. Very dry environments or soils that contain high levels of calcium carbonate (e.g., in shell middens) at a moderate pH, produce the best conditions for preservation (Cronyn 1990:277).

Processing of bone artifacts and faunal remains will depend upon the condition in which they are recovered archaeologically. Samples that are recovered in good condition and are stored in areas with appropriate controlled temperature and relative humidity levels may need little treatment beyond dry brushing, cataloging, and packing. Bone (and ivory) recovered from extremely dry or wet contexts, may be stabilized by maintaining those conditions in the storage context. Bone that is in poor condition and actively deteriorating, may require consolidation (the addition of chemicals to restore physical or structural strength) before it can be removed from the archaeological contexts. Other samples may require consolidation in the laboratory to permit handling of the specimens. Others may require treatments to stabilize and slow the degenerative process.

Consolidation should be undertaken upon the advice and supervision of a professional conservator. Many “simple” methods advocated in the archaeological conservation literature (e.g., saturating bone with water-based white glue (National Park Service 1995:P:16)) have associated risks. White glues can cross-link (become less or completely insoluble) with the passing of time and hence, they are not considered to be satisfactory conservation treatments with full reversibility (Sease 1987). Some treatments involve the use of hazardous chemicals that require special handling and disposal. The best option is to consult a conservator, and be certain that any such treatment is fully documented and added to the Curation History.

Antler

Antler is the outgrowth of the skull bones of deer, elk, moose, caribou and other animals, referred to as cervids. Because antler is an extension of bone it can be treated much the same way as animal bone. Unlike the hollow horns of other animals, antler consists of solid bone. Structurally, antler is very similar to long bones in that they consist of a hard outer layer surrounding a spongy central area. Unlike long bones, antlers do not have a central marrow cavity. For consolidation and preservation of antler see the recommendations above for faunal remains.

Ivory

True ivory comes from the upper incisors, more commonly referred to as the tusks, of elephants and mammoths. However, this term is frequently used to describe the teeth and tusks of other animals such as walrus, hippopotamus, and narwhal. Ivory is formed of successive layers of dentin that are hygroscopic. Deterioration usually occurs between the layers due to absorption or loss of water, or migration of salts from the interior to the exterior surface. Like bone, ivory swells and warps at high humidity, and shrinks and cracks at low humidity (< 40% RH, Rose 1992:151). High humidity levels cause soluble salts in the ivory to rehydrate, crystallize, and cause the layers of dentin to split (Lamb and Newsom 1983:30). Very dry environments or soils that contain high levels of calcium carbonate (e.g., in shell middens) at a moderate pH, produce the best conditions for preservation (Cronyn 1990:277).

Human Remains

In general, human bone is compositionally similar to animal bone and can be treated in much the same way, however greater care is necessitated by the nature of the material. Human remains typically offer a greater degree of information about the past

lives of groups of people than faunal remains (White and Folkens 1991). Coupled with the emotional and psychological aspect of dealing with deceased humans, great care should employed when consolidating, stabilizing, and conserving these remains.

All human remains should receive respectful handling and storage procedures. Native American human remains must be treated according to the requirements of NAGPRA. This law stipulates that culturally affiliated federally recognized tribes and lineal descendants of Native American human remains should be consulted regarding the disposition of the remains. Stabilization and preservation of Native American remains should be undertaken only after consultation with affiliated peoples has been completed.

Botanicals (see also Textiles, Wood)

Botanicals (or flora remains) are collected from archaeological contexts in a variety of forms. They may have been processed as foodstuffs or used to manufacture tools, housing, or textiles. They may also appear as unprocessed samples of the flora extant at the time the site was used. Each of these forms poses unique requirements for processing and for long-term storage.The one factor common to all botanicals is their fragility. They must be handled with great care and packaged so that they are not crushed or contaminated.

Flora food remains may consist of charred fragments of stems, seeds, or other portions of plants. These may be collected directly from the midden during excavation, from residues on other artifacts, or they may be floated from soil samples that are processed with water after the excavation has been completed. Care should be taken to keep these samples as free from contaminants as is possible. Oils from hands, plasticizers from artifact containers, can all affect their future use as research specimens. If the botanical specimens have been processed with water (i.e., floated) they must be thoroughly air-dried before they are placed into rigid walled, inert containers, and the containers must be vented to permit air circulation and prevent mold growth.

Some botanical remains may survive only as impressions cast in baked or sun dried clay, asphaltum, or some other medium. These too should be handled carefully and placed into rigid walled containers.

Pollen samples that have been processed for analysis have undergone extensive chemical manipulations. They must remain in liquid storage if they are to preserve beyond their initial analysis. Often, these samples are stored in glass or polypropylene test tubes. Long-term storage should focus on maintaining the physical integrity of the sample by supporting the tubes in specially constructed trays or racks, and by routine periodic inspections to ensure that the wet medium has not evaporated. Data concerning the chemicals and techniques used to process the samples should be entered into the Curation History.

Ceramics

In many archaeological sites, both prehistoric and historic ceramic sherds constitute a significant amount of the total volume of artifacts recovered and they have the potential to reveal a tremendous amount of data about a site and/or group of people. The term ‘ceramics’ refers to a wide variety of fired clay products, including pottery. Many types of pottery exist, from low-fired aboriginal earthenwares to higher-fired, often glazed, earthenwares, stonewares, and porcelains (Cordell 1983:63). The raw clays used to make pottery are basically aluminum silicates, however, the clays vary in chemical composition and in the nature and quality of impurities. Additionally, many clays are tempered with other materials such as ground shell, rock, organics, etc. Because of differences in composition and hardness, the reaction of pottery when buried will vary depending on the burial conditions, but generally speaking, well fired ceramics will survive better in all types of soil conditions (Sease 1987:93). Soil conditions that can damage pottery are excessive acidity, alkalinity, and salinity.

Acidic soils exert a weakening effect on certain types of pottery, generally those that are low-fired ceramics and those with temper that is easily affected by the acidity, such as crushed limestone and shell tempers. Acids can react with these temper types and leave the pottery exceedingly porous (Cordell 1983:63).

Alkaline soil conditions will result in the deposit of carbonates, sulfates, or silicates of

calcium on the surfaces of sherds. These compounds are referred to as insoluble or slightly soluable salts because they are not readily dissolved in water. Again, low-fired pottery is more susceptible to encrustation and penetration of these compounds. Calcium carbonate is the most frequently encountered insoluble salt that leaves a whitish encrustation on sherd surfaces. Ceramics located in semi-arid environments or buried in shell middens also produce these encrustations (Cordell 1983:63–64; Cronyn 1990:146).

Soluble salts can saturate pottery in varying environments, particularly in areas located in marine environments, but soluble salts can also occur in pottery buried in semi-arid conditions and in tropical environments. The soluble salts impregnate ceramics and when the moisture evaporates, the salts crystallize and move to the surface of the sherds through capillaries in the clay bodies (Cordell 1983:64). This crystallization can exert tremendous force and may cause spalling or disintegration of the ceramic body. Most common soluble salts are chlorides, nitrates, phosphates, sulfates, and carbonates. The chlorides, nitrates, and phosphates are more readily dissolved in water while the sulfates and carbonates have slower dissolution in water and are thus referred to as insoluble salts (Paterakis 1987:67). Salts cause more damage to pottery than any other agent. If the salts are not removed, they promote loss of surface decoration and can eventually cause complete disintegration of the ceramic body.

Cleaning and repair are the two treatments commonly applied when processing ceramics. However, as more techniques are developed to analyze residues found on ceramic sherds, complete cleaning is giving way to spot cleaning of the area needed for labeling the specimen. The most common methods of cleaning are dry–brushing or washing with water. Ceramics with salt encrustations should be cleaned under the supervision of a professional conservator to ensure that the proper techniques are applied. All ceramics, especially the low-fired varieties, are porous, and any ceramics that are cleaned with water or another solution must be permitted to air dry thoroughly before any additional processing can proceed. They should not be enclosed in airtight bags until they are completely dry.

Some ceramics are friable or actively deteriorating and require special treatment and handling before cleaning can begin. If pottery needs to be consolidated or has already been consolidated, it should not be washed. Some consolidants may alter the physical and chemical properties of pottery, thereby altering their suitability for certain kinds of analyses. Consolidation should be undertaken only after consulting a professional conservator to verify the type of stains, salts, or other problems that may be affecting the ceramics. Be certain to document every specimen that receives some form of special cleaning, consolidation, or repair.

Large fragments or whole pots frequently require external support to provide structural reinforcement or protection during storage and handling. These supports can be made of ethafoam, padded cotton knit tubes, or other supports similar to those constructed for large baskets (see Clark 1988). The support will also provide a safer means of transporting or handling the specimen. When it is necessary to handle a whole pot directly, use both hands to lift it by the base, never by the rim or handles. Storage environments should provide stable temperature and humidity ranges of 55–75° F and 40–60% RH for low-fired ceramics, and 45–55° F and 45–55% RH for high-fired ceramics (National Park Service 1990:P:21).

Composite Materials

If artifacts are composed of two or more different materials that require dissimilar conservation techniques, a decision must be made as to which artifact component is more important and then the appropriate preservation method for that component should be employed (National Park Service 1995:17; Sease 1987:65; Cronyn 1990:94). Examples of some composite items include furniture, knives, pistols, rifles, and cutlery. It is recommended that the artifact not be disassembled for conservation.

Glass

Glass is composed of silica that is fused with other elements or modifiers such as potassium (potash), sodium (soda ash), lead, or calcium (National Park Service 1990:P:8; Sease 1987:72). These are referred to as fluxes. They lower the melting point of silica and allow it to fuse more readily. However, fluxes

may compromise the stability of the final glass product (Cronyn 1990:128; Sease 1987:72).

Additional materials such as lime, magnesia, or iron are also added to act as stabilizers. They, in turn, can influence the color of the glass, e.g., manganese gives glass a purple color whereas iron gives glass a green color (Cronyn 1990:128; Guldbeck and MacLeish 1990:187; National Park Service 1990:P:8).

Absorption of moisture is the primary cause of chemical and physical changes in glass, which result in weathering and/or decay. The kinds and rates of absorption are dependent upon the chemical composition of the glass, the firing history, the post-use deposition matrix, and the length of time that the glass has been deposited in the matrix. If the glass contains insufficient quantities of silica, it is more susceptible to absorption of moisture and consequent weathering or decay. If there is more or less than the optimum 10% lime flux, the glass will also be unstable. Soda glass (glass containing soda ash) is almost twice as durable as potash glass. Glass will be reasonably well preserved in acidic soils. Alkaline soils will cause severe deterioration because under alkaline conditions the flux is leached preferentially to the silica, and will render the glass porous, pitted, and covered with layers of carbonates (Sease 1987:72; see also Shapiro 1983).

Glass decays when its chemical composition is unstable and compounds leach from the glass body out to the surface of the glass. Iridescence, crizzling, weeping, efflorescence, and encrustation are all terms used to describe the effects of specific compounds (see Newton and Davison 1989, Cronyn 1990, and National Park Service 1990, Appendix P for detailed descriptions).

Glass decay is irreversible, but it can sometimes be stabilized. Guldbeck and MacLeish (1990:188) recommend maintaining an ideal relative humidity level between 45%–47%, although a range of 40%–55% is acceptable; Plenderleith and Werner (1976:346) recommend < 42% RH; and Sease (1987:74) suggests < 40%.

Handling precautions may also prevent additional glass decay. Bare hands can transfer moisture, oils, and acids onto the surfaces of the glass, and these can accelerate inherent deterioration. Snug-fitting latex gloves are recommended over cotton gloves because the glass surface might be slippery. Glass should never be handled by any knobs, rims, handles, or decorative motifs. Jewelry such as rings, bracelets, and long necklaces should also be removed from the person handling the glass so that scratches or chips do not accidentally occur (National Park Service 1990:P:19).

Leather and Other Animal Skin Products

Leather artifacts recovered from archaeological sites provide numerous preservation problems. Control of temperature, humidity, and ventilation are crucial to the preservation of leather. Extreme heat will harden and embrittle leather. Drying will cause leather to shrink, curl, crack, and become brittle and inflexible. Low relative humidity (< 40%) will cause the leather to dry out; high humidity (> 60%) promotes the growth of bacteria and fungi, increases the chances of infestation, and may also cause changes in dimension and flexibility. Leather may also provide a source of food for various pests including moths, beetles, and rodents. Once deteriorated by whatever cause, leather cannot be returned to its original condition. Therefore, the most important elements in conserving leather goods are optimum storage conditions and appropriate handling, in other words, preventive conservation. (See Cronyn 1990, Guldbeck 1969; Guldbeck and MacLeish 1990; Sease 1987).

If the leather is in a dry, stable condition, no treatment may be necessary. Leather dressings should not be applied to dry stable leather. Items that need to be cleaned, repaired, or reshaped should probably be referred to a professional conservator, especially one specializing in leather care.

Moisture and heat cause the majority of problems for leather objects. Moist leather may mold or mildew and should be kept damp and refrigerated until it can be properly conserved; leather should never be allowed to freeze.

Red rot is the common term used to designate the deterioration of leather objects, particularly vegetable tanned skins, due to reaction with sulfuric pollutants (Rose 1992:148). It is not reversible though it may be slowed with the use of a potassium lactate buffer solution. Red rot is

commonly found on leather bookbindings made between 1850 and 1900.

Virtually all leather stabilization treatments will result in some shrinkage, though the degree will vary. For this reason, the size and shape of leather artifacts should be recorded prior to and following treatment. One method of stabilization is to replace the water in the leather with a more stable material, one that will coat the fibers and thereby prevent cross-linking on drying (Cronyn 1990:273). Humectants (hygroscopic chemicals which bond to the organic material in question) such as glycerol or sorbitol can be used for this purpose since both contain oils and tannins that are vital for leather stabilization (Cronyn 1990:245, 273–274). Treatments should be performed by a professional conservator.

A special caution should be noted regarding handling of leather specimens. Many treatments of leather objects advocated and performed well into the 1970s involved the use of arsenic and other hazardous chemicals. All older specimens should be assumed to contain potential skin-absorbent toxins unless they have been analyzed by a professional conservator and are certified to be free of such chemicals. These specimens should never be handled without gloves and the gloves should also be disposed properly after a single use (consult your local Hazardous Materials disposal guidelines; see also Carson and Mumford 1994).

Masonry

Masonry refers to stonework or brickwork used in constructing structures. Examples of stonework collected from prehistoric or historic sites should be treated according to the conditions discussed in *Stone*; brickwork is a manufactured *Ceramic* material and should be treated accordingly.

Metals

Metals are broadly classed as either ferrous or non-ferrous. Ferrous metals contain iron; non-ferrous metals do not. Ferrous objects will attract a magnet if there is sufficient sound metal (iron and steel) remaining; non-ferrous metals, with the exception of nickel, will not attract a magnet (National Park Service 1995:19–20).

Ferrous metals (e.g., cast iron, wrought iron, and steel) generally comprise the majority of metal artifacts from historic sites. The major cause of ferrous metal deterioration is rust or oxidation. Metals such as copper, brass, lead, tin, pewter, and silver are examples of non-ferrous metals commonly found at historic sites.

Metals are referred to as base or noble metals. Base metals corrode more easily than noble metals. The chart below depicts reactivity of metals to chemical corrosion, from the most reactive base metals to the least reactive noble metals (Cronyn 1990:171).

(base) Zinc|Iron|Tin|Lead|Copper|Silver|Gold (noble)

Metal artifacts are generally affected by oxidation or corrosion in surface or subsurface environments. The degradation of the metal results from electro-chemical reactions that form mineral encrustation. The rate of these reactions is dependent upon the nature of the metal and the microenvironment of the surrounding soil (e.g., soil pH, porosity, naturally occurring salts, moisture content) and pollutants in the air (e.g., oxygen, carbon dioxide, salts) (Wilson 1983:39; National Park Service 1995:19; Hamilton 1976). Metal that is exposed to these chemicals forms corrosion products such as oxides, carbonates, and sulfates (Cronyn 1990:171). Once a metal object has been deposited into a deposit, it will begin to corrode in order to achieve a state of equilibrium with its surroundings. When the item is excavated and placed into a new environment, the equilibrium is destroyed, allowing for further corrosion (Wilson 1983:40; Scott et al. 1991). Most metals will also tarnish in dry air, though the introduction of water will accelerate this process. Even more stringent requirements must be met for preserving metals that are excavated from wet contexts (Hamilton 1976). All metal storage environments should be dry.

Conservation of metal objects is difficult at best, and should be referred to or performed under the supervision of metal conservators. Before any treatment can be undertaken, the composition and stability of the metal or its alloys must be identified and assessed. The condition of the artifact and the type of metal will determine the process to be used to clean and stabilize the object. Corrosion products

are extremely difficult to remove without causing damage to the object; in some instances the corrosion products are actually harder and stronger than the metal itself. Scraping dirt off with a metal tool or brush may scratch the object's surface. If little or no metal remains, cleaning by an inexperienced person may cause disintegration or irreparable damage to the object. One method that is used by conservators to identify and decide on conservation treatment is X-ray radiography.

Because metal conservation is expensive and time-consuming, only a select group of artifacts may undergo treatment beyond the initial cleaning stage. These should be chosen for their suitability to treatment and for their potential research or exhibit value. Wilson (1983) uses a tripartite classification of the stages of deterioration to evaluate potential specimens for their suitability for further treatment:

- Metal objects with substantial metal cores and consolidated surfaces that are capable of withstanding any of the various conservation treatments;
- Metal artifacts that are badly corroded but retain their shape. Little core metal remains and it is so weak that most treatments would damage the object; and
- Artifacts that are so badly corroded the only treatment is consolidation, or in the case of encrusted objects, casting is the only means of preservation or recovery of the object.

Many metal objects are better left untreated, providing they can be placed in a stable storage environment. Preventive conservation may be the best option for the bulk of archaeological metal objects.

Because lead is toxic, a handling and storage caution is warranted for all lead artifacts. Handling should be kept to a minimum. The use of gloves is recommended to protect the artifact and the handler. Avoid breathing particles from the corrosion products. Prolonged exposure requires the use of a respirator or mask when handling lead objects. Lead artifacts should also be stored separately so that the acids and vapors from organic materials (e.g., paper, cardboard, wood, cotton) that can cause lead to corrode, are not placed in or near the lead object's storage container (Sease 1987:83).

Plaster

Plaster is a combination of earth and other constituents, that is applied in a wet state to structures; upon drying, it acts as a protective sealing coat or a smooth final surface that can be decorated. Plaster or "mud" as it is still referred to today, consists of a mixture of clay or earth, to which sand, animal blood, hair, grass, etc. are added to improve the workability and strength of the material, and to prevent shrinkage and cracking upon drying. Mud-lime, an even stronger combination, contains lime produced by burning shell or limestone.

In various regions of the United States, prehistoric structures were plastered to protect the construction and, in the case of ceremonial structures, to provide a smooth surface on interior walls to which ceremonial paintings could be applied. Walls constructed prehistorically and historically with techniques such as wattle and daub, rammed earth, and adobe brick all require the application of a protective plaster top coat to seal out moisture that would otherwise compromise the strength of the walls and hasten the deterioration of the construction materials

Plaster was also used to provide a smooth coat on interior walls that could then be decorated with paint, paper, or cloth, as seen in prehistoric kiva paintings, colonial silk wall coverings, or the many layers of painted plaster found in historic American structures. Plaster can be used with any type of construction e.g., wood, stone, or brick, by applying the mud to a wood lath, metal screen, or other roughened surface that facilitates the adherence of the mud and application of several layers to produce a final smooth surface. This technique has evolved into today's prefabricated plaster wallboard that receives a final coating of mud to fill in any seams or fissures to produce the desired smooth surface.

Up until the close of the 19th century, plaster was made primarily of calcined lime (calcium carbonate); this was gradually replaced by calcined gypsum (calcium sulfate) plaster (MacDonald 1989:3). "Historically, gypsum made a more rigid plaster and did not require a fibrous binder. However, it is difficult to tell the difference between lime and gypsum plaster once the plaster has cured (MacDonald 1989:4)."

Plaster was also used extensively to create decorative architectural elements that were appended to ceilings and walls. This technique fell out of favor during much of the 20th century, although the preservation and rehabilitation movements of the 1970s have created a new interest in the use of plaster as a decorative technique.

Plaster will be retained in archaeological collections for a variety of reasons e.g., as documentation of construction techniques, to record original paint colors used in historic structures, to preserve decorative architectural elements, or to preserve decorated wall panels that may have religious significance or potential for interpretive uses.

Because plaster is dried earth mixed with aggregates and other materials, moisture presents the greatest hazard to its preservation. Absorption of moisture in any form will weaken the original bond and cause swelling, distortion, decomposition, cracking upon re-drying, and eventual loss. Depending upon the constituent materials and how well they were proportioned and mixed, whether multiple layers had similar shrinkage rates, whether the plaster cured under optimum conditions (55–70° F), some plaster may have inherent structural problems that lead to cracking or crumbling (MacDonald 1989:7).

Plaster reaches an equilibrium with the water content in the environment; samples removed for study or storage should not be subjected to rapid desiccation, nor should they be enclosed in airtight containers that might promote mold growth. If polyethylene bags are used to transport the sample, they should be punctured to permit air exchanges.

Plaster is also very brittle and requires external support to maintain its original structure. Place samples in rigid walled containers, adding support with custom-fitted ethafoam if needed. Extremely brittle or crumbling plaster may require consolidation by a professional conservator. Plasters containing botanical or proteinaceous materials may attract infestation and should be monitored routinely.

Plastics

Plastic materials are manufactured from "complex organic compounds produced by polymerization, capable of being molded, extruded, cast into various shapes and films, or drawn into filaments used as textile fibers (Riverside Publishing Company 1994:900)." Natural plastic materials such as amber, horn, bone, tortoiseshell, shellac, lacquer, and latex, etc. have been used for many centuries to manufacture items by heat treating and shaping the original material into the desired shape.

In the early 19th century, industry's search for materials that were both flexible and moldable, resulted in "semi-synthetic" plastics manufactured from natural materials in combination with various chemicals. These included materials such as vulcanized rubber (vulcanite) and cellulose nitrate (known by various names such as Parkesine (1860s), celluloid (1870s onward), and cellophane) (Katz 1984:9). Nitrocellulose was widely used between the 1870s and the 1920s to make common household items such as dresser sets (mirrors, combs, brushes), cutlery handles, toys, eyeglass frames, buttons, and other "plastic" items. Objects manufactured prior to 1920 that have the appearance of clear "plastic" are likely to be cellulose nitrate. The first true synthetic plastic, Bakelite®, was manufactured from phenol formaldehyde in the 1900s. The combinations since then have been limitless.

All plastics pose preservation problems because they are susceptible to rapid deterioration through oxidation. Depending upon their formulation, the off-gassing byproducts of deterioration can be hazardous to other materials, especially metals, and to humans. The semi-synthetics such as cellulose nitrate and cellulose acetate are inherently unstable and cellulose nitrate in particular is flammable, particularly if stored in conditions with poor air circulation. In general, the semi-synthetics are more susceptible to deterioration, while many recent plastic materials include anti-oxidants as part of their formulation. Nevertheless, all plastics remain susceptible to rapid degradation and deterioration under adverse conditions. Deterioration can cause loss of flexibility and strength, shrinkage, cracking, color change, or changes to the surface composition.

The rate of deterioration by oxidation can be further affected by temperature and light levels. Another cause of deterioration is exposure to caustic chemicals such as sulfur dioxide and nitrogen dioxide, especially when coupled with high humidity. High humidity will also promote fungal growth on cellulose nitrate materials. Physical stress

can also cause breakage that leads to additional deterioration.

Morgan (1991) identifies light, relative humidity, temperature, and ventilation as the prime factors to be considered in preserving plastics. He cautions, however, that ideal conditions are material-specific e.g., cellulosic materials require low humidity about 40%, whereas cellulose nitrate and nylon become brittle at low RH and require an optimum of 60% (Morgan 1991:10). If humidity cannot be controlled, serious damage can be avoided if plastics are placed in minimal light, cool stable temperatures, and good ventilation. The latter is particularly important, as plastics tend to off-gas as they undergo chemical reactions. Cellulose nitrate objects should be segregated from other materials and never enclosed or touching one another. These objects should be routinely monitored for any sign of active deterioration that would indicate unstable, dangerous conditions.

Other plastics or synthetic rubbers should also be kept in an environment that is dry and has low temperature and light levels. Do not place these materials in sealed polyethylene bags, as the off-gassing vapors can accumulate and accelerate the deterioration (see Dubois 1943; Roff et al. 1971; Johnson 1976; Katz 1984; CCI ICC Notes 1986; Selwitz 1988; Williams 1994).

Shell

Shell is composed of layers of calcium carbonate. Exposure to acids in surface and subsurface environments weakens and softens these layers causing exfoliation and crumbling. Worked shell (e.g., beads, buttons, gorgets, etc.), regardless of its appearance of stability, should be treated by a conservator. Many of these artifacts may require some form of consolidation before they can be processed further.

Examine all shell carefully before cleaning. Unmodified shell can be cleaned gently with a soft brush to remove surface dirt. Although dry brushing is the preferred method of cleaning, if shell is washed, it must be done so very gently as it is highly susceptible to damage from abrasion as well as exfoliation due to absorption of water. Some unmodified shells may have been used as containers for food or pigments and should not be cleaned.

Shell should be thoroughly air-dried before packaging. Because it is hygroscopic (absorbs moisture easily), it should never be stored in air-tight containers. Vent bags or rigid-walled containers.

Shell is susceptible to degradation by Byne's disease, an efflorescence that is triggered by storage environments with high levels of carbonyl pollutants (Grzywacz 1995:197). Large collections of shell will require well ventilated storage areas and pollutant monitoring and filtration. Prevent rapid or frequent fluctuations in temperature and humidity.

Soil Samples

Soil samples from archaeological sites are collected so that one or more tests can be performed on the soil, each of which can reveal different things about the site or geographical location. Soil analysis of hearths, the contents of a vessel, or the remains on a floor of a structure, can reveal what types of organic matter were utilized during the occupational period of the site. Soil analysis can also answer questions about the climate and environment during a particular period of time.

Various types of analysis from soil include pollen, phytoliths, radiocarbon (C^{14}), thermoluminesence (TL), particle size analysis (PSA), archeomagnetometry, phosphate and acidity levels, and heavy and light fractions from flotation (National Park Service 1995:9–10; Smith 1983:5–7). Each soil sample is treated differently in terms of the collection techniques and analysis, yet outside contamination can ruin any sample. It is recommended that the individual doing the analysis instruct the field archaeologist on how and where to remove the soil samples. Better yet, if possible, the expert should remove the samples themselves to ensure proper removal techniques and to minimize the possibility of contamination.

Given the cost of storing archaeological materials, there is a temptation to discard bulk soil samples that may not have been processed during the original investigation's analysis of the collection. Like all archaeological remains, once soils have been excavated, they cannot be replaced in their original contexts or duplicated by samples from other locales within a given archaeological site. A representative

minimum (1000 cm^3) should be retained of each soil sample collected in the field.

Soil samples should be stored in a dry environment (< 65% RH) to prevent the growth of microorganisms that would cause deterioration of any organic content and contamination of the sample. They should be thoroughly air-dried before being placed into a storage container. The storage container, be it polyethylene bagging or a rigid container, should contain a label on the inside as well as on the exterior. Tyvek® can be used to make interior labels that are moisture and grime resistant.

Stone

By definition, stone is concreted earthy or mineral matter (Riverside Publishing Co. 1994:1142). The formulation of the mineral content, the types and kinds of inclusions, the hardness, the porosity and consequent permeability, and the environmental conditions in which the stone is deposited, all affect the durability of each specimen (National Park Service 1990:P:11; Shapiro 1983).

Moisture and temperature are the primary agents of stone deterioration. Atmospheric water and the chemicals it transports, combined with the permeability of stone (the ease with which fluids pass through) affect the rate of deterioration. The more caustic the solution and the more permeable the rock, the greater the deterioration. Airborne pollutants such as carbon monoxide, nitrogen oxides, hydrogen oxides and sulfur oxides, as well as particulates of dust, coal, and soot are deposited directly or as part of atmospheric water. Temperature comes into play when fluid-saturated stone is frozen or dried. Water increases approximately 9% in volume upon freezing, thus causing expansion pressure upon the stone material (National Park Service 1990:P:16). The greater the number of freeze/thaw cycles, the more likely the stone will undergo fissuring from this expansion, and ultimately segments of rock will spall from the parent rock. If the liquid contains soluble salts, the salts will crystallize upon drying and will appear as an efflorescence layer on the surface of the stone, or if they crystallize beneath the surface they will exert pressure that may cause delamination of the surface or fissures in the body of the stone. The hardness (resistance to scratches as measured with a Mohs scale) of the stone will also determine how susceptible it will be to abrasion from bioturbation or from wind-borne particles prior to its collection.

Stone that has been fragmented by any of these processes will be more susceptible to increased rates of deterioration as well as attack by algae, fungi, or botanical growth in the fissures. Although these forces should no longer be in effect in a controlled environment in a storage area, all archaeological specimens will have undergone weathering in situ prior to their excavation and collection. This will determine the amount of care or treatment required to stabilize them for long-term curation. Curated stone specimens remain susceptible to abrasion from poor storage conditions or mishandling, particularly when specimens are very large or heavy. Stone can also absorb oils from hands or stains from other materials used in storing, studying or exhibiting them.

Within the last ten years, cleaning stone artifacts has become the exception rather than the rule. This is due, in large part, to the increase in techniques to analyze microwear patterns and residues via techniques such as electronmicroscopy, pollen washes, serum analyses, and gas chromatography. Unless the specimen must be cleaned for exhibit purposes or to enable special analyses, only the small area needed to label the specimen should be spot cleaned using a cotton tipped swab and water (distilled or deionized water would be preferred; tap water is okay). If stone is to be cleaned completely, the cleaning methods should be suited to the hardness and durability of the stone material. For example,

- Soapstone, sandstone, and limestone are soft and can be damaged if cleaned with a hard bristled brush. Polished alabaster should not be washed.
- Mica tends to delaminate and may require consolidation by a professional conservator before attempting any further processing.
- Porous granitics, fire-affected rock, or vesicular basalt should be examined first for stability, before any cleaning is attempted.
- Specimens with powdery white deposits on the surface probably contain salts. These should be referred to a conservator for consolidation (if necessary) and removal of the salts.

- Prehistoric ground stone objects requiring repair should be referred to a conservator who can determine the best adhesive or consolidant for the particular type and weight of stone prior to further processing.
- Never use acidic cleaning solutions (found in most commercial stone cleaners).

Any stone that is cleaned with water should be permitted to air dry thoroughly before it is processed further. Artifact bags should be ventilated unless the specimen has been protectively wrapped to preserve its depositional matrix for special analyses. Large stone items such as metates should not be stored directly on the floor and should be protected from dust by using closed containers or sheets of polyethylene as covers over open storage.

Stable stone objects should be stored in environments having a temperature range of 55–75° F and RH of 40–60%. (National Park Service 1990:P16:21). Stone suspected to contain soluble salts should be stored in dry conditions (e.g., <35% RH).

All stone specimens should be protected from abrasion due to movement within the storage container. Each formed tool or artifact should be stored in an individual artifact container, padded as necessary. Debitage or rock samples may be stored in bulk lots.

Textiles

Textiles are made from animal and vegetable fibers, and in the 20th century, from natural and synthetic polymers (National Park Service 1995:25; Keck 1974). The primary causes of the deterioration of textiles are the natural instability of the fibers, mechanical damage, detrimental environmental conditions, and attack by insects or microorganisms. Mechanical damage may result from internal stress, exposure to the elements, or handling and use. Damage that resulted from original use may be preserved as a record of the artifact's function and use. Damage from improper curation should be documented and stabilized until a professional textile conservator can evaluate the specimen and make any requisite repairs. Minor treatments should be restricted to providing support for weak or damaged areas until they can be professionally treated.

Environmental conditions such as light, heat, and pollution can damage textiles, particularly those made from organic materials that are more susceptible to aging. Insects and microorganisms may utilize textiles as habitation sites and/or as a food source. Organic textiles are also subject to attack by molds and bacteria, and if in subsurface contexts, they are also susceptible to deterioration by the chemical and physical conditions of the soil. Moisture can destroy vegetable fibers and excessive heat will cause desiccation and embrittlement of the fibers. Exposure to light will cause dyes to fade and the textile fibers to deteriorate.

Recommendations for optimum environmental conditions for textiles vary slightly; 60–70°F, 35–50% RH according to Commoner (1992:88) and 55–68° F, 40–50% RH per Orlofsky (1992:80), but the important factor is to choose levels within these ranges and maintain them. Textiles should be stored in the dark when not in use. Light levels for examination or display should be 50 lux (5 foot–candles), and for limited duration only (Orlofsky 1992:80).

When handling textiles, always wear gloves to protect the artifact from transfer of oils and acids from human skin. Cloth gloves are recommended unless the textile has frayed surfaces that might snag more easily on cotton gloves; in those instances, use polyethylene gloves.

A professional conservator should be consulted regarding any attempt to humidify, soften, unfold, or stabilize textiles, or to repair or strengthen weak or torn areas. If the textile is folded or crumpled, no attempt should be made by anyone other than a textile conservator, to unfold or flatten the textile. Four contributing factors cause the deterioration of textile objects (National Park Service 1990:K:12; Florian et al. 1990).

- The natural deterioration of fibers composing the textile object. This includes chemical and physical instability of the material, interaction with other incompatible materials, and the degradation of by-products used in the manufacturing of the textile object.
- Damage resulting from excessive handling, inadequate storage and display environments, natural disaster, and vandalism.

- In-house environmental effects (i.e., pesticides, light, smoke, carbon dioxide).
- Damage resulting from insects and microbiological infestation.

If cleaning of textiles is necessary, a gentle vacuuming with a low suction vacuum equipped with a rheostat to control the speed, is the most effective and least harmful method of removing most dirt and microorganisms. Vacuum through a nylon screen or with a nozzle covered with cheesecloth, and use an up and down motion rather than back and forth. Avoid direct contact between the vacuum nozzle and the textile. Additional cleaning treatments should only be undertaken if absolutely necessary and only when under the supervision of a professional textile conservator. These include wet or dry cleaning methods that employ solvents, including water.

Any treatment used to clean and/or stabilize a textile artifact should be thoroughly documented on a treatment record that notes the materials and procedures used, the date of the treatment, and the name of the person performing the treatment. If the appearance of the artifact will be significantly altered by the treatment, before-and-after photographs should be taken to document the appearance and condition of the artifact.

Textiles should be placed in an acid-free environment as soon as possible. Textiles can be padded with unbuffered acid-free tissue to avoid any undue stress on vulnerable areas and to prevent creasing or folds. Unbuffered acid-free tissue is best for protein-based textiles such as silk, wool, fur, or leather. Textiles should be stored in the dark whenever not in use. If exhibited or under study, light levels should be maintained at 50 lux or less, with the maximum acceptable UV level of 75 W/lumen (a proportion of the visible light level) and relative humidity levels between 50%–55% (National Park Service 1990:K:19-20). Hunt (1992:133) recommends that light and temperature levels not exceed 5 foot–candles and 65° F (18° C) for natural fibers.

Basketry and Cordage

Basketry and cordage are considered to be textile materials becasue they are manufactured from botanical materials. Both may be recovered from prehistoric as well as historic sites. They are usually very fragile and require special handling and are extremely perishable. Basketry or cordage that survive in the archaeological record are generally found under very dry or very wet conditions. These factors will temporarily act as stabilizers for the materials while they are in situ. Materials removed from these environments must be packaged and stabilized according to their condition. In general, after treatement, optimal environmental conditions are the same as those for textiles and for botanicals, that is RH of 50–55% and a temperature range between 55–70° F.

Dry basketry or cordage tends to be brittle and highly prone to breakage. Extra care must be taken when handling these materials. These materials benefit from custom-designed supports or packing (Clark 1988). Supports provide both structural reinforcement as well as a means to handle the specimen container without coming into direct contact with the specimen. When handling specimens directly, whole baskets should never be lifted by the rim or any handles because of the risk of breaking them. They should be lifted by placing both hands beneath the basket if feasible, or one hand against the side of the basket for support.

Large fragments may be placed on a nest of acid-free tissue paper in an acid-free cardboard box deep enough to allow closure of the box without applying pressure to its contents. *Do not* place this box inside a bag. Tie the lid of the box with a piece of cotton twill tape, being careful not to tip or turn the box over. Label the exterior of the box with handling information such as “Fragile,” “Do Not Tip,” or a directional arrow indicating the top of the box. Small fragments of basketry or cordage may be placed in boxes with shape-specific padding or immobilized by encapsulation in two polyester sheets (e.g., Mylar®) closed with double-sided tape.

Wood

Wood preservation at most archaeological sites is generally very poor. An exception is wood that is preserved in arid caves, tombs, or in anaerobic conditions such as underwater or submerged in silt. Wood is vulnerable to damage from a host of agents, particularly moisture, light, fire, acids, alkalines,

salts, infestation, and human reuses (Merrill 1974; National Park Service 1995: 25–26).

Wood is hygroscopic, shrinking and swelling with variations in relative humidity. It is also anisotropic which means that the shrinkage and swelling are not dimensionally uniform. The combination of these two traits leads to cracking and distortion of the original shape of the wood (National Park Service 1990:N:9).

Wood that is dry should never be exposed to water. Cleaning should be limited to dry brushing, vacuuming, or careful cleaning with wooden tools (metal tools may damage wood artifacts). Moist wood should be kept moist immediately after excavation until it can be treated by various methods for removing the water without causing the cells to collapse due to the lack of support. Wood and other organic materials that is found in wet environments can be irreversibly damaged if allowed to dry out for even a short period of time. A conservator should be consulted for assistance with these methods. Large wooden artifacts can be packed in wet polyethylene sheeting until they can be treated. Small artifacts may be triple bagged in zip-lock bags then refrigerated. Objects that are discovered in fully wet environments should be moved directly to wet storage so that they never are allosed to dry.

Fungal activity is the single greatest cause of biodeterioration of wood. Fungi are found nearly everywhere, and various species are capable of staining or consuming wood. Fungal activity may be reduced or eliminated by controlling humidity, and avoiding direct exposure to water.

Relative humidity levels for wood storage is dependent on the area of the country that the repository is housed. The National Park Service *Museum Handbook* (1990:N:31) states that the relative humidity level should be 50% ±5%. However, in a drier climate such as that of the desert Southwest, recommended relative humidity levels should be between 35%–40% and along moist coastal zones 55%–60% is acceptable (1990:N:31). The most important thing to remember is to maintain a constant level of humidity and prevent excessive fluctuations because of woods sensitivity to water. Temperature is critical in so far as it affects relative humidity and should be maintained at the lowest comfort level to reduce agents of deterioration (i.e., mold and fungal growth)(National Park Service 1990:N:31–32).

Light levels should not exceed 200 lux for exposed wooden objects that are finished and 300 lux for unfinished wooden objects (National Park Service 1990:N:32). Hunt (1992:133) recommends an optimum of no more than 5 foot–candles and 65° F or 18° C. Light can damage dyes, finishes, the natural color of heartwood (the center portion of a tree from which many wooden items are constructed), and any upholstery on the wooden item.

Exposure to handling and airborne contaminants should also be kept to a minimum. Dust accumulations can be abrasive and cause scratching of the surface. Oils from hands can also be damaging.

Conservation Criteria for Associated Documentation

Audiovisual Materials

The most important thing to remember about audiovisual materials is that they must be kept free of dust. Dust and other particulates can abrade and scratch tapes. These scratches may distort sound or picture, or may result in blank areas on the tape. Disc-recordings should be stored in a vertical position at all times; do not allow them to lean because of the possibility of warping. Inner sleeves should be replaced with archivally sound sleeves. Disk recordings should be handled on the edges and only when wearing cotton gloves. Reel-to-reel and cassette tapes should be stored away from stray magnetic fields which can erase all or part of the recording. Vertical orientation on shelves is recommended. Cassette tapes are not considered a good medium for long-term storage and should be transferred to reel-to-reel tapes, if possible. Videotapes should be kept in an environment similar to reel-to-reel tapes. They should be stored in the played position and rewound only at the time of the next use.

Tapes, both audio and video, should always be rewound slowly. The use of fast-reverse or fast-forward speeds will create fluctuating tension in the tape and can be damaging. Tapes should only be handled by their housing and bare hands should never touch the tape surfaces. Also remember that

each time these materials are played, the playback heads, even if well maintained, will cause degradation to the tape (Ritzenthaler 1993:74).

A special note needs to be made here concerning historic movie films. These may be 8-mm, 16-mm, 35-mm, or 72-mm films. Those produced prior to 1950 should not be handled any more than necessary. Earlier films were made with nitrate negatives (see Photographic Materials) and are extremely dangerous. When stored in improper conditions these films deteriorate and form a highly combustible chemical coating. In extreme cases the spark from opening a film canister or friction from unrolling the film just to see what it depicts is enough to cause these materials to burst into flames. These materials should only be opened by trained individuals and in fire-retardant areas. Do not discard these materials in a dumpster or with household trash. Nitrate film and negatives must be transferred to fire protection officials for proper destruction.

Because of the more stringent storage requirements for audiovisual materials, they should be removed from the collection and stored elsewhere (e.g., locking cabinets) in the repository. When these materials are removed from collections, indexing and cross-references must be provided for research use. This practice ensures that the materials are not permanently separated from the rest of the document collection and intellectual control is maintained.

Technical obsolescence (as in the case of phonographs) or other damage can render audio and visual recordings unusable. Transcripts ensure that the informational content is preserved. For this reason, transcripts should be made of all audio-video materials as soon as possible. In this manner, conversations and their content are preserved, even if picture or voice inflection is lost.

Dust and particulates may be lessened by proper packaging and by installing filtering systems on environmental controls (i.e., HVAC systems). As with other archival materials, lower temperature and relative humidity (<68° F and <35% RH) will prolong the lifespan of these materials. Fluctuations in temperature and relative humidity (greater than a rate of ± 3° and ± 5% RH per month) will hasten the deterioration of these materials (Ritzenthaler 1993:74).

Cartographic Materials/Oversize Drawings

Due to their size and the damage inherent to larger formats, these materials are frequently those that require the most conservation. All too frequently these items are dirty, torn, and generally mishandled.

Dry cleaning can be performed with a soft bristled brush and a vinyl eraser used for gentle cleaning. These activities must ensure that no damage or residue is left on the document. Vigorous cleaning often does more damage than leaving the document soiled. Some documents can be safely washed in water or solution, but care should be taken that the inks on the document are not washed away. This should only be undertaken by a professional conservator. In cases of extreme acidity, the archivist may wish to deacidify the document. Wei T'o® deacidification solution comes as a liquid or as a spray. Again, as in wet washing, the inks on the document must be tested first to ensure that they will survive the deacidification process. Never fully submerge documents in liquid solution of any type unless you are positive permanent damage will not result. Documents can be treated with Japanese tissue and wheat starch to mend rips and tears. Adhesives such as tape or glue can be removed through careful physical removal or the use of solvents.

Folded or rolled materials may be humidified and flattened prior to storage in order to lessen the damage made along creases. Humidification introduces small amounts of moisture into paper fibers through the use of an enclosed humidification chamber. The process relaxes the paper fibers and allows the gentle unrolling or unfolding of the document. The flattened document is then placed between two clean, dry sheets of alkaline-buffered blotter paper. This "sandwich" is then weighted down by evenly distributing weights on top of the "sandwich." The document is allowed to air dry slowly. Once dry, the flattened document can then be properly stored (Ritzenthaler 1993:184–185).

Finally, fragile or frequently handled documents, regardless of their size, may be encapsulated in sheets of Mylar® film. The rigid mylar provides extra support for these documents, prevents further transfer of acids from the user's

hands, and provides a translucent surface through which both sides of the document can be viewed. Still, care must be taken in handling encapsulated documents. Encapsulation consists of cutting two sheets of mylar, one inch larger than the dimensions of the document. Archival double-sided polyethylene tape is affixed to all four edges of one sheet, save for a small vent in one corner. The document is then placed atop the taped sheet and carefully centered so that one-half inch of space is left between all edges of the document and the tape. The second sheet of mylar is placed on top of the document and gently pressed to adhere the two sheets of mylar and remove trapped air through the corner vent. Paperweights can also be used to remove the air, seal the tape, and prevent slippage of the document. Encapsulated materials should be periodically checked to make sure that the document has not slipped and is not in direct contact with the tape.

For further reading on the above techniques, see Appendix D in Ritzenthaler (1993). None of these treatments should be performed without consulting a qualified document conservator. Any and all treatments performed must be recorded in the Curation History or documented in the accession file.

Even if no treatments are necessary, cartographic or oversize materials are usually separated from the rest of the collection so that they may be stored appropriately in large size containers. Cross-index notes should be left in the original file and with the oversize material. This cross-index and separation must also be reflected in the finding aid.

Procedures for proper packaging and labeling of these materials were discussed in Chapter V. Environmental storage issues and requirements are dependent upon the medium of the oversize material (e.g., paper, photographic). See the appropriate section in this chapter for specifics.

Electronic Media

Electronic records present unique problems for long-term storage. Electronic media may be classified into two general types—magnetic and optical. Magnetic media includes materials such as diskettes or floppy disks, hard drives, DAT tapes, and conventional tape backups. Magnetic media can be partially or totally erased by electromagnetic fields. This damage can be caused by something as simple as laying a disk too close to a telephone or stray static electricity from the user's clothes. Dust and humid conditions can corrupt the disk, causing lost sectors of information on the disk or tape much the same way as with audiovisual material.

Optical media is physically more stable than magnetic media and includes CD-ROM, WORM (Write-Once, Read Many), magneto-optical disks, and phase change disks. These materials are not susceptible to destruction through dust light, heat, or humidity (Balough 1993:36). While more stable than magnetic media, optical media is not considered archival or permanent either.

Technical obsolescence, however, creates the primary problem with curation of electronic media. Computer technology changes so quickly there is no guarantee that information recorded in electronic form this year will be retrievable on the next generation of computers. Software poses an additional layer of difficulty; changes in software virtually guarantee information stored in electronic form will not be readable unless that software (and that particular version) is still operable. Even in the case of optical media, ten years is approximately the life span one can expect and there is no guarantee the new equipment can read older disks (Balough 1993). It is important to remember: "even if the media lasts, if the machine and all the software necessary to interpret it are not usable, the information may as well not exist because it will not be accessable [sic]" (Balough 1993:28).

Long-term storage of electronic formats is not viable. If electronic media are submitted, the following provisions must be made: (1) routine inspection of software to ensure readability, (2) duplication of all files in hard copy format and on disk, and (3) routine transfer of files into formats compatible with new software and hardware. Store magnetic tape in cool, dry environments of 40–70° F and 20–30% RH, with variations of no more than ± 3° F and ± 5% RH (Wheeler 1998).

Microform

"Microforms are photographic images that are 20 to 150 times smaller than the original" (Balough 1993:17). This reductive ratio enables a large number of images to be recorded onto a small space. While microform, like electronic media is machine dependent, issues of technological obsolescence are

not as critical. Archival microfilm has proven stability and too much has been invested in it to "switch over" to another medium easily. Finally, microfilm may be read with a microscope, if all else fails.

Generally microform is produced on film with a life expectancy (LE) of 500 years (Fox 1996:30–31). The procedures for microfilming and the materials used are standardized and accepted throughout the archival and library communities. When preservation microfilm is produced, three copies are made—a master negative, a printing master, and a service copy (Fox 1996:32). As long as the printing master and/or master copy is available, service copies may be made for a relatively low cost.

Microform is available in a variety of formats and sizes—35 mm, 16 mm, 105 mm, and microfiche—but 35 mm is the standard for preservation purposes (Fox 1996:31). Long-term storage areas should be kept dark, dust-free, protected from natural disasters, and temperature and relative humidity should not exceed accepted standards. Medium-term storage should have the same basic conditions, but the temperature and relative humidity standards are slightly less stringent (see Table 8). For a full discussion on all stages of microfilming see Fox (1996).

Paper

Paper, due to its organic nature and the manufacturing process used to produce it, is extremely acidic. Today's paper has a life expectancy of less than fifty years. Acidic paper turns yellow and brittle with age and eventually disintegrates. This natural degradation can never be completely halted, but it can be slowed to a much lower rate. This deterioration may be partially combated by photocopying the information onto acid-free paper or by applying a buffering agent to acidic paper. Acid-free paper has a pH close to neutral or may be slightly alkaline. It is more stable and lasts longer than acidic paper. Acid-free papers may be ordered with varying pH values (see Table 9, Balough 1993:14). Other paper types commonly encountered in archival collections include onionskin paper and newsprint. Of these two types, newsprint is the most unstable and acidic. It should be replaced immediately if found in the collection. Not only will newsprint deteriorate rapidly, but it will transfer its acidity to any other paper it touches. Onion skin paper should also be copied onto acid-free paper if at all possible.

Obviously the paper itself is of secondary importance to the data recorded upon it. Carbon ink, chinese ink, india ink, carbon ribbon inks, and most printing inks are permanent and pose fewer problems for long-term storage and preservation than colored inks. Colored inks and many of the inks used in felt tip pens are water soluble and very unstable. Even ballpoint ink is relatively unstable; it sits on the surface of the paper and is soluble in many solvents. There is always the danger that the ink will run and become illegible if it is exposed to liquids or extreme moisture levels.

Adhesives are a concern in preservation of paper for several reasons. First, they are often misapplied and cause damage to a wide variety of materials. Adhesives may break down over time, losing their tackiness; they also may permanently stain documents and initiate harmful chemical reactions that hasten the deterioration of paper.

Table 8.
Temperature and Relative Humidity Requirements for the Storage of Microforms (Fox 1996:217)

	Medium-Term Storage		Extended-Term Storage	
Sensitive Layer	**Maximum Temperature (°F)**	**Relative Humidity Range***	**Maximum Temperature (°F)**	**Relative Humidity Range***
Silver-Gelatin,	77°	20-50%	70°	20-30%
Vesicular, and Diazo			59°	20-40%
			50°	20-50%
Color	77°	20-50%	70°	20-30%
			59°	20-40%
			50°	20-50%

*The moisture content of the film to be stored shall not be greater than film in moisture equilibrium with these relative humidity.

Table 9.
Classes of Paper Based on Acid Content
(Balough 1993:14)

Type	Acidity	Life Expectancy (LE)
One	pH 7.5-9.5	Several hundred years
Two	pH 6.5-7.5	50-100 years
Three	pH 5.5-6.5	About 50 years
Four	pH under 5.5	Under 50 years

Deteriorating adhesives can also attract insects and other pests. Some common adhesives are tape, glue, and rubber cement.

Metal fasteners such as staples and paper clips can rust, leaving permanent stains; they also can function as cutting edges against which paper will break as it is flexed over a period of time. Rubber bands deteriorate, dry out, and attach to paper fibers, making them virtually impossible to remove without damaging the document. Alternative methods of attaching paper include zip-staplers and archival paper clips.

The rate of paper deterioration is dependent upon the inherent chemical stability of the material, in combination with external influences such as the environment, storage conditions, and handling procedures. It is susceptible to embrittlement and deterioration by high temperature, humidity, and light levels, as well as chemical and physical attack by airborne pollution and biological agents.

Paper is hygroscopic; it readily absorbs and releases water vapor, and these fluctuations strain the organic fibers. Most chemical reactions that cause paper objects to deteriorate occur twice as fast with each 10° F increase in temperature (National Park Service 1990:J:7). When relative humidity is low (< 40%) yet temperature is high (> 70° F), paper becomes embrittled. Any adhesives on the paper will dry out, bookbindings will crack, and paint will begin to flake. However, if the relative humidity is high (> 60%) and the temperature is high, then the excessive dampness will result in cockling, paint loss, hydrolysis of adhesives and parchment, mold growth, and staining on paper products (Shelley n.d.:29).

In general, dark, dry and cool are the operative factors in preserving paper. If humans are also using the area where paper collections are stored, a constant temperature between 60–72º F is optimum; if the area is for storage of paper only, then temperatures can be maintained at less than 60º F and between 30–35% RH (Van der Reyden 1995:332).

The fading and drying effects of light on paper objects are cumulative. Paper that is on exhibit should have no more than a maximum of 50 lux or 5 footcandles for no longer than a total of six months (National Park Service 1990:J:37–38). Black ink on white rag paper is less apt to fade than colored inks or colored paper. Ultraviolet radiation should be screened from windows or from storage and collection use areas at all times. Archival materials must be protected against ultraviolet (UV) radiation and active visible light, both of which have a damaging effect on paper and speed up chemical reactions. Direct sunlight can be very damaging. The easiest way to combat this threat is through fluorescent, nonUV light systems, or better yet incandescent lights, set up where documents are exposed.

Airborne pollutants can also hasten the deterioration of archival materials. Gaseous pollutants such as sulfur dioxide and nitrogen dioxide combine with moisture in the air to form acids which then attack the fibers in paper. Solid pollutants such as dirt and dust transported through the air can damage archival materials through abrasive action. In addition to abrading paper and thereby obscuring information, many of these pollutants also permanently stain paper. Air filtration systems control the pollution levels from both gaseous and solid pollutants, in addition to prohibiting mold growth.

As an organic product, paper is a natural food source for a variety of pests. Adhesives on the paper often provide additional incentive for infestation. Preventive Integrated Pest Management measures are essential in ensuring that paper is protected from this source of deterioration.

Finally, paper is also very susceptible to damage incurred during handling. Paper should be supported when transported (e.g., placed in a folder before moving from one location to another). Paper should not be creased or folded so that the fibers remain intact rather than bent or broken. This will preserve the original strength of the paper fabric. Duplicate or microfilm copies may be made for day-to-day use or exhibit, thus lessening the damage

incurred from frequent handling. Paper conservation techniques such as cleaning, mending, deacidification, encapsulation, and humidification, and flattening are discussed under Cartographic Materials/Oversize Documents above.

Photographic Materials

General

Photographic materials pose a unique set of difficulties for long-term storage. Twentieth-century photographic images include prints, negatives, slides (or transparencies), and digital images. Earlier images include materials such as daguerreotypes, ambrotypes, ferrotypes, cabinet cards, carte-de-visites, tintypes, and albumen prints, just to name a few. The discussion below addresses prints, slides, and negatives which may be black-and-white, color, or sepia toned. Should other nineteenth century images be noted, contact a trained document/photograph conservator immediately. It should be noted, however, that all types of photographic materials are unstable and require more stringent handling and storage requirements.

The first rule of handling photographic materials is always wear cotton gloves. Although the acid from human skin is invisible, it transfers to the image and will chemically attack the emulsion. Ideally, a copy of the print, negative, or slide should be created, and the original used only to make additional copies.

Every image (print, negative, or slide) should be stored in its own envelope or sleeve. Envelopes and sleeves should be constructed of either acid-free paper or an inert plastic. Plastics that are considered archivally sound include polyester (Mylar®), polyethylene and polypropylene. If photographic materials are improperly stored in a single envelope or sleeve, the emulsion can become scratched or dented thus irreparably damaging the image.

Photographs and slides should be indirectly labeled. Never write directly on an image; write on the back of prints, on slide or negative sleeves, and on the cardboard border of slides. Do not use ballpoint pens or pencils—the pressure used to write the label will make an irreversible impression on the front of the photograph. These impressions crack the emulsion on the photograph, thus hastening deterioration. This danger, however, does not mean that photographs should not be labeled. If label information is not recorded, valuable information will be lost and value of the photograph limited.

The storage environment is the second significant factor in determining the longevity of photographic materials. Issues that must be addressed include: light, airborne pollutants, humidity, and temperature.

As with paper documentation, ultraviolet radiation hastens the fading and embrittlement of photographic prints. This issue is particularly of concern when dealing with sepia tone or color images. These materials have an extremely short life span, and exposure to light only hastens the loss of color and definition in these images.

Air pollution can also be a source of print degradation as airborne acids attack the emulsion and particulates abrade photographic surfaces. Other types of pollutants may permanently stain images. These pollutants can also induce mold and mildew growth, which in turn, may attract insects and rodents. Much of these pollutants may be eliminated from storage areas by placing appropriate filters on the environmental systems (e.g., HVAC Systems).

High relative humidity levels (> 60%) will promote the growth of microorganisms such as mold. Fluctuating humidity levels will “impose considerable strain on the adhesion of the gelatin to the support as it expands and contracts” (Hendriks n.d.:41). Ideally, the optimum relative humidity level for processed photographic material is between 30–35% (Hendriks n.d.:42).

Temperature levels also play an important role in determining the longevity of photographic materials. High temperature levels combined with high humidity levels will accelerate the decomposition of photographs, though even high temperature alone will play a factor in the photographs decomposition. For glass plates and paper prints, temperature levels should range between 59–77° F, though excessive fluctuations should be prevented. For film, a temperature below 68° F is recommended (Hendriks n.d.:42). It is recommended that photographic experts be consulted for optimum ranges in specific locales.

Color Images

Color images are particularly susceptible to deterioration, losing their color over a relatively short period of time (less than ten years). Preservation requires not only optimal conditions, but routine replication of the original image. Guldbeck and MacLeish (1990:223) notes that some color film is now being stored in temperatures below freezing. If color images are kept in a refrigeration chamber or freezer, it is absolutely essential that these materials be allowed to slowly adapt to the outside temperature when they are removed for any reason. If this equilibrium in temperature is not achieved slowly, condensation will form on the image surface and hasten the deterioration of color images even more rapidly.

Nitrate Negatives and Film

Cellulose nitrate and cellulose acetate films deteriorate relatively quickly, and in the case of cellulose nitrate, pose a potential fire hazard. Negatives created prior to 1947 have a high probability of being Cellulose nitrate negatives. Often these negatives are larger sizes (4-x-5 inches, 5-x-7 inches, and 8-x-10 inches), and are clearly labeled NITRATE on the border of the negative. As the cellulose nitrate deteriorates, it becomes increasingly unstable. If these negatives are stored in high temperatures, there is the potential for spontaneous combustion. These materials should be copied immediately and then turned over to the local fire department for proper disposal. Movie film (of varying sizes) from this time period was also created on nitrate negative stock, and is extremely hazardous. Any spark may ignite the negatives if they have suffered severe degradation (see Audiovisual Materials above).

VII. Compliance Checklist

The following checklist is offered as a quick guide to curation requirements for cultural resources management personal. More details are provided elsewhere in the curation SOPs.

1. Repository physical plant meets DoD recommendations for implementing standards outlined in 36 CFR Part 79.

2. Repository is staffed with professional collections managers and curatorial staff.

3. Repository has written collections management policies in place: (1) collections registration procedures (including accessioning, assessment, cataloguing, labeling, packaging for use/storage, and deacessioning) that permit intellectual control of the contents and storage location of all objects and associated documentation; (2) a records management policy; (3) collection access and use policies (including loans, duplication or photography, and destructive testing); (5) routine monitoring of collections and storage areas; (6) a physical inventory policy; and (7) a disaster policy. Without these policies in place, collections cannot be managed efficiently and cost-effectively.

4. Archaeological materials and associated documentation are segregated by material class within a collection, and stored in environments appropriate to each material class. There should be devices such as a hygrothermograph and a thermohygrometer for monitoring relative humidity and temperature.

5. Collections are stored in archival quality containers.

6. All storage areas are secure.

7. An archival quality security copy of all associated documentation is stored in a separate facility.

8. Repository staff will make no decisions affecting the condition of archaeological materials or associated documentation without first consulting the appropriate DoD installation POC.

7

Recommendations for Implementing the DoD Field Collecting Guidelines and Curation Standard Operating Procedures

Proposing policies and procedures is easy; implementing them is not. This is especially true if they are perceived as having been mandated without consulting interested parties, particularly installation personnel tasked with the implementation. Additionally, several peripheral issues affect the efficacy of these proposed policies and procedures. The following eight recommendations are suggested to facilitate the review process and obtaining substantive comment and cooperation from all parties involved directly, or indirectly, in DoD archaeological collections.

1. *Work with the National Park Service to revise and reissue a Proposed Bulk Archaeological Material Deaccession Rule.*
One way to reduce collection size and consequent curation load would be to deaccession archaeological materials that are determined to be redundant, lacking provenience data, or having no scientific or interpretive value. DoD can work with the National Park Service (NPS) to revise and re-issue the proposed rule for the disposal of bulk archaeological collections. The original proposed rule to amend 36 CFR Part 79 was published in the Federal Register (1990) (see Appendix C). A number of commentators suggested changes, however, a final rule has never been released (Terry Childs, personal communication, 1997). In the absence of a final rule, the DoD has no legal basis to deaccession or dispose of any existing archaeological materials in DoD collections. The DoD should encourage NPS to revise and reissue the proposed rule, to solicit public comment, and strive to issue the final rule. The MCX-CMAC further recommends that after the final rule takes effect, DoD should create implementing guidance through a DoD Directive or an Instruction.

2. *Work with the National Park Service to replace Appendix B (Example of a Memorandum of Understanding for Curatorial Services for a Federally-Owned Collection) of 36 CFR Part 79 with language that conforms to the Office of Management and Budget's (OMB) Circular A-102 (Grants and Cooperative Agreements with State and Local Governments, August 29, 1997).*
DoD should work with the National Park Service (NPS) to replace Appendix B of 36 CFR Part 79 so that procurement of curatorial services from state and local governments is conducted according to the provisions of OMB Circular A-102. The circular directs all federal agencies to use contracts "when the principal purpose is acquisition of property or services for the direct benefit or use of the Federal Government. A grant or cooperative agreement shall be used only when the principal purpose of a transaction is to accomplish a public purpose of support or stimulation authorized by Federal statute" (Circular A-102, Section 1.a). The procurement of services by federal agencies requires competition for

amounts in excess of $2,500, thus covering the vast majority of potential costs for curation work needed on DoD archaeological collections. We suggest working with the NPS to replace Appendix B with language stipulating competitive procurement of curation services.

3. *Consult with the National Conference of State Historic Preservation Officers and the National Park Service Concerning Proposed DoD Collecting Guidelines.*
Although the proposed collecting policies and curation procedures would be applicable throughout DoD, individual installations interact with other non-DoD entities particularly State Historic Preservation Offices in managing their historic properties. Each SHPO potentially has different requirements for fieldwork and occasionally, for curation. To avoid a situation where DoD collecting and curation policies conflict with other similar non-DoD policies, we recommend that the DoD consult with the National Conference of State Historic Preservation Officers (NCSHPO), an organization that represents the interests of all SHPOs. By consulting the NCSHPO, the DoD avoids having to consult with many SHPOs.

MCX-CMAC recommends that DoD consult the National Park Service to draw on their expertise on these same issues. The Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation serve as viable general guidance for field collection. However, DoD should seek comments from the NCSHPO and the NPS on the DoD's proposed refinements.

4. *Coordinate Proposed DoD Guidelines and Standard Operating Procedures (SOPs) with the Tri-Services Military History Museums.*
Although the existing military museums in the Army, Air Force, Navy, and Marines do not generally curate archaeological collections, we suggest that each service's museum system headquarters be informed of the adoption of any field collecting guidelines and/or curation standard operating procedures by the DoD. We suggest that each service's museum headquarters participate in the review of these draft documents.

5. *Coordinate Proposed Guidelines and SOPs with installation staff directly responsible for oversight of archaeological compliance activities.*
National standards may be issued from headquarters level for each of the tri-services, but the standards will only be useful if they can be implemented by staff who are directly responsible for archaeological compliance activities. Often the MCX-CMAC hears complaints that new guidelines or SOPs have never benefited from the input of those most directly involved, largely because the circulated drafts never make it below the major subordinate command level. One means of insuring individual installation input is to request that each major subordinate command within the tri-services, submit a minimum of five points-of-contact (POCs), drawn from installation cultural resource management staff. These POC's would serve as an ad hoc committee to the Integrated Process Team for Curation (IPT). The committee would consist of "local" subject matter experts that would be charged as a group with to provide written input on these documents. MCX-CMAC could provide distribution and collection of comments from the committee for the IPT.

6. *After adoption of the Field Collecting and Curation Procedures, incorporate a review of the Guidelines and SOPs into existing External Environmental Audit Programs.*
To ensure that the field collecting guidelines and curation procedures are being implemented, we suggest that a review of the guidelines and procedures be incorporated into the existing external environmental audit programs for the tri-services. The external review will also provide installations with the opportunity to recommend changes and modifications to improve the guidelines and procedures. Furthermore, we suggest that major subordinate commands and headquarters cultural resources management staff also review the guidelines and procedures every five years.

7. *Develop regional archaeological overviews at the DoD level that can then be used as part of individual installation Integrated Cultural Resource Management Plans.*
MCX-CMAC has emphasized that a research design should be written to guide all archaeological projects. One part of the research design should

present specific research questions that can be tested by the proposed fieldwork and analysis. Given the large land-holdings of the tri-services, especially in the western U.S., we suggest the creation of regional archaeological overviews that can then be used to generate more localized research questions. While many SHPOs have created research designs to address archaeological questions in their particular states, these are constrained by geopolitical boundaries that do not conform to regional research issues. The requirement to develop installation Integrated Cultural Resource Management Plans could be used as a vehicle through which the DoD could develop regional overviews that could be used by multiple installations.

Many regions of the U.S. do not have regional syntheses of the archaeological research or the kinds of problems that could be addressed. We suggest that the DoD develop partnerships with other federal land-holding agencies such as the Bureau of Land Management, the U.S. Forest Service, and the National Park Service with lands in the vicinity of installations to write these regional overviews. The overviews should use both published and especially, unpublished data. The involvement of the academic community, installation cultural resources staff, and other qualified archaeologists and historians is also important to establish regional and local research topics. Multiple parties should be involved in defining the regional boundaries for each overview.

8. *Create guidance on who is responsible for archaeological materials removed from leased, withdrawn, or any lands held in less than fee-simple title.*
The proposed policy and SOPs provided herein are restricted to DoD fee-title lands. Further clarification is needed to determine how these should be applied to lands that the DoD uses or leases where it holds less than fee-simple title.

9. *Make curation a Category 1 (Must Fund) DoD budget activity and a line item in DoD budget.*
The U.S. Air Force has included curation as an ongoing budget category. Unfortunately, neither of the other services has done so. Collections curation and management are ongoing activities. They require constant monitoring, maintenance, and conservation in adequate facilities by professional staff. Collections are curated so that they are preserved and thus useable by future generations of Americans. Without a consistent funding stream, collections are certainly in peril.

Curation has become a significant problem today because funds have not been routinely allocated. Even those projects that had the foresight to include curation as part of the initial archaeological project cost, cannot provide sufficient funds to support curation in perpetuity. Initial funding for processing the collection and a first few years of annual curation maintenance may be provided, but not for the cost of curation in perpetuity. This requires ongoing maintenance funding.

Admittedly, curation is not a high profile budget item. It has low public visibility and does not command the military respect accorded a new armament system. It is easily overlooked or placed at the bottom of the funding chain. Nevertheless, routine minimal funding is a more efficient and least costly approach to curation. By making it a Category 1 “must fund” budget activity, DoD will expend fewer resources in the long run, and will fulfill its legal and moral obligation to preserve our public heritage.

8

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Appendix A

Telephone Questionnaire for DoD Standards Project

Institution Name | Date Called:
Address: | By:

Institution Type: *(circle one)* Federal Agency State Agency University Museum Contractor Other

POC Name:
POC Title:
Telephone #:

Field Collection of Archaeological Materials

1. Do you have a field collecting policy for archaeological materials? Yes No Tailored to Project

   (If no, do the agencies you work with prescribe a collecting policy?) Yes No Tailored to Project

   Obtain names of agencies and POCs
   Ask for examples of policies

2. Is it Written Unwritten
   (if written, request copies)

3. Does the policy address Surveys Yes No Testing Yes No Migration? Yes No

   If yes, describe how:

4. Is the policy different for prehistoric and historic materials? Yes No

   If yes, what is the difference?

5. How well does the policy work? What changes would you make? (solicit examples)

Cataloging

6. Do you catalog (wash, label, package)
   - archaeological materials? Yes No
   - associated documentation? Yes No

7. Do you have written procedures for cataloging
   - artifacts? Yes No
   - associated documentation? Yes No

   (If so, obtain copy)

8. Do agencies prescribe different cataloging procedures you must follow? Yes No
   (If yes, solicit agency names, POCs, and examples)

9. Are individual artifacts
   - Directly labeled? Yes No
   - Weighed? Yes No

10. Are individual documents
    - Directly labeled? Yes No
    - Copied? Yes No

11. Do you prepare a machine-readable catalog? Yes No

Curation of Archaeological Materials

12. Do you curate
    - Archaeological artifacts? Yes No *(If No, go to #17)*
    - Associated documentation? Yes No

13. Do you provide curation only during a project? Yes No
    - long term? Yes No

    (If both are yes, explain)

14. Do you have a written Collections Policy or Mission Statement? Yes No
    (If yes, obtain copy)

15. How are archaeological materials used?
    - a. reviewed for compliance projects
    - b. academic research
    - c. public interpretation/displays
    - d. teaching
    - e. repository administrative tasks
    - f. other (describe)

16. Is there a written use policy? Yes No
    (If yes, obtain a copy)

IF ARCHAEOLOGICAL MATERIALS ARE NOT CURATED AT THE INSTITUTION:

17. Where are they curated?
    Archaeological artifacts

    Associated documentation

18. How is a curatorial facility selected?

General Comments

19. *Solicit input on their perception of archaeological curation nationally; what works; what doesn't; improvements needed; etc.)*

Appendix B

List of Federal Institutions Contacted

Institution Name	POC Last Name	POC First Name	Street	City	State	Zipcode	Telephone Number
Air Force Space Command HQ AFSPACECOM/CEV	Rowland	Randall	150 Vandenberg St., Suite 1105	Peterson AFB	CO	80914-4150	DSN 692-9915
Air Force Special Operations Command HQ	Applegate	Michael	16 CES/CEV; 301 Cody Ave., Building T-206	Hurlburt Field	FL	32544	850-884-2977
Allegheny National Forest	Kondare	Richard	222 Liberty Street, P.O. Box 847	Warren	PA	16365	814-723-5150
Amistad National Recreation Area	Labadie	Joe	HCR 3, Box 5-J	Del Rio	TX	78840-9350	830-775-7491 ext. 205
Argonne National Laboratory	Wescott	Connie	9700 South Cass Avenue	Argonne	IL	83403-2528	630-252-5789
Atlantic Division, Naval Facilities Engineering Command	Larson	Bruce	Atlantic Division, Code 09G1, Naval Facilities Engineering Command, 1510 Gilbert Street	Norfolk	VA	23511-2699	757-322-4885
Bolling Air Force Base	Carpenter	More	11 WG/CEV, 1 McCord Street, Suite 300	Bolling AFB	DC	20332-5403	(202) 767-8603
Brooks Air Force Base Environmental Services, MS4525 (M1B), Department of the Interior	Wilde	Jim	3207 North Road	Brooks AFB	TX	78235-5363	210-536-6546
Bureau of Indian Affairs	Sutherland	Donald	18th and C Streets, NW	Washington	DC	20245	202-208-4791
Bureau of Land Management	Barker	Pat	1340 Financial Blvd., P.O. Box 12000	Reno	NV	89520-0006	702-861-6482
Bureau of Land Management	Damadio	Stephanie	2135 Butano Drive	Sacramento	CA	95825	916-978-4650
Bureau of Land Management	Douglas	John	204-LS, 18th and C Sts., NW	Washington	DC	20240	202-452-0327
Bureau of Land Management	Fike	Rich	2850 Youngfield Street	Lakewood	CO	80215-7093	970-240-5303
Bureau of Land Management	Fossberg	Steven	1474 Rodeo Road	Santa Fe	NM	87505	505-438-7415
Bureau of Land Management	Hanes	Richard	2890 Chad Drive	Eugene	OR	97408	541-683-6669
Bureau of Land Management	Kaldenberg	Russ	2135 Butano Office	Sacramento	CA	95825	916-978-4635
Bureau of Land Management	King	Robert	222 West 7th Avenue, #13	Anchorage	AK	99513	907-271-5510
Bureau of Land Management	Nowak	Tim	5353 Yellowstone, P.O. Box 1828	Cheyenne	WY	82003	307-775-6256
Bureau of Land Management	Portillo	Garth	324 South State Street, P.O. Box 45155	Salt Lake City	UT	84145-0155	801-539-4276
Bureau of Land Management	Smith	Gary	222 North 32nd Street	Billings	MT	59101	406-255-2939
Bureau of Land Management	Stumpf	Gary	222 North Central	Phoenix	AZ	85004-2203	602-417-9236
Bureau of Land Management	Townsend	Jan	7450 Boston Blvd.	Springfield	VA	22153	703-440-1600
Bureau of Reclamation	Ferguson	Bobbie	P.O. Box 25007	Denver	CO	80225-0007	303-445-2707
Bureau of Reclamation	Friedman	Ed	Land, Recreation, and Cultural Resources, D-5300, P. O. Box 25007	Denver	CO	80225-0007	303-445-2910
Bureau of Reclamation	Hicks	Patrica	Lower Colorado Regional Office, P.O. Box 61470	Boulder City	NV	89006-1470	702-293-8705

Institution Name	POC Last Name	POC First Name	Street	City	State	Zipcode	Telephone Number
Bureau of Reclamation	Zontek	Terry	P.O. Box 36900	Billings	MT	59101-1362	406-247-7720
Bureau of Reclamation, Great Plains Region - GP2100	Coutant	Brad	P.O. Box 36900	Billings	MT	59107-7722	406-247-7722
Bureau of Reclamation, Mid-Pacific Region	Welch	Patrick	2800 Cottage Way	Sacramento	CA	95825	916-978-5040
Bureau of Reclamation, Pacific Northwest Region, PN-6511	MacDonald	Lynne	1150 North Curtis Road, Suite 100	Boise	ID	83706	208-378-5316
Canyonlands National Park, Archs, Natural Bridges, Southeast Utah Group	Coulam	Nancy	2282 South West Resource Blvd.	Moab	UT	84532-8000	435-259-3911
Capitol Reef National Park	Kreutzer	Lisa	HC70, Box 15	Torrey	UT	84775	801-425-3791 ext. 146
Channel Islands National Park	Morris	Don	1901 Spinnaker Drive	Ventura	CA	93001	805-658-5730
Chequamegon and Nicolet National Forest	Stiles	Cindy	1170 4th Avenue, South	Park Falls	WI	54552	715-362-1338
Chippewa National Forest	LeVasseur	Andrea	Route 3, Box 244	Cass Lake	MN	56633	218-335-8671
Cleveland National Forest	Ver Planck	Cari	10845 Rancho Bernardo Road, St 200	San Diego	CA	92127-2107	619-674-2973
Department of Energy, Office of Environmental Policy and Assistance ETT-412	Thompson	Lois	1000 Independence Avenue SW	Washington	DC	20585-0119	202-586-9581
Department of the Interior	Wilson	Rex	1849 C Street, NW	Washington	DC	20240	202-208-3438
Eldorado National Forest	McLemoore	Denise	100 Forni Road	Placerville	CA	95667	530-622-5061
Environmental Protection Agency, Office of Federal Activities	Haman	Patricia	401 “M” Street (2232-A)	Washington	DC	20460	202-564-7152
F.E. Warren Air Force Base	Bryant	Rick	90 CES/CEV, 300 Vesle Drive	F.E. Warren AFB	WY	82005-2793	307-773-3667
Federal Energy Regulatory Commission	Griffen	James	888 1st Street NE	Washington	DC	20426	202-219-2799
Federal Highway Administration, Environmental Analysis Division, HEP-40	Eberle	Bruce	400 7th Street SW, Rm 3240	Washington	DC	20590	202-366-2060
Ft. Carson Curation Facility	Lay	Gina	801 Tevis Street	Ft. Carson	CO	80913-4000	719-526-3806
Ft. Hood	Smith	Kimball	ATTN: AFZF-DE-ENV	Ft. Hood	TX	76544-5057	254-287-7955
Ft. Lewis	McGuff	Paul	ATTN: AFZH-DEQ, Env and NR Div DEH	Ft. Lewis	WA	98433	253-967-5337
Glen Canyon National Recreation Area	Burchett	Tim	P.O. Box 1507	Page	AZ	86040	520-608-6275

Institution Name	POC Last Name	POC First Name	Street	City	State	Zipcode	Telephone Number
Golden Gate National Recreation Area	Barker	Leo	Fort Mason, Building 201	San Francisco	CA	94123	415-561-4832
Grand Canyon National Park	Balsam	Janet	P.O. Box 129	Grand Canyon	AZ	86023	520-638-7758
Green Mountain National Forest	Lacy	Dave	231 North Main Street	Rutland	VT	05701	802-747-6719
Hanford Reservation	Lloyd	Dee	825 Jadwin Avenue, MSIN A5-15	Richland	WA	99352	509-372-2299
Hawaii Volcanoes National Park	Keswick	Jane	P.O. Box 52	Hawaii Volcanoes National Park	HI	96718-0052	808-967-8186
Hiawatha National Forest	Franzer	John	2727 North Lincoln Road	Escanaba	MI	49829	906-786-4062
Hoosier National Forest	Krieger	Angie	811 Constitution Avenue	Bedford	IN	47421	812-277-3576
HQ, Air Force Material Command	Tagg	Marty	4225 Logistics Avenue, Suite 8	Wright Patterson AFB	OH	45433-5747	513-257-5878/ DSN 986-1281
HQ, Air Mobility Command	Burgess	Robin	HQ AMC/CEVP, 507 A Street	Scott AFB	IL	62225-5022	618-256-5764
Idaho National Engineering and Environment Laboratory, Lockheed-Martin Idaho Technologies Company	Marler	Clayton	MS2105; P.O. Box 1625	Idaho Falls	ID	83401	208-526-0924
Klamath National Forest	Rock	Jim	1312 Fairlane Road	Yreka	CA	96097	700-842-6131
Lake Mead National Recreation Area	Pepito	Rosie	601 Nevada Highway	Boulder	NV	89005	702-293-8959
Langley Air Force Base	Green	Paul	129 Andrews St., Suite 102	Langley AFB	VA	23665-2769	DSN 574-9335
Lassen National Forest	Johnston	Jim	55 South Sacramento Street	Susanville	CA	96130	530-257-2151
Los Alamos National Laboratory	McGhee	Ellen	ESH-20,MS M887	Los Alamos	NM	87545	505-665-1722
Mark Twain National Forest	Erickson	Enid	401 Fairgrounds Road	Rolla	MO	65401	573-341-7442
Mendocino National Forest	Greenway	Greg	825 N. Humboldt Avenue	Willows	CA	95988	530-934-3316
Midwest Archeological Center	Dial-Jones	Jan	Federal Bldg., 100 Centennial Mall N, Rm 474	Lincoln	NE	68508-3873	402-437-5392 x114
Modoc National Forest	Gates	Gerry	800 W. 12th Street	Alturas	CA	96101	700-623-5100
Monogahela National Forest	Brinker	Ruth	200 Sycamore Street	Elkins	WV	26241	304-636-1800 ext. 245
National Conservation Training Center, U.S. Fish and Wildlife Service	Harold	Jeanne	Route 1, Box 116	Shepherds-town	WV	25443	304-876-7285
National Lake Meredith Recreation Area	Rancier	Jim	P.O. Box 1460	Fritch	TX	79036	806-857-3151
National Park Service	Childs	Terry	P.O. Box 37127	Washington	DC	20013-4101	202-523-0000

Institution Name	POC Last Name	POC First Name	Street	City	State	Zipcode	Telephone Number
National Park Service	Wilson	Robert	Southeast Archeological Center, 2035 East Paul Dirac Drive, Box 7, Johnson Building, Suite 120	Tallahassee	FL	32310	850-580-3011 ext. 149
National Park Service, Western Archeological and Conservation Center	Baumann	Steve	1415 North 54th Avenue	Tucson	AZ	85705-6643	520-610-6501
Natural Resources Conservation Service	Kaczor	Michael	P.O. Box 2980	Washington	DC	20013-2890	202-720-2587
Naval Air Station, North Island, Natural Resources Office	Yatzko	Andy	Staff CE Code 18N, NAS-North Island, Box 357040	San Diego	CA	92135-7040	619-545-1131
Naval Air Weapons Station, Port Mugu	Schwartz	Steve	Environmental Division - P7320, Naval Air Weapons Station	Port Mugu	CA	93042-5000	805-989-3008
Nellis Air Force Base	Myhrer	Keith	99 ABW/EM, 4349 Duffer Drive, Suite 1601	Nellis AFB	NV	89191-7007	702-652-9365
Nevada Test Site, Nevada Operations Office, U.S. Department of Energy	Furlow	Robert	232 Energy Way North	Las Vegas	NV	89030	702-295-0845
Oak Ridge National Laboratory, Technical Support Division, SE-32	Moore	Ray	P.O. Box 2001	Oak Ridge	TN	37831	423-576-9574
Olympic National Park	Gleason	Paul	600 East Park Avenue	Port Angeles	WA	98362-6798	360-452-0316
Ottawa National Forest	Hill	Mark	E6248 US2	Ironwood	MI	49938	906-932-1330 ext. 314
Pacific Air Force, HQ PACAF/CEVP	Buckman	Art	25 East St., Suite D-306	Hickam AFB	HI	96853-5412	808-449-9695
Pocatello Research Area Office	Kreswell	Lisa	Pocatello Resource Area Office, 1111 North 8th Avenue	Pocatello	ID	83201-5789	208-236-6860
Randolph Air Force Base	Siegel	Jack	266 “F” St. West, Building 901	Randolph AFB	TX	78150-4321	DSN 487-3959/ 210-652-3959
Redwood National Park	Smith	Ann	1111 Second Street	Crescent City	CA	95531	707-464-6101
San Bernardino National Forest	Mlazovsky	Marilyn	1824 South Commerce Center Circle	San Bernardino	CA	92408	909-383-5588
Sandia National Laboratories	Wolff	Ted	MS-0369	Albuquerque	NM	87185-0369	505-844-6148
Savannah River Archaeological Research Program	Forehand	Tammy	P.O. Box 600	New Ellenton	SC	29809	803-725-3623
Sequoia and Kings Canyon National Parks	Burge	Tom		Three Rivers	CA	93271-9700	209-565-3139
Shawnee National Forest	McCorvie	Mary	221 Walnut Street	Murphysboro	IL	62966	618-687-1731

Institution Name	POC Last Name	POC First Name	Street	City	State	Zipcode	Telephone Number
Smithsonian Institution	Tompkins	William	900 Jefferson Road, SW 3101	Washington	DC	20500	202-357-3125
Superior National Forest	Okstad	Walt	8901 Grand Avenue Place	Duluth	MN	55808-1102	218-626-4321
Tennessee Valley Authority	Yarnell	Richard	17 Ridgeway Road	Norris	TN	37828	423-632-1584
U.S. Air Force Academy, HQ USAFA/CEVP	Boyle	Duane	8120 Edgerton Drive, Suite 40	USAF Academy	CO	80840-2400	719-333-4483
U.S. Fish and Wildlife Service, Division Of Refuges, MS ARLSQ-670	Killcullen	Kevin	1849 C Street NW	Washington	DC	20240	703-358-2029
U.S. Forest Service	De Bloois	Evan	P.O. Box 96090	Washington	DC	20250	202-205-1427
U.S. Forest Service Region 3, Southwest Region	Propper	Judy	Federal Building, 51 Gold Avenue SW	Albuquerque	NM	87102	505-842-3232
U.S. Forest Service, Eastern Region	Forney	Sandi	310 West Wisconsin Avenue, Room 500	Milwaukee	WI	53203	414-297-3656
U.S. Forest Service, Northern Region	Beckes	Mike	Federal Building, P.O. Box 7669	Missoula	MT	59807	406-329-3654
U.S. Forest Service, Region 5	Rose	Judy	630 Sansome Street	San Francisco	CA	94111	415-705-2898
U.S. Forest Service, Rocky Mountain Region	Liestman	Terri	P.O. Box 25127	Lakewood	CO	80225	303-275-5051
U.S. Navy	McLaughlin	Kathleen	200 Stovall Street	Arlington	VA	22332-2300	703-325-7353
U.S. Navy, Office of the Assistant Secretary of the Navy	Murphy	Bernard	200 Stovall Street	Arlington	VA	22332-2300	703-325-8004
White Mountain National Forest	Roenke	Karl	Federal Building, 719 Main Street; P.O. Box 638	Laconia	NH	03247-2772	603-528-8721
Yellowstone National Park	Johnson	Ann	P.O. Box 168	Yellowstone National Park	WY	82190-0168	307-344-2155
Yosemite National Park	Laird	Laura	P.O. Box 577	Yosemite	CA	95389	209-379-1840

Appendix C

List of Non-Federal Institutions Contacted

POC Last Name	POC First Name	Institution Name	Street	City	State	Zipcode	Telephone Number
Acuff	Beth	Virginia Department of Historic Resources	2801 Kensington Ave.	Richmond	VA	23221	804-367-2323 x134
Anderson	Kelly	Lac du Flambeau Band of Lake Superior Chippewa Indians	P.O. Box 67	Lac du Flambeau	WI	54538	715-588-3303
Anfinson	Scott	Minnesota Historical Society	345 Kellogg Blvd. West	St. Paul	MN	55102-1906	612-296-5434
Arnison	Kathy	Spokane Tribe of Indians	P.O. Box 100	Wellpinit	WA	99040	509-258-4060
Au	Kenneth	Hawaii Department of Transportation	869 Punchbowl St.	Honolulu	HI	96813-5098	808-581-1843
Aune	Elisse	Mille Lacs Band of Ojibwe Indians Tribal Historic Preservation Office	HCR 67, Box 194	Onamia	MN	56395	320-532-4181
Ballow	George	Florida Department of Transportation	605 Swannee Street	Tallahassee	FL	32399-0450	850-414-5205
Baumler 406-444-7721	Mark F.	Montana State Historic Preservation Office	1410 8th Ave., P.O. Box 201202	Helena	MT	59620-1202	
Beckerman	Ira	Pennsylvania Department of Transportation	1200 Transportation and Safety Building, Commonwealth and Forster	Harrisburg	PA	17120	717-787-1024
Bell	Edward L.	Massachusetts Historical Commission	220 Morrissey Blvd.	Boston	MA	02125	617-727-8470 x358
Benaron	Sue	Statistical Research, Inc.	P.O. Box 31865	Tucson	AZ	85751-1865	520-721-4309
Benchley	Elizabeth	Archaeology Institute	University of West Florida, 11000 University Parkway	Pensacola	FL	32514	850-474-3015
Bicchieri	Barbara	Central Washington Archaeological Survey	Central Washington University	Ellensburg	WA	98926-7544	509-963-3489
Black	Kevin	Colorado Historical Society	1300 Broadway	Denver	CO	80203	303-866-4671
Blank	John	Department of Anthropology	Cleveland State University	Cleveland	OH	44115	216-687-2413
Boulgrin	Lon	Northern Mariana Islands Historic Preservation Office	Department of Community and Cultural Affairs	Saipan	MP	96950	670-664-2120
Bowers	Peter M.	Northern Land Use Research, Inc.	P.O. Box 80532	Fairbanks	AK	99708	907-474-9684
Brooks	Robert L.	Oklahoma Archaeological Survey	University of Oklahoma, 111 E. Chesapeake, Room 102	Norman	OK	73019	405-325-0311
Brown	Judy	CRM Survey Office	University of Wyoming, Box 3431, University Station	Laramie	WY	82071	307-766-3671
Burke	Clarinda	Confederated Salish and Kootenai Tribes Historic Preservation Office	P.O. Box 278	Pablo	MT	59855	406-675-2700
Busby	Colin I.	Basin Research Associates, Inc.	1933 Davis St., Suite 210	San Leandro	CA	94577	510-430-8441

POC Last Name	POC First Name	Institution Name	Street	City	State	Zipcode	Telephone Number
Butler	Susan	Louis Berger and Associates	950 50th St.	Marion	IA	52302	319-373-3043
Butler	Brian	Center for Archaeological Investigations	Southern Illinois University-Carbondale, Faner Hall	Carbondale	IL	62901	618-453-5024
Campbell	Jan	Prentice Thomas and Associates	124 Shell Ave. SE	Ft. Walton Beach	FL	32548	850-243-5992
Campbell	Russell	Alexander Archaeological Consultants	P.O. Box 62	Wildwood	GA	30757	423-822-9944
Carmichael	David	Sociology and Anthropology Department	University of Texas, Old Main Building, Room 109	El Paso	TX	79968	915-747-6599
Carr	Kurt	Pennsylvania Division of Archaeology and Protection	P.O. Box 1026, State Museum Building	Harrisburg	PA	17120-1026	717-783-9926
Casner	Nancy	District of Columbia Historic Preservation Division	614 H Street NW, Suite 305	Washington	DC	20001	202-727-7360
Chandler	Susan	Alpine Archaeological Consultants, Inc.	P.O. Box 2075, 521 E. Main	Montrose	CO	81402-2075	970-249-6761
Chapman	Dick	Office of Contract Archeology	University of New Mexico, 1717 Lomas Blvd. NE	Albuquerque	NM	87131	505-277-5853
Childs	Denise	Office of Cultural Resources Management	Arizona State University, Box 872402	Tempe	AZ	85287-2402	602-965-6262
Claggett	Stephen	North Carolina Division of Archives and History	109 E. Jones St.	Raleigh	NC	27601-2801	919-733-7342
Claybaugh	Patricia	Center for Environmental Archaeology	Texas A & M	College Station	TX	77843-4352	409-845-9333
Clessert	Tony	Navajo Nation Tribal Historic Preservation Department	P.O. Box 4950	Window Rock	AZ	86515	520-871-6375
Collins	Mary	Museum of Anthropology	Washington State University	Pullman	WA	99164-4910	509-335-3341
Cook	John	ASM Affiliates, Inc.	543 Encinitas Blvd., Suite 114	Encinitas	CA	92024	760-632-1094
Corbett	Patsy	Center for Archaeological Research	Southwest Missouri State University, 901 South National Avenue	Springfield	MO	65804-0089	417-836-5363
Cunningham	Kevin	Delaware Department of Transportation	Highway Administration Center, P.O. Box 778	Dover	DE	19903	302-760-2125
Dancey	William	Department of Anthropology	Ohio State University	Columbus	OH	43210-1364	614-292-9770
Davis	Richard	Guam Historic Preservation Office	Department of Parks and Recreation, P.O. Box 2950	Agana	GU	96910	671-475-6290
Day	Bill	Tunica-Biloxi Tribe of Louisiana, Historic Preservation Office	PO Box 331	Marksville	LA	71351	318-253-0213
De Marais	Casey	IMA Consulting, Inc.	2635 4th St. SE	Minneapolis	MN	55414	612-623-0299

POC Last Name	POC First Name	Institution Name	Street	City	State	Zipcode	Telephone Number
Deitz	Lisa	Department of Anthropology Museum	University of California, Davis	Davis	CA	95616-8522	530-752-8280
Deming	Joan	Archaeological Consultants, Inc.	2345 Bee Ridge Road #6	Sarasota	FL	34239	941-925-9906
Dent	Richard	Potomac River Archeology Section	Department of Anthropology, American University	Washington	DC	20016-8003	202-885-1830 and 202-885-1848
Deshotels	Michelle	Louisiana Department of Transportation and Development	P.O. Box 94245, 1201 Capitol Access Road	Baton Rouge	LA	70804	504-929-9192
DiBlasi	Philip	Department of Anthropology	University of Louisville	Louisville	KY	40292	502-852-6864 (dept) and -6724 (o)
Diehl	Judy	Missouri Historic Preservation Program	P.O. Box 176	Jefferson City	MO	65102	573-751-7862
Donat	Lela	Arkansas Archaeological Survey Research Station	University of Arkansas, PO Box 1249	Fayetteville	AR	72702-1249	501-575-6552 and 501-575-6554
Drucker	Lesley	AF Consultants	6546 Haley Drive	Columbia	SC	29206	803-787-4169
Dudzik	Mark	Fort Snelling History Center	Historic Fort Snelling	St. Paul	MN	55111	612-725-2411
Dykmann	Jim	Utah Preservation Office	Antiquities Section, 300 Rio Grande	Salt Lake City	UT	84101	801-533-3555
Elliott	Jim	Massachusetts Highway Department	10 Park Plaza	Boston	MA	02116-3973	617-951-0672
Entrof	Bob	Georgia Department of Transportation	2 Capitol Square	Atlanta	GA	30334	404-699-4405
Esarey	Mark	Illinois Historic Preservation Office	Old State Capitol	Springfield	IL	62706	217-785-4999
Estabrook	Rich	Janus Research	2935 First Ave. North	St. Petersburg	FL	33713	813-821-7600
Eubanks	Thomas	Louisiana Division of Archaeology	Capitol Annex Building, P.O. Box 44247	Baton Rouge	LA	70804	504-342-8170
Faber	Randy	Iowa Department of Transportation	800 Lincoln Way	Ames	IA	50011-1050	515-239-1215
Fish	Paul	Arizona State Museum	University of Arizona	Tucson	AZ	85721	520-621-2556
Francis	Julie	Wyoming Department of Transportation	5300 Bishop Blvd., P.O. Box 1708	Cheyenne	WY	82003-1708	307-777-4740
Frankenburg 423-974-1864	Sue	Forensic Anthropology Center	University of Tennessee-Knoxville	Knoxville	TN		37996-0720
Friedlin	Adeline	Confederated Tribes of the Colville Reservation	P.O. Box 150	Nespelem	WA	99150	509-634-4711
Futato	Eugene	Office of Archaeological Research, University of Alabama Museum	13075 Moundville Archaeological Park	Moundville	AL	35474	205-371-2266 and 205-348-7774
Garber	James	Southwest Texas State University	601 University Drive	San Marcos	TX	78666	512-245-8272

POC Last Name	POC First Name	Institution Name	Street	City	State	Zipcode	Telephone Number
Gard	Hal	Oregon Department of Transportation	140 Transportation Building, Capitol and Center Streets	Salem	OR	97310	503-986-3477
Gasser	Bob	Arizona Department of Transportation	206 S. 17th Avenue	Phoenix	AZ	85007	602-255-8461
Gaston	Jenna	Idaho Department of Transportation	3311 W. State St., P.O. Box 7129	Boise	ID	83707	208-334-8479
Gates	Thomas	Yurok Tribe Cultural Division	1034 6th St.	Eureka	CA	95501	707-444-0433
Geidel	Richard	KCI Technologies, Inc.	5001 Louise Dr., Suite 201	Mechanicsburg	PA	17055	717-691-1340
Gerhardt	Juliette	John Milner Associates, Inc.	309 N. Matlack St.	West Chester	PA	19380	610-344-0531
Gettys	Marshall	Oklahoma State Historic Preservation Office	2704 Villa Prom, Shepherd Mall	Oklahoma City	OK	73105	405-521-6381
Gilreath	Amy	Far Western Anthropological Research Group, Inc.	P.O. Box 413	Davis	CA	95617	530-756-3941
Gilsen	Leland	Oregon Historic Preservation Office	State Parks and Recreation, 1115 Commercial St., NE	Salem	OR	97310-1001	503-378-6508
Good	Kent	North Dakota Department of Transportation	608 E. Boulevard Ave.	Bismarck	ND	58505-0700	701-328-2731
Gozdzik	Gloria	Horizon Research Consultants	1534 Point Marion Road	Morgantown	WV	26506	304-599-5799
Graham	Paul	Ohio Department of Transportation	1980 W. Broad St.	Columbus	OH	43223	614-466-5099
Green	William	Office of the State Archaeologist	University of Iowa, 700 Clinton Street Bldg.	Iowa City	IA	52242-1030	319-384-0732
Gregg	Michael	New Jersey Department of Environmental Protection	CN-402, 401 East State Street	Trenton	NJ	0865	609-633-2395
Gresham	Thomas	Southeastern Archeological Services	P.O. Drawer 8086	Athens	GA	30603	706-546-1850
Grey	Bruce	Mississippi Department of Transportation	Woolfolk State Office Building, 401 North West Street	Jackson	MS	39215-1850	601-944-9371
Hall	Charles	Maryland Department of Transportation	Office of the Secretary, P.O. Box 8755, 10 Elm Road	BWI Airport	MD	21240-0755	410-321-3230 (Brookville)
Hally	David	Riverbend Research Laboratory, University of Georgia	Baldwin Hall	Athens	GA	30602-1619	706-542-1458
Hartgen	Karen	Hartgen Archeological Associates, Inc.	331 N. Greenbush Road	Troy	NY	12180	518-283-0543
Hartley	John	Oklahoma Department of Transportation	200 NE 21st St.	Oklahoma City	OK	73105	405-521-3651
Hattori	Gene	Nevada State Historic Preservation Office	100 Stewart Street, Capitol Complex	Carson City	NV	89710	702-687-6362

POC Last Name	POC First Name	Institution Name	Street	City	State	Zipcode	Telephone Number
Haug	James	South Dakota State Archaeological Research Center	2425 East St. Charles Street, P.O. Box 1257	Rapid City	SD	57709-1257	605-394-1936
Hebert	Mike	Rhode Island Department of Transportation	2 Capitol Hill, State Office Building	Providence	RI	02903	401-222-2023 x4040
Hess	Kathleen	Mid-Continental Research Associates, Inc.	P.O. Box 728	Springdale	AR	72765	501-750-1412
Hilton	Charles	Maxwell Museum of Anthropology	University of New Mexico	Albuquerque	NM	87131-1201	505-277-4405 and 505-277-0195
Hollingsworth	Caryn	Department of Anthropology	University of Alabama-Birmingham, 1212 University Blvd.	Birmingham	AL	35294	205-934-4690
Holstein	Harry	Jacksonville State Archaeological Research Laboratory	Department of Geography and Anthropology, Jacksonville State University	Jacksonville	AL	36265	205-782-5656
Honnerkamp	Nicholas	Institute of Archaeology	University of Tennessee-Chattanooga	Chattanooga	TN	37403-2598	423-755-4325
Hostelder	Beth	New Hampshire Department of Transportation	Hazen Drive, P.O. Box 483	Concord	NH	03301-0483	603-271-3226
Howard	Anne	Arizona SHPO	1300 West Washington	Phoenix	AZ	85007	602-542-7138
Hughes	Richard	Maryland Office of Archaeology	Division of Historical and Cultural Programs, Division of Housing/Community Development, 100 Community Place	Crownsville	MD	21032-2032	410-514-7600
Hume	Gary	New Hampshire Division of Historical Resources	P.O. Box 2043	Concord	NH	03302-2043	603-271-3483 and 603-271-3558
Hurst	Bill	Nebraska Department of Roads	1500 Nebraska Highway 2, P.O. Box 94759	Lincoln	NE	65809-4759	402-479-4795
Ivey	Mary	New York Department of Transportation	Building 5, State Office Campus	Albany	NY	12232	518-457-4054
Jacobs	Teresa	Nebraska State Historical Society	P.O. Box 82554	Lincoln	NE	68501	402-471-4766
Jaehnig	Manfred	Confederated Tribes of the Umatilla Reservation	P.O. Box 638	Pendleton	OR	97801	541-276-3165
Jennings	Cal	Laboratory of Public Archaeology	Colorado State University	Ft. Collins	CO	80523	970-221-0627
Jepson	Dan	Colorado Department of Transportation	4201 E. Arkansas Ave.	Denver	CO	80222	303-757-9631
Johnson	Nathan	Alaska Department of Transportation and Public Facilities	3132 Channel Drive	Juneau	AK	99801-7898	907-465-6954

POC Last Name	POC First Name	Institution Name	Street	City	State	Zipcode	Telephone Number
Juli	Harold	Department of Anthropology	Connecticut College, 270 Mohogan Ave.	New London	CT	06320-4196	860-439-2228
Justice	Noel	Glenn A. Black Laboratory of Archaeology	Department of Anthropology, Indiana University	Bloomington	IN	47405	812-855-6022
Kaufman	Cara	Iowa State Historical Society	Capitol Complex, East Sixth and Locust Streets	Des Moines	IA	50319	515-281-8744
Kavanagh	Tom	William Hammond Mathers Museum	Indiana University, 601 East 8th Street	Bloomington	IN	47405	812-855-3339
Keck	John	Wyoming State Historic Preservation Office	2301 Central Ave., D209 Fourth Floor	Cheyenne	WY	82002	307-777-7697
Kenmotsu	Nancy	Texas Department of Transportation	125 C. Greer Highway Building, 125 E. 11th Street	Austin	TX	78701-2483	512-416-2631
Keyes	Maurice	District of Columbia Department of Public Works	Reeves Center, 2000 14th St. NW, 6th Floor	Washington	DC	20009	209-939-8010
King	Glenda	Idaho State Historical Society	210 Main Street	Boise	ID	83702	208-334-3847
Klein	Terry	URS-Greiner Inc.	561 Cedar Lane, Suite 553	Florence	NJ	08518-2511	609-499-3447
Kline	Gerald	Tennessee Department of Transportation	700 James K. Polk Building, Fifth and Deaderick	Nashville	TN	37243-0349	615-741-3653
Koczan	Steve	New Mexico State Highway and Transportation Department	1120 Cerrilos Road, P.O. Box 1149	Santa Fe	NM	87504	505-827-5235
Kuhn	Robert	New York Office of Parks, Recreation and Historic Preservation	Peebles Island, PO Box 279	Waterford	NY	12188	518-237-8643 x255
Lampe	Chris	Archaeological and Historic Consultants	101 N. Pennsylvania Ave., PO Box 482	Centre Hall	PA	16828	814-364-2135
Larson	Lynn	Larson Anthropological/ Archaeological Services	P.O. Box 70106	Seattle	WA	98107	206-782-0980
Larson Jr.	Lewis	Antonio J. Waring Jr. Archaeological Laboratory, State University of West Georgia	Martha Munro, Rm. 308	Carrollton	GA	30118	770-836-6455
Lewis	Michael	University of Alaska Museum	University of Alaska-Fairbanks,` 907 Yukon Drive	Fairbanks	AK	99775-6960	907-474-6943
Lewis	Claudette	Virgin Islands Department of Planning and Natural Resources	Division of Archaeology and Historic Preservation, Foster Plaza, 396-1 Anna's Retreat	St. Thomas	VI	00802	340-776-8605
Linder-Linsley	Sue	Department of Anthropology	Southern Methodist University, P.O. Box 750336	Dallas	TX	75275	214-768-2938

POC Last Name	POC First Name	Institution Name	Street	City	State	Zipcode	Telephone Number
Lindsey-Foster	Judith	Maine Department of Transportation	Transportation Building, State House Station 16	Augusta	ME	04333-0016	207-287-5735
Little	Keith	Panamerican Consultants, Inc.	P.O. Box 40930	Tuscaloosa	AL	35404	205-556-3096
Louise	Lee	Alabama Department of Transportation	1409 Coliseum Blvd.	Montgomery	AL	36130	334-242-6225
Markman	Charles	Markman and Associates	840 S. Meramec Avenue	St. Louis	MO	63105-2539	314-862-6117
Martin	Bill	Texas Historical Commission	Box 12276, Capitol Station	Austin	TX	78711	512-463-5867
Matranga	Pete	Nevada Department of Transportation	1263 S. Stewart St.	Carson City	NV	89712	702-888-7478
Mauricio	Rufino	Micronesia Historic Preservation Office of Administrative Services	Division of Archives and Historical Preservation, FSM National Government, P.O. Box PS 35	Palikir Pohnpei	FM	96941	011-691-320-2343
Mayer	Thomas	Alabama Historical Commission	468 S. Parker Street	Montgomery	AL	36130	334-242-3184
McCallister	Paul	Michigan Department of Transportation	State Transportation Building, 425 West Ottawa, P.O. Box 30050	Lansing	MI	48913	517-335-2622
McClurkan	Barney	Arkansas Department of Transportation	P.O. Box 2261	Little Rock	AR	72203	501-569-2281
McCord	Beth	Archaeological Resources Management Services	Ball State University	Muncie	IN	47306	765-285-1575
McGahey	Samuel	Mississippi Department of Archives and History	PO Box 571	Jackson	MS	39205	601-359-6940
McGowan	Dana	Jones and Stokes Associates, Inc.	2600 V Street, Suite 100	Sacramento	CA	95818-1914	916-737-3000
McGowan	Kevin	Public Service Archaeology Program	University of Illinois Urbana-Champaign, 109 Davenport, 607 S. Matthews	Urbana	IL	61801	217-333-1636
McLesky	George	Arkansas Historic Preservation Program	323 Center St., Suite 1500	Little Rock	AR	72201	501-324-9880
McNerney	Mike	American Resources Group, Ltd.	127 N. Washington	Carbondale	IL	62901	618-529-2741
Mead	Barbara	Michigan Historical Center	Department of State	Lansing	MI	48919-1847	517-373-6416
Meetile	John	Kentucky Transportation Cabinet	State Office Building, High and Clinton Streets	Frankfort	KY	40622	502-564-7250
Mehrer	Mark	Department of Anthropology	Northern Illinois University	Dekalb	IL	60115	815-753-0293
Mentz	Tim	Standing Rock Sioux Tribe Historic Preservation Office	P.O. Box D	Fort Yates	ND	58538	701-854-2120
Metcalf	Michael	Metcalf Archaeological Consultants	P.O. Box 899	Eagle	CO	81631	970-328-6244

POC Last Name	POC First Name	Institution Name	Street	City	State	Zipcode	Telephone Number
Miester	Nicolette	University of Colorado Museum	Henderson Building, Campus Box 218	Boulder	CO	80309-0218	303-495-8881 and 303-492-6671
Miller	James J.	Florida Division of Historical Resources	500 S. Bronough Street	Tallahassee	FL	32399-0250	850-487-2299
Miller	Susan	Utah Department of Transportation	Regional Office #4, P.O. Box 700	Richfield	UT	84701	435-896-9501 x735
Mohow	Jim	Indiana Department of Natural Resources	Division of Historic Preservation, 402 W. Washington, Room W274	Indianapolis	IN	46204	317-232-6983
Mone	Sheila	California Department of Transportation	1120 N Street, P.O. Box 942673	Sacramento	CA	94273-0001	916-653-8746
Morrow	Julie	Arkansas Archaeological Survey	Arkansas State University, Arkansas Archaeological Survey Station, Drawer 820	Jonesboro	AR	72467	870-972-2071
Murdoch	Lynn	Idaho Museum of Natural History	Idaho State University	Pocatello	ID	83209	208-236-3131 x4945
Nelson	James	South Dakota Department of Transportation	700 E. Broadway Ave.	Pierre	SD	57501-2586	605-773-3098
Newton	Dale	Kansas Department of Transportation	Docking State Office, 915 Harrison	Topeka	KS	66612	785-296-8413
Norcini	Marilyn	Museum of Anthropology	New Mexico State University, Box 3001, Department 3564	Las Cruces	NM	68003-8001	505-646-4536
O'Malley	Nancy	Office of Archaeology, Museum of Anthropology	University of Kentucky, 330A Virginia Avenue	Lexington	KY	40506-0024	606-257-8208
O'Masky	Matt	Department of Anthropology	Vanderbilt University, Box 6050, Station B	Nashville	TN	37235	615-343-2518
Opperman	Tony	Virginia Department of Transportation	1401 E. Broad St, Room 414	Richmond	VA	23129	804-371-6749
Otto	Martha	Ohio Historical Society	1982 Velma Ave.	Columbus	OH	43211	614-297-2641
Pape	Kevin	Gray and Pape, Inc.	1318 Main St.	Cincinnati	OH	45210	513-287-7700
Peebles	Giovanna	Vermont Division for Historic Preservation	135 State Street, Drawer 33	Montpelier	VT	05633-1201	802-828-3050
Peter	Duane	Geo-Marine, Inc.	550 E. 15th St.	Plano	TX	16828	972-422-2736
Phelps	David	Archaeology Laboratory	Department of Sociology and Anthropology, East Carolina University	Greenville	NC	27858-4353	515-328-6766
Platt	Steve	Montana Department of Transportation	2701 Prospect Ave.	Helena	MT	59620	406-444-0455
Poirer	Dave	Connecticut Historical Commission	59 South Prospect Street	Hartford	CT	06106	860-566-3005

POC Last Name	POC First Name	Institution Name	Street	City	State	Zipcode	Telephone Number
Polk	Michael	Sagebrush Archaeological Consultants L.L.C.	3670 Quincy Ave., Suite 203	Ogden	UT	84403	801-394-0013
Prewitt	Elton R.	Prewitt and Associates, Inc.	7701 No. Lamar Suite 104	Austin	TX	78752-1012	512-459-3349
Price	Barry	Applied EarthWorks	5090 N. Fruit Avenue, Suite 101	Fresno	CA	97311-3064	209-229-1856
Prouty	Fred	Tennessee Department of Environment and Conservation	401 Church St., L and C Tower, 21st Floor	Nashville	TN	37243-0435	615-532-1554
Ramsey	Darwin	South Carolina Department of Transportation	955 Park Street, P.O. Box 191	Columbia	SC	29202	803-737-1424
Reeder	Bob	Missouri Department of Transportation	Highway and Transportation Building, PO Box 270, Corner of Capitol and Jefferson	Jefferson City	MO	65102	573-751-0473 and 573-751-4606
Richter	Sue	Kansas State Historical Society	6465 Southwest 6th Ave.	Topeka	KS	66615-1099	785-272-8681 x151
Robinson	Kenneth	North Carolina Department of Transportation	PO Box 252011, 1 South Wilmington St.	Raleigh	NC	27611	919-733-7844 x288
Sanders	Tom	Kentucky Heritage Council	300 Washington Street	Frankfurt	KY	40601	502-564-7005
Saxman-Rogers	Michelle	South Dakota Historical Preservation Center	Cultural Heritage Center, 900 Governor Drive	Pierre	SD	57501	605-773-3458
Schneider	Fred	Department of Anthropology	University of North Dakota, P.O. Box 8374	Grand Forks	ND	58202	701-777-4718
Sebastian	Lynn	New Mexico Historic Preservation Division	Villa Rivera Building, 228 East Palace Ave.	Santa Fe	NM	87503	505-827-4044
Seidel	Bill	California Office of Historic Preservation	P.O. Box 942896	Sacramento	CA	94296-0001	916-653-6624
Shaw	Robert	Alaska Department of Natural Resources	Office of History and Archaeology, 3651 C Street, Suite 1278	Anchorage	AK	99503-5921	907-269-8727
Shepard	Kristopher	Archaeological Research Services, Inc.	2123 S. Hu-Esta Drive	Tempe	AZ	85282	602-966-3508
Simpson	Kay	Louis Berger and Associates	1001 E. Broad St. Suite 220	Richmond	VA	23219	804-225-0348
Smith	Edward	Indiana University-Purdue University	Department of Sociology and Anthropology, 2101 Coliseum Blvd. E	Fort Wayne	IN	46805	219-481-6838
Southerland	Bobby	Brockington and Associates, Inc.	5980 A Unity Drive	Norcross	GA	30071	770-662-5807
Spears	Carol	Spears, Inc.	14007 S. Hwy. 170	West Fork	AR	72774	501-839-3663
Spielbower	Judith	Miami University	Upham Hall	Oxford	OH	45056	513-529-1551
Spiess	Arthur	Maine Historic Preservation Commission	55 Capitol Street, State House Station 65	Augusta	ME	04333-0065	207-287-2132

POC Last Name	POC First Name	Institution Name	Street	City	State	Zipcode	Telephone Number
Stanley	David	Bear Creek Archeology, Inc.	Hwy 9 East, P.O. Box 347	Cresco	IA	52136	319-547-4545
Stathas	Shirley	Wisconsin Department of Transportation	4802 Sheboygan Ave., P.O. Box 7910	Madison	WI	53707-7910	608-266-8216
Steadham	Ralph	Connecticut Department of Transportation	PO Box 317546, 2800 Berlin Turnpike	Newington	CT	06161-7546	860-594-2924
Stein	Julie	Thomas Burke Memorial, Washington State Museum	University of Washington, ,Seattle, DB-10	Seattle	WA	98195	206-543-7907
Steumke	Scott	Confederated Tribes of Warm Springs	Cultural Resources Department, P.O. Box C	Warm Springs	OR	97761	541-553-3290
Stocum	Faye	Delaware State Historical Preservation Office	#15 The Green	Dover	DE	19901-3611	302-739-5685
Stroup	Rodger	South Carolina State Historic Preservation Office	Department of Archives and History, P.O. Box 11669	Columbia	SC	29211	803-896-6100
Susanyatame	Man	Hualapai Tribe Cultural Resource Center	P.O. Box 310	Peach Springs	AZ	86434	520-769-2234
Swanson	Fern	North Dakota State Historical Society	Archeology and Historic Preservation Division, North Dakota Heritage Center, 612 E. Boulevard Ave.	Bismarck	ND	58505-3710	701-328-2672
Taomia	Julie	American Samoa Historic Preservation Office	American Samoa Government	Pago Pago	American Samoa	96799	011-684-633-2385
Taylor	Charlotte	Rhode Island Historic Preservation Commission	Old State House, 150 Benefit Street	Providence	RI	02903	401-222-2678
Thomas	Ronald A.	MAAR Associates, Inc.	9 Liberty Plaza, PO Box 655	Newark	DE	19715-0655	302-368-5777
Thomas	Peter	Consulting Archaeology Program	University of Vermont, 1700 Hegeman Drive	Burlington	VT	05405-0168	802-655-5480
Thorne	Robert	Center for Archaeological Research	University of Mississippi	University	MS	38677	601-232-7316
Tomack	Curtis	Indiana Department of Transportation	Indiana Government Center	Indianapolis	IN	46204-2249	317-232-5210
Tonetti	Al	ASC Group, Inc.	4620 Indianola Ave. North, 100 N. Senate Avenue	Columbus	OH	43214	614-268-2514
Trader	Patrick	West Virginia Division of Culture/History	The Cultural Center, 1900 Kanawha Blvd. East	Charleston	WV	25305-0300	304-558-0220 x719
Turner	Sandy	Washington Department of Transportation	Room 3D25, Transportation Building, Jefferson Street at Maple Park, Mail Stop: KF-01	Olympia	WA	98504	360-705-7493

POC Last Name	POC First Name	Institution Name	Street	City	State	Zipcode	Telephone Number
Velez	Roberto	Puerto Rico Department of Transportation	P.O. Box 42007	San Juan	PR	00940-2007	787-725-7112
Versaggi	Nina	Public Archaeology Facility	Department of Anthropology, State University of New York, Binghamton, P.O. Box 6000	Binghamton	NY	13902-6000	607-777-4786
Walthall	John	Illinois Department of Transportation	2300 S. Dirksen Parkway	Springfield	IL	62764-0002	217-785-2831
Wayne	Lucy	South Arc, Inc	3700 NW 91 St., Suite D300	Gainesville	FL	32606	352-372-2633
Welch	John	White Mountain Apache Tribe Historic Preservation Office	P.O. Box 1150	Whiteriver	AZ	85941	520-338-5430
Wheaton	Thomas	New South Associates, Inc.	6150 E. Ponce de Leon Ave.	Stone Mountain	GA	30083	770-498-4155
White	Gerald	Leech Lake Band of Chippewa Indians Tribal Historic Preservation Office	Rte 3, Box 100	Cass Lake	MN	56633	218-335-8095
Whitlam	Robert G.	Washington Department of Community Trade and Economic Development	111 West 21st Ave. SW, KL-11, P.O. Box 48343	Olympia	WA	98504-8343	360-407-0771
Wilkie	Duncan	Vermont Agency of Transportation	133 State Street	Montpelier	VT	05633	802-828-3965
Williams	Lorraine E.	New Jersey State Museum	205 W. State Street, CN530	Trenton	NJ	08625	609-292-8594
Wise	Roger	West Virginia Department of Transportation	1900 Kanawha Blvd. East	Charleston	WV	25305-0430	304-558-3236
Wooley	David	State Historical Society of Wisconsin	816 State St.	Madison	WI	53704	608-264-6574
Yamamoto	Yoshiko	Adan E. Treganza Anthropology Museum	San Francisco State University, 1600 Holloway Avenue	San Francisco	CA	94132	415-338-1642
Zollinger	Lynn	Utah Department of Transportation	4501 S. 2700 West	Salt Lake City	UT	84119	801-965-4327

Appendix D

Collection Policies Consulted

Alabama Museum of Natural History
1994 Archaeological Curation. Division of Archaeology, University of Alabama, Tuscaloosa.

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Appendix E

Analysis of the Non-Federal Answers to the Project Questionnaire

by Michael D. Wiant and Debra K. Loveless

We begin the analysis with the results from State Historic Preservation Offices because of their role in cultural resources management. As a principal regulatory authority, their policies serve as a standard. The discussion proceeds in the following order: (2) Tribal Historic Preservation Offices, (3) State Archaeologists not serving in a SHPO, (4) State Department of Transportation archaeologists, (5) archaeological consultants, (6) university-based archaeologists. We conclude this first section of the chapter by summarizing the results of all respondents.

State Historic Preservation Offices

Museum Society staff completed interviews with 52 State Historic Preservation Offices (SHPO) including representatives of U.S. Territories offices. Because many of those classified as State Archaeologist serve in the SHPO, we included their responses with SHPOs. The responses of the remaining State Archaeologists are reported in the next section.

In many instances, the percentages referred to below reflect the proportion of responses to a question that is contingent on a previous response (Table 10). For example, the proportion of respondents with written field collecting policies is based on those who indicated in that they had a field collecting policy (40 of 44 or 91%). Throughout the report, we have used the convention "of those" to indicate the calculation of a proportion of a subset. Nevertheless, the value of the overall statistics are not diminished.

It is important to note at the outset that approximately one-third of the SHPOs are not directly involved in field work. Thus, the number of responses to questions about field collecting routinely falls short of the total number of respondents. In general, one third of the respondents indicate that they do not conduct field work and that they do not have detailed standards for field collecting or curation.

Eighty-three percent (44/53) of the respondents indicated that they have field collecting policies. They generally cite the U.S. Secretary of the Interior's standards. Of those that do not have such policies, only one of the respondents relies on the policies of another agency (1/7 or 10%), and two respondents (2/53 or 4%) indicate that they tailor the policies of other agencies to their particular project. Ninety-one percent (40/44) of the SHPOs with collecting policies have written policies, but three respondents (3/44 or 7%) do not and one respondent (1/44 or 2%) writes policies project-by-project.

Less than half of the SHPOs with field collecting policies address all phases of cultural resource management including survey (18/44 or 41%), testing (18/44 or 41%), and mitigation (15/44 or 35%). The slightly smaller number of policies that address mitigation or data recovery may reflect the fact that data recovery plans required under federal law address collecting strategies developed for mitigation projects.

Four of the SHPOs (4/44 or 9%) have different policies for collecting prehistoric versus

Table 10.
Summary of Results for State Historic Preservation Offices

		Yes	%	No	%	Contingent	%	Total	Total %
1a.	Field collecting policy?	44	83	7	13	2	4	53	100
1b.	If no, do the agencies you work for?	1	14	5	71	1	14	7	100
2.	Written policy?	40	91	3	6.8	1	2	44	100
3a.	Policy subject survey?	18	90	2	10	0	0	20	100
3b.	Policy subject testing?	18	90	2	10	0	0	20	100
3c.	Policy subject mitigation?	15	75	5	25	0	0	20	100
4	Different policy for prehistoric vs. historic?	4	20	16	80	0	0	20	100
5.	Policy performance? Recommended changes?								see text
6a.	Catalog artifacts?	21	40	32	60	0	0	53	100
6b.	Catalog documentation?	19	36	34	64	0	0	53	100
7a.	Written catalog standards for artifacts?	17	71	7	29	0	0	24	100
7b.	Written catalog standards for documentation?	13	54	11	46	0	0	24	100
8.	Agencies prescribe different procedures?	3	15	17	85	0	0	20	100
9a.	Label individual artifacts?	6	29	2	9.5	13	62	21	100
9b.	Artifacts weighed?	3	14	5	24	13	62	21	100
10a	Documents labeled?	13	62	7	33	1	5	21	100
10b.	Documents copied?	9	47	10	53	0	0	19	100
11.	Machine readable catalog?	16	73	6	27	0	0	22	100
12a.	Curate artifacts?	22	42	31	58	0	0	53	100
12b.	Curate documentation?	23	43	30	57	0	0	53	100
13a.	Project curation only?	2	9	20	91	0	0	22	100
13b.	Long-term curation?	22	96	1	4.3	0	0	23	100
14.	Written policy or mission?	13	59	9	41	0	0	22	100
15a.	Use collections for compliance?	13	59	9	41	0	0	22	100
15b.	Use for research?	19	86	3	14	0	0	22	100
15c.	Use for exhibit?	16	73	6	27	0	0	22	100
15d.	Use for teaching?	15	68	7	32	0	0	22	100
16.	Written use policy?	9	39	14	61	0	0	23	100
17.	Where are objects and documentation curated?								see text
18.	How is a curation facility selected?								see text

historic artifacts. In one instance, the respondent indicates they differ in terms of testing strategies and mitigation work. In another instance the respondent indicates that collection strategy is determined by research themes that need to be developed on a project by project basis.

In response to the question about the effectiveness of the policy and the request for recommended changes, most SHPO respondents had no comment. The remainder indicated that policy works well and they recommend no change. Only one respondent indicates that their policy is being revised.

Forty percent (21/53) of the respondents catalog artifacts, whereas 36% (19/53) catalog documentation. Of those that catalog artifacts, about three quarters of them (17/24 or 71%) have written procedures. Slightly more than half (13/24 or 54%) of those who catalog documents have written procedures. Six percent (3/20) of the SHPOs use procedures prescribed by other agencies. In those instances, they most often refer to the Secretary of the Interior's guidelines.

Twenty-nine percent (6/21) of the respondents indicate that they label individual artifacts without exception, whereas sixty-two percent (13/21) label or require labeling of artifact subsets (e.g., only diagnostic artifacts). The remaining ten percent (2/21) do not label or require artifact labels. A smaller proportion (3/21 or 14%),

weigh or require those subject to their policy to weigh artifacts. An additional sixty-two percent (13/21) weigh artifact subsets (e.g., often diagnostic specimens or specimens that are subject to discard). Five respondents (24%) do not weigh or require those subject to the policy to weigh artifacts.

Nearly two thirds (13/21 or 62%) of the respondents label documents, 17% (9/28) copy documents. Seventy-two percent of the SHPOs (16 of 22) that catalog artifacts have machine readable catalogs. In hindsight, it is apparent that the question did not distinguish between artifacts and documents.

Less than half of the SHPOs curate objects (22/53 or 42%) and documents (23/53 or 43%). Of these, only 9% (2/22) indicate that they curate collections on a short-term project by project basis. Of those who curate collections, 96% (22/23) indicate that they are involved in long-term curation. Despite this level of investment in long-term curation, less than two thirds (13/22 or 59%) of the respondents have written policies or mission statements on curation.

Of those respondents involved in long-term curation, 59% (13/22) indicate that their collection is used for compliance purposes, 86% (19/22) cite research use, 73% (16/22) cite exhibit use, and 68% (15/22) say that their collections are used for teaching. However, despite widespread collection use, only 39% (9/22) of the respondents have written use policies.

Many SHPO respondents are concerned about the lack of adequate curatorial facilities and the need for adequate funding to support collections management. Many respondents raised the issue of regional repositories. Like other respondents, SHPOs are divided in their support for this approach to curation. Supporters of regional repositories note that smaller repositories have not been able to properly curate collections. Those opposed contend that collections should be curated locally or by state.

A variety of other concerns were expressed under the heading of General Comments. One respondent expressed opposition to non-collecting field strategies. Collection accessibility, especially the lack thereof, was raised by another respondent. One respondent indicated that university repositories do not want collections acquired through cultural resource management, apparently preferring those collected in the context of selected research, sites studied on the basis of research design rather than compliance. Another suggested that the lack of space, and by implication at least, the cost of curation was adversely influencing collecting policy. In this regard, comprehensive collections were selected against.

In summary, the proportion of SHPOs without written collecting policies is surprising. Of those with written policies, most are general statements that cover all phases of cultural resource management including survey, testing, and mitigation.

In general, SHPOs directly involved in field work catalog, label, and weigh artifacts, and they catalog and copy documentation, although certain conditions apply (e.g. catalog, label, and weigh only diagnostic artifacts). Many have written policies to standardize these procedures.

Those involved in fieldwork also participate in long-term collection curation. Most have written policies for collections management and use. Of the few who identified where collections and documentation were curated and how the curation facility was selected, most identified museums, some of which serve as mandatory repositories. Only one respondent indicated that 36CFR79 is the means by which they determine suitable repositories.

Tribal Historic Preservation Offices

Museum Society representatives completed questionnaires for 14 Tribal Historic Preservation Offices (THPO) (Table 11). These offices serve as the cultural resources management regulatory authority for tribal land.

Sixty-four percent (9/14) of the respondents have field collecting policies and one (8%) of respondents develops policies tailored to specific projects. Of the 14 Tribal Preservation Office representatives contacted, six use their state's SHPO or the Secretary of the Interior's guidelines for their fieldwork. The other seven have either Cultural Resource Management Handbooks or tribal ordinances that dictate the proper method of field collection. The Cultural Resource Management Handbooks for the tribes are available through Ronnie Emery of the Heritage Preservation Service

Table 11.
Summary of Results for Tribal Historic Preservation Offices

		Yes	%	No	%	Contingent	%	Total	Total %
1a.	Field collecting policy?	9	64	4	29	1	7	14	100
1b.	If no, do agencies?	1	7.7	12	92	0	0	13	100
2.	Written policy?	5	45	6	55	0	0	11	100
3a.	Policy subject survey?	10	91	1	9	0	0	11	100
3b.	Policy subject testing?	6	55	5	45	0	0	11	100
3c.	Policy subject mitigation?	6	55	5	45	0	0	11	100
4.	Different policy for prehistoric vs. historic?								not asked
5.	Policy performance? Recommended changes?								see text
6a.	Catalog artifacts?	7	50	7	50	0	0	14	100
6b.	Catalog documentation?	7	50	7	50	0	0	14	100
7a.	Written catalog standards for artifacts?	4	57	3	43	0	0	7	100
7b.	Written catalog standards for documentation?	4	57	3	43	0	0	7	100
8.	Agencies prescribe different procedures?	1	17	5	83	0	0	6	100
9a.	Label individual artifacts?	5	71	2	29	0	0	7	100
9b.	Artifacts weighed?	4	67	0	0	2	33	6	100
10a.	Documents labeled?	5	71	2	29	0	0	7	100
10b.	Documents copied?	4	57	3	43	0	0	7	100
11.	Machine readable catalog?	5	71	2	29	0	0	7	100
12a.	Curate artifacts?	4	29	10	71	0	0	14	100
12b.	Curate documentation?	4	29	10	71	0	0	14	100
13a.	Project curation only?	1	33	2	67	0	0	3	100
13b.	Long-term curation?	3	100	0	0	0	0	3	100
14.	Written policy or mission?	2	50	2	50	0	0	4	100
15a.	Use collections for compliance?	1	33	2	67	0	0	3	100
15b.	Use for research?	1	33	2	67	0	0	3	100
15c.	Use for exhibit?	1	33	2	67	0	0	3	100
15d.	Use for teaching?	2	67	1	33	0	0	3	100
16.	Written use policy?	1	33	2	67	0	0	3	100
17.	Where are objects and documentation curated?								see text
18.	How is a curation facility selected?								see text

of the National Park Service in Washington, D.C. None of the Tribal Historic Preservation Office representatives were willing to send copies of their policies.

Fifty percent (7/14) of the THPOs indicate that they practice a strict noncollecting policy on reservation lands, the only exception being the obvious destruction of artifacts. A few mention that artifacts are sometimes collected and redeposited elsewhere in a safer location on the reservation.

Only one respondent indicates that they used a policy prescribed by another agency other than the state SHPO or the Department of the Interior. Less than half (5/11 or 45%) of the THPOs have written collecting policies. The written policies contain guidelines for every phase of cultural resource management including survey (10/11 or 91%), testing (5/11 or 55%) and mitigation (6/11 or 55%).

The first representative of a THPO contacted by the Museum Society took exception to the fourth question on the questionnaire which reads "Is the policy different for prehistoric and historic materials?" As a result, the ISMS staff did not ask the other THPO this question.

Only five tribal representatives responded to the question about the effectiveness of the policy and suggestions for changes. Four of the five (80%) indicate that their policies are working well, and they did not recommend any changes. The fifth respondent objected to most, if not all, of the

questions. It is difficult to interpret or, frankly, to report most of his responses.

Fifty percent (7/14) of the respondents indicate that they catalog artifacts and documents. Of those doing so, only 57% (4/7) have written cataloging standards. Only one respondent indicates that they use a policy prescribed by the Bureau of Land Management policy.

Seventy-one percent (5/7) of the respondents indicate that they label individual artifacts and documents. Sixty-seven percent (4/6) weigh all artifacts, while 33% (2/6) selectively weigh artifacts. Only 57% (4/7) of the respondents indicate that they copy documents, but 67% (5/7) have machine-readable catalogs.

Few (4/14 or 29%) of the Tribal Historic Preservation Offices curate artifacts or documentation. Of those that curate, one respondent (33%) does so project-by-project, whereas three respondents (100%) curate for the long term. Only half (2/4 or 50%) of those who curate have written curation policies.

Of those engaged in long-term curation (three respondents), collection use is limited (compliance, 1/3 or 33%; research, 1/3 or 33%; exhibits, 1/3 or 33%; and teaching 2/3 or 66%). Only one of the offices involved in long-term curation, the Federated Tribes of the Colville Reservation, has a written use policy.

In general, THPOs believe that there is not enough respect for Native American artifacts. In particular, they cite the problem of grouping sacred and common artifacts together. They also raised concerns about the interpretation of artifacts, which they said was often misleading. Under the heading of other General "Comments", one respondent said that "too much is lost in the museum." Another respondent suggests that most federal agencies have not "been keeping track of anything" and that they have not been curating collections in federally approved facilities. The concept of "curation in perpetuity" was considered unworkable by another respondent.

One THPO is concerned that it is "hard for tribes to get materials if far away." This comment was made in reference to Native American Graves Protection and Repatriation Act. There is no doubt that collections from many noteworthy sites across the country have been widely distributed, and they are often difficult to find. One respondent raised an issue about the interpretation of artifacts, which he believes should more often include American Indian opinion.

In summary, 64% (9/14) of the THPOs have collecting policies, but less than half (5/11 or 45%) are written. Nearly all address survey but fewer are concerned with testing and mitigation. The policies of these offices address some or all of the subjects outlined in the questionnaire, but the policies are not available in a written form.

State Archaeologists

Many state archaeologists (SA) serve in the State Historic Preservation Office. Their responses to the questionnaire are included under the SHPO. Only eight respondents under the heading "State Archaeologist." These are the state archaeologists from Arizona, Georgia, Kentucky, Maine, Minnesota, New Jersey, South Dakota, and Wyoming. Of these, five are situated in a museum or university setting (Table 12).

One of the SAs indicates that it conforms to federal and state guidelines and thus, had no additional information to provide on any of the subjects addressed by the questionnaire. Three of the eight (38%) SAs indicate that they did not or rarely conducted field work and thus, had little to offer regarding this subject.

Only a quarter (2/8) of the SAs have field collecting policies, and two of the SAs indicate that they use policies prescribed by another agency. In particular they identified the policies of federal agencies such as the U.S. Army Corps of Engineers, U.S. Forest Service, and Bureau of Land Management and state agencies such as state highway department. One of the SA (25%) has a written field collecting policy. Whether they apply their own policy or that of another agency, three of the four respondents have guidelines for survey and testing. Only one SA has guidelines for mitigation.

One SA out of three applies a different policy for collecting prehistoric and historic artifacts. They indicate that the policy for historical sites is "more flexible."

Only one SA commented on the effectiveness of the policy indicating that it worked "very well." Another indicated that the field policies

Table 12.
Summary of Results for State Archaeologists Not Serving as the State Historic Preservation Officer

		Yes	%	No	%	Contingent	%	Total	Total %
1a.	Field collecting policy?	2	25	5	63	1	13	8	100
1b.	If no, do agencies?	2	33	3	50	1	17	6	100
2.	Written policy?	1	25	3	75	0	0	4	100
3a.	Policy subject survey?	3	75	1	25	0	0	4	100
3b.	Policy subject testing?	3	75	1	25	0	0	4	100
3c.	Policy subject mitigation?	1	25	3	75	0	0	4	100
4.	Different policy for prehistoric vs. historic?	3	75	1	25	0	0	4	100
5.	Policy performance? Recommended changes?								see text
6a.	Catalog artifacts?	5	63	3	38	0	0	8	100
6b.	Catalog documentation?	5	63	3	38	0	0	8	100
7a.	Written catalog standards for artifacts?	6	100	0	0	0	0	6	100
7b.	Written catalog standards for documentation?	5	83	1	17	0	0	6	100
8.	Agencies prescribe different procedures?	0	0	6	100	0	0	6	100
9a.	Label individual artifacts?	0	0	1	17	5	83	6	100
9b.	Artifacts weighed?	1	17	4	67	1	17	6	100
10a.	Documents labeled?	3	50	3	50	0	0	6	100
10b.	Documents copied?	3	50	3	50	0	0	6	100
11.	Machine readable catalog?	6	100	0	0	0	0	6	100
12a.	Curate artifacts?	7	88	1	13	0	0	8	100
12b.	Curate documentation?	7	88	1	13	0	0	8	100
13a.	Project curation only?	1	14	6	86	0	0	7	100
13b.	Long-term curation?	6	86	1	14	0	0	7	100
14.	Written policy or mission?	5	71	2	29	0	0	7	100
15a.	Use collections for compliance?	6	100	0	0	0	0	6	100
15b.	Use for research?	6	100	0	0	0	0	6	100
15c.	Use for exhibit?	6	100	0	0	0	0	6	100
15d.	Use for teaching?	5	83	1	17	0	0	6	100
16.	Written use policy?	5	71	2	29	0	0	7	100
17.	Where are objects and documentation curated?								see text
18.	How is a curation facility selected?								see text

were tailored to each project and as such was the case, the policy worked well.

Five SAs catalog both artifacts and documentation; however, only six have written standards for cataloguing artifacts and five respondents have written standards for cataloguing documentation. None of the SA use procedures prescribed by other agencies.

Five of six SAs indicate that they label artifacts, but they do so selectively. The guidelines for labeling artifacts include “only diagnostics”, “depends on size”, and “if big enough.” Most (84%) respondents do not weigh all artifacts. Three of the six SAs label and copy documentation. All SAs have a machine-readable catalog of documents and artifacts.

All but one of the SAs curate artifacts and documentation, and six of the seven curate long term. Five of seven SAs have a written curation policy. Those who curate artifacts report substantial use of the collections for compliance, research, exhibit, and teaching purposes. Five of the seven respondents also have collection use policies. The only SA that does not curate artifacts and documents sends the collections to a nearby university, noting that the state does not have a central repository.

Under the heading of general comments one SA endorsed the concept of developing long-term storage facilities, others urged more federal support

to develop better facilities. Others suggested a grant program for basic collection management should be created. One SA underscored the need for national standards.

The responses of SAs are comparable to those for SHPOs and THPOs. In brief, those with written field collecting, artifact and documentation cataloging, and collections management policies tend to cover the subject. Although a small sample, it is noteworthy that three quarters (3/4) do not have written policies for field collecting.

State Department of Transportation Offices

Museum Society staff completed interviews with 51 state departments of transportation (DOTA), many of whom are not archaeologists (Table 13). It is noteworthy that 42% of the departments do all or part of their cultural resource management work under contract with archaeological consultants.

Twenty (20/51 or 45%) of the DOTAs have a policy for field collection and another 5 (5/51 or 11%) have field collecting policies that are tailored to each project. Six respondents indicate that they use the policies of other agencies, citing both state and federal guidelines.

Of those who indicate that they had field collecting policies, both survey and testing are addressed by the policy. Two respondents indicated that their policy did not address mitigation.

Eighteen percent (5/28) of the DOTAs that have policies that distinguish between the collection of prehistoric and historic artifacts. Reasons cited include “more cautious for historic”, “have more of a prehistoric focus”, “many fewer historic materials get collected”, and “decisions are made on a project-by-project basis.”

In general, most of the DOTAs had no comment about the effectiveness of their policies. Of those that did respond, they considered their policies effective and in light of changing requirements, they noted that shortfalls were being addressed. In a few instances, the department does not have a staff archaeologist. In another instance, the respondent indicated that in the past DOT projects did not follow SHPO guidelines. They are now working with the SHPO to develop requirements for DOT projects.

Only forty-one percent (21/51) of the DOTAs catalog artifacts and 39% (20/51) catalog documentation; however, only 17% (5/30) of these have written catalog standards for artifacts and 10% (3/30) have standards for documentation. Slightly less than half (13/29 or 45%) indicate that other agencies prescribe different procedures. Of those that catalog artifacts, half (11/22 or 50%) label individual specimens. However, many DOTAs indicate that they label only diagnostic or certain other artifacts.

Thirty-five percent (8/22) of DOTAs weigh all artifacts and 35% (8/22 weigh specific classes of artifacts. For example, one respondent indicates that they did not weigh fire-cracked rock. Three quarters of the DOTA catalog documents (18/24 or 75%) and seventy-six percent (19/25) copy documents. Less than half of the respondents (13/27 or 48%) have machine-readable catalogs.

Only 10% (5/50) of the DOTs curate artifacts, but 26% (13/50) curate documentation, presumably administrative paperwork associated with the project rather than field records, maps, or photographs. Of those that curate artifacts or documentation, most (5/7 or 71%) do so short term. Only five DOTs curate artifacts and/or documentation long-term, none have a written curation policy. Of the five who curate long term use of the collections for compliance, research, exhibition, and teaching is variable, but in general collections are used. One of the respondents has a written collection use policy.

DOTs identified a variety of curatorial facilities including regional universities, the state archaeological survey, museums, historical societies, SHPOs, other state agencies, and archaeological consultants. One respondent indicates that artifacts and documents are often returned to landowners. Universities appear to be the most common repositories for DOTs.

Few respondents provided reasons for how a curatorial facility is selected. It is clear, however, that Cooperative Agreements for curation are becoming more common. In one instance, the repository is mandated by state law. Another respondent says a repository must meet the requirements of 36CFR79. In many cases, DOTs maintain traditional curation arrangements with a university or museum. In fewer instances,

Table 13.
Summary of Results for State Department of Transportation Offices

		Yes	%	No	%	Contingent	%	Total	Total %
1a.	Field collecting policy?	21	45	21	45	5	11	47	100
1b.	If no, do agencies?	6	26	16	70	1	4	23	100
2.	Written policy?	25	74	9	26	0	0	34	100
3a.	Policy subject survey?	25	100	0	0	0	0	25	100
3b.	Policy subject testing?	24	100	0	0	0	0	24	100
3c.	Policy subject mitigation?	23	96	1	4	0	0	24	100
4.	Different policy for prehistoric vs. historic?	5	18	23	82	0	0	28	100
5.	Policy performance? Recommended changes?								see text
6a.	Catalog artifacts?	21	41	30	59	0	0	51	100
6b.	Catalog documentation?	20	39	31	61	0	0	51	100
7a.	Written catalog standards for artifacts?	5	17	25	83	0	0	30	100
7b.	Written catalog standards for documentation?	3	10	27	90	0	0	30	100
8.	Agencies prescribe different procedures?	13	45	16	55	0	0	29	100
9a.	Label individual artifacts?	11	50	4	18	7	32	22	100
9b.	Artifacts weighed?	8	36	6	27	8	36	22	100
10a.	Documents labeled?	18	75	5	21	1	4	24	100
10b.	Documents copied?	19	76	4	16	2	8	25	100
11.	Machine readable catalog?	13	48	14	52	0	0	27	100
12a.	Curate artifacts?	5	10	45	90	0	0	50	100
12b.	Curate documentation?	13	26	37	74	0	0	50	100
13a.	Project curation only?	5	71	2	29	0	0	7	100
13b.	Long-term curation?	5	71	2	29	0	0	7	100
14.	Written policy or mission?	1	20	4	80	0	0	5	100
15a.	Use colls for compliance?	3	60	2	40	0	0	5	100
15b.	Use for research?	2	40	3	60	0	0	5	100
15c.	Use for exhibit?	4	80	1	20	0	0	5	100
15d.	Use for teaching?	3	60	2	40	0	0	5	100
16.	Written use policy?	1	20	4	80	0	0	5	100
17.	Where are objects and documentation curated?								see text
18.	How is a curation facility selected?								see text

respondents indicate that the choice of a repository is project dependent or based on site location. In one instance, the respondent indicates that the repository must be approved by the state archaeologist.

DOTs provided many "General Comments." Many respondents expressed concern about the availability of space, the escalating cost of curation, and the need for more funding. One DOTA noted the use of decommissioned military buildings for curation use. Another respondent said that most cultural resource management funding was spent on field work, after which artifacts are "put in a barn." Another DOTA takes exception with the Federal Highway Administration's refusal to support curation.

One respondent questions the wisdom of retaining all objects collected during a project. Another respondent said "We collect too much" and another questioned the need for large collections with little research value. These concerns are expressed in the following question: "How many bags and bags of whiteware and/or chert flakes do we need curated?" And finally, one respondent said "We curate a lot of stuff that never sees the light of day again."

Several DOTs are of the opinion that curation has become excessively expensive. Some

respondents recommend re-examining collections to develop a policy for deaccessioning high volume and/or redundant objects. This same respondent also called for a national forum on curation. As noted above, some artifacts are returned to landowners. One respondent feels strongly that artifacts found as part of cultural resource management should become public property.

Another respondent says collections are not accessible to the public and recommends the development of more exhibits. A respondent recommends that collections remain in local repositories.

In summary, the results of the interviews of DOTs do not differ significantly differ from their SHPO, THPO, and SA counterparts. Written policies are note generally available: collecting (21/47 or 45%), cataloguing artifacts (5/30 or 17%), cataloguing documents (3/30 or 10%), collections management (1/5 or 20%), and collections use (1/5 or 20%). The lack of collections policies may be due to two factors: (1) DOTs are not involved in collections management and (2) there is no demand for written policies.

Archaeological Consultants

Museum Society staff interviewed 41 archaeological consultants (AC) from across the country (Table 14). Forty-four percent (18/41) of the AC have collecting policies and another 49% (20/41) have policies tailored to specific projects. Only three of the 41 respondents (7%) do not have collecting policies. Of those without collecting policies, two rely on the policies of other agencies. Less than two thirds (25/41 or 61%) of the AC have written policies. Most policies address survey (35/37 or 95%), testing (31/37 or 84%), and to a lesser degree mitigation (29/37 or 78%).

About one third (12/35 or 34%) of the respondents indicate that they have different policies for collecting prehistoric versus historic artifacts. They cite the following reasons for the difference: (1) "depends on the focus of the project, they collect mainly diagnostics", (2) "sampling from historic sites", (3) "up to the field director or PI, depends on site and what's known about area", (4) historic materials—selective sampling, do not collect non-diagnostics artifacts, (5) at prehistoric sites "they pick up everything except fire-cracked rock, or millions of flakes" and at historic sites "materials like brick, cinder, and some window glass fragments… these materials are just noted rather than collected", and (6) they are "less regimented about historic artifacts."

Under the heading of "General Comments", most ACs indicate that their policy is effective and needs no changes. All forty-one AC indicate that they catalog artifacts and all but one said that they catalog documentation. However, slightly more than half (21/38 or 55%) have written standards for cataloging artifacts and less than half (17/38 or 45%) have standards for cataloging documentation. Sixty-eight percent (28/41) of the ACs indicate that agencies prescribe different procedures.

Seventy-seven percent (27/35) of the respondents label individual artifacts; however many respondents also say that they label artifacts only if project guidelines require it. Some of the ACs said they labeled only diagnostic artifacts and those large enough to label. Another respondent said that acid-free tags are used instead of directly labeling a specimen. Another AC indicates that bags are labeled instead of the object if the object is fragile or otherwise could not be labeled.

Seventy-nine percent (27/34) of the ACs indicate that they weigh artifacts, but it is clear from comments that certain artifact classes are not weighed. For example, one respondent said that fire-cracked rock is not weighed.

Eighty-percent (33/41) of the AC slabel documents and 92% (36/39) copy documents. Ninety percent (37/41) of the ACs have a machine-readable catalog of artifact and documents. Less than a third (13/41 or 32%) of the ACs curate artifacts, slightly more (16/38 or 42%) curate documentation. We suspect they curate only administrative records.

There is a discrepancy in the response to questions about curation. Only thirteen (13/41 or 32%) of the ACs indicate that they curate artifacts and slightly more (16/41 or 39%) curate documents. However, 27 (27/41 or 96%) respondents say they curate project-by-project, while only 7 (7/27 or 26%) curate collections long term. Nevertheless, in general ACs do not curate collections long term. Less than one quarter (3/15 or 20%) of the respondents have a written curation policy.

Table 14.
Summary of Results for Archaeological Consultants

		Yes	%	No	%	Contingent	%	Total	Total %
1a.	Field collecting policy?	18	44	3	7.3	20	49	41	100
1b.	If no, do agencies?	2	22	2	22.0	5	56	9	100
2.	Written policy?	25	61	16	39.0	0	0	41	100
3a.	Policy subject survey?	35	95	2	5.4	0	0	37	100
3b.	Policy subject testing?	31	84	6	16.0	0	0	37	100
3c.	Policy subject mitigation?	29	78	8	22.0	0	0	37	100
4.	Different policy for prehistoric vs. historic?	12	34	23	66.0	0	0	35	100
5.	Policy performance? Recommended changes?								see text
6a.	Catalog artifacts?	41	100	0	0.0	0	0	41	100
6b.	Catalog documentation?	39	98	1	2.5	0	0	40	100
7a.	Written catalog standards for artifacts?	21	55	17	45.0	0	0	38	100
7b.	Written catalog standards for documentation?	17	45	21	55.0	0	0	38	100
8.	Agencies prescribe different procedures?	28	68	13	32.0	0	0	41	100
9a.	Label individual artifacts?	27	77	8	23.0	0	0	35	100
9b.	Artifacts weighed?	27	79	7	21.0	0	0	34	100
10a.	Documents labeled?	33	80	8	20.0	0	0	41	100
10b.	Documents copied?	36	92	3	7.7	0	0	39	100
11.	Machine readable catalog?	37	90	4	9.8	0	0	41	100
12a.	Curate artifacts?	13	32	28	68.0	0	0	41	100
12b.	Curate documentation?	16	42	22	58.0	0	0	38	100
13a.	Project curation only?	27	96	1	3.6	0	0	28	100
13b.	Long-term curation?	7	26	20	74.0	0	0	27	100
14.	Written policy or mission?	3	20	12	80.0	0	0	15	100
15a.	Use collections for compliance?	7	100	0	0.0	0	0	7	100
15b.	Use for research?	7	100	0	0.0	0	0	7	100
15c.	Use for exhibit?	7	100	0	0.0	0	0	7	100
15d.	Use for teaching?	7	100	0	0.0	0	0	7	100
16.	Written use policy?	0	0	13	100.0	0	0	13	100
17.	Where are objects and documentation curated?								see text
18.	How is a curation facility selected?								see text

Of the thirteen ACs that say they curate artifacts they report use the collection for compliance (10/13 or 77%), research (10/13 or 77%), exhibit production (11/13 or 85%), and to a lesser extent, for teaching (9/13 or 69%). None of the AC has a written collection use policy.

Most ACs conduct cultural resource management projects locally and in nearby states. Because states often have different collection curation guidelines, collections are curated according to the requirements of the regulatory agency or client. It appears that museums and universities provide most of the curation, but respondents also listed a variety of other institutions and agencies. The most common curation facilities listed are as follows: state repositories such as the Arkansas Archaeological Survey, universities, the National Park Service, museums, offices of the state archaeologist, military installations, and state DOT facilities.

Most ACs indicate that a curatorial facility is mandated by the regulatory agency or the client. Often the curatorial location is indicated in the Scope of Work. In general, collections are curated state-by-state. Several respondents offered different and often interesting reasons for selecting a particular repository. For example, one respondent offered the following: “Whoever has the most liberal

rules on accepting collections and how much the fees are." Another respondent indicates that "Repositories are not willing to take collections—too full."

Representatives of consulting firms offered numerous and sometimes lengthy general comments. The following paraphrased examples represent a cross section of remarks.

> We need more facilities and standard guidelines. Repositories limit access and the type of objects they will accept. For example, many repositories will not accept large objects such as milling stones.
> The American Cultural Resource Association (ACRA) list serves as one forum addressing questions of collecting and curation policies.
> We must improve access to collections by putting inventories "on line."

There is concern about the lack of care for older collections. Several respondents feel we need federal guidelines beyond 36 CFR Part 79. However, others indicate that the problem should be addressed state-by-state. Yet another respondent took exception to the latter, suggesting instead comparable standards state-by-state.

Some respondents are opposed to regional repositories. They believe collections should remain near where they were found. One respondent contended that at present there are insufficient funds to cover the expense of meeting curation standards, and many clients will not pay "high ($200/box)" curation fees. Apparently, some federal projects require landowners to sign waivers transferring artifacts to the client or consultants. Some consultants find landowners reluctant to sign collection transfer agreements.

The results of the interviews with ACs provide insight into collecting and collections management policy. In general, archaeological consultants conduct cultural resource management work in more that one state and it is apparent that they have difficulty dealing with differences in field collecting policies in particular.

About 93% (38/41) of the archaeological consultants have field collecting policies. Respondents indicate that they often operate under curation policies prescribed by other agencies. Based on this survey, it appears that many consultants carry out work according to applicable guidelines and do not follow more stringent standards. Of course, stringent standards are more expensive, and in general, archaeological consultants are in the business of cultural resources management. Few consultants have curatorial responsibilities and few of those have written policies for collection management and collection use.

University and Museum Archaeologists

Museum Society staff completed 48 questionnaires for university archaeologists (UA) (Table 15). The UAs represent a cross section of the university community and include representatives of contract archaeology programs, field schools, university museums, and Anthropology departments.

Ten of the 48 (21%) respondents do not conduct field work. Nine of the UAs not engaged in field work are museums and the other is the Arkansas Archaeological Survey Station at Jonesboro. Most of the UAs that do field work are involved in cultural resource management. The field work done by other UAs involves field schools, class-related work, or research.

Less than half (19/48 or 40%) of the UAs have a field collecting policy. None of those who responded "No" say that they work under the auspice of another agency's policy. A small proportion of the UAs has a policy tailored to a specific project. Less than half (13/27 or 48%) of the UAs have written policies. Most of the field collecting policies address all phases of cultural resource management including survey (20/24 or 83%) and testing (18/4 or 75%), and mitigation (14/24 or 58%).

Less than one third (7/24 or 29%) of the UAs have policies with different collecting practices for prehistoric versus historic sites. Few respondents address the matter directly. One UA said they occasionally measure exact artifact proveniences on prehistoric sites.

Many UAs indicate that their policy worked well or did not comment. Of those with recommendations for changes, one UA took exception to the use of 5 m intervals for field walkover surveys. Another UA indicates that current policy works well for prehistoric sites, but notes that

Table 15.
Summary of Results for University-based Archaeologists

		Yes	%	No	%	Contingency	%	Total	Total %
1a.	Field collecting policy?	19	40	25	52	4	8	48	100
1b.	If no, do agencies?	0	0	22	88	3	12	25	100
2.	Written policy?	13	48	14	52	0	0	27	100
3a.	Policy subject survey?	20	83	4	17	0	0	24	100
3b.	Policy subject testing?	18	75	6	25	0	0	24	100
3c.	Policy subject mitigation?	14	58	10	42	0	0	24	100
4.	Different policy for prehistoric vs. historic?	7	29	17	71	0	0	24	100
5.	Policy performance? Recommended changes?								see text
6a.	Catalog artifacts?	46	96	2	4	0	0	48	100
6b.	Catalog documentation?	39	81	9	19	0	0	48	100
7a.	Written catalog standards for artifacts?	33	72	13	28	0	0	46	100
7b.	Written catalog standards for documentation?	24	51	23	49	0	0	47	100
8.	Agencies prescribe different procedures?	17	40	25	60	0	0	42	100
9a.	Label individual artifacts?	29	64	5	11	11	24	45	100
9b.	Artifacts weighed?	14	31	17	38	14	31	45	100
10a.	Documents labeled?	24	53	16	36	5	11	45	100
10b.	Documents copied?	25	56	16	36	4	9	45	100
11.	Machine readable catalog?	34	71	12	25	2	4	48	100
12a.	Curate artifacts?	42	88	6	13	0	0	48	100
12b.	Curate documentation?	38	81	9	19	0	0	47	100
13a.	Project curation only?	13	30	30	70	0	0	43	100
13b.	Long-term curation?	41	95	2	5	0	0	43	100
14.	Written policy or mission?	26	63	15	37	0	0	41	100
15a.	Use collections for compliance?	16	39	25	61	0	0	41	100
15b.	Use for research?	39	95	2	5	0	0	41	100
15c.	Use for exhibit?	31	76	10	24	0	0	41	100
15d.	Use for teaching?	36	88	5	12	0	0	41	100
16.	Written use policy?	17	41	24	59	0	0	41	100
17.	Where are objects and documentation curated?								see text
18.	How is a curation facility selected?								see text

it "destroys historic and misses some of it", a view shared by another respondent who remarked "prehistoric—good, historic—so, so…"

Ninety-six percent (46/48) of the respondents catalog artifacts. It is noteworthy that none of the respondents identify any contingencies, unlike consultants who generally say they do not label certain classes of artifacts. Eighty-one percent (39/48) of the respondents catalogue documents. However, less than three-quarters (33/46 or 72%) of the UAs have a written policy for cataloging artifacts and about half (24/47 or 51%) have written standards for cataloging documents. Forty percent (17/42) of the respondents indicate that other agencies prescribe different procedures than those commonly used at the institution.

Sixty-four percent (29/45) of the respondents label artifacts and an additional 24% (11/45) say that labeling depends on the type of artifact (e.g., diagnostic specimens). The same is true for whether or not artifacts are weighed. About one third (14/45 or 31%) of the UAs weight artifacts without condition, but another 31% (14/45) say they weigh certain artifacts and not others. About half (24/45 or 53%) of the UAs label documents and 56% (25/45) indicate that they copy documents. Nearly three-quarters (34/48 or 71%) of the UAs have a machine-readable catalogs.

Eighty-eight percent (42/48) of the UAs curate artifacts and 81% (38/47) curate documents. Less than one third (13/43 or 30%) curate materials project-by-project, whereas 95% (41/43) say they are involved in long-term curation. There is a discrepancy in the number of respondents who say they curate and the total of those who do so on a short- and long-term basis. It may be that some institutions engaged in long-term curation also have artifacts and documents from projects whose final disposition is another institution. Of those who curate long-term, only 63% (26/41) have written collection management policies.

The statistics for collection use reflect the nature of the university setting. Of those who curate long term, only 39% (16/41) use collections for compliance, 95% (39/41) use collections for research, 76% (31/41) for exhibits, and 88% (36/41) of the UAs report that they use the collections for teaching purposes. Despite widespread use, only 41% (17/41) of the respondents have written collection use policies.

Only six of the 48 (13%) UAs send collections to other institutions. All six send collections elsewhere under the terms of curation agreements through cultural resource management projects. A seventh UA is involved in fieldwork outside of the United States where all collections must be curated in the country of origin.

The request for "General Comments" was met with enthusiasm by UAs. On the topic of collecting policy, one respondent suggests that curators and archaeologists work closely to determine what should be collected and curated. Another respondent points out that large and redundant historical collections should be characterized and selectively deaccessioned.

One UA notes that the quality of curation is directly proportional to the sum of money invested in it. Another respondent urged more financial support for curation. One UA contends that some federal agencies "don't care about collections" and that others are inefficient and waste money when it comes to collections management.

One UA wants a greater investment in computerization of collection inventories, presumably with substantially increased access. In addition, one UA suggests the development of consistent software to improve communication between repositories and researchers. In their opinion, each museum is developing custom collections management software.

One UA noted that older collections can be problematic because often they do not have adequate documentation or notation (e.g., provenience). They suggest that the cause of this problem is the lack of "strict regulations." In that regard, another UA suggests that repositories refuse to accept collections that are not fully (emphasis by the respondent) cataloged.

One UA considers federal standards for curatorial facilities unrealistic. We assume that they are referring to 36CFR79. Regarding facilities, another respondent indicates that many repositories are being built or renovated to accommodate collections generated by CRM work without regard for adequate work space for those involved in research. Another respondent indicated that institutions often view archaeological curation as a burden: "When things go wrong, (the administration says) it's just a bunch of rocks."

The issue of regional repositories was raised by one respondent. They are against small "short-term" programs or museums and in favor of transferring all CRM collections to long-term, perhaps regional facilities. Another UA says: "It would be difficult for people doing research to travel long distances to a centralized repository."

Another respondent endorsed the call for national standards and adequate funding to implement them. In this regard, it is interesting that a respondent suggested that projects are often under funded, not so much where curation was concerned, but they expressed concern about appropriate analysis. According to the respondent, under-analyzed collections fall prey to the argument advanced by many, including Native Americans, that collections are under-used. In the context of national standards, one respondent suggested that a program of accredited repositories be developed. And finally, one UA with a long tenure in the field described the interest and new investment in curation a "wonderful change."

Table 16.
Summary of Results for All Respondents

		Yes	%	No	%	Contingent	%	Total	Total %
1a.	Field collecting policy?	113	54	64	30	33	16	210	100
1b.	If no, do agencies?	12	16	52	69	11	15	75	100
2.	Written policy?	109	68	51	32	0	0	160	100
3a.	Policy subject survey?	111	92	10	8	0	0	121	100
3b.	Policy subject testing?	100	83	20	17	0	0	120	100
3c.	Policy subject mitigation?	88	73	32	27	0	0	120	100
4.	Different policy for prehistoric vs. historic?	34	30	81	70	0	0	115	100
5.	Policy performance? Recommended changes?								see text
6a.	Catalog artifacts?	141	67	68	33	0	0	209	100
6b.	Catalog documentation?	129	61	80	38	1	0	210	100
7a.	Written catalog standards for artifacts?	86	57	65	43	1	1	152	100
7b.	Written catalog standards for documentation?	66	43	86	57	0	0	152	100
8.	Agencies prescribe different procedures?	62	43	82	57	0	0	144	100
9a.	Label individual artifacts?	79	56	22	16	40	28	141	100
9b.	Artifacts weighed?	57	41	37	26	46	33	140	100
10a.	Documents labeled?	96	67	41	28	7	5	144	100
10b.	Documents copied?	96	67	39	27	9	6	144	100
11.	Machine readable catalog?	111	74	38	26	0	0	149	100
12a.	Curate artifacts?	93	43	122	57	0	0	215	100
12b.	Curate documentation?	101	48	109	52	0	0	210	100
13a.	Project curation only?	49	45	61	55	0	0	110	100
13b.	Long-term curation?	84	76	26	24	0	0	110	100
14.	Written policy or mission?	50	53	44	47	0	0	94	100
15a.	Use for compliance?	49	58	35	42	0	0	84	100
15b.	Use for research?	77	92	7	8	0	0	84	100
15c.	Use for exhibit?	69	82	15	18	0	0	84	100
15d.	Use for teaching?	70	83	14	17	0	0	84	100
16.	Written use policy?	33	36	59	64	0	0	92	100
17.	Where are objects and documentation curated?								see text
18.	How is a curation facility selected?								see text

All Non-Federal Respondents

The results of all respondents combined are summarized below (Table 16). Fifty-four percent (113/210) of the respondents have a field collecting policy and another 16% (33/210) have policies tailored to specific projects. The remaining 30% (64/210) do not have a policy guiding artifact collecting. Sixteen-percent (12/75) of the respondents say they rely on policies prescribed by another agency and another 15% (11/75) work under a policy that is tailored to the project. Only 68% of the collecting policies are written documents.

Most of the policies address all phases of cultural resource management including survey (111/121 or 92%), testing (100/120 or 83%), and mitigation (88/120 or 73%). For federal projects at least, we suspect that collecting guidelines are likely part of the required data recovery plan developed to address specific project needs.

It is apparent that there are substantial and significant differences in collecting strategies. For example, one respondent indicated that there are general guidelines for each project, but that the contractor and SHPO often modify methods according to the project research design. Another respondent reports that surveyors collect a sample of

non-diagnostic and diagnostic artifacts. Yet another respondent indicates that surveyors collect everything but fire-cracked rock and human remains. And finally another respondent reports that artifacts are not collected during surveys.

About one third (34/115 or 34%) of the respondents have different policies for collecting prehistoric and historic artifacts. The reasons given for differences are as follows: "depends on the focus of the project, collect mainly diagnostics"; "sample historic sites"; "prehistoric—everything collected except for fire-cracked (rock) or tons of flakes …historical—most materials just noted not collected"; and "historic—collect only diagnostics… prehistoric—grab samples of diagnostics." In essence, the respondents who report that they have different policies often do so on quantitative grounds. In their view, historical sites have significantly higher frequencies of redundant items. To a lesser extent, they cite the presence of large objects such as bricks, which they note as being present, but do not collect.

Slightly more than two thirds (141/209 or 67%) of the respondents catalog artifacts and a smaller number (129/210 or 61%) catalog documentation. Fifty-seven percent (86/152) of the respondents have written guidelines for cataloging artifacts, but only 43% (66/152) have written guidelines for cataloging documentation. The absence of cataloging policy appears to be mitigated by the fact that 43% (62/144) of the respondents report that other agencies prescribe different procedures.

Fifty-six percent (79/141) of the respondents label artifacts. Another 28% (40/141) indicate that they do so under certain circumstances. For example, some respondents indicate that they labeled only diagnostic artifacts. Fewer than half (57/140 or 41%) of the respondents weigh artifacts, although 33% (46/140) again cite a variety of conditions.

The results of the series of questions regarding the labeling and copying of documentation are comparable. Sixty-seven (96/144) percent of the respondents both label and copy project documentation. However, it is not clear that all forms of documentation (e.g., field notes, maps, illustrations, and photographs) are treated consistently. Nearly three quarters (111/149 or 74%) of the respondents prepare a computer-based catalog.

Less than half (93/215 or 43%) of the respondents curate artifacts. This statistic is not surprising because a significant proportion of the respondents represent regulatory agencies not involved in curation. Slightly more respondents (101/210 or 48%) curate documentation. Approximately the same number (49/110 or 45%) of respondents curate artifacts and documents project-by-project.

In light of the foregoing, it is curious that 76% (84/110) of the respondents are involved in long term curation. The meaning of this apparent inconsistency is unknown, but it may refer to the curation of administrative documentation.

Of the respondents engaged in long-term curation, 59% (49/84) say their collection is used for compliance purposes, 92% (77/84) for research, 82% (69/84) for exhibits, and 83% (70/84) say that their collection is used for teaching. Only 36% (33/92) of the respondents have written collection use policy.

Policies

A cursory examination of the information compiled indicates that few policies address field collecting, cataloging, collections management, and repository standards (Table 8). However, this is not surprising because many of the institutions and organizations contacted are not involved in all of these activities. It is surprising that SHPOs, in particular, do not have comprehensive policy statements given their regulatory responsibilities. SHPOs should be the vanguards of cultural resource management, including the management.

In general, the policies that address field collecting follow the format of cultural resource management activity including survey, testing, and mitigation. They commonly address standards for what constitutes adequate inspection, collection, and reporting. In addition, they provide guidelines on submitting site information to the state site file and standards for professional archaeologists. Many of the field collecting policies are limited to Phase I survey and Phase II testing. Mitigation or data recovery is viewed as a subject to be negotiated with the SHPO or with another regulatory authority. In some instances, the policies refer to federal guidelines including 36 CFR Part 61, Section 106,

Archaeological Resources Protection Act, and the Secretary of the Interior's Standard's and Guidelines.

Many policies address the treatment of artifacts and documentation under the heading of laboratory methods, collections management policies, or guidelines for the curation of archaeological collections. Regardless of the title, most consider artifact cleaning, numbering, labeling, packaging, and cataloging. Some address the treatment of documentation, but it is given less attention than artifacts. None of the policies reviewed are comprehensive, but some provide a suitable point of departure for drafting DoD guidelines (e.g., Alabama Historical Commission, Environmental Review Primer for Connecticut).

As noted above, artifact and document cataloging during a field project is often limited to the assignment of a specimen number. To a museum curator, cataloging includes the assignment of a specimen number (or use of an existing number), and the compilation of a variety of information including data on the donor, accession, and a detailed description of the objects and its condition. Thus, the term cataloging is found in both laboratory and collections management policies.

Most of the policies do not address collections management or repository standards. Generally only museums provide basic statements about collection acquisition, use standards, appraisals, care, and other topics such as destructive analysis. In a few instances, museum or repository policies refer to 36 CFR Part 79 as their guiding principle and 36 CFR Part 79 is also occasionally cited where repository standards are addressed.

Table 8.
Summary of the Contents of Field Collecting and Curation Policies Acquired During the Project From Non-Federal Entities

No.	Source	Field Collecting	Cataloging	Collections Management	Repository Standards
1	Alabama Historical Commission Policy for Archaeological Survey and Testing in Alabama	Professional qualifications, standards for field work (survey and testing), and report standards	Standards for laboratory analysis and curation	Not addressed	Not addressed
2	University of Alabama Museums Office of Archaeological Services Collections Management Policies and Procedures	Not addressed	Registration and accession procedures	Access to collections, loans, collection use, site file use, curation costs	Facility described but standards not addressed
3	University of Alabama, Anthropology Research Laboratory (uses Historical Commission policy)	Professional qualifications, standards for field work (survey and testing), and report standards	Standards for laboratory analysis and curation	Not addressed	Not addressed
4	University of Alaska Museum: Collections Management Policy	Not addressed	Not addressed	Object acquisition, accession, loans, collection use, collection care, appraisals	Not addressed
	Policy for Access to the Archaeological Collections at the University of Alaska Museum	Not addressed	Not addressed	Access procedure, destructive analysis, loans, photographs, NAGPRA-related materials	Not addressed
	Preparing Archaeological Collections for Deposition at the University of Alaska Museum	Not addressed	Not addressed	Accession, cataloguing, numbering, lots, packaging and labeling, shipping and insurance, cites 36 CFR Part 79	Not addressed
5	Arizona Department of Transportation - Request for Proposal Package for Statewide On-Call Archaeological Investigations	Report standards	Not addressed	Responsibility of Consultants	Not addressed
6	The Arizona State Museum Procedures Manual for State Land Permits, Records Management/Repository Agreements and Site Files Access	Permit applications	Not addressed	Not addressed	Not addressed
	The Arizona State Museum Archaeological Site Recording Manual	Recording archaeological sites	Not addressed	Not addressed	Not addressed

Table 8.
Summary of the Contents of Field Collecting and Curation Policies Acquired During the Project From Non-Federal Entities (Continued)

No.	Source	Field Collecting	Cataloging	Collections Management	Repository Standards
7	Arizona SHPO Policy on Report Abstracts and Site Recordation	Report standards	Not addressed	Not addressed	Not addressed
	Arizona SHPO Guidelines for New Linear Rights-of-Way	Project-by-project options for field work	Not addressed	Not addressed	Not addressed
8	Arkansas - Midcontinental Research Associates, Inc.	Not addressed	Laboratory procs. including cataloguing, artifact labeling, bag labeling, packaging, documentation	Not addressed	Not addressed
9	California—ASM Affiliates, Inc.	Not addressed	Catalog forms	Not addressed	Not addressed
10	California—DOT, UC-Riverside, Archaeological Curation Unit (same document as UC-Davis, UC-Chico and UC-Santa Barbara)	Not addressed	Preparation and documentation, cleaning, labeling, artifact reconstruction, digital data, film, organization and boxing	Collection access, registration	Not addressed
11	California—Far Western Anthropological Research Group, Inc. (Uses UC-Davis, UC-Chico, and UC-Santa Barbara standards)	Not addressed	Catalog sheet	Collections policy, fee structure, directions for preparing collections	Not addressed
12	California SHPO, Archaeological Resource Management Reports Recommended Contents and Format	No standards, per se, but recommended subject matter for compliance reports	Not addressed	Not addressed	Not addressed
	State of California Guidelines for the Curation of Archaeological Collections	Not addressed	Guidelines for the acquisition of archaeological collections	Guidelines for archaeological collections management	Selection of repositories
13	Colorado—University of Colorado Museum, Collections Policy	Not addressed	General cataloging procedures	Standard museum policy statement, accession, loans, deaccession	Not addressed
14	Colorado—SHPO	Secretary of the Interior's Standards and Guidelines	Not addressed	Not addressed	Not addressed

Table 8.
Summary of the Contents of Field Collecting and Curation Policies Acquired During the Project From Non-Federal Entities (Continued)

No.	Source	Field Collecting	Cataloging	Collections Management	Repository Standards
15	Connecticut Historical Commission, Environmental Review Primer for Connecticut's Archaeological Resources	Performance criteria for archaeological survey, testing and data recovery	Lab. of Archaeology and Mus. of Natural Hist., Univ. of Conn., Collections Repos. Guidelines. general procs, cost	Not addressed	Not addressed
16	Connecticut—Connecticut College Archaeology Laboratory	Not addressed	Guidelines for washing/cleaning and cataloging	Not addressed	Not addressed
17	Delaware—MAAR Associates, Inc.	Archaeological field work procedures, survey and excavation	Laboratory procedures, washing, preservation, numbering and labeling, preparing collection for curation	Not addressed	Not addressed
18	Delaware— Historic Preservation Office, Guidelines for Architectural and Archaeological Surveys	Archaeological site survey instructions, report guidelines	Cites 36 CFR Part 79	Cites 36 CFR Part 79	Cites 36 CFR Part 79
19	District of Columbia—American University, Field and Laboratory Manual for Shawnee-Minisink site	Excavation methods	Laboratory methods	Not addressed	Not addressed
20	District of Columbia—Historic Preservation Division, Guidelines for Archaeological Investigations	Identification of archaeological resources, evaluation of archaeological resources, treatment of archaeological resources	Curation standards for archaeological studies, processing material remains	Not addressed	Not addressed
21	Florida—University of West Florida Archaeology Institute, Artifact Classification Manual	Not addressed	Laboratory procedures, washing, sorting, classification, weighing and measuring	Not addressed	Not addressed
22	Florida—Division of Historic Resources, Florida Statutes and Rules Pertaining to Historical Resources, Administration of Permanent Collections	Repealed		Accessioning and acquisition procedures	
23	Georgia—GDOT Archaeological Survey Guidelines	Survey methods, reporting	Not addressed	Not addressed	Not addressed

Table 8.
Summary of the Contents of Field Collecting and Curation Policies Acquired During the Project From Non-Federal Entities (Continued)

No.	Source	Field Collecting	Cataloging	Collections Management	Repository Standards
24	Georgia—State University of West Georgia, Curation Agreement and Curation Policies and Procedures	Not addressed	Curation policies and procedures 36 CFR Part 79	36 CFR Part 79	36 CFR Part 79
25	Idaho—The Archaeological Survey of Idaho, Curation Standards and Guidelines	Not addressed	Catalog, numbering, conservation, documentation, packaging	Not addressed	Not addressed
	Idaho State Historical Society Collections Policy	Not addressed	Not addressed	Mission, object acquisition, deaccessioning, standard policy statement	Not addressed
26	Illinois—Illinois State Museum Instructions for boxing and inventorying archaeological collections	Not addressed	Inventories, box labels, collection organization	Not addressed	Not addressed
27	Illinois—University of Illinois, Public Service Archaeology Program Laboratory procedures	Not addressed	Standard laboratory procedures, washing, bagging, labeling	Not addressed	Not addressed
28	Illinois—American Resources Group	Not addressed	Not addressed	Not addressed	Curation standards for Indiana, Iowa, and Missouri
29	Indiana—Indiana University, Glenn A. Black Laboratory of Archaeology, Indiana University, Statement of Qualifications, Collections/Work Area Access, Guidelines for Curation	Not addressed	Not addressed	36 CFR Part 79	36 CFR Part 79
30	Indiana—Indiana Historic Preservation Office, Draft priorities for the Historic Preservation Fund Matching Grants Program	Survey priorities	Not addressed	Not addressed	Not addressed

Table 8.
Summary of the Contents of Field Collecting and Curation Policies Acquired During the Project From Non-Federal Entities (Continued)

No.	Source	Field Collecting	Cataloging	Collections Management	Repository Standards
31	Iowa—University of Iowa, Office of the State Archaeologist, Laboratory Procedures Manual	Not addressed	Washing, cataloging, numbering	Not addressed	Not addressed
	Iowa—University of Iowa, Office of the State Archaeologist, Curation Services	Not addressed	Not addressed	Provisions of curation services	Not addressed
	Iowa—Association of Iowa Archaeologists, Guidelines for Phase I Reporting of Archaeological Survey (1998)	Reporting guidelines only	Not addressed	Not addressed	Not addressed
32	Iowa—State Historical Society, Guidelines for Archaeological Investigations in Iowa	Archaeological survey, testing, and data recovery	Laboratory work – not elaborated in this draft	Not addressed	Cites 36 CFR Part 79
33	Iowa—Bear Creek Archeology, Inc.	Not addressed	Not addressed	Not addressed	Curation standards for Iowa, Minnesota, Missouri, and Wisconsin
34	Kansas State Historical Society, Policy for Curation of Archaeological Materials	Not addressed	Cataloging, numbering, labeling	Not addressed	Not addressed
35	Kentucky State Historic Preservation Office, Specifications for Archaeological Fieldwork and Assessment Reports	Survey and testing procedures, reporting	Statement on curation of artifacts and records, no procedures	Not addressed	Not addressed
36	Kentucky—William S. Webb Museum of Anthropology, University of Kentucky, Guidelines for Archaeological Contractors	Procedures for government agencies or archaeological contractors conducting cultural resource assessments	Guidelines for preparation of archaeological specimens and documents for curation at WSWMA	Loan request	Not addressed
37	Kentucky—University of Louisville, Program of Archaeology, Agreements, Requirements Loan Forms for Curation	Not addressed	Requirements to curate materials obtained from Kentucky	Not addressed	Not addressed

Table 8.
Summary of the Contents of Field Collecting and Curation Policies Acquired During the Project From Non-Federal Entities (Continued)

No.	Source	Field Collecting	Cataloging	Collections Management	Repository Standards
38	Louisiana—Historic Preservation Office, Investigation and Report Standards	Survey and testing guidelines, reports, treatment of human remains	Not addressed	Site records management	Not addressed
39	Maryland—Historic Preservation Office, Standards and Guidelines for Archaeological Investigations in Maryland	Guidelines for survey, testing, and treatment	Processing and curation of collections (artifacts and records), reports and documentation	Not addressed	Not addressed
40	Massachusetts Historical Commission	Secretary of the Interior Standards	36 CFR Part 79	36 CFR Part 79	36 CFR Part 79
41	Michigan—Office of the State Archaeologist, Michigan Historical Center	Not addressed	Collections cataloging policies and procedures, ARGUS program	Procedures Manual, Archaeology Section, Michigan Department of State – loan policies	Not addressed
42	Michigan—Department of Transportation, Work Specifications for Archaeological Cultural Resource Investigations	SOPA standards, Phase I, II, and III, and Report Guidelines	Not addressed	Not addressed	Not addressed
43	Minnesota—IMA Consulting, Inc.	Field Manual: methods and procedures for Phase I and Phase II Investigations	IMAC Preprocessing artifacts in the field and lab protocol	Not addressed	Not addressed
44	Minnesota—Office of the State Archaeologist	Permit license information	Not addressed	Not addressed	Not addressed
45	Mississippi—State of Mississippi, Department of Archives and History	Survey report guidelines/standards	Not addressed	Not addressed	Not addressed
46	Missouri—Center for Archaeological Research, SW Missouri State Univ.	Not addressed	Laboratory procedures	Not addressed	Not addressed
47	Missouri—State Historic Preservation Office/ Office of the State Archaeologist, Guidelines for Reporting Phase II Testing	Phase II evaluations	Not addressed	Not addressed	Not addressed
48	Montana—Bureau of Indian Affairs, Instructions for preparing materials for curation at BLM	Not addressed	Not addressed	Only preparing collections for deposit at repository	Not addressed

Table 8.
Summary of the Contents of Field Collecting and Curation Policies Acquired During the Project From Non-Federal Entities (Continued)

No.	Source	Field Collecting	Cataloging	Collections Management	Repository Standards
49	Nebraska SHPO Guidelines for Protection of Archaeological Properties under Section 106	Archaeological resource assessments, reports	Not addressed	Not addressed	Not addressed
50	New Jersey—Louis Berger and Associates, Inc. Field Manual, the Cultural Resource Group	How archaeological projects proceed, survey, testing, data recovery	Laboratory guidelines for fieldwork, cataloging, bagging boxing, and conservation	Not addressed	Not addressed
51	New Jersey—SHPO Guidelines for Phase I Archaeological Investigations	Field inspection and investigation, report guidelines	Data collection and analysis, artifact cleaning and numbering	Not addressed	Not addressed
52	New Mexico—SHPO Division, Guidelines for the Preparation of Archaeological Survey Reports	Report guidelines	Not addressed	Not addressed	Not addressed
	New Mexico—Procedures Manual for Submission of Archaeological Artifact and Records Collection, Museum of New Mexico	Not addressed	Storage location and cataloging procs, containers, organization of artifacts and documentation, curation fees	Not addressed	Not addressed
53	New York—Education Department, Cultural Resources Survey Program Work Scope Specification for Cultural Resource Investigations, New York Department of Transportation Projects	Phase I survey, Phase II testing, Phase III data recovery/mitigation, report guidelines	Not addressed	Not addressed	Not addressed
54	New York—SHPO, Standards for Cultural Resource Investigation and the Curation of Archaeological Collections in New York State	Phase I, Phase II, and Phase III cultural resource investigation guidelines	Standards for the Curation of archaeological collections cataloging, records	Not addressed	Guidelines for selecting a repository
55	New York—SUNY Binghamton, Public Archaeology Facility, Dept of Anthro., State Univ. of New York at Binghamton, Mission statement	Not addressed	Not addressed	Not addressed	Not addressed
	New York—SUNY Binghamton, Draft Archaeological Collections Policy	Not addressed	Accession, deaccession	Not addressed	Not addressed

Table 8.
Summary of the Contents of Field Collecting and Curation Policies Acquired During the Project From Non-Federal Entities (Continued)

No.	Source	Field Collecting	Cataloging	Collections Management	Repository Standards
56	North Carolina—Archaeological Curation Standards and Guidelines, Office of State Archaeology, North Carolina Department of Cultural Resources	Guidelines for the preparation of archaeological survey reports	Guidelines for curation of artifacts, cleaning, numbering, labeling, packing	Not addressed	Not addressed
57	North Dakota—State Historical Society of North Dakota, Curation Agreements Archaeological Artifacts	Not addressed	Cataloging	Collections policies	Not addressed
58	Ohio—ASC Group, Inc., Employees Manual	Artifact collecting	Not addressed	Not addressed	Not addressed
59	Ohio—Historical Society, Instruction Manual, Ohio Archaeological Inventory Form	Definitions of sites	Collection Protection Plan	Not addressed	Not addressed
	Ohio—Historic Preservation Office, Archaeology Guidelines	Not addressed	Curation standards and guidelines	Not addressed	Not addressed
60	Oklahoma—DOT Cultural Resources Phase I Surveys manual	Phase I, field survey, report guidelines	Not addressed	Not addressed	Not addressed
61	Oregon—Oregon State Museum, Guidelines for the Preparation of Arch. Collections to be curated at the Oregon State Museum	Not addressed	Curation fee, procedures, accessioning, labeling, documents	Not addressed	Not addressed
62	Pennsylvania—Historic and Museum Commission, Cultural Resource Mgmt in Pennsylvania, Guidelines for Archaeological Invest.	Phases I, II investigations, report guidelines	Curation guidelines, cleaning, labeling, inventories	Not addressed	Not addressed
63	Rhode Island—Historical Preservation and Heritage Commission	Report guidelines, Phase I, II, and III	Standards for the conservation and curation of arch. collections	Not addressed	Standards for storage and custody of arch. collections
64	Tennessee—Division of Archaeology, Standards and Guidelines for Archaeological Permit Application	Phase I, Phase II, Phase III general guidelines, reporting standards	Archaeological curation requirements, labeling – limited	Not addressed	Not addressed

Table 8.
Summary of the Contents of Field Collecting and Curation Policies Acquired During the Project From Non-Federal Entities (Continued)

No.	Source	Field Collecting	Cataloging	Collections Management	Repository Standards
65	Texas—Historical Commission, Rules of Practice and Procedure for the Antiquities Code of Texas	Criteria for evaluating archaeological sites	Not addressed	Not addressed	Not addressed
	Texas—Historical Commission, Archaeological Survey Standards for Texas	Minimum survey standards	Not addressed	Not addressed	Not addressed
	Draft Archaeological Survey Standards for each Region of Texas	Field procedures	Not addressed	Not addressed	Not addressed
66	Texas—Council of Texas Archaeologists, Curation Appendix A	Not addressed	Human remains	Not addressed	Not addressed
	Texas—Guidelines for Cultural Resource Management Reports	Report standards	Not addressed	Not addressed	Not addressed
	Guidelines for Curation Standards and Procedures	Not addressed	Not addressed	Not addressed	Accredited Archaeological Repository Accreditation
	Guidelines for Professional Performance	Data recovery plans	Not addressed	Not addressed	Not addressed
67	Texas—Center for Ecological Archaeology, Texas A & M University, Mission Statement	Not addressed	Not addressed	Not addressed	Standards of facility
68	Texas—Prewitt and Associates, Inc., Preparation of collections manual	Not addressed	Preparation of collections, cataloging and inventory	Not addressed	Not addressed
69	Utah—State Historical Society	Not addressed	Not addressed	Not addressed	Not addressed
70	Virginia—Commonwealth of Virginia, Department of Historic Resources, Collections Management Policy	Phase I, II, and III methods, Guidelines for Archaeological Investigations	Not addressed	Accessions, deaccessions, loans, care of collections, use of collections	Not addressed
71	Washington—Central Washington Archaeological Survey, Field Protocol	Standards for field work	Not addressed	Not addressed	Not addressed

Table 8.
Summary of the Contents of Field Collecting and Curation Policies Acquired During the Project From Non-Federal Entities (Continued)

No.	Source	Field Collecting	Cataloging	Collections Management	Repository Standards
72	Washington—Thomas Burke Memorial Washington State Museum, Collections Management Policy	Not addressed	Not addressed	Acquisitions, deaccession, loans, collection care, records	Security
73	Washington—Guidelines for the Preparation of Collections to be curated at the Museum of Anthropology, Washington State University	Not addressed	Artifact organization, labeling, packaging, records organization	Not addressed	Not addressed
74	West Virginia—Guidelines for Phase I Surveys, Phase II Testing, and Phase III Mitigation and Cultural Resource Reports	Methods and procedures, report guidelines	Not addressed	Not addressed	Not addressed
	West Virginia—Curatorial Guidelines,	Not addressed	Minimum standards for collections, cleaning, labeling, labels, documentation	Not addressed	Not addressed
75	Wisconsin—Archaeological Survey, Guidelines for Public Archeology In Wisconsin	Phase I, Phase II, Phase III standards	Curation guidelines	Not addressed	Not addressed
76	Wisconsin—SHPOs Collections procedures	Permit and Report Guidelines for Phase I, II, and III	Not addressed	Depends on owner of material	Not addressed
77	Wyoming—Office of the State Archaeologist, Guidelines for Submitting an Archaeological Collection to the University of Wyoming Archaeological Repository	Not addressed	Agreement, fees, basic curation procedures, specific curation procedures	Not addressed	Not addressed

Appendix F

National Park Service's Proposed Rule for Deaccessioning Bulk Archeological Materials in Federal Collections

(Originally published in the Federal Register, Vol. 55, No. 177, pages 37670-37672, September 12, 1990)

DEPARTMENT OF THE INTERIOR
National Park Service
36 CFR Part 79
Curation of Federally-Owned and Administered Archeological Collections
AGENCY: National Park Service, Interior.
ACTION: Proposed rule.

SUMMARY: This proposed rule would amend the final regulation for the curation of federally-owned and administered archeological collections. It would establish procedures for Federal agencies to provide both information on the disposition of collections and copies of certain associated records to pertinent State officials and other appropriate parties. In addition, it would establish procedures for Federal agencies to discard, under certain circumstances, particular material remains that may be in collections subject to this part.

DATES: Comments on this proposed rule must be received on or before December 11, 1990.

ADDRESSES: Comments on this proposed rule should be addressed to Douglas H. Scovill, Acting Departmental Consulting Archeologist, National Park Service, P.O. Box 37127, Washington, DC 20013-7127, or delivered to Room 4127C, 1100 L Street, NW., Washington, DC, between 8 a.m. and 4:30 p.m.

FOR FURTHER INFORMATION CONTACT: Francis P. McManamon (Chief, Archeological Assistance Division) at 202-343-4101 or FTS 343-4101.

SUPPLEMENTARY INFORMATION:

Background

The final regulation 36 CFR part 79 establishes definitions, standards, procedures, and guidelines to be followed by Federal agencies to preserve collections of prehistoric and historic material remains, and

associated records, recovered in conjunction with Federal projects and programs under certain Federal statutes. This proposed rule would amend Sec. 79.5 and would add Sec. 79.12 to part 79.

Section 79.5 sets forth the responsibilities of Federal Agency Officials for the long-term management and preservation of collections subject to part 79. Paragraph © of Sec. 79.5 requires that certain administrative records on the disposition of collections subject to part 79 be maintained by the Federal Agency Official. It does not, however, call for the Federal Agency Official to provide information on the disposition of collections or copies of certain associated records to pertinent non-Federal parties. For example, State and Tribal Historic Preservation Officers should be provided with information about prehistoric and historic resources on lands within their respective States and reservations. In addition, researchers and scholars should have access to information about prehistoric and historic resources that they are studying. This proposed rule would address this matter by adding paragraph (d) to Sec. 79.5.

Proposed paragraph 79.5(d)(1) would call for information on the disposition of collections and copies of certain associated records to be provided to pertinent State officials and other appropriate parties. Proposed paragraph

79.5(d)(2) would identify those State officials and other parties who should receive the information and records. Proposed paragraph 79.5(d)(3) would call for the Federal Agency Official to submit copies of final reports of federally-authorized surveys, excavations and other studies to a national depository of reports. Proposed paragraph 79.5(d)(4) would call for certain information on final reports of such studies to be submitted for inclusion in the National Archeological Database, which is administered by the National Park Service.

As currently codified, 36 CFR part 79 does not provide a mechanism for Federal agencies to discard material remains, which may be in collections subject to the part, that have limited or no scientific value. By adding a new Sec. 79.12 to part 79, this proposed rule would establish procedures to discard, under certain circumstances, particular material remains.

Proposed paragraph 79.12(a) would provide Federal agencies with the discretion to discard, under certain circumstances, particular material remains. Proposed paragraph 79.12(b) would set forth four categories of material remains that would be appropriate for a Federal Agency Official to discard./1/ The categories are specific and narrowly defined to ensure that material remains that are archeological or historic in nature are not inadvertently or casually discarded.

NOTE /1/ The procedure that would be established under this proposed amendment is not intended to address the complex issue of repatriation of human remains and funerary objects. A procedure for Federal agencies to release particular human skeletal remains and objects excavated or removed from public lands into the custody of the pertinent Indian tribe or other Native American group is being drafted by the Departments of the Interior, Agriculture, Defense, and the Tennessee Valley Authority as part of an amendment to uniform regulations (43 CFR part 7, 36 CFR part 296, 18 CFR part 1312, and 32 CFR part 229) implementing the Archaeological Resources Protection Act (16 U.S.C. 470aa-mm). Nevertheless, human skeletal remains and objects that would meet any of the four categories of material remains set forth in proposed paragraph 79.12(b) may be appropriate for discard under 36 CFR part 79.

Proposed paragraphs 79.12(c) and (d) would establish procedures by which the Federal Agency Official would make and document determinations to discard particular material remains. Proposed paragraph 79.12(e) would provide a means for the Federal agency's determination to discard material remains to be reviewed by the Department of the Interior's Departmental Consulting Archeologist.

Proposed paragraphs 79.12(f) through (i) would set forth the requirements under which material remains to be discarded would be disposed of.

Proposed paragraph 79.12(j) would call for pertinent records on the collection to be amended to indicate any deaccessions and discards, and for certain documentation on the discard to be retained.

Preparation of the Rulemaking

The final regulation 36 CFR part 79 for the curation of federally-owned and administered archeological collections appears as 90-21348 published elsewhere in this issue of the Federal Register. The regulation had been published for public comment as a proposed rule on August 28, 1987 (52 FR 32740). A number of commenters recommended the changes being proposed in this amendment. Because the procedures being proposed were not contained in the proposed rule that was published in 1987, they are being issued herein below as a proposed rule to allow for public review and comment.

The National Park Service seeks comments and suggestions from Federal, State and local Government agencies, Indian tribes, repositories, professional organizations, other interested organizations, groups, and the public on these proposed amendments to 36 CFR part 79.

Authorship

The author of this rulemaking is Michele C. Aubry (Archeologist and Program Analyst) in the office of the Departmental Consulting Archeologist, National Park Service, Washington, DC.

Compliance with Executive Order 12291 and the Regulatory Flexibility Act

The Department of the Interior has determined that this document is not a major rule under E.O. 12291 and certifies that this document will not have a significant economic effect on a substantial number of small entities under the Regulatory Flexibility Act (5 U.S.C. 601 et seq.).

Compliance with the Paperwork Reduction Act

This rules does not contain information collection requirements which require approval by the Office of Management and Budget under 44 U.S.C. 3501 et seq.

Compliance with the National Environmental Policy Act

Federal agencies that conduct or authorize archeological investigations are required by law to maintain and preserve the resulting collections of artifacts, specimens and associated records. Issuance of this document will result in more consistent, systematic and professional care of those collections. The National Park Service has determined that this rulemaking will not have a significant effect on the quality of the human environment under the National Environmental Policy Act (42 U.S.C. 4321-4347). In addition, the National Park Service has determined that this rulemaking is categorically excluded from the procedural requirements of the National Environmental Policy Act by Departmental regulations in 516 DM 2. As such, neither an Environmental Assessment nor an Environmental Impact Statement has been prepared.

List of Subjects in 36 CFR Part 79

Archeology, Archives and records, Historic preservation, Indians-lands, Museums, Public lands. Dated: June 25, 1990.

Constance B. Harriman,

Assistant Secretary for Fish and Wildlife and Parks.

For the reasons set out in the preamble, the Department of the Interior proposes to amend title 36, chapter I of the Code of Federal Regulations by amending part 79 as follows:

PART 79—CURATION OF FEDERALLY-OWNED AND ADMINISTERED ARCHEOLOGICAL COLLECTIONS

1. The authority citation for part 79 continues to read as follows:

Authority: 16 U.S.C. 470aa-mm, 16 U.S.C. 470 et seq.

2. Section 79.5 is amended by adding paragraph (d) to read as follows:

Sec. 79.5 Management and preservation of collections.

(d) Distribution of records to other parties. (1) For each new collection and, upon request, for each preexisting collection, the Federal Agency Official shall ensure that pertinent State officials and other parties, as appropriate, are provided with:

(i) The name and location of the repository where the collection is deposited;

(ii) Copies of any site forms and maps of the prehistoric or historic resource that was surveyed, excavated or otherwise studied;

(iii) Copies of any final reports of the survey, excavation or other study;

(iv) Upon request, copies of other appropriate records; and

(v) In accordance with such terms and conditions as are developed pursuant to Sec. 79.10(d) of this part, instructions for restricting access to site forms, maps, final reports, and other records being provided that contain

information relating to the nature, location or character of a prehistoric or historic resource.

(2) Pertinent State officials and other parties, as appropriate, would include but not be limited to the:

(i) State Historic Preservation Officer;

(ii) State Archeologist;

(iii) When the State Historic Preservation Officer does not maintain the State's official site files, the official who represents the State agency or institution that does maintain such files;

(iv) When the collection is from a site on Indian lands, the Tribal Official and the Tribal Historic Preservation Officer, if any, of the Indian tribe that owns or has jurisdiction over such lands;

(v) When the collection is from a site on public lands that the Federal Agency Official has determined is of religious or cultural importance to any Indian tribe having aboriginal or historic ties to such lands, the Tribal Official and the Tribal Historic Preservation Officer, if any, of the pertinent Indian tribe; and

(vi) When the collection is from a site on State, local or privately owned lands, the owner.

(3) For each new collection, after removing any information on the nature, location or character of a prehistoric or historic resource to which access is restricted pursuant to Sec. 79.10(d) of this part, the Federal Agency Official shall submit copies of any final reports of the survey, excavation or other study to the:

(i) National Technical Information Service;

(ii) Defense Technical Information Service;

(iii) Library of Congress; or (iv) Other appropriate national depository for reports.

(4) For each new collection and, upon request, for each preexisting collection, the Federal Agency Official shall ensure that the information required by the National Archeological Database, administered by the National Park Service, about final reports of the survey, excavation or other study is submitted for inclusion in the National Archeological Database.

Procedures for submitting the required information are available from the Archeological Assistance Division, National Park Service, P.O. Box 37127, Washington, DC 20013-7127.

* * * * *

3. A new Sec. 79.12 is added to read as follows:

Sec. 79.12 Procedures to discard material remains.

(a) Under certain circumstances, the Federal Agency Official may determine that particular material remains in a collection subject to this part need not be preserved and maintained in a repository, and may be discarded.

b) It may be appropriate to discard material remains when:

(1) The material remains are not archeological or historic in nature and were inadvertently collected and included in the collection;

(2) Material remains subject to the Archaeological Resources Protection Act (16 U.S.C. 470aa-mm) are not or are no longer of archeological interest, as determined under uniform regulations 43 CFR part 7, 36 CFR part 296, 18 CFR part 1312, and 32 CFR part 229;

(3) The material remains, while archeological or historic in nature, consist of large quantities of bulky, highly redundant, non-diagnostic items that have limited potential for further research; or

(4) The material remains, while archeological or historic in nature, are a hazard to human health or safety.

c) Prior to making a determination that it may be appropriate to discard particular material remains, the Federal Agency Official shall ensure that the following procedures are followed:

(1) The material remains are professionally evaluated and documented, consistent with the "Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation" (48 FR 44716, Sept. 29, 1983), for the purpose of determining whether they meet the requirements of paragraph (b)(1), (b)(2), (b)(3) or (b)(4) of this section;

(2) The Federal agency's principal archeologist or, in the absence of an agency principal archeologist, the Department of the Interior's Departmental Consulting Archeologist, shall review the documentation prepared under

paragraph (c)(1) of this section and make recommendations to the Federal Agency Official concerning the adequacy of the evaluation and documentation and the appropriateness of the proposed discard;

(3) When the material remains are from a site on Indian lands, the Indian landowner and the Indian tribe having jurisdiction over the lands are notified of the proposed discard;

(4) When the material remains are from a site on State, local or privately owned lands, the owner is notified of the proposed discard;

(5) When the material remains are from a site on public lands that the Federal Agency Official has determined is of religious or cultural importance to any Indian tribe having aboriginal or historic ties to such lands, the pertinent Indian tribe or other group is provided with an opportunity to comment on the proposed discard;

(6) The State Historic Preservation Officer and other appropriate State and Federal agencies, universities, museums, scientific and educational institutions, and interested persons are provided with an opportunity to comment on the proposed discard; and

(7) When the collection is included in or eligible for inclusion in the National Register of Historic Places, the discard action is reviewed to determine whether it is subject to section 106 of the National Historic Preservation Act (16 U.S.C. 470f).

(d) The Federal Agency Official shall fully document determinations to discard material remains and any terms and conditions to be applied. The Federal Agency Official's determinations shall be based upon:

(1) A professional evaluation of the material remains, conducted pursuant to paragraph (c)(1) of this section, that the remains meet the requirements of paragraph (b)(1), (b)(2), (b)(3) or (b)(4) of this section;

(2) The recommendations of the agency's principal archeologist or the Department of the Interior's Departmental Consulting Archeologist, as appropriate, provided in accordance with paragraph (c)(2) of this section;

(3) The consent of any non-Federal owners; and

(4) Any consultations performed pursuant to paragraphs (c)(5), (c)(6) and (c)(7) of this section.

(e) Any interested person may request in writing that the Department of the Interior's Departmental Consulting Archeologist review any Federal agency's determination to discard material remains. Two copies of the request should be sent to the Departmental Consulting Archeologist, National Park Service, P.O. Box 37127, Washington, DC 20013-7127. The request should document why the requester disagrees with the Federal Agency Official's determination or the terms and conditions to be applied. The Departmental Consulting Archeologist shall review the request and, if appropriate, the Federal Agency Official's determination and its supporting documentation. Based on this review and within 60 days of the receipt of the request, the Departmental Consulting Archeologist shall prepare and transmit to the head of the Federal agency a final professional recommendation for further consideration.

(f) Federally-owned material remains to be discarded shall be disposed of in accordance with the Federal Property and Administrative Services Act (40 U.S.C. 484), its implementing regulation (41 CFR Part 101), any agency specific regulations on the management of Federal property, any agency specific statutes and regulations on the management of museum collections, and such terms and conditions as may be appropriate.

(g) Indian-owned material remains to be discarded shall be disposed of in accordance with such terms and conditions as may be requested by the Indian landowner and the Indian tribe having jurisdiction over the lands.

(h) State, local, and privately owned material remains to be discarded shall be disposed of in accordance with such terms and conditions as may be requested by the owner.

(i) When the material remains to be discarded consist of bulky, highly redundant, non-diagnostic items, a sample shall be retained that is representative of the remains and large enough to allow for destructive analysis in the future without substantially depleting the sample.

(j) The accession, catalog and artifact inventory list records for the collection from which the material remains are discarded shall be amended to indicate which material remains are deaccessioned and discarded, the basis for the discard, and the manner in which they are discarded. The documentation prepared under paragraphs (c) and (d) of this section shall be retained as a part of the collection.

Appendix G

Glossary

Accession (when applied to federal collections deposited in non-federal repositories) is the formal acceptance of custody of a collection and recording of that acceptance.

Accessioning of federal collections is the totality of steps required to process an incoming collection to add it to a repository's management system (assigning an accession number, creating an accession file that documents the chain of custody for the collection, adding specimen numbers to objects if needed, and incorporating the specimens into the repository's collections management system so that its location, condition, use, etc. can be tracked).

An *accession number* is the unique number assigned to each collection within a curation repository. This number may or may not be used as part of the unique specimen number assigned to each object or object lot, within the repository.

Acid are a substances with a pH under 7.0. Acids can weaken cellulose in paper, board, and cloth, leading to embrittlement. Acids may be introduced in the manufacture of library materials and may be left in intentionally (as in certain sizings) or incidentally. Acids may also be introduced by migration from other materials or from atmospheric pollutants.

Acid-free materials have a pH of 7.0 or higher. Acid-free is sometimes used incorrectly as a synonym for alkaline or buffered. Such materials may be produced from virtually any cellulose fiber source (cotton and wood, among others), if measures are taken during manufacture eliminate active acid from the pulp. However free of acid a paper or board may be immediately after manufacture, over time the presence of residual chlorine from bleaching, aluminum sulfate from sizing, or pollutants in the atmosphere may lead to the formation of acid unless the paper or board has been buffered with an alkaline substance.

Alkaline substances have a pH over 7.0. Alkaline based paper increases the longevity of paper. Alkaline substances can be added to a material to neutralize acids or as an alkaline reserve or buffer for the purpose of counter-acting acids that may form in the future. A buffer may be added during manufacture or during the process of de-acidification. While a number of chemicals may be used as buffers, the most common are magnesium carbonate and calcium carbonate.

Appraisal is the process of determining the value and thus the disposition of records based upon their current administrative, legal, and fiscal use; their evidential and informational value; their arrangement and condition; their intrinsic value; and their relationship to other records.

Archaeological interest is said to be found in an item that is capable of providing scientific or humanistic understandings of past human behavior, cultural adaptation, and related topics through the application of scientific or scholarly techniques (32 CFR Part 229.3).

Archaeological materials (see Material remains)

Archaeological resources are any material remains of past human life or activities which are of archaeological interest, as determined under uniform regulations promulgated pursuant to the Archaeological Resources Protection Act (16 U.S.C 470bb, 32 CFR Part 229).

Archival or *archivally sound* are non-technical terms that denote a material or product is permanent, durable or chemically stable, and that it can therefore safely be used for preservation purposes. The phrase in not quantifiable; no standards exist that describe how long an "archival" or "archivally sound" material will last.

Archival quality indicates materials that have been manufactured of inert materials specifically designed to extend the life of artifacts and records by protecting them from agents of deterioration.

Archives include (1) The non-current records of an organization or institution preserved because of their continuing value; also referred to, in this sense, as archival materials or archival holdings. (2) The agency responsible for selecting, preserving, and making available archival materials; also referred to as an archival agency. (3) The building or part of a building where such materials are located; also referred to as an archival repository or archival depository.

Arrangement is the process and results of organizing archives, records, and manuscripts in accordance with accepted archival principle, particularly provenance, at as many as necessary of the following levels: repository, record group, subgroup, series, file unit, and document.

Associated Records (or Associated Documentation) are original records (or copies thereof) that are prepared, assembled and document efforts to locate, evaluate, record, study, preserve or recover a prehistoric or historic resource. Some records such as field notes, artifact inventories and oral histories may be originals that are prepared as a result of the field work, analysis and report preparation. Other records such as deeds, survey plats, historical maps and diaries may be copies of original public or archival documents that are assembled and studied as a result of historical research (36 CFR Part 79.4.a.2).

Bulk dates are the range of dates in which the majority, or bulk, of a collection falls. Used in conjunction with inclusive dates as a method to more specifically describe the range of dates for a collection.

Cartographic records are archival records that contain information in graphic or photogrammetric form of a portion of a linear surface (e.g., maps).

A *catalog* is a listing of materials with descriptive details, usually arranged systematically.

Cataloging is the process of assigning and applying a unique identifying number to an object and completing the written documentation of this process.

Collection is a group of material remains that are excavated or removed during a survey, excavation or the study of an archaeological resource historic property, and associated records that are prepared or assembled in connection with the survey, excavation, other study (36 CFR Part 79.4.a).

Conservation is the treatment of library or archive materials, works of art, archaeological artifacts, or museum objects to stabilize them chemically or strengthen them physically, sustaining their survival as long as possible in their original form. Use treatments that are fully tested, reviewed, and recommended by professional conservators, rather than new, untested, or "household" treatments.

Correspondence comprises letters, postcards, memoranda, notes, telecommunications, and any other form of addressed, written communications sent and received.

Curation is the process of managing and preserving a collection according to professional museum and archival practices (36 CFR Part 79.4.b).

Deaccession is the formal procedure whereby objects or records are permanently removed from a repository's holdings. At present, only items

specified by the Native American Graves Protection and Repatriation Act can legally be deaccessioned from a federal archaeological collection.

De-acidification is a common term for a chemical treatment that neutralizes acid in a materials such as paper and deposits an alkaline buffer to counteract future acid attack. De-acidification technically refers to only the neutralization of acids at the time of treatment, not to the deposit of a buffer. For this reason, the term is slowly being replaced with the more accurate phrase "neutralization and alkalization." While de-acidification increases the chemical stability of paper, it does not restore strength or flexibility to brittle materials.

Evidential value is the worth of documents for illuminating the nature and work of their creator by providing evidence of the creator's origins, functions, and activities. Evidential value is distinct from informational value.

Finding aids are the descriptive media, published and unpublished, created by an originating office, an archival agency, or manuscript repository to establish physical or administrative and intellectual control over records and other holdings.

Geomorphology is the science that deals with the relief features of the earth (Merriam-Webster on-line, http://www.m-w.com/)

Historic property (or historic resources) is defined as any prehistoric or historic district, site building, structure, or object included in or eligible for inclusion on the National Register, including artifacts, records, and material remains related to such a property or resources (16 U.S.C. 470w).

A *hygrometer* is an instrument used for measuring relative humidity.

A *hygrothermograph* is a devise used to measure and record both relative humidity and temperature.

Inclusive dates are the dates that describe the period in which a records collection was made. Even if there is only a single document dating far before the rest of the collection, the beginning inclusive date is that of the single document. These are also known as the span dates because they describe the dates that span the entire collection.

Indian tribe as defined by NAGPRA (25 U.S.C. 3001.2.7) is any tribe, band nation, or other organized group or community of Indians, including any Alaska Native village which is recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians.

Informational value refers to the worth of documents for reference and research deriving from the information they contain on persons, places, subjects, etc. as distinct from their evidential value.

Integrated pest management (IPM) is the selection, integration, and implementation of pest management methods based on predicted economic, ecological, and sociological variables. IPM can also be defined as a decision-making process that helps one decide if a treatment is necessary and appropriate, where the treatment should be administered, when treatment should be applied, and what strategies should be integrated for immediate and long-term results.

Intellectual control is the process of documenting the acquisition or creation of a collection so that the informational content of the collection can be accessed and maintained.

Intrinsic value refers to the inherent worth of a document based upon factors such as age, content, usage, circumstances of creation, signature, or attached seals.

Machine-readable records are archives and records, whose informational content is usually in code, that have been (1) recorded on media such as magnetic discs, drums, tapes, punched paper cards, or punched paper tapes and (2) are accompanied by finding aids known as software documentation. Coded information is retrievable only by machine.

Material class is a group or set of archaeological materials manufactured from the same raw matter,

that share common attributes, e.g., ceramics, glass, metal, chipped stone, or ground stone

Material remains as defined by 36 CFR Part 79, Curation of Federally-Owned and Administered Archeological Collections, refers to artifacts, objects, specimens and other physical evidence that are excavated or removed in connection with efforts to locate, evaluate, document, study, preserve or recover a prehistoric or historic resource (36 CFR Part 79.4.a.1).

Native American means of, or relating to, a tribe, people, or culture that is indigenous to the United States (25 U.S.C. 3001.2.9). (*see also Indian Tribe and Native Hawaiian*)

Native Hawaiian means any individual who is a descendant of the aboriginal people who, prior to 1778, occupied and exercised sovereignty in the area that now constitutes the State of Hawaii (25 U.S.C. 3001.2.10).

Polyester is a common name for plastic polyethylene terephthalate. Its characteristics include transparency, colorlessness, and high tensile strength. In addition, it is useful in preservation because it is very chemically stable. Commonly used in sheet or film form to make folders, encapsulations and book jackets. Common trade names are Mylar by DuPont and Mellinex by ICI.

Polyethylene is a chemically stable, highly flexible, transparent or translucent plastic. Used in preservation to make sleeves for photographic materials, among other uses.

Polypropylene is a stiff, heat resistant, chemically stable plastic. Common used in preservation for sleeves for 35mm slides or films, and containers.

Record group is a body of organizationally related records established on the basis of provenance with particular regard for the administrative history, the complexity, and the volume of the records and archives of the institution or organization involved. Collective and general record groups represent modification of this basic concept for convenience in arrangement, description, and reference service.

Relative humidity (RH) is the ratio of the amount of water vapor in the air at a specific temperature to the maximum capacity of the air at that temperature.

Repository is a facility such as a museum, archeological center, laboratory or storage facility managed by a university, college, museum, other educational or scientific institution, a Federal, State or local Government agency or Indian tribe that can provide professional, systematic and accountable curatorial services on a long-term basis (36 CFR Part 79.4(j)).

Sample is a finite part of a statistical population whose properties are studied to gain information about the whole (Merriam-Webster online, http://www.m-w.com). In archaeological contexts, a sample is an excavated portion of the total material remains that comprise an archaeological site, resource, or material class.

Security copy is a duplicate copy of original documentation that is on archival paper and is stored in a separate location from the original

Series means a group of records arranged in accordance with a filing system or maintained a unit because they relate to a particular subject or function, result from the same activity, have a particular form, or because of some other relationship arising out of their creation, receipt, or use. Sometimes known as a record series.

Site number is the unique identifying number assigned to each archaeological resource within a state. Many states use the Smithsonian alpha-numeric trinomial system consisting of a state code, county code, and unique site number within that county (e.g., 26Wp2886 represents the 2,886th site recorded in White Pine County in Nevada).

Sizings are chemicals added to paper that make it less absorbent, so that inks applied will not bleed. Acidic sizings can be harmful and can cause paper to deteriorate, but some are not acidic and are expected to be more chemically stable.

Subgroup is a body of related records within a record group, usually consisting of the records of a primary subordinate administrative unit. Subgroups may also be established for related bodies of records within a record group that can best be delimited in terms of functional, geographical, or chronological relationships. Subgroups, in turn, are divided into as many levels as are necessary to reflect the successive organizational units that constitute the hierarchy of the subordinate administrative unit or that will assists in grouping series entries in terms of their relationships.

Subseries is an aggregate of file units within a records series readily separable in terms of physical class, type, form, subject, or filing arrangement.

A *thermohygrometer* is a non-recording device used to measure both relative humidity and temperature.