



Arizona State Museum  
THE UNIVERSITY OF ARIZONA.

**Requirements for the Preparation**  
**of**  
**Archaeological Project Collections**  
**for**  
**Submission to the Arizona State Museum**

COLLECTIONS DIVISION

**Suzanne Griset, Ph.D.**  
**Collections Division Head**

**Arthur W. Vokes**  
**Curator of Repository Collections**

**Catherine Sarther**  
**Assistant Curator of Repository Collections**

**Contributions by**  
**Teresa Moreno**  
**Assistant Conservator**

**Revision 2004**

**Arizona State Museum**  
**University of Arizona**  
**Tucson, Arizona 85721-0026**

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## ARIZONA STATE MUSEUM STAFF

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<b>Collections Division</b>		<b>Silvana Miller, Coll. Div. Sec'y (520) 621-4609</b>
Head, Collections Division	Suzanne Griset, Ph.D.	(520) 621-6276 <a href="mailto:griset@email.arizona.edu">griset@email.arizona.edu</a>
Curator of Repository Collections	Arthur W. Vokes	(520) 626-9109 <a href="mailto:vokesa@email.arizona.edu">vokesa@email.arizona.edu</a>
Assistant Curator of Repository Collections	Catherine Sarther	(520) 626-9109 <a href="mailto:sarther@email.arizona.edu">sarther@email.arizona.edu</a>
Curator of Archaeological Collections	Mike Jacobs	(520) 621-6312 <a href="mailto:jacobsg@email.arizona.edu">jacobsg@email.arizona.edu</a>
Assistant Curator of Archaeological Collections	Lisa Zimmerman	(520) 621-6312 <a href="mailto:laz@email.arizona.edu">laz@email.arizona.edu</a>
Archivist (Paper Records & Sound Recordings)	Alan Ferg	(520) 621-2970 <a href="mailto:ferg@email.arizona.edu">ferg@email.arizona.edu</a>
Conservator	Nancy Odegaard, Ph.D.	(520) 621-6314 <a href="mailto:odegaard@email.arizona.edu">odegaard@email.arizona.edu</a>
Curator of Photographic Collections	Susan Luebbermann	(520) 621-2445 <a href="mailto:luebbers@email.arizona.edu">luebbers@email.arizona.edu</a>
Museum Registrar	Mark Cattanaach	(520) 626-8742 <a href="mailto:mgcattan@email.arizona.edu">mgcattan@email.arizona.edu</a>
Arizona State Repatriation Coordinator	John Madsen	(520) 621-4795 <a href="mailto:jmadsen@email.arizona.edu">jmadsen@email.arizona.edu</a>
Permits Administrative Reviewer	Su Benaron	(520) 621-2096 <a href="mailto:sbenaron@email.arizona.edu">sbenaron@email.arizona.edu</a>
Permits Coordinator	Teresa Serrano	(520) 626-2715 <a href="mailto:tserra@email.arizona.edu">tserra@email.arizona.edu</a>
AZSITE Database Manager	Rick Karl	(520) 621-1271 <a href="mailto:karlr@email.arizona.edu">karlr@email.arizona.edu</a>
Archaeological Records Information Line (Site Files Checks & Site Number Assignments)	Staff	(520) 621-4011 <a href="mailto:azsite@email.arizona.edu">azsite@email.arizona.edu</a>

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### **Archaeology Division**

Associate Curator of Bioarchaeology	Lane Anderson Beck, Ph.D.	(520) 626-5579 <a href="mailto:lbeck@email.arizona.edu">lbeck@email.arizona.edu</a>
Assistant Curator of Bioarchaeology	John McClelland, Ph.D.	(520) 626-2950 <a href="mailto:jmcclell@email.arizona.edu">jmcclell@email.arizona.edu</a>
Assistant Curator of Zooarchaeology	Barnet Pavao-Zuckerman, Ph.D.	(520) 626-3989 <a href="mailto:bpavao@email.arizona.edu">bpavao@email.arizona.edu</a>

---

### **Information Services Division**

Data Manager	Karen L. Lominac	(520) 621-4697 <a href="mailto:klominac@email.arizona.edu">klominac@email.arizona.edu</a>
Webmaster	Laura LePere	(520) 621-4697 <a href="mailto:llepere@email.arizona.edu">llepere@email.arizona.edu</a>

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### **Other Numbers**

ASM FAX Number	(520) 621-2976
Archaeological Records FAX Number	(520) 621-4011

## Section 1

### REPOSITORY INFORMATION

#### 1.1 Introduction

By agreeing to serve as repository for archaeological collections from lands in Arizona, the Arizona State Museum (ASM) recognizes its responsibility to implement high curation standards for such materials (see Appendix A, ASM Curatorial Services Policy). Appropriate and systematic preparation of collections on the part of depositors prior to transfer to ASM is an integral part of ensuring that these standards are met.

See Appendix A for ASM's Curatorial Services Policy.

This manual explains how to acquire an Accession Number and a Repository Agreement from ASM, and then describes how to process archaeological collections that will be deposited at the Arizona State Museum under the terms of that Repository Agreement. Definitions of terms used throughout this manual are provided as Appendix E.

Archaeological collections that are incomplete or inadequately processed and documented may be refused. Failure to rectify the problems will result in the notification of both the sponsor and the permit granting agency. ASM reserves the right to cancel or refuse issuance of further Repository Agreements to companies or agencies that repeatedly or consistently fail to adequately comply with the terms of the Agreement.

Although this manual is intended to aid archaeological contractors in meeting the terms of the Repository Agreement, we recognize that projects encounter special, unanticipated situations. Project directors, laboratory directors, and project personnel are encouraged to contact the Curator of the Archaeological Repository or his assistant to obtain further information or procedural advice during the preparation of project collections for curation. Contact information for key ASM staff is provided at the front of this document.

Refer to the front of this manual for ASM staff contact information.

#### 1.2 Obtaining an ASM Accession Number and a Repository Agreement

**In order to curate any materials resulting from archaeological contract projects at ASM, it is necessary to obtain an identifying accession number and a Repository Agreement, or "Notice of Intent to Provide Repository Services," prior to the start of fieldwork.**

Accession numbers are assigned by ASM upon receipt of:  
1) a request for a state permit  
2) a request for a repository agreement.

### 1.2.1 Accession Numbers

**The accession number is a unique identifying number assigned by ASM.** It covers all documents and materials generated by an archaeological project. **This number must be provided in all correspondence with ASM, in project reports, and on all inventories and related documents prepared for ASM.** The number has two parts: the year in which the number is assigned and a sequence number specific to the project (e.g., 2003–2 represents the second accession in the year 2003). The accession number is assigned upon receipt of a request for a State Permit or a Repository Agreement. **For all state-permitted projects, ASM requires submission of a project registration form and THREE copies of the final report to ASM—even if another repository receives the collections.** In fact, ASM is also required to track and document all collections resulting from state-permitted projects, including those housed at other repositories. Therefore, an ASM Accession Number will be assigned to all projects subject to a State Permit, regardless of the designated repository.

All state permitted work requires submission of a project registration form and THREE copies of the final report to ASM.

### 1.2.2 Repository Agreements

**In order to designate the Arizona State Museum as the intended repository for collections resulting from systematic surface collection, archaeological monitoring, archaeological test excavations, or archaeological data recovery, depositors must obtain a project-specific Repository Agreement from the Head of the Collections Division.** For non-collection surveys, contractors must obtain an annual Archaeological Records Management Agreement from the Permits Coordinator. The latter agreement covers management and curation of survey project documentation.

A **formal written request** addressed to the Head of Collections initiates the issuance of a project-specific Repository Agreement. The request should employ the “Request for Repository Services” form available at [www.statemuseum.arizona.edu](http://www.statemuseum.arizona.edu) under “Professional Services > Forms and Guidelines.” Repository staff can also provide a copy of this form via email or U.S. mail. A written letter may be substituted, but it **MUST** include the following information:

- Company name and address
- Contact person at the company
- Project name
- Legal description of project area
- Name and address of the project sponsor
- Name of a contact person within the sponsor's organization
- Name and address of the land owner or administrative agency
- Scope of work
- Estimated number of person-field days necessary to complete the fieldwork
- ASM site numbers under investigation

- Permitting agencies

Allow at least ten working days for ASM staff to process a Request for Repository Services.

A copy of ASM's standard Repository Agreement, or “Notice of Intent...” is provided as Appendix B of this manual. The “Notice” sets forth the responsibilities of both ASM and the contracting organization requesting the Agreement. Please read it carefully.

### 1.3 Definition of a *Complete Collection*

**Collections submitted to ASM must represent a substantially complete record of the information derived from the study that produced them.**

This requirement ensures that the collections are amenable to independent use. Future use generally involves further research by professional archaeologists and students, as well as use or exhibition of the artifacts for public interpretation.

A complete collection includes:

- All survey forms or excavation records
- All field logs and notes
- Maps showing locations and boundaries
- All valid photographs, negatives, and slides
- All artifacts and other cultural and environmental materials collected
- Analysis records
- Copies of all reports and publications

The release of material for special analyses by a subcontracting analyst—thereby removing it from the direct control of the contractor—must be documented in writing (see Section 3.2.5, “Documentation of Specimens Released”). Additionally, any materials destroyed during the analytical process must be also be adequately documented. This documentation should specify any terms or restrictions and include the signatures of the releasing and receiving parties. Use the “Specimens Released” form provided by ASM. Furthermore, the archaeological contractor is responsible for ensuring that collections released to outside specialists for non-destructive analyses are returned and submitted to ASM with the project collections.

**Consult Section 3.2.5 for further information on release of specimens.**

It is also the responsibility of each project director to ensure that all materials are properly prepared and delivered to ASM in good condition. Assistance in complying with the described procedures is always available from ASM staff; we especially encourage depositors to consult us regarding conservation problems encountered in the field or the laboratory.



## **1.4 Organization of ASM Collections**

Federal and state preservation legislation enacted over the past four decades has contributed to the rapid growth of cultural resource management studies and concomitant growth in the volume of archaeological collections. At the same time, developments in archaeological theory and methodology have resulted in changes in the ways researchers use these collections. Materials that were previously studied and discarded are now routinely saved and subjected to various intensive analyses. It is now standard procedure for archaeologists to retain essentially 100% of the artifacts they recover.

All of these factors impose new challenges for the curation of archaeological collections and their associated documentation. ASM is committed to curating these materials in a manner that does not impair their potential as sources of information and public enjoyment. At the same time, these materials must be made accessible in a manner that is consistent with responsible use and conservation. To best accomplish these ends, ASM has organized its archaeological collections into several basic categories. These categories are:

- Objects and environmental samples (i.e., catalog specimens, bulk materials, and survey collected materials)
- Photographic documentation
- Digitally/electronically formatted information
- Paper archives
- Sound recordings
- Human remains

Each of these classes of material is processed and maintained by specially trained staff. These categories are characterized by different patterns of use and by different methods of access, storage, and documentation. Specific requirements for the preparation of these basic categories are presented in subsequent Sections 3 through 7.

## **1.5 Exhibit Loan Requests**

Materials recovered by archaeological projects are occasionally placed on exhibit at the sponsor's request. If the exhibit will occur after the project collection has been delivered to ASM, the request for exhibit loan must be submitted to ASM. Identification of specific artifacts expedites the processing of this material, provided ASM staff are informed of the loan request well in advance. As soon as the requested artifacts are documented within ASM's system, they will become available for display purposes.

**We discourage the exhibition of collections that have not yet been submitted to ASM.** If this becomes necessary, archaeological contractors and sponsors **must** comply with the following procedures:

- At the time the material is released for exhibit, the contractor must complete a Specimens Released Form (see 3.2.5, and Appendix F) with a detailed listing of each item. Include the Catalog Number for the item, provenience information, site number, field number, and a description of the object. Each item must be photographed in order to document its condition.
- If the exhibit will not be dismantled before the rest of the collection is transferred to ASM, the exhibit must contain a placard stating that ASM is the designated repository, e.g., “This material will be curated by the Arizona State Museum, University of Arizona.” **It is the archaeological contractor’s responsibility to ensure that the exhibited material is ultimately delivered to ASM.**
- Photographs of the exhibit itself should be made after installation is complete. Submit these images to ASM.
- When the non-exhibited portions of the project collection are delivered to ASM, all exhibit-related documentation, such as Specimens Released forms, photographs, etc., should be submitted as a unit. Any objects remaining on exhibit should be brought to the attention of repository staff at the time of transfer.

The Museum Registrar will establish loan agreements between ASM and the designated representative of the corporate entity that holds the outstanding objects after the rest of the project collection has been submitted to the Repository.

## 1.6 Ownership of Collections

**Archaeological contractors are required to identify the owner(s) of artifacts recovered during archaeological projects, and to so inform ASM** (see Appendix B, “Notice of Intent to Provide Repository Services”). Ownership negotiations must be resolved before the end of the project.

### 1.6.1 Government and Tribal Lands

Artifacts recovered from federal, tribal, or state lands remain the property of the respective governmental body. Collections owned by municipalities or counties fall under the jurisdiction of the state. **The contractor must notify ASM if these forms of ownership are involved at the inception of a project so that appropriate arrangements can be negotiated.**

### 1.6.2 Privately Owned Objects

**When artifacts are recovered from land owned by a corporation or private individual(s), ASM cannot accept the artifacts unless title to the collection is transferred from private ownership to ASM.**

Landowners may or may not consent to a transfer of title. If the owners decline to donate the artifacts, the remaining project data and documentation should still be submitted to ASM as required by the

**If materials are retained by the landowner, the contractor should make every effort to completely document these materials before they are returned. Submit this documentation to ASM.**

Repository Agreement, or “Notice of Intent.” Should the owners wish to retain some items or a portion of the collection, the items returned to the owners should be photographed and recorded in detail, and this documentation should be submitted with the rest of the project collection. Create a list of items retained by the landowner and submit this to ASM as documentation of their disposition.

**If the owners do consent to transfer title to any or all of the collection, this must be accomplished prior to the delivery of the project collection to ASM.** To initiate transfer of title from the donor(s) or trustee to ASM, the project director should complete **two copies** of the Deed of Gift provided by ASM, and have them signed by the donor(s) (see Appendix C for details). The name and address of the donor(s) must be typed or printed legibly on the Deed of Gift. **The archaeological contractor is responsible for obtaining the signatures, completing the Deed of Gift, and submitting it to ASM.** The timing and manner of negotiating the transfer is at the discretion of the contractor. Contractors are encouraged to contact ASM for advice or assistance as needed.

Submit **TWO** signed copies of the Deed of Gift to the Museum. Both must include the typed name and address of the donor.

See Appendix C for further information on Deeds of Gift.

Once the Deed of Gift is received and the project collection is submitted to ASM, the Head of Collections will sign the Deed on behalf of ASM. A completed original copy will be returned to the donor for their records.

## **1.7 Disposal of Archaeological Material**

By agreeing to serve as a repository for archaeological collections, **ASM does not accept responsibility for unauthorized disposal of any archaeological material** prior to the transfer of such material to ASM. Any such action must conform to the following guidelines for disposal and documentation.

### **1.7.1 Collections from State Lands in Arizona**

**Archaeological projects may not unilaterally discard or otherwise dispose of survey or excavated collections from State lands** or any part of them. The Director of the Museum must approve disposal of any cultural material, no matter how trivial in appearance or apparent significance, from any surveys or excavations on State lands. This approval must be in writing.

This process is generally restricted to historic mass-produced products—fragmentary glass bottles, plate glass, and metal containers—that are redundant in the collection. In such cases, the project is expected to retain as many complete examples as are necessary to document all variations of a product (e.g., different labels on bottles and cans, etc.). The specimens considered for disposal should be pieces that are not only redundant, but

also less intact or less stable. These redundant, fragmentary materials must be thoroughly and professionally studied, and the derived information must be presented in a professionally acceptable manner.

Non-artifact samples such as unprocessed flotation or soil samples may be culled from excavated collections without prior approval. The soil should be screened before disposal in order to recover any small artifacts.

Indicate that materials have been culled in the electronic database (see Section 3.2.3), or include a list of disposed items and their associated field numbers in the project documentation.

#### 1.7.2 Collections from Other Lands in Arizona

It is the responsibility of all parties using ASM as a repository to comply with the policies and guidelines of the agency owning, sponsoring, or authorizing the project. This is particularly critical for the disposal of material. Complete records of any such disposal must be provided to ASM as an essential part of the project documentation.

### **1.8 ASM Responsibility**

ASM reserves the right to loan, conserve, and authorize destructive analysis of artifacts from its collections. Except for the authorization of destructive analysis, ASM will not permanently dispose of any materials that are owned by the federal or state government or Indian tribes unless such action is authorized in writing by the appropriate governmental agency.

## Section 2

# LABORATORY TREATMENT OF ARTIFACTS

### 2.1 Introduction

Artifacts typically undergo four main processing steps in the laboratory before final packaging for curation:

- Assessment
- Cleaning and, if necessary, treatment
- Labeling
- Cataloguing

Section 2 addresses laboratory assessment, cleaning, and labeling. For information on cataloguing, refer to Section 3.

Together with the packaging and documentation procedures described in Section 3, these steps ensure proper handling and, ultimately, effective curation of artifact material. Please note that the documentation of catalog specimens is discussed in detail in Section 3. Appendix D discusses the handling and treatment of various material classes in greater detail.

### 2.2 Assessment

Two objectives should be addressed during laboratory assessment of the artifacts recovered by a field project. First, the FN list submitted with the artifacts must be compared to the specimens present in order to identify any discrepancies and subsequent remedial action. Second, individual specimens must be examined by the laboratory director or analysts in order to identify those that:

- Require some type of immediate stabilization or conservation treatment before they can be processed further
- Need special cleaning treatments
- Should not be cleaned at all
- Will be submitted for analytical testing
- Will be set aside as unprocessed samples

As specimens are segregated for special processing, **care must be taken to ensure that all provenience data remain with the objects**. These objects should be labeled with their FN number and, if known, ASM-assigned accession number as soon as possible. This will make it easier to track their location and status as they undergo special treatment or analysis. Once these specimens have rejoined the collection or have been consumed during analytical tests, the electronic inventory should be updated to record specific conservation treatments, analytical results, or specimen destruction as a result of analysis.

For information on labeling artifacts, consult subsection 2.4.

For information on the proper treatment of various material classes, consult Appendix D.

## 2.3 Cleaning and Conservation Treatment

### 2.3.1 Cleaning

Artifacts are cleaned for three main reasons:

- To permit analysis of the original surface and attributes of an object
- To facilitate the application of a label to an object
- To remove substances that might otherwise hasten the deterioration of an object

However, it is best to keep cleaning to a minimum in certain circumstances, particularly if there is a possibility of destroying fragile surface features of an object such as impressions or decorations, or use-related evidence such as residues, polish, or scratches. A conservator will undertake professional cleaning of objects intended for display.

Depending upon the nature of the underlying material and the type of material that must be removed from it, the laboratory may need to use dry, wet, chemical, or ultrasonic cleaning methods (see Table 2.1, and see Appendix D for more specific guidelines). Usually, the entire artifact should be cleaned, but in some cases only the area that will be labeled should be cleaned. **Cleaning should be halted immediately if any damage to the artifact is detected.** Provenience information must be kept with the specimen at all times. Special kinds of residues produced during cleaning (e.g., pollen washes or DNA samples) should be retained and added to the electronic inventory, noting the link between the original specimen and the residue.

See Table 2.1 for recommended cleaning methods by material type.

#### 2.3.1.1 Dry cleaning

Dry cleaning typically involves **dry brushing or dry vacuuming**. For the former, use 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 for cleaning porous objects. The vacuum should be used on low-powered suction with 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. Special vacuums suitable for these tasks may be obtained from conservation suppliers or from medical/dental equipment suppliers.

#### 2.3.1.2 Wet cleaning

Never use water to clean artifacts that are unstable or contain residues that may be useful for chemical analyses. **Examples of fragile or unstable materials that should *not* be cleaned with water include:**

- Bone
- Shell (if weathered or chalky)
- Leather
- Iridescent, encrusted, or otherwise unstable glass
- Metal objects

- Very low-fired earthenware ceramics
- Unfired clay objects
- Ceramics with flaking or fugitive decorative surfaces
- Botanical remains, either processed (e.g., basketry and textiles) or unprocessed

Residues found on ceramics, flaked stone, and other artifacts can be useful for phytolith, blood serum, radiocarbon, elemental, microfossil, and DNA analyses. It may be necessary to consult with the appropriate materials analyst before a decision about cleaning is made.

**Wet cleaning should be restricted to stable artifacts such as ceramics fired at high temperatures and stone.** In order to prevent accidental loss, most artifacts should be cleaned in a tub or wash basin rather than under running water. 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. Alternatively, artifacts can be placed on absorbent toweling and turned over to ensure thorough drying.

In general, **we do not recommend the use of any kind of acid bath for wet cleaning materials.** If an acid bath is necessary, please ensure that items are thoroughly saturated with water prior to immersion and thoroughly rinsed after immersion.

#### *2.3.1.3 Ultrasonic cleaning*

Ultrasonic cleaning loosens stubborn deposits of soil or oxidation. An artifact is immersed in water through which ultrasonic waves are pulsed. This technique must be restricted to stable objects that can withstand immersion and fit within the ultrasonic cleaner; for example, sherds, debitage, or projectile points.

It takes approximately five minutes or less to strip stubborn oxidation deposits from most artifacts. The progress of this cleaning treatment must be closely monitored. When no further improvement is apparent, remove the artifact, rinse it with water, and allow it to dry thoroughly.

#### *2.3.1.4 Spot cleaning*

In some instances it is preferable to clean only the spot on the artifact where the label will be placed. Use a moistened soft-cotton tipped stick to clean an area the size of the intended label. Let the artifact dry completely before the label is applied.

#### *2.3.1.5 Chemical cleaning*

**Chemical cleaning methods should be performed or supervised by a professional conservator.** Chemical cleaning may be necessary to

remove encrustations or corrosion, particularly on metals, but also on basketry, bone, or ceramics. These chemicals can cause irreversible damage to the artifact if they are not applied correctly. Contact ASM's conservator if you suspect that an object may require chemical cleaning.

**Table 2.1, Guidelines for Cleaning Archaeological Materials**

<b>Material class</b>	<b>Recommended cleaning method</b>
Bone	Dry brush.
Organics (e.g., wood, botanicals)	Do not clean.
Ceramics	Stable, high-fired ceramics may be washed with water. Ceramics with residues may be spot-cleaned for labeling. For others, consult ASM.
Glass	Softly dry brush stable glass as necessary. Do not brush, scrub, or aggressively clean glass that has thin films, encrustations, or iridescence.
Leather	Do not clean.
Flaked stone	Wash in water; gently brush or use ultrasonic cleaning as necessary. Do not clean specimens that will undergo use-wear or residue analysis.
Metals	Do not wash.
Paper	Do not clean.
Samples for special analysis	Follow procedures prescribed by analytical laboratory.
Shell	To prevent loss or damage, do not wash in a basin or tub. Clean with a damp or dry brush if surface is stable.
Textiles (e.g., basketry, cordage, cloth)	Do not clean. Use low power vacuum through a screen if absolutely necessary.



### 2.3.2 Conservation Treatment

Conservation treatments in archaeological contractors' laboratories should be restricted to **minimal efforts designed to stabilize objects** sufficiently so that they can be handled for analysis and cataloguing. Typically, this involves the construction of a special acid-free support or box for the object (see subsection 3.2 and Table 3.3 for appropriate support and packaging materials). Consult Appendix D for more details on the proper handling and treatment of various material classes. **Do not** attempt to mend or consolidate an object or apply other chemical treatments without consulting ASM. **The restoration of vessels from sherds is an exception to this rule; however, contractor laboratories must use conservation quality materials and adhesives. Do not** attempt to treat more complex cases such as surface exfoliation of ceramic vessels without consultation. **Even minor conservation treatments must be documented**; indicate the methods and materials used to treat each affected specimen.

Review Appendix D for details on the proper handling and treatment of various material classes.

Document all conservation treatments—even minor procedures. Include this information in the artifact database.

Objects that have been stabilized still require special handling and should be marked as such. Objects encased in special boxes or supports should be handled by their container whenever possible; avoid handling the object unnecessarily. Again, care should be taken to ensure that provenience data accompany the object at all times.

## 2.4 Labeling

Objects must be labeled with their ASM-assigned accession number (if known) and FN number, or with their catalog number if they are selected for cataloguing. Depending upon the nature of the object, it may be labeled directly or indirectly. In any event, **the label should be non-invasive and reversible**. It should be legible, neat, and unobtrusive. Extraneous writing on an object should be avoided.

**Each catalog item MUST be labeled with its catalog specimen number.** See Section 3.2.2.1 for information on the assignment and format of catalog numbers.

**For smaller collections of bulk material, 100% of the items must be labeled with their ASM-assigned accession number AND FN number.** Any items smaller than the size of a U.S. quarter coin are excepted from this rule, and need not be labeled. **For larger collections of bulk material** (e.g., a large bag of 30 or more small sherds, a bag of 60 pieces of debitage), **at least 10% of the items in the bag should be labeled.** Please select items that are larger or more likely to be examined by an analyst.

In general, bulk materials smaller than a U.S. quarter coin do not need to be labeled.

### 2.4.1 Direct Labels on Artifacts

**It is best to label an object directly whenever this is possible.** Directly

labeled artifacts are less likely to lose their identifying numbers and, by extension, associated information. Materials that are generally appropriate for direct labeling include ceramics, metal, glass, stone, bone, and shell. However, the surface of the material must be stable.

If their surfaces are stable, the following materials can usually be labeled directly:

ceramics	shell
metal	stone
glass	bone

The placement of the label is important. **Labels should not be applied over diagnostic portions of an artifact, or portions that will show in photographs or exhibits.** For example, a stone tool should be labeled on the unmodified portion of the tool. If a tool has been bifacially worked, label the least photogenic side. Sherds should not be labeled on the broken edges. Vessels should not be labeled on resting surfaces or surfaces that will wear. Labels should not cover maker's marks or design elements, if possible.

Direct labels must be applied using the "sandwich" technique described in the following table.

**Table 2.2, Guidelines for Directly Labeling Artifacts**

RECOMMENDED	Acceptable	DO NOT
<ul style="list-style-type: none"> <li>• Laser-print a label on high quality acid-free paper</li> <li>• Use <b>Century Gothic</b> or <b>Arial</b> font in the <b>3 to 6 point size</b> range, depending upon the size and nature of the object</li> <li>• Cut labels such that there is <b>no excessive white space</b> around the number. The labels should be rectangular or subrectangular (slightly rounded corners)</li> <li>• Use a conservation quality adhesive such as <b>Rhoplex</b>, a paraloid B-72 emulsion</li> <li>• Using a small paintbrush or clean nail polish brush, paint on a <b>thin layer of adhesive</b> just large enough to contain the paper label</li> <li>• Using tweezers, carefully place the label on the adhesive while the adhesive is still tacky</li> <li>• <b>Paint a generous “top coat” layer</b> of adhesive over the paper label</li> <li>• Allow to <b>dry thoroughly</b>; depending upon the relative humidity, this can take several hours or overnight</li> </ul>	<ul style="list-style-type: none"> <li>• Using a small paintbrush or clean nail polish brush, paint on a <b>thin layer of acryloid B-72</b></li> <li>• Using a crow-quill pen and <b>black India ink</b>, a technical pen (e.g., Rapidograph) filled with black India ink, or a Pigma Micron pen with archival ink, write the number as neatly and compactly as possible</li> <li>• It may be necessary to use white ink on dark colored objects</li> <li>• After the ink has thoroughly dried, <b>paint on a second, “top coat” layer</b> of B-72</li> <li>• Allow to dry thoroughly</li> </ul>	<ul style="list-style-type: none"> <li>• Use an ink jet printer to create labels. The ink will not be properly fused to the paper.</li> <li>• Use any paper other than high quality acid-free paper</li> <li>• Use clear nail polish</li> <li>• Use permanent marker (e.g., Sharpie) or non-archival ink pen</li> <li>• Paint a white background on a dark object (e.g., with correction fluid)</li> <li>• Apply a paper label to a <b>plastic artifact</b>. Use the technique described in the middle column.</li> <li>• Directly label basketry, leather, textiles, wood, very small artifacts, or very fragile/unstable artifacts</li> </ul>

#### 2.4.2 Indirect Labels

Some artifacts are too small to be labeled directly. Specimens with unstable surface conditions and particularly fragile items should not be labeled directly. **Basketry, leather, textiles, wood, and deteriorating ceramics, glass, or metal should not be directly labeled.** Attach an acid-free tag or, if this is not possible (e.g., for botanicals or textiles), enclose the object in a labeled container (see 2.4.3). Care must be taken to avoid damaging the object; labeling must not compromise the condition of the piece.

The material used to make the tags or labels must be archival quality and of a material best suited to the object. Never use tags or labels with metal

rims. Tags and labels can be attached to an object by tying or sewing. The material used to attach the label or tag should be compatible with the artifact and its storage conditions. The following materials are acceptable under the circumstances specified:

- *100% Cotton String, undyed.* This is the most commonly preferred material. However, 100% cotton string should not be used on rubber or plastic artifacts because the aging of by-products used to manufacture the rubber and plastic can destroy the cotton thread. **Do not used colored or treated string or 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, and does not stretch. It 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.
- *Acid-free 100% cotton rag paper* is the recommended material type for most tags because it is pH neutral, lignin free, and inexpensive. However, it is easily damaged if it gets wet. Do not use stationer's and jeweler's paper tags because these are usually are not acid-free, and will deteriorate.
- *Tyvek®* is an inexpensive, waterproof, proprietary polyester fabric. It can be used to make labels or tags for small or large items. 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.
- The string or thread should be softer than the artifact's surface. It should not cut into or through the object. Attach the label somewhat loosely; it should neither constrict the object nor catch on other objects and tear.

When labeling a tag or paper label, the writing medium must be easy to apply and able to survive light and water exposure. Waterproof black India ink is preferred. Do not use felt-tip pens; these are usually composed of dyes that fade.

### 2.4.3 Loose Labels

If direct or indirect labeling is not possible, a laser printer-generated, acid-free paper label should be placed in the artifact container; that is, inside the polyethylene bag or acid-free box containing the artifact. Particularly fragile materials such as basketry fragments, textiles, or wood artifacts typically require this kind of label.

## Section 3

### PREPARATION AND DOCUMENTATION OF ARTIFACTS AND SAMPLES

#### 3.1 Introduction

Our goals in establishing the following standards for preparing artifacts and samples are twofold: first, *to ensure that all collections submitted to ASM's repository are consistently and systematically prepared*; and, by extension, *to most effectively and efficiently preserve both the materials and their accompanying documentation for future use*. Please consult repository staff about any issues or concerns that are not addressed in this manual.

ASM has developed and maintains an **electronic information system** to track and retain data related to the collections in its care. Among other benefits, this system enables the curatorial staff to respond to requests for access in a timely and efficient manner. **In order to ensure compatibility with ASM's information system, we require that all depositors submit information about a collection according to a standard set of formats and fields.** This allows us to track the occurrence of specific types of materials and objects in a collection, contextual and analytical information related to those objects, and their final storage location.

ASM strives to maintain the highest possible professional curation standards. The archaeological collections staff is keenly aware that the materials entrusted to its care are unique and irreplaceable. As such, we endeavor to store these materials in a manner that contributes to their long-term preservation and availability for study. Depositor compliance with repository procedures provides critical support to our collective mission as cultural resource professionals.

Subsection 3.2.1 addresses packaging methods and materials, and provides guidelines specific to each major collection category as appropriate. Subsection 3.2.2 discusses the selection, organization, and inventory or documentation of each major collection category. Subsection 3.2.3 sets forth electronic data requirements. The documentation of repatriated collections is discussed in subsection 3.2.4. Finally, subsection 3.2.5 addresses the use of "Specimens Released" forms.

The Archaeological Repository is part of ASM's Collections Division. The repository was formally established in 1984. It currently houses approximately 23,000 cubic feet of artifact collections.

ASM instituted its first comprehensive electronic information system in 1983. As of 2003, ASM is in the process of upgrading to a state-of-the-art system with graphical capabilities and a web interface.

See 36 CFR (Code of Federal Regulations) Part 79 for comparable federal curation standards.

## 3.2 Packing, Selection, Organization, and Inventory of Collection

Before submission to ASM, artifacts and samples must be organized into one or more of the **collection categories** described in Section 1. General guidelines for the packing, organization, and inventory of each category are outlined below.

See Section 1 for collection categories.

### 3.2.1 Packaging Methods and Materials

This subsection explains the packaging methods and materials pertinent to each major collection category. Further details on the selection, organization, and inventory or documentation of items in each collection category follow in subsection 3.2.2.

#### 3.2.1.1 Materials

##### *Boxes*

ASM provides **inert polypropylene document containers and lids (or “banker’s boxes”)** for the final packing of catalogued specimens and bulk materials. ASM also provides 9 × 9 × 2” cardboard boxes with telescoping lids for materials recovered during limited collection surveys (e.g., representative samples or unique finds; see section 3.2.2.3, “Survey Collected Materials”). Materials recovered during large-scale systematic collection surveys should be packed in the larger polypropylene boxes. Except in special circumstances, **we ask that depositors use these standard size boxes exclusively** because they enable us to store materials in a space-efficient manner that is consistent with established conservation standards. Please contact repository staff to obtain these boxes. Repository staff can also demonstrate proper assembly.

Contact repository staff to obtain proper curation boxes, adhesive box label sleeves, and other required labels and forms.

##### *Box labels*

Each polypropylene box must have **ASM’s standard box label** attached to one of its long sides. Smaller cardboard survey boxes must have the box label attached to the exterior face of the lid. The box label is available with other required forms in Appendix F and on ASM’s website ([www.statemuseum.arizona.edu](http://www.statemuseum.arizona.edu)) under “Professional Services > Forms & Guidelines.” You may also contact the repository staff to have a box label master sent to you via email or U.S. mail. **The box label must be printed on acid-free paper and inserted into a adhesive-backed polyethylene sleeve.** ASM provides these sleeves to depositors; contact repository staff to obtain them. For oversized items that are not boxed, put the box label in a zip-top bag and secure the bag to the item with sturdy string. We have found that it is best to use a hole punch to create a perforation for threading the string through the bag.

**Each box label must be marked with the project name, ASM-assigned accession number (when known), ASM site number(s), collection type (e.g., Bulk Materials, Survey Collected Materials, Catalog Specimens),**

**material type, and proper box sequence number** (i.e., 1 of 40, 2 of 40, 33 of 40). Boxes in a project collection must be organized such that boxes containing bulk materials come at the beginning of the numbering sequence, followed by catalog specimens, and completed by archival and photo documentation. **Boxes should be numbered from 1 to N for the entire project collection; *do not*** start again with 1 for a new site, a new material class, or a new category of collection (i.e., bulk, catalog, archival). Some guidelines are summarized in Table 3.1, and project collection organization is discussed in further detail in subsection 3.2.2.

See Table 3.1 and subsection 3.2.2 for more information on collection organization.

*Internal packaging: bags, containers, and tags*

**Items within each box should be enclosed in 4 mil-thick (or 4-ply) polyethylene zip-top bags.** Guidelines for the appropriate use of bags are summarized in Table 3.2. Repository staff can provide a list of suppliers. **Fragile items should be placed in hard-walled containers with secure lids.** These containers should be large enough to contain both the item and appropriate cushioning material. A list of suitable containers and cushioning material is presented in Table 3.3. For special cases or concerns, please contact repository staff.

See Table 3.3 for a list of recommended protective containers and cushioning material.

**Each bag must also contain a label or tag with a standard set of information:** depositor's name, project name, Museum-assigned accession number (when known), site number, find or specimen number, and contextual information, as well as catalog number and report figure number as applicable. **We prefer that depositors laser-print these tags on acid-free paper in the 64 lb. range;** however, permanent ink and lighter weight acid-free paper tags will be accepted. ***Do not enclose the original brown paper field bag tags in the bags with the artifacts.*** The brown paper is highly acidic and deteriorates rapidly, causing damage to the artifacts. Gather these original tags and submit them to the repository; it is best to place them together in a plastic zip-top bag and include them in the corresponding box.

If it seems likely that the acid-free tag enclosed with the artifacts will be damaged by the materials, place the label in a smaller zip-top bag and enclose that bag within the larger zip-top bag containing the artifact(s).

### 3.2.1.2 Methods

#### *Catalog specimens*

Items selected for cataloguing should be placed individually in zip-top bags or acceptable hard-walled containers (see Table 3.3) with their accompanying paper label/tag, and then packed into polypropylene boxes. If only a few small items have been selected, these may be placed in the last polypropylene box containing bulk materials or packed into a smaller cardboard survey box. If the items are placed in a box with bulk materials, they must be internally segregated—i.e., individual smaller bags of catalog

See subsection 3.2.2.1 for more information on catalog specimens.

items placed together in a larger zip-top bag, and clearly labeled as catalog specimens on the exterior of the larger bag—and the depositor should draw the attending repository staff member’s attention to the presence of these items in a box of bulk materials. In any event, *care must be taken to ensure that the catalog collections are protected from impact or crushing.*

For the packing of oversized catalog items, refer to Table 3.1 and contact repository staff.

The box label must be marked to reflect that the items within are catalog specimens. Indicate both the site number(s) from which the materials were recovered and the major material types represented by the catalog items. **Boxes of catalog specimens should be placed at the end of the box numbering sequence, after the boxes of bulk material (see subsection 3.2.2).**

#### *Bulk materials*

Items to be curated as bulk materials should be placed, along with their accompanying paper label/tag, into zip-top bags according to the guidelines summarized in subsection 3.2.2.2. They are then packed into the standard polypropylene boxes. Care must be taken such that:

See subsection 3.2.2.2 for more information on bulk materials.

- **Boxes are not overloaded.** Overloaded boxes are dangerous and have a tendency to disassemble; moreover, they do not fit properly on storage shelves. The lids and sides of the boxes should not bulge.
- **Boxes are not unreasonably heavy.** With the obvious exceptions of individual oversized groundstone artifacts or other special items, boxes should be packed such that an average person can lift them to shoulder height (i.e., **less than 40 lbs.**). In special situations where this is unavoidable, the exterior of the box should somehow indicate that it is unusually heavy.
- **When boxes contain more than one type of material, heavy items are placed at the bottom.** Moreover, particularly fragile materials should not be packed with bulk sherds, lithics, groundstone, or soil samples. In situations where this is unavoidable, the fragile items should be placed in adequately protective containers within the box.

For the packing of oversized bulk materials and soil samples, refer to Table 3.1 and contact repository staff.

The box label must be marked to reflect that the items within are bulk materials. Indicate both the site number(s) from which the materials were recovered and the major material types represented by the items within the box.

#### *Survey collected materials*

Artifacts to be curated as survey collected materials should be placed in zip-top bags with their accompanying paper label/tag. Specific guidelines for organizing and bagging these materials are presented in subsection

See subsection 3.2.2.3 for more information on survey collected materials.



3.2.2.3. The bagged items are then packed into cardboard survey boxes or larger polypropylene boxes, depending upon the size and nature of the collection. Most artifacts recovered during non-collection and limited collection surveys can be placed into the cardboard boxes with telescoping lids provided by ASM. Materials should be boxed by ASM site; **no 9 × 9 × 2” cardboard box should contain materials from more than one site** (again, see 3.2.2.3).

The box label should be affixed to the exterior face of the cardboard box lid, or to the side of the polypropylene box. The label must be marked to reflect that the items within are survey collected materials. Indicate both the site number(s) from which the materials were recovered and the major material types represented by the items within the box.

#### *Transport*

Please exercise care in loading boxes into the vehicle. Place heavier boxes in the bottom layers and lighter boxes above them. Oversize groundstone wrapped in cardboard may be stacked, but should not be placed on top of lighter boxes. Fragile items, whether small or oversized, should be secured inside the vehicle. If boxes are loaded into an open truck bed, consider securing them with a tarp and elastic cords, as boxes and lids have been known to “escape.” Alternatively, box lids can be secured with packing tape for transport.

We do not encourage the shipment of excavated collections. Please contact repository staff if unusual circumstances arise so that we may advise on packing methods and coordinate receipt of the shipment.

**Please do not ship excavated collections. Contact repository staff to make arrangements if the collection cannot be delivered in person.**

**Table 3.1, Guidelines for the Boxing and Packing of Collections**

<b>Collections:</b>	<b>DO</b>	<b>DO NOT</b>
Catalog Specimens, Bulk Materials, and Survey Collected Materials	<ul style="list-style-type: none"> <li>• Use standard boxes provided by ASM whenever possible</li> <li>• Attach ASM’s standard box label to sides of document boxes, and to lids of small cardboard boxes</li> <li>• Use plastic adhesive label sleeve provided by ASM whenever possible</li> <li>• Put heavy or bulky items on the bottom of a box, and lighter items on top</li> <li>• Segregate more fragile items by placing them in a separate box or creating special protective internal packaging</li> <li>• Follow the “boxing hierarchy” described for collections in 3.2.1.1; keep items from one site together in the box sequence</li> <li>• Number all boxes in a single project collection from 1 to N</li> </ul>	<ul style="list-style-type: none"> <li>• Overload boxes—an average person should be able to lift a box to shoulder height (40 lbs.)</li> <li>• Mix heavy/bulk items with lighter, more fragile items unless those items have been protected by special packaging</li> <li>• Mix items from more than one site in one box of bulk materials <b>unless</b> the collection is limited to one or two boxes and the boxes would not be even half full</li> <li>• Begin the box numbering sequence over again from 1 within a single project collection (e.g., 1 to N for each site, or 1 to N for each material type)</li> </ul>
<b>Oversize Items:</b>	<ul style="list-style-type: none"> <li>• Submit on a cardboard flat or wrapped in cardboard</li> <li>• Place box and artifact labels in a plastic sleeve or zip-top bag; attach bag to object with sturdy string</li> <li>• Assign each oversize groundstone item its own sequence box number</li> </ul>	<ul style="list-style-type: none"> <li>• Load more than one heavy groundstone item into polypropylene boxes</li> <li>• Neglect to securely attach a zip-top bag containing artifact and box labels</li> </ul>
Groundstone		
Whole vessels and restored vessels	<ul style="list-style-type: none"> <li>• For transport to ASM, place in a box large enough to accommodate the vessel <b>and appropriate cushioning material</b> (see Table 3.3)</li> <li>• Protect the top and sides of a box containing such a vessel during transport</li> <li>• Contact repository staff with special concerns</li> </ul>	<ul style="list-style-type: none"> <li>• Deconstruct whole vessels or vessels that have already been restored or partially restored</li> </ul>

**Table 3.1, Guidelines for the Boxing and Packing of Collections, continued**

<b>Oversize Items and Flotation Samples, continued:</b>	<b>DO</b>	<b>DO NOT</b>
Historic metal objects or other oversize historic objects	<ul style="list-style-type: none"> <li>• For transport to ASM, place in a box large enough to accommodate the item <b>and appropriate cushioning material</b> (see Table 3.3)</li> <li>• If the previous is not feasible, contact repository staff for recommendations</li> <li>• Wrap sharp edges or projecting parts in “bubble” wrap and cardboard or another sturdy cushioning material</li> </ul>	<ul style="list-style-type: none"> <li>• Disassemble the object unless instructed to do so by repository staff</li> </ul>
Organic residue from flotation samples	<ul style="list-style-type: none"> <li>• Dry material thoroughly and seal in zip-top bags</li> </ul>	<ul style="list-style-type: none"> <li>• Neglect to adequately dry material; do not ventilate bag</li> </ul>
<b>Unanalyzed, unprocessed</b> flotation samples ( <b>prior approval</b> by ASM required)	<ul style="list-style-type: none"> <li>• When dry, seal original field bag inside zip-top bag</li> </ul>	<ul style="list-style-type: none"> <li>• As above, and do not seal field bags with masking tape</li> </ul>

**Table 3.2, Guidelines for the Use of Plastic Bags**

<b>DO</b>	<b>DO NOT</b>
<ul style="list-style-type: none"> <li>• Use, at minimum, 4 mil (or 4-ply) polyethylene bags with a zip-top</li> <li>• Select a size of bag that is appropriate for its intended contents</li> <li>• Use a thicker ply bag for heavier objects or items that need more cushioning</li> <li>• Ventilate bags that contain hygroscopic materials (i.e., those that take in and retain moisture, such as bone and shell) in order to promote air exchange and prevent the growth of mold and fungi</li> </ul>	<ul style="list-style-type: none"> <li>• Use brown paper bags, sandwich baggies, lightweight food storage/freezer bags, or plastic wrap</li> <li>• Force an object into a bag, or overfill it</li> <li>• Store fragile objects or organic materials in a bag; use an acceptable hard-walled container (see Table 3.3)</li> <li>• Ventilate bags that do not contain hygroscopic materials; soil samples are a key exception</li> </ul>

**Table 3.3, Guidelines for the Use of Special Containers and Cushioning Materials**

<b>PREFERRED</b>	<b>NOT RECOMMENDED</b>
<p><b>Special containers:</b></p> <ul style="list-style-type: none"> <li>• Acid-free paper boxes</li> <li>• Non-PVC (polyvinyl) plastic boxes or vials with lids</li> <li>• Glass containers are only allowed for liquid samples such as pollen residues; the containers must then be stored in a non-glass container with adequate padding and support</li> </ul>	<ul style="list-style-type: none"> <li>• Cigar boxes, grocery boxes, manila folders, manila envelopes</li> <li>• PVC (polyvinyl) containers, film vials, pill bottles</li> <li>• Metal containers (for artifacts)</li> <li>• Glass containers without padding and support</li> <li>• Mailing tubes</li> </ul>

<p><b>PREFERRED CUSHIONING MATERIALS:</b></p> <ul style="list-style-type: none"> <li>• Acid-free poster board or carved polyethylene foam to make rigid supports</li> <li>• Polyethylene sheeting (this can be created from ASM curation boxes) or chips</li> <li>• Acid-free tissue paper</li> <li>• Polyester batting</li> <li>• “Bubble” wrap</li> <li>• Acid-free tissue wrapping (if appropriate) and rigid-walled non-PVC containers for C14 samples and organic materials</li> </ul>	<p><b>NOT RECOMMENDED:</b></p> <ul style="list-style-type: none"> <li>• Styrofoam or polyurethane chips</li> <li>• Plastic wrap</li> <li>• Toilet paper, facial tissue, or paper toweling</li> <li>• Cotton</li> <li>• Paper envelopes or other acidic paper</li> <li>• Aluminum foil for C14 samples or organic material</li> </ul>
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### 3.2.2 Selection, Organization, and Documentation of Collection

As discussed in Section 1, artifacts submitted to ASM typically fall into one of three major collection categories: catalog specimens, bulk materials, and survey collected materials. These categories of material are stored in different areas of ASM in accordance with their anticipated use and significance.

- **Catalog specimens** consist of artifacts that have particular aesthetic or research value. It is expected that these items will require special treatment or receive significant research attention. These items are tracked individually and stored in drawers by ASM site number, or, in the case of large items or whole pots, on shelves.
- **Bulk materials** contain high volumes of sherds, lithic debitage, groundstone fragments, manufacturing debris, broken glass, metal fragments, soil samples, and so on. Bags of materials are tracked within boxes. These materials may or may not have been analyzed, but in any event it is expected that they will receive moderate or more intermittent research attention. Bulk materials are stored in boxes on shelves.
- **Survey collected materials** can be organized and stored one of two ways : 1) large-scale systematic collection surveys are boxed by site and stored with the bulk materials because they are packed in larger boxes and because it is expected that they may be reviewed more frequently; 2) items recovered during non-collection or limited collection surveys are boxed by site and stored on shelves sequentially by quad.

The following subsections indicate the proper treatment for each of these three categories.

#### 3.2.2.1 *Catalog Specimens*

##### *Selection*

Specimens that are technologically, chronologically, or aesthetically significant are typically segregated from the bulk materials and catalogued. These objects are frequently displayed in exhibits, illustrated in publications, used for teaching, and subjected to more intensive research attention. They are stored in a high security area that is easily accessible to curatorial staff.

To a certain extent these items are selected at the discretion of the analyst or other project personnel; for example, items that are illustrated or discussed in depth in the project report. The following guidelines should help in the selection of catalog specimens. However, these guidelines are not intended to be exclusive or restrictive.

**Table 3.4, Guidelines for Selecting Catalog Specimens**

<p><b>DO include:</b></p> <ul style="list-style-type: none"> <li>• Items <b>illustrated</b> in the project report(s), either in plates or figures</li> <li>• Items highlighted in papers or presentations at professional meetings or public lectures</li> <li>• Artifacts <b>discussed in detail</b> in the project report(s)</li> <li>• <b>Temporally diagnostic</b> artifacts (e.g., projectile points of recognized type)</li> <li>• <b>Whole or reconstructed ceramic, glass, or stone vessels</b>, both plain and decorated</li> <li>• <b>All perishable artifacts</b> (e.g., sandals, baskets, mats), whether complete or fragmentary</li> <li>• <b>All samples submitted for special analysis</b> (e.g., petrography, XRF, ICPS, neutron activation); include both <b>the sample and any remnants</b> of the sampled artifact</li> <li>• Examples of any <b>newly defined ceramic types</b></li> <li>• Examples of “<b>project-specific</b>” artifact types (e.g., “Type II Projectile Points”)</li> <li>• Examples of any <b>newly defined artifact forms</b> (e.g., a new projectile point type)</li> <li>• Particularly <b>fragile or sensitive</b> artifacts (e.g., glass light bulbs, leather shoes)</li> <li>• Objects with <b>exceptional cultural or aesthetic qualities</b></li> </ul>
<p><b>DO NOT:</b></p> <ul style="list-style-type: none"> <li>• Include reconstructible vessels if they <b>have not</b> been reconstructed <b>and are not</b> illustrated</li> <li>• Split a reconstructible vessel into parts and only submit the sherds that have been illustrated; <b>DO</b> submit the entire vessel as a catalog item</li> <li>• Deconstruct vessels that have already been reconstructed</li> </ul>

If an artifact meets one of the first three selection criteria, it is likely that it also meets one of the other criteria. Contact repository staff if you are uncertain about the status of a particular item.

*Organization*

Each item selected for cataloguing **must be assigned a unique identifying number**, or catalog number. The number is a composite of the ASM accession number assigned at the outset of the project, followed by a sequence number (1 through N) as indicated in the previous examples. Various configurations of the number are possible, depending upon the nature of the item and the circumstances of recovery. A suffix indicating the nature or condition of the item(s) is added to the basic catalog number. Table 3.5 demonstrates the possibilities. Contact repository staff for further assistance.

**Basic catalog number format:**  
ASM accession no.–sequence no.

**Example:** 2002-32-1  
is the first catalog item of  
ASM Accession 2002-32

**Table 3.5, Guidelines for Assigning Catalog Numbers**

Description	Example and catalog number format
<ul style="list-style-type: none"> <li>Single item with no fragmentary pieces</li> </ul>	<ul style="list-style-type: none"> <li>Complete jar = <b>2003-21-1</b></li> </ul>
<ul style="list-style-type: none"> <li>Multiple fragments comprise the object               <ul style="list-style-type: none"> <li>The largest fragment (or largest decorated fragment) is assigned the suffix “-X”</li> <li>Other, smaller fragments are assigned the suffix “-XX”</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Partial vessel with loose sherds               <ul style="list-style-type: none"> <li>Largest fragment = <b>2002-32-2-X</b></li> <li>Each other fragment = <b>2002-32-2-XX</b></li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>The specimen is a mass of small, individually discrete items               <ul style="list-style-type: none"> <li>The entire item is assigned the suffix “-X”</li> <li>The actual count of individual pieces should be indicated on the catalog record</li> <li><i>Do not</i> assign any “-XX”</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>A deposit of 312 beads in a vessel cache—the cache is known to comprise a single deposit               <ul style="list-style-type: none"> <li>The entire group of beads = <b>2002-23-42-X</b></li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>Two individual artifacts were found in direct association in a manner that indicated that they represent a functional set               <ul style="list-style-type: none"> <li>One piece is given the suffix “-a” and the other “-b”</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>A metate and a mano found together in direct association               <ul style="list-style-type: none"> <li>Metate = <b>2003-43-5-a</b></li> <li>Mano = <b>2003-43-5-b</b></li> </ul> </li> </ul>

*Inventory and Documentation*

The artifact database/electronic inventory (see subsection 3.2.3) must contain the following information for each catalog specimen:

- Assigned **catalog number**
- Object name** (e.g., Reconstructed Sacaton Jar, Clovis Point, Stone Beads)
- Number of specimens** associated with that number (e.g., 1 complete jar, 1 partial jar comprised of 3 sections [the -X and -XX], 2345 stone disk beads)
- A **brief description** of the object’s significance (i.e., why it was selected for cataloguing); include this in the “Comments” field
- Associated **image or illustration** number; include this in the “Comments” field

**Furthermore, each box must have an inventory.** Both paper and electronic versions should be submitted. The box inventory must state ASM-assigned accession number, the project name, and the ASM site numbers represented by the artifacts in the box. The inventory must also provide, for each item, both **the catalog number and the original field number** or specimen number. The latter number must be linked to the object’s provenience information. See subsection 3.2.3 for specifications.

See subsection 3.2.3 for electronic inventory requirements.

As discussed in subsection 3.2.1.2, **catalog specimens should be boxed separately** from the bulk materials except under the conditions stated. Exercise care in packing catalog specimens, as they tend to be more fragile. Consult Table 3.3 for suitable packing materials. The boxes containing catalog specimens are placed after the bulk materials.

Consult subsections 3.2.1.1 and 3.2.1.2 for packaging instructions.

- Example 1:** There are 23 boxes of bulk materials and 4 boxes of catalog specimens in accession 2002-129. The boxes of bulk materials are assigned box numbers 1–23, and the boxes containing catalog specimens are assigned box numbers 24–28.

The boxes of catalog specimens should be organized according to the catalog number sequence of the items they contain, to the extent that this is possible.

- **Example 2:** Box 24 in Example 1 contains catalog items 2002-129-1 through 2002-129-35-X. Box 25 contains items 2002-129-36 through 2002-129-43, and so on.

Some catalog specimens may require submission of a “Specimens Released” form. See subsection 3.2.5 for further information.

### 3.2.2.2 Bulk Materials

#### *Content*

Bulk materials typically comprise the major portion of an archaeological project collection. Bulk materials are used in several ways: they are often examined prior to additional fieldwork in the same area or adjacent areas; and they are also available for reanalysis, more intensive study, and other problem-oriented research. These materials are stored in boxes by project, and boxed by ASM site number within projects.

Bulk materials generally include, but are not limited to:

- **Prehistoric and historic sherds**
- **Lithic tools and debitage**
- **Groundstone artifacts and fragments**
- **Historic metal and glass objects and fragments**
- **Faunal material**
- **Raw materials** (e.g., unworked turquoise, ochre, hematite)
- **Botanical materials**
- **Organic materials** from flotation samples (i.e., light fraction), and **a selection of unanalyzed pollen and soil samples** from important proveniences
- **Other environmental samples**
- **Chronometric samples**

#### *Organization*

The organization and inventory of bulk materials should to some extent reflect the research goals of the project and any work performed by analysts. Because future use of bulk materials is often stimulated by a project report, it is important to maintain a correspondence between the organization of the materials and their presentation in a report. Nevertheless, the primary consideration should be preservation of site assemblages.

Consult subsections 3.2.1.1 and 3.2.1.2 for packaging instructions.

#### ***A Note on Samples***

Samples accepted by the repository include:

chronometric (C14, dendro)	petrographic slides
charcoal	XRF
botanical	ceramic (ICPS, NAA)
pollen (washes, slides, residue)	geological (clay, minerals)
soil (unprocessed, up to 8 oz.)	flotation (processed/light fraction or analyzed only)

For other kinds of samples, please contact the repository for information.

**The following organization hierarchy should be followed when boxing and inventorying bulk materials:**

- **By site**
  - **By major artifact class or analytic category**
    - **By intra-site provenience**

Boxes of bulk material begin the box numbering sequence for a project collection; catalog specimens follow. The first box of bulk materials in a project collection is always assigned box number 1. ***Do not restart the box numbering sequence at any point within a project collection.***

#### *Inventory and Documentation*

**Each box must have an inventory.** Both paper and electronic versions should be submitted. The box inventory **must include ASM-assigned accession number, project name, box number, and ASM site number.** It must also provide, for each discrete bag of material in a box:

- **Project bag number** (this must be unique to a site)
- **Artifact type** represented in the bag (e.g., sherds, lithic debitage)
- **Material type** represented by the bag (if this can be specified further, e.g., ceramic, rhyolite, agave fiber)
- **Quantity** (e.g., 17 sherds, 42 flakes)
- **Intra-site provenience** information, including designation and type (e.g., Feature 2, privy pit; non-feature; Feature 15.01, hearth)
- Additional information as available (e.g., “unanalyzed”).

See subsection 3.2.3 for more information on electronic inventory format.

See subsection 3.2.3 for electronic inventory requirements.

Some items within the bulk material may require submission of a “Specimens Released” form. See subsection 3.2.5 for more information.

#### *3.2.2.3 Survey Collected Materials*

##### *Content, Organization, and Documentation*

There are two types of survey collections: limited and systematic. Table 3.6 summarizes the content, organization, and documentation of each.



**Table 3.6, Content, Organization, and Documentation of Survey Collected Materials**

<i>Limited or non-collection surveys</i>	<i>Systematic collection surveys</i>
<ul style="list-style-type: none"> <li>• Collections, if any, generally consist of               <ul style="list-style-type: none"> <li>• Culturally or stylistically diagnostic artifacts</li> <li>• Temporally diagnostic artifacts</li> <li>• Isolated occurrences of rare or especially diagnostic objects</li> <li>• Representative ceramic types</li> </ul> </li>   <li>• Collections are organized into 9 × 9 × 2” cardboard boxes with telescoping lids               <ul style="list-style-type: none"> <li>• By ASM site number</li> <li>• By quad (if an isolated occurrence)</li> <li>• Each specimen must be labeled with ASM site number and, if known prior to submission to ASM, accession number</li> </ul> </li>   <li>• Each box must have an inventory indicating the accession number (if known), ASM site number, and the <b>number of items in each material class</b>. Contact the Site Survey office for additional assistance.</li>   <li>• See subsections 3.2.1.1 and 3.2.1.2 for more information on packaging survey collected materials.</li> </ul>	<ul style="list-style-type: none"> <li>• Collections are usually much larger and made according to a grid system               <ul style="list-style-type: none"> <li>• A broader range of diagnostic and undiagnostic material is recovered</li> <li>• Provenience information is captured either by reference to the collection grid or by point proveniencing</li> </ul> </li>   <li>• Collections are organized in the same manner as bulk materials; see subsection 3.2.2.2.</li>   <li>• Collections are documented in the same manner as bulk materials; see subsection 3.2.2.2.</li>   <li>• Some materials may require submission of a “Specimens Released” form; see subsection 3.2.5.</li> </ul>

*3.2.2.4 Unprovenienced Specimens for Educational Use*

*Content*

ASM maintains a collection of unprovenienced archaeological material for teaching and research purposes. Depositors should only contribute to this educational collection if, while in the field, project personnel are approached by a local resident or other private citizen who wishes to donate essentially unprovenienced, but likely local archaeological material to the project or to ASM via the project. The material should be immediately segregated from the rest of the project collection. Contact repository staff as soon as possible for instructions.

**Depositors will only contribute unprovenienced specimens for educational use in very specific circumstances.**

### 3.2.3 Electronic Inventory

**Inventories of catalog specimens, bulk materials, and survey collected materials must be submitted in an electronic format** that can be downloaded and integrated into ASM's databases. The new Collections Information System currently under development includes a routine for transferring and integrating Microsoft Access databases. **To facilitate data transfer from depositors to ASM, we require that all inventories include the fields summarized in Table 3.7,** even if no data are entered into a particular field.

Table 3.8 presents a list of **suggested material class terms**. Use of these terms will facilitate data transfer between depositors and ASM.

**Table 3.7, Required Data Fields with Recommended Specifications**

Field	Format	Length	Definition	Examples
Accession Number	Text	10	Unique number assigned by ASM at the beginning of a project when a Permit and/or Repository Agreement are requested	2003-1
FN/Bag No.	Text	20	<b>Identifying number unique to each bag in a project.</b>  This can take several formats depending on the depositor's policies.	If the FN is a straight sequence number regardless of site, then it can take the form of "1" or "FN 1" through "FN n".  If Provenience no. and Bag no. are combined, the number should be a combination of both, e.g., "234.1" or "234-1".  If there are multiple sites in a project and the numbers start with 1 at each site, the Bag Id. would need to be a combination of the Site and Bag no. "AZ U:13:22 (ASM) Bag 1" could be formatted as bag "22-1".
Site Number	Text	18	<b>ASM Site Number</b> Must have the following format: AZ_(@):(#):#:(#)(#)(ASM). It must include the state prefix "AZ" and have the institutional suffix in parentheses "(ASM)"	AZ AA:12:489(ASM) AZ F:1:1(ASM)
Locus	Text	15	This can be any subdivision of the site area (Locus, Study Area, etc) that helps identify location	1, A, Locus 1, Study Area 2A
Box Number	Text	5	Unique sequence number assigned by contractor for the project beginning with 1 and going through "N". See subsection 3.2.2 and Section 7 for the boxing sequence.	1, 2, 3...
ASM Box ID	Text	15	Formatted box number that will be unique in the aggregated ASM collections database. The number will provide the linking record to the box summary record. The format is the <b>ASM Accession Number-RC###</b>	2001-234-RC490 2002-23-RC1
Collection Sub-Category	Text	20	ASM Collection Category or object disposition.	Catalog Specimens, Bulk Materials, Culled, Repatriated, Voided, Analyzed
Catalog Number	Text	15	ASM catalog number assigned by project staff (see section 3.2.2.1 for details)	2003-23-224
Figure Number	Text	50	List any figure illustrating the object	Fig. 2a, Plate 3a, Plate XVI
Material Class	Text	50	Broad terms that indicate the general type of material in bag. A list of acceptable terms is provided in Table 3.8. <b>Please consult repository staff before adding to the list.</b>	Ceramic, Bone, Soil, Shell, etc.
Object Type	Text	50	More specific identifying terms that qualify the Material Type designation.	Sherds, Decorated Sherds, Projectile Point, Pendant, Bracelet, Pollen Sample, Pollen Wash, Flotation Light Fraction, etc.
Quantity	Numeric	5	A count of the number of items in the bag. If this is not known (i.e., the bag was not part of the analyzed sample), put "99999" and note reason in Comments.	32, 64, 405... Note: 99999 is a warning code that points to the Comments field
Feature Number	Text	25	The identifying number for the cultural feature from which the bag was recovered. If it is not from a feature, leave this blank. Feature number can have several possible formats.	Fea. 1 1 Structure 1 Mound 40 11G House 3
Subfeature	Text	25	If an object is in a feature that is internal—and related—to a larger unit, then record the most specific feature information, with the enclosing feature listed under the Feature field.	Fea. 1.01 700.01 Posthole 1
Feature Type	Text	50	One- or two-word phrase describing the nature of the context	Pit structure Trashmound Pit Non-feature Fill
Northing	Text	50	Grid information: the North/South coordinate.	N286.00 – N288.00 N 280.00
Easting	Text	50	Grid information: the East/West coordinate	E452.00 – E454.00 E452.00

**Table 3.7, Required Data Fields with Recommended Specifications, continued**

Field	Format	Length	Definition	Examples
Unit ID	Text	10	Identification of excavations unit if appropriate. Can be a number or quad id, ect.	Unit 23 or "23" SE ¼ or N ½
Stratum	Text	10	Cultural stratum	2, 2a, II, 20
Level	Text	5		1, A
Depth (from)	Text	50	Measured depth to top of unit w/ unit of measure specified	0.28 mbd 28 cmbd
Depth (to)	Text	50	Measured depth to bottom of unit with unit of measure specified	0.38 mbd 38 cmbd
Conservation Treatments	Text	250	Describe any treatments applied to the object	Reconstructed with B-72 Acrysol
Comments	Text	250	Free text field for comments and clarification	

**Table 3.8, Suggested Material Class Terms**

Material Class	Definition/Qualifiers/Examples
Bone, faunal	Animal bone
Bone, human	Human bone
Bone, indeterminate	
Bone Artifact	Worked bone
Botanical Sample	Unprocessed sample
Botanical Specimen	Charcoal, seeds, wood, or other macrobotanical specimen
Ceramics	Sherds, RV, whole vessels, ceramic artifacts (prehistoric)
Ceramic Artifact	Perforated sherd disk, worked sherd
Ceramic Sample	ICPS, Neutron Activation, X-ray Diffraction
Flaked Stone	Debitage, tools, projectile points
Chronometric Sample	C14, archaeomagnetic samples, dendro samples
Flotation Sample	Light fraction or residue
Fossil	Unmodified shell fossils, mammoth bone
Geological Sample	Sourcing samples, clay samples (non-cultural)
Ground Stone	Manos, metates, axes, tesseræ, palettes, stone beads
Historic Glass	Sheet glass, bottles, flaked glass
Historic Building Material	Brick, adobe
Historic Ceramics	European, Euro-American, Spanish, Mexican
Historic Native American Ceramics	Papago Black-on-Red
Historic Metal	Cans, pipes, mechanical parts
Historic Other	Rubber, leather, jewelry
Historic Wood	Milled lumber
Mineral	Cultural artifacts (not modern geological)
Other Artifact	Please use sparingly
Other Samples	Phytoliths, obsidian for sourcing
Other Stone Artifact	Concretions, ochre, slag, manuports
Perishable Materials	Textiles, sandals, vegetal artifacts
Petrography Samples	Glass slides, residue blocks, sherd remnant
Pollen Sample	Wet or dry; soil sample or processed sample (slide and residue; vial)
Pollen Wash	Artifact for wash (unprocessed only)
Prehistoric Building Material	Daub, adobe, stone lintel
Shell	Worked or unworked
Soil Sample	Small (< 8 oz.) samples for analysis—not flotation
Void/culled	Materials that are not artifacts
Wet-screened Sample	Processed samples only

### 3.2.4 Documentation of Repatriated Materials

In cases where a project recovers human remains and associated objects, it is understood that these objects are subject to repatriation under the Native American Graves Protection and Repatriation Act (NAGPRA) or under A.R.S. §41-844. The specifics of this process should have been outlined under the terms of the Burial Agreement. Documentation of the repatriation in the form of a copy of a signed and dated, itemized inventory listing returned material and remains must be provided when the remainder of the collection is transferred to ASM. Update the project's FN/Bag inventory to reflect the return of this material, and mark the items as repatriated.

**Document and inventory repatriated items. Submit this information to ASM with the project collection.**

### 3.2.5 Documentation of Specimens Released

Materials may be temporarily released by depositors before final submission of the project collection to ASM. Specimens are usually released to other institutions, subcontractors, laboratories, or departments for special analyses (e.g., petrography analysis, obsidian hydration) or for display. **Any materials leaving the premises of the contracting depositor for any reason must be tracked using a Specimens Released form.** This form is available in Appendix F and on ASM's website ([www.statemuseum.arizona.edu](http://www.statemuseum.arizona.edu)) under "Professional Services > Forms & Guidelines."

**The Specimens Released form must be prepared in duplicate:** one copy accompanies the materials and one copy remains with the contracting depositor.

The released material should be returned to the depositor and re-integrated into the project collection **before** it is submitted to ASM for curation. The Specimens Released forms must be included with the project documentation. Exceptional circumstances include:

- The return of material to project personnel **after** the collection has been submitted to ASM. This is strongly discouraged. **The material and accompanying documentation must be forwarded to ASM immediately.**
- The **anticipated whole or partial destruction** of the material as a result of analysis methods. The project director or laboratory director must thoroughly document the material prior to destruction. The depositor must also arrange for the transfer of unused portions or remnants and accompanying documentation to ASM.

**Analysts may not retain any specimens or samples**—including thin sections and their artifacts of origin—that have been generated by a project that is covered by a Repository Agreement with ASM. There is one exception: tree ring samples submitted to the Laboratory for Tree Ring Research at the University of Arizona may remain there for permanent curation.

## **PREPARATION OF PHOTOGRAPHIC MATERIALS**

### **4.1 Introduction**

The photographic record of an archaeological investigation is a vital part of the project's collection and documentation. ASM maintains a photographic archive that includes materials from both field and laboratory phases of archaeological projects. Negatives, slides, and original prints are catalogued and indexed, and may be retrieved by several categories: subject (including terms for archaeological structures, features, procedures, equipment, artifacts, etc., as well as the names of any individuals in the photograph); project name; provenience (including site number, site name, and intrasite provenience); photographer's name; and date of photography. After photographic materials enter the Photographic Collections, they are assigned a Photo Catalog Number and transferred into archival filing enclosures and storage boxes.

The Photographic Collections are used by researchers, publishers, faculty, staff, students, and the public for a variety of research, publication, and exhibit purposes. Proper organization and documentation is essential to user accessibility.

### **4.2 Archival Film**

The black-and-white negative is considered to be the best photographic material to use as an archival record for archaeological projects. Due to their chemical instability, color positive (slide) and negative film should only be used as a supplemental record. Moreover, slower speed films should be selected, as they are more archivally stable than those with a faster film speed. Advice and additional information on the use and archival quality of different film types may be obtained from the Curator for Photographic Collections.

### **4.3 Preliminary Organization of Photographic Material**

Preparation and handling of photographic materials should occur in a stable environment without excessive heat, dust, humidity, or chemical contaminants. Lightweight, 100% cotton gloves should be worn while sorting, numbering, and filing materials to protect film emulsions from dirt and oil on the hands.

Photographic materials should be organized by film type (e.g., roll film, sheet film, 35mm slides, prints) in a logical, chronological order. During preliminary organization, any redundant, irrelevant, or poor quality images should be culled; see specific culling procedures for each type of photographic material listed below. This important step results in a higher quality photographic record, fewer person-hours of documentation effort, and lower costs for supplies and storage.

## 4.4 Preparation of Photographic Materials

### 4.4.1 Roll Film (Negatives)

Cut roll film in strips of 4 to 6 frames each and file in mylar sheets (or archival quality negative pages) for contact printing. **Do not cut the strips to remove negatives for images being culled.** Each mylar sheet of film should be **contact printed** onto one 8 × 10 sheet. Assign field numbers to each image (except those being culled) on the contact sheet using a technical pen filled with black India ink (e.g., *Rapidograph*), or an archival quality pen (e.g., *Pigma Micron*). Alternatively, images may be numbered on the back of the contact sheet in pencil. Then type documentation in assigned number order on the Project Photographic Material Data sheets (see Appendix F).

### 4.4.2 Prints

**For original prints submitted without negatives (which is acceptable only if the negatives have been lost or destroyed),** assign field numbers with a soft lead pencil along the upper right hand edge of the non-image side of the print. **Do not, under any circumstances, write, stamp, or attach anything else on the back of the print.** File in mylar sleeves/archival sheet protectors or acid-free paper envelopes. If using envelopes, label the field number on the back or upper right-hand corner of the envelope. Enter documentation on the Project Photographic Material Data Sheets in field number order.

### 4.4.3 Slides

Assign field numbers in pencil on the lower (non-emulsion side) of the slide mount; file slides in plastic sheets or boxes; and enter documentation on the Project Photographic Material Data Sheets in assigned number order. **Do not place any other information on the slide mount.**

### 4.4.4 Sheet Film

In the rare circumstance when 4 × 5—or other sheet film—is employed, a contact print of each negative must be provided on 8 × 10 paper. Multiple images can be printed on a page. Assign field numbers to each image on the contact sheets as described above; file negatives in archival sleeves or acid-free envelopes with the field number typed or written in pencil on the upper right-hand corner of the envelope; and enter documentation on the Project Photographic Material Data Sheets in assigned number order.

### 4.4.5 Digital Images

Consult Section 6, SUBMISSION OF ELECTRONIC/DIGITAL DATA: Digital Photographic Files.

## 4.5 Documentation Guidelines

The following documentation should be recorded on the Project Photographic Material Data Sheet (Appendix F) for each image within each set of materials deposited (e.g., negatives, slides, prints):

- Date of Photography
- Field Number
- Subject (description of archaeological structures, features, procedures, equipment, artifacts, etc., as well as the names of any individuals in the photograph)
- Provenience [site number, site name, intrasite provenience, and orientation from which the photograph was taken (i.e., “looking to the Northwest”); include site-specific units of designation such as features, floor numbers, burial numbers, grid numbers, etc.]
- Photographer's full name

General information describing the film type, project name, site number, and cataloguer should be filled in at the top of each data sheet.

For additional information on the preparation of photographic material or to schedule an appointment to view the collections, contact the Curator of Photographic Collections.



## PREPARATION OF ARCHIVAL MATERIALS

### 5.1 Introduction

Project documentation includes paper records (e.g., original field notes and forms, analysis records, maps, correspondence, and project reports) and sound recordings. These materials are curated in the ASM Archives. These records are filed and stored by project in acid-free folders and boxes. A running inventory and index to the materials is maintained by the Archivist. Researchers can gain access to the archival records of a particular project by arrangement with the Archivist.

Contact the ASM Archivist for further information or to view archival materials.

Questions concerning the preparation of archival materials should be directed to the ASM Archivist.

### 5.2 Organization and Inventory of Materials

Materials submitted to the ASM Archives should be arranged in a logical manner, usually following the project's working or chronological order. The individual parts or sections of the material should be clearly marked. File folders are best labeled with a #4 graphite (2H) pencil or black ink pen. If adhesive labels are used, the label must be stapled to the folder with a single staple, as the adhesive will dry out with time.

Arrange documents neatly and in a logical manner. Provide an inventory of the material on acid-free paper.

If the arrangement of the material is such that it cannot easily be understood, a written explanation of the arrangement should accompany the material. **A folder-by-folder inventory of the general contents of the material must be submitted.** Where relevant, it should identify authors of written matter within the collection.

### 5.3 Use and Restrictions

Project materials in the Archives will be made available to researchers and photocopied on request, within ARPA guidelines. Restrictions may be imposed only to prevent invasion of privacy, as might apply to **oral history materials**. If a submission, or any part of it, falls into this category, such considerations must be specifically stated and fully explained in writing. The duration of any proposed restrictions, and to whom they should apply, should be noted.

If oral history materials of a sensitive nature are submitted, please describe recommended restrictions on their use in writing.

### 5.4 Reports and Publications

**ASM requires the submission of three copies of final reports and any other reports containing project data not included in the final report** (See Appendix B, "Notice of Intent to Provide..." Provision 10). One copy of each of these publications is placed in the ASM Archives. The second copy is annotated with

Submit **THREE** copies of each project report.

catalogue and negative numbers and remains with the artifact collections. The third copy is transferred to the ASM Library for the circulating shelves.

## 5.5 Maps

Maps from archaeological projects are catalogued and curated by ASM Archives personnel. Access to maps is by verbal or written request and requires completion of a Request for Access to Collections form (see Appendix F). Maps are not loaned, but photocopies can be ordered.

### 5.5.1 General Requirements

All maps used and generated by archaeological projects must be submitted to ASM for inclusion with the project's archives. This includes, but is not limited to, USGS "quad" maps, regional and project area maps, survey and excavation maps, collection grid maps, and profiles. ASM will accept field maps, inked copies, and reductions of either the blue or black line varieties.

### 5.5.2 Documentation

**An inventory consisting of a complete list of all maps and profiles must accompany the collection.** ASM requires the following information for each map and profile submitted:

- Project name and project number
- Project map field number, if assigned
- Name of cartographer
- Date map was drafted
- ASM site number and site name, if assigned
- North arrow and scale
- A brief description of the map or profile

**Submit project maps with supporting information as listed in 5.5.2.**

Any of this information that does not appear on the map should be supplied on a separate sheet of paper attached to the map.

## 5.6 Sound Recordings

All sound recordings submitted for curation must be originals. If the original recording is in a medium other than cassette tape, a cassette copy must also be submitted. Furthermore, each recording must be accompanied by an original typed transcript. If the transcription is not in English, cite the dictionaries or orthographies used to make the transcription. If the transcription is itself a translation, provide the names, affiliations, and qualifications of the translators.

Submit the following information with each recording:

- Short description
- Length of recording
- Dates recordings were made
- Location where the recordings were made (as specific as possible)
- Recorder and affiliation (institutional)
- Subjects and their affiliations (cultural or institutional, or both)
- What languages are recorded, and who is speaking them

- If there is music on the recording, what instruments are played and by whom?
- Brief outline of subjects/topics in the same order in which they occur in the recording
- Recommended restrictions on use (state what portions, why, under what circumstances, and from whom)

## SUBMISSION OF ELECTRONIC/DIGITAL DATA

### 6.1 Digital Data and Text Files

All projects using machine-readable data for computer inventory and analysis must submit copies of all raw data and support data files/tables to ASM. Hard copies of the files and the data structure must be included.

#### 6.1.1 Raw Data

The raw data files and associated supporting files/tables **must be recorded on a CDR (write-only)**. Due to the possibility of disk error, two (2) copies (compact discs) of the data files should be provided. The compact discs' contents and structure should be recorded on a paper inventory.

- **The program** employed to create the database must be identified (e.g., ACCESS, dBase V, SPSS).
- **The file/table names and descriptions of their contents** must be provided. File/table names should reflect their content (e.g., Debitage.dbf, Artifact Type Code.dbf).
- Similarly, **the field names** must be specified and the contents defined.
- For relational databases such as ACCESS, **the linking fields that form the relationships** must be specified.

Codes and associated values (e.g., 1=sherds, 2=flaked stone, etc.) must be provided with the raw data. This documentation should include a description of the contents of each raw data field.

#### 6.1.2 Printout

Only the raw data and structure are required in printed form. Printed output **must be submitted on 8½ × 11 or 8½ × 14 acid-free paper**.

### 6.2 Digital Photographic Files

The increased popularity and quality of digital imaging technology has led to more frequent use of digital photography in the field and the laboratory. However, **digital photography is not a replacement for traditional formats, and should not be used exclusively to document fieldwork.**

Electronic images degrade over time. The exclusive use of digital photography is not recommended.

### 6.2.1 Media and File Formats

Digital photographic images generated by a digital camera or by scanning must be submitted on a CD-R (write-only) disk, and must be accompanied with full documentation. **TIFF (\*.tif) or Kodak Photo CD (Image Pac, \*.pcd) format files are the preferred formats.** These are the only formats currently available on the market that feature a “lossless” data storage process. If it is necessary to submit JPEG format, **we must receive the JPEG image as downloaded from the camera—prior to ANY modification** (i.e., cropping, color adjustment, etc.). Manipulation of the image degrades resolution.

Preferred formats are TIFF or PCD files. JPEG files lose resolution with each modification. If JPEGs are submitted, the files must be as downloaded from camera.

**The minimum resolution standards for a digital color photo are 24-bit, and approximately 1600×1200 pixels.** For Kodak Photo CDs, chose the 16-base resolution. An 8-bit or better gray scale ( $\approx 1500 \times 1000$  pixels) is required for B/W images. If an image is cropped, it can be smaller than these standards, as long as the original image complied with the aforementioned specifications and compression was not applied. These are minimum standards; higher resolutions are encouraged, as these have greater detail. Higher resolution will, however, entail larger file sizes.

The minimum resolution standards for digital color images are 24-bit,  $\approx 1600 \times 1200$  pixels.

### 6.2.2 Hard Copy of Images and Photo Documentation

If digital photographs are submitted as part of a project’s documentation, printed copies of all images must be included. Print these images on **acid-free paper** using a **B/W laser printer**. Color prints are not archival because the ink is not stable over time. Each print should be at least  $3 \times 4$  and have a minimum resolution of 600 ppi (pixels per inch). Larger formatted prints, e.g., a  $5 \times 7$ , can be printed with a resolution of 300 ppi. The images must have the image file name listed next to or below the image. The image ID must reflect the project or accession number (Site 5\_Image 1 / 2003-234-Image 1).

- Some commercially available digital photo management programs provide the “contact sheet” option. This can be set to print 4 “contacts” on an  $8\frac{1}{2} \times 11$  page.

The camera-generated numbers are duplicated by all other cameras of the same model/maker and are therefore not unique. ASM encourages use of the accession number format, as all images received will be stored on a central server at the Museum.

- Some commercially available digital photo management programs provide a routine for batch renumbering using a template.

A **Digital Image Photo Log** must accompany all digital photo discs. A version of this log is provided in Appendix F, but some digital photo management programs can automatically generate the equivalent output. Because these can be adapted into a word processing file, they are acceptable as long they contain the following minimum fields:

See Appendix F for preferred digital image inventory format.

- Project’s ASM Accession Number
- Project Name
- Name of the Depositor

- Image Identifying Number or Name (Acc2003-222-Image 001, or “Site 5 Image 1”—contractors are encouraged to rename image files to reflect the project or subject)
- Subject of photograph
- Image Size (megabytes or kilobytes; e.g., “9.1 mb,” or “9,137 kb”)
- Pixel Resolution (e.g., 2048 × 3072, 24-bit)
- Date image was taken
- Image Format (TIFF or PCD only)
- Name of Photographer

## FINAL PROCEDURES

### 7.1 Introduction

After the various portions of an archaeological project collection have been prepared in accordance with the standards set out in the first six sections of this manual and packed into standard-size boxes, there are a few very important summary procedures to follow.

### 7.2 Assigning Box Numbers

Each box of project materials must be assigned a unique sequence number. First, organize the entire collection along the following lines:

- The first boxes in the sequence must contain the Bulk Material. **If the project involves more than one site, the boxes MUST also be arranged in alpha-numerical order.** For example, AZ B:2:44(ASM) precedes AZ T:12:23(ASM), which in turn precedes AZ AA:1:10(ASM) and AZ AA:1:11(ASM).
- Next in the series should be any boxes containing other types of artifact material; for example, Survey Collected Materials and Unprovenienced Specimens should come after the Bulk Material. **The Catalog Specimens will always come after any boxes containing Bulk Materials, Survey Materials, or Unprovenienced Specimens.**
  - Example: Three sites were tested. There are 24 boxes of Bulk Material from these three sites, 1 box of Unprovenienced Specimens given to the project director by a local landowner, and 2 boxes of Catalog Specimens. The boxes of Bulk Material get box numbers 1 through 24. The box of Unprovenienced Specimens gets box number 25. The two boxes of Catalog Specimens get box numbers 26 and 27.
- Finally, boxes containing project documentation—archival materials, photographic records, computer data, and maps—should be added at the very end of the sequence.
  - Example: Following on the preceding example, if there is one box of documentation, it receives box number 28.

**The numbering sequence must go from 1 to N for the entire project collection. Never start the sequence over within a project.**

At this point, the final series of box numbers can be assigned, beginning with 1 and continuing as necessary until all boxes are numbered sequentially. These numbers must be unique to the accession; thus, there must be only one Box 1, one Box 2, and so forth. **Do not start over with each site number or with a change in the type of collection.** This unique number **must be recorded in the electronic inventory.**

### 7.3 Standard Box Label

Complete the ASM Archaeological Project Collections Box Labels (see Appendix F), laser print them on acid-free paper, and attach them to each box. Use the self-adhesive 6 × 6” sleeve provided by ASM. **Please confirm that the box label clearly displays the appropriate box number and Accession Number.**

Check the information on the box label against the box inventory database to ensure accuracy. Be sure to check off all appropriate categories in the section labeled “Material.”

### 7.4 Summary of Project Collections

This form (see Appendix F) summarizes the major categories represented in the complete project collection by site. List sites in order of ASM site number, and check off the appropriate categories for each site.

### 7.5 Summary Box Inventory

This form (see Appendix F) summarizes the contents of the boxes of project material. Again, to ensure accuracy, check this information against the electronic inventory. Record the assigned box numbers in order in the first column of the form. Use the second column to indicate the subcategory of the collection, such as Bulk Materials, Survey Collected Materials, Catalog Specimens, and so on. Use the third column, “Material,” to indicate the types of artifacts within the box (e.g., Sherds, Lithics, Groundstone, Botanical Materials). Record the ASM site number in the fourth column. Do not enter information into the fifth column; it is reserved for use by ASM.

Always verify that the information recorded on the paper forms matches the information recorded in the electronic inventory.

### 7.6 Archaeological Project Registration Form

**The Archaeological Project Registration Form (Appendix F) serves as the primary collections management document for every archaeological project using ASM’s repository services.** This form summarizes essential information about each project. It is the key document that ties together various portions of the project collection that require special curation. It accompanies those subdivisions of the collection that are curated by different departments within the Collections Division; for example, copies of the Project Registration form are sent to the Photographic Archives along with the negatives and slides submitted with a project.

**The project director is responsible for the completion and accuracy of this form.** Provide the number of field person-days rounded to the nearest whole day. For multi-phase projects involving survey, testing, and excavation, include a breakdown of the effort expenditures. **Pay particular attention to the checklist on the final page; a signed copy of the Project Registration Form will be issued as a receipt for project materials,** so it must accurately reflect the



submitted materials. **It must accompany the project collection to ASM at the time of transfer.** If any project material is retained by the contractor for any reason, specify this, and provide an explanation.

## **7.7 Transfer of Project Materials**

After all phases of collections preparation are complete and the final version of the project report is available, contact ASM to schedule the physical transfer of the project collection. ***Repository staff will not accept delivery of a collection without a final report unless this has been authorized by the Curator of Repository Collections.*** The delivery date must be scheduled with the Curator **at least one week in advance.** Confirm the amount of curation fees with the Curator at that time. This can be done by phone, email, or U.S. mail addressed to the Curator. **Payment must be made at the time of the transfer. *Repository staff will not accept delivery of a collection without payment.***

### **Project collections must be hand delivered by members of the project staff.**

Collections must be delivered to the Curator, Assistant Curator, or a designated alternate staff member. Deposited collections will be examined to determine that they have been satisfactorily processed. If so, the project collection will be accepted by ASM. If the materials are not in proper order, the project director will be notified. In most cases, the project director will be given the option of reprocessing the collection before it is refused. If a project collection is refused, the permit granting agency and the project's sponsor will be notified.

**Improperly prepared project collections may be refused per the terms of the repository agreement.**

Questions concerning final procedures, the transfer of project collections to ASM, or fulfillment of the terms of the repository agreement in general should be directed to the Curator for Repository Collections.

Appendix A

**Arizona State Museum Policy Statement**

**Curatorial Services**

## Appendix A

### ARIZONA STATE MUSEUM POLICY STATEMENT

#### 3.0 Collections

#### 3.4 Curatorial Services

##### 3.4.1 POLICY

As the primary State institution curating anthropological collections, the Arizona State Museum acknowledges a responsibility for the preservation of artifacts and data recovered by anthropological projects conducted in Arizona. To the extent feasible, the Museum will agree to act as a repository for such materials provided they are complete, thoroughly documented and prepared for curation according to Museum standards. Criteria for determining whether the Museum will accept a collection for curation are the Museum's established research and collections policies and priorities. Except in the case of collections of outstanding importance from unfunded projects, the Museum will be compensated at a predetermined rate. If these conditions are not met, the Museum may refuse the collections and will so inform the funding or permit-granting agency.

The Museum will accept the data and artifacts, accession them into its permanent collections and curate them in perpetuity according to established Museum standards and procedures. Data and artifacts will be accessible for research, publication, exhibition, educational, and other purposes in conformance with established Museum policy and procedures. The Museum reserves the right to loan, conserve, and authorize destructive testing of such materials.

##### 3.4.2 PROCEDURES

- a. All projects using the Museum curatorial services must follow Museum requirements and conditions in effect at the time the agreement is made.
- b. Those desiring to use the Museum as a collections repository must request this service in conjunction with preparation of research proposals or with the issuance of a state or federal permit, if required.
- c. All requests for curatorial services shall be directed to the Curator of Collections or, in the case of archaeological limited and non-collection survey, the Associate Archaeologist.
- d. The Curator of Collections or Associate Archaeologist shall communicate curatorial agreements in writing to the applicant stating the conditions of the agreement and the applicable fee structure.
- e. Curatorial agreements may be brought before the Museum Administrative staff for approval, but in any case all such agreements shall be reported to the Administrative staff within 60 days of being issued.
- f. The above conditions and procedures shall apply to projects conducted by the Museum and other units of the University of Arizona as well as to those conducted by other agencies or companies.

Approved by the Director's Administrative Staff 02/01/84.

Appendix B

**Notice of Intent to Provide Repository Services**

**Notice of Intent to Provide Repository Services**

**Accession No.:    2004-**

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The Arizona Board of Regents, on behalf of the Arizona State Museum (the Museum), agrees to serve as collections repository for artifacts and archaeological data recovered by (COMPANY NAME AND ADDRESS) as a result of archaeological data recovery phase work on the (PROJECT NAME), under permit or contract serving in lieu of permit issued to (COMPANY NAME)

The purpose of this agreement is to provide for the curation and accessibility of archaeological materials that are and will remain the property of federal or state governments or Indian tribes as well as project-associated materials that may be donated by private individuals or corporations. The Museum will not agree to act as a repository for collections that are the property of any party or governmental agency not mentioned above without first negotiating an additional written agreement with that body or agency.

The Museum will accept the data and artifacts covered by this agreement, accession them into its permanent collections, and curate them according to established Museum standards and procedures. Data and artifacts will be accessible for research, publication, exhibition, educational, and other purposes in conformance with established Museum policy and procedures. The Museum reserves the right to loan, conserve, and authorize destructive analysis of such materials. Except for authorization of destructive analysis, the Museum will not permanently dispose of any collections materials that are property of the federal or state governments or Indian tribes unless such action is authorized in writing by the appropriate governmental agency.

Use of this letter by (COMPANY NAME) as evidence of a repository agreement constitutes acceptance of the following provisions:

1. (COMPANY NAME) must submit copies of all Federal and tribal antiquities permits authorizing project work.
2. (COMPANY NAME) is responsible for providing in its proposal and contract adequate time for the delivery of project collections and for the Museum to accept, process, store and receive compensation for services rendered before termination of the project contract if so required by the project sponsor.
3. (COMPANY NAME) must notify the Museum's Head of Collections in writing of any change orders to contracts involving scheduling or number of person field days.



4. A formal fixed price agreement between the Arizona Board of Regents on behalf of the University of Arizona and (COMPANY NAME) may be required before the termination of the project.
5. (COMPANY NAME) agrees to include the Arizona State Museum's Accession Number on all correspondence and documentation relating to the projects collections.
6. (COMPANY NAME) must submit properly completed Arizona State Museum Site Survey cards or updates to cards for all project sites. Arizona State Museum site numbers must be used in all project reports and collections documentation.
7. All artifacts submitted must be documented and processed according to the Arizona State Museum Requirements for Processing of Archaeological Project Materials. A copy of the Requirements will be sent to (COMPANY NAME) upon request.
8. Complete data and documentation from the project must be submitted to the Museum. Project data and documentation includes one complete set of the following:
  - a. map defining project area
  - b. all field maps
  - c. all original field and laboratory documentation such as logs, recording forms, or analysis sheets
  - d. any other documents that contain additional information not included in project reports
  - e. photographic negatives, contact prints, slides, and digital image files
  - f. any computer readable data, final analyses and inventories that provide supporting documentation for project reports

Originals of these records must be submitted whenever possible; when originals cannot be submitted, all copies must be completely legible and must be accompanied by a written statement explaining why copies are being submitted. All records must be documented and processed according to the Arizona State Museum Requirements for Processing of Archaeological Project Materials.

Collections that are incomplete or inadequately processed and documented may be refused. Both the Sponsor and the permit granting agency will be notified in writing.

9. (COMPANY NAME) is responsible for identifying the owners of all recovered material and for so informing the Museum.
10. If the project involves private lands, data and documentation from work performed on the private land must be submitted to the Museum. If private landowners consent to donate recovered artifacts to the Museum, (COMPANY NAME) is responsible for ensuring that transfer of title of such materials is obtained prior to their being submitted to the Museum with the collection. The Museum cannot accept any artifacts from private land without a completed and signed transfer of title provided by the Museum.
11. Three copies of the final report and any other reports containing archaeological data not included in the final report must be submitted to the Museum with the collection.
12. To cover the cost of curatorial services, the Museum will be compensated at the rate of \$\*\*.\*\* per person field day plus \$\*\*\*.\*\*. Computation of person field days must include all personnel employed at the site, whether paid or volunteer. Filed lab personnel should not be included in this computation. (COMPANY NAME) must

submit to the Museum proof of actual number of person field days employed for the project. In addition, a \$10.00 surcharge will be assessed for each box of historic material. Collections received by the Museum more than two years after the completion of the field effort will be subject to an 8% surcharge, compounded annually and pro-rated monthly.

13. (COMPANY NAME) grants to the Museum and its designees any rights that it may hold for publication and independent use of artifacts, photographs, documents, and data covered by this agreement, excepting publication rights to reports and other manuscripts. Such transfer will not in any way infringe upon publication rights held by (COMPANY NAME)
14. During the term of this agreement, the parties agree to be bound by applicable state and federal rules governing Equal Employment Opportunity and Non-discrimination.
15. In accordance with Arizona Revised Statute 38-511, this agreement may be cancelled without penalty or further obligation if any person significantly involved in initiating, negotiating, securing, drafting, or creating the agreement on behalf of the Arizona Board of Regents becomes an employee in any capacity of the other party with respect to the subject matter of the agreement while this agreement or any extension hereof is in effect.
16. The parties agree that should a dispute arise between them, in any manner, concerning the agreement, and said dispute involves the sum of Thirty Thousand Dollars (\$30,000.00) or less in money damages only, exclusive of interest, cost, or attorney's fees, the parties will submit the matter to Binding Arbitration pursuant to the Arizona Supreme Court Rules for Compulsory Arbitration and the decision of the arbitrator(s) shall be final and binding on the parties.
17. The parties recognize that the performance by the Arizona Board of Regents for and on behalf of the University of Arizona may be dependent upon the appropriation of funds by the State Legislature of Arizona. Should the Legislature fail to appropriate the necessary funds, the Board of Regents may cancel this agreement without further duty or obligation. The Board agrees to notify other parties as soon as reasonably possible after the unavailability of said funds comes to the Board's attention.

Arizona State Museum on behalf of the University of Arizona

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Hartman H. Lomawaima, Director  
Arizona State Museum

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Date

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Suzanne Griset, PhD.  
Collections Division Head, Arizona State Museum

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Date

Appendix C

**Deed of Gift**



## Appendix C

### DEED OF GIFT

#### C.1 Preparation of Deed of Gift

To initiate the transfer of title from a donor or trustee to the Museum, the project director must complete **two** original typed versions of ASM's "Deed of Gift" (see Appendix F for the form itself).

##### C.1.1 Directions for Completion

The blank area after the first line of the Deed ("...we, the undersigned") should be filled in with the **legal name** of the donor or trustee, **complete address**, and **telephone number**. The legal name should be confirmed with the landowner. The following are examples of the necessary information:

Dr. John Watson, Director  
Developers Unlimited  
221B Coronado Drive  
Lake Havasu, Arizona 86234  
(520) 555-1234

Pioneer Trust, Inc.  
3736 Frontier Trail  
Flat Top, AZ 98765  
(602)999-9999  
An Arizona Corporation as Trustee under Trust No. 12345-C on behalf of the XYZ Development Corporation, Inc.

The space between the pre-printed paragraph, which states the conditions of the title transfer, and the signature lines near the bottom should be filled in with a description of the materials to be donated. **The Deed must be specific about both the identity of the project and the materials included in the donation.** The following statement is an example of the type of wording that can be used if all project materials are to be deeded to ASM:

All archaeological materials recovered from field research and data recovery carried out between the dates of January 23, 1986 and October 3, 1986, by Acme Investigations at Casa Merida for the Bureau of Very Important Research on property located in T13S, R14E, Section 6.

Notice the use of the term "all," by which the entire collection becomes the property of ASM, as opposed to a gift in which a portion of the project collection is retained by the donor or another party. If the material to be retained by the donor represents a small portion of the collection, describe it specifically, and the donated material in a more general statement:

All archaeological materials, except as stated below, recovered from the investigations conducted by...(complete as above). The following project materials are not included in this donation:  
One 3/4 grooved axe, diorite, FN 5-32 from Room 5 fill;  
Three Salado Polychrome sherds, FN TM1-24, from level 2 of Trash  
Mound 1

If the landowner prefers to retain a large portion of the artifacts recovered by a project, those items actually to be donated should be listed on the Deed:

Archaeological materials, as stated below, recovered during investigations carried out by...(complete as above). The following materials are included in this donation:

One box of chipped stone from Trash Mound 1, FN TM1-1 through TM1-15 inclusive  
Five Tularosa Black-on-white jars, FN 3-30, 5-1, 6-30, 10-5, 12-35

Have the donor or trustee sign and date both copies of the Deed of Gift. In the case of corporate ownership, make sure that the person who signs the Deed is authorized to do so by the corporation. After they have been signed and dated, both copies are submitted to the Collections Division Head for execution by ASM.

ASM retains one copy for the accession file; the second will be returned to the donor **after the artifacts and project documentation have been received and accepted** by ASM. A copy of the artifact inventories, prepared by the archaeological contractor, will be enclosed with the Deed of Gift if necessary.

If the donor wishes to claim a deduction for a charitable contribution for the donation of archaeological materials, and the total claimed value of exceeds \$5,000, they must obtain a written appraisal of the donated property from a qualified appraiser. **ASM does not provide appraisals.** After the Deed of Gift has been executed by ASM, the University of Arizona will issue an IRS 8283 form directly to the donor at the addresses listed on the Deed of Gift.

Appendix D

**Conservation Criteria for Archaeological Materials**

## CONSERVATION CRITERIA FOR ARCHAEOLOGICAL MATERIALS

Edited by

Teresa Moreno, Assistant Conservator, ASM

Catherine F. Sarther, Assistant Curator of Archaeological Collections, ASM

Arthur W. Vokes, Curator of Archaeological Repository Collections, ASM

### D.1 Introduction

The following section provides basic information on the characteristics—and consequent handling and storage requirements—of object material classes commonly recovered during archaeological excavations. This should serve as a reference tool for making informed decisions as to the appropriate handling and storage procedures during a project.

Most 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 in the field or the laboratory to prevent additional deterioration of a damaged item, but the best way to prevent deterioration of artifacts and documents is through preventive care. **If minor treatments are carried out in the field, be certain to thoroughly document every treatment, including any cleaning, consolidation, or repairs, for each object.** The information presented here should assist in planning storage environments or selecting containers suited to the particular needs of specific material classes. Archaeological materials are listed alphabetically.

### D.2 Bone and Other Skeletal Material

Vertebrate skeletal material, whether human or animal, is comprised of both organic and inorganic components. Both components have some association with water, which, when lost, leads to hardening of the material. The organic component consists mostly of the fibrous protein collagen, as well as other forms of proteins and polysaccharide complexes. The inorganic component consists of the crystalline mineral hydroxyapatite, a complex of tricalcium phosphate and calcium hydroxide. Both components combine to form different kinds of bony structures. The ratio of the two components differs for bone, antler and ivory, as do their micro- and macro-structures.

Skeletal material can be preserved in many archaeological environments, but its level of preservation varies depending on the conditions of the soil from which it was recovered. This is because each of the two components of bone is preserved at opposing pH. For example, bone recovered from acidic soils may be weakened as a result of the chemical degradation of its mineral component. On the other hand, bone recovered from alkaline soils may be brittle and friable as a result of the bacterial breakdown of its organic component. Some discoloration of skeletal material may also occur during burial, depending on the mineral content of the soil. Additionally, in the case of artifacts, the condition of the material will vary according to how the object was processed or worked, and how it was used.

In general, skeletal material is best preserved in either very dry, desiccated environments or in an environment where there are high levels of calcium carbonate present at a moderate pH, such as in the sea. It can also be very well preserved if it is burnt (calcined), and subsequently lacking its entire organic component. Skeletal material is most likely to be preserved in good condition when recovered from anaerobic non-acidic environments; it is most likely to degrade completely in aerated acidic environments.

#### D.2.1 Bone

Bone typically consists of approximately 1:2 collagen:hydroxyapatite, with 5 percent by weight of water. It has two major types of tissue structure, a sponge-like structure known as cancellous bone, and a compact laminated structure known as lamellar bone. Cancellous bone, which is light and porous, is found in the interior of bones surrounding a central marrow cavity. Lamellar bone, which is heavier and much denser, is found on the outside of bones, particularly long bones. Within the structure of the bone there is a system of holes and canals through which blood flows into the bone.

The appropriate methods for processing bone artifacts and faunal remains depend upon the condition of the bone at the time that it is excavated. Bone that is in good condition when recovered and subsequently stored in areas with appropriately controlled temperature and relative humidity levels needs little treatment beyond dry brushing. **Note that it is much easier to clean bone when it is newly excavated—in other words, when it is damp or wet—than after it has dried out. Wet cleaning (i.e., with water) bone after it has dried out is not recommended unless it is carried out under the supervision of a professional conservator,** because it can cause any remaining organic component to swell and subsequently crack and delaminate upon re-drying. Care should be taken when cleaning bone because the soft surface can be more easily marked or damaged. Bone recovered from extremely dry or wet burial contexts may be stabilized by maintaining similar conditions in storage. Bone that is in poor condition and actively deteriorating may require consolidation before it can be removed from the archaeological context, or prior to handling by an analyst.

**Consolidation** is the process by which materials with adhesive and cohesive properties are introduced to an object to impart physical or structural strength that has otherwise been lost. **This type of treatment should only be undertaken only upon the advice of or under the supervision of a professional conservator.** Many “simple” methods advocated in older archaeological conservation literature (e.g., saturating bone with water-based white glue) have associated risks. White glues are no longer recommended because they become less soluble or completely insoluble over time. Some treatments involve the use of hazardous chemical solvents that require special handling and disposal. The best option is to consult a conservator, and be certain that any consolidation treatment is fully documented in writing and recorded in the electronic inventory.

#### D.2.2 Human Remains

In general, the treatment of human remains should comply with the procedures specified in the burial agreements established before the initiation of fieldwork. Human bone is compositionally similar to animal bone, and can be treated in much the same way; however, greater care is warranted due to the sensitive nature of the material. All human remains should receive respectful handling and storage procedures.

### D.2.3 Antler

Antler is an outgrowth of the skull bones of deer, elk, moose, caribou and other animals known 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 is a solid material, much tougher than other skeletal bone. Structurally, antler is very similar to long bones, in that it consists of a hard outer layer of lamellar bone surrounding a spongy central area of cancellous bone. Antlers, however, do not have a central marrow cavity. For the preservation and conservation of antler, see recommendations for bone.

### D.2.4 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 walruses, hippopotami, and narwhals. Ivory is composed almost entirely of successive layers of dentine, which is roughly 1:3 collagen:hydroxyapatite, with 10 percent by weight of water. This core of dentine is covered with a thin cap of enamel. The layers of the core are growth rings that give ivory its laminated structure. Unlike bone, ivory lacks any type of canal system, but it does have a structure of very fine tubules. The gyratory pattern of these tubules produces the distinctive “engine turning” markings that distinguish true ivory.

Deterioration of ivory usually occurs between the dentine layers due to the absorption or loss of water, or the 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. High humidity levels or extreme fluctuations in humidity levels cause the soluble salts in ivory to re-hydrate and crystallize between dentine layers, causing them to split, spall, and delaminate. Very dry environments or soils containing high levels of calcium carbonate at a moderate pH produce the best conditions for preservation.

Upon excavation, care must be taken to maintain the moisture content of ivory. Like bone, ivory recovered from extremely dry or wet burial contexts may be stabilized by maintaining similar conditions in storage. Controlling the ambient RH and maintaining a cool and even temperature are the most effective methods of preventing deterioration. Ivory that is known to contain soluble salts should, however, be kept as dry as possible to prevent reactivation of the salt crystals. Additionally, ivory should be stored in a dark place to minimize exposure to UV light and prevent embrittlement.

The best method for cleaning newly excavated ivory is gentle dry brushing with a soft brush. Do not abrade the surface. Once it is dry, or if it was found dry, **do not attempt to wet clean ivory** (i.e., with water)—even if it appears to be in good condition. If further surface cleaning is necessary, consult a professional conservator.

### D.2.5 Teeth

Like ivory, teeth are made up of a core of dentine, which is approximately 1:3 collagen:hydroxyapatite, with 10 percent by weight of water. The dentine core of a tooth is covered by a thick cap of enamel, which is itself 97 percent by weight hydroxyapatite. The enamel cap is thickest over the cusps on the grinding surfaces, and tapers away towards the root of the tooth. A thin, hard material called cementum coats the outer surface of the roots, and may also invade the folds of the enamel crown. The structure of this mineralized tissue is more closely comparable to bone than dentine or enamel. Within the dentine core there is a central pulp cavity.

Because teeth have a thicker cap of protective enamel, they are usually found in better condition than ivory, and from a wider range of sites. For the preservation and conservation of teeth, see recommendations for bone and ivory.

### **D.3 Botanicals (see also Textiles, Wood)**

Botanicals—flora remains such as wood, nuts, seeds, pits, grasses, fibers, and grains—are recovered 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. The manner in which botanical remains are preserved will also vary, resulting in different forms of material: for example, charcoal and partially carbonized material, pseudomorphic replacements, casts, and impressions. Each of these forms requires unique methods of processing and long-term storage. The one factor common to all botanicals is their fragility. They must be collected and handled with great care, and packaged so that they are not crushed or contaminated, particularly if they are to be used for radiocarbon dating or other analyses.

Botanical remains may be recovered directly from a midden during excavation or from residues on other artifacts. They may also be recovered through dry- or wet-sieving, or from flotation. Carbonized material and charcoal may also be recovered in the same manner.

**Once botanical remains are recovered, however, it is important to keep them as free from contaminants as possible.** Oils from hands and plasticizers from artifact containers can affect the use of botanical remains as research specimens. If the specimens have been processed with water (i.e., floated), they must be thoroughly air-dried before they are placed into polyethylene zip-top bags. Fragile specimens should be placed in inert, rigid-walled containers. The containers should 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, or in some other medium. These should also be handled carefully and placed into rigid-walled containers. Appropriate supportive packaging will minimize damage from impact to the container.

Pollen samples that have been processed for analysis have undergone extensive chemical manipulations. They must remain in liquid storage in order to preserve beyond initial analysis. Often, these samples are stored in glass or polypropylene test tubes. Long-term storage should focus on maintaining the physical integrity of these samples by supporting the tubes in vertical position by means of specially constructed trays or racks.

### **D.4 Ceramics**

In many archaeological sites, prehistoric and historic ceramic sherds constitute a significant portion of the total volume of artifacts. 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. Clay, the raw material used to make pottery, is composed of hydrated silicates of aluminum such as kaolinite ( $\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2 \cdot 2\text{H}_2\text{O}$ ) and montmorillonites ( $\text{Al}_2\text{O}_3 \cdot 4\text{SiO}_2 \cdot n\text{H}_2\text{O}$ ). Clays vary in both their

chemical composition and in the nature and quality of impurities. Additionally, many clays are tempered with other materials such as ground shell, rock, or organics.

Because of differences in composition and hardness, pottery reacts varyingly to different burial conditions. Well-fired ceramics typically survive better in all types of soil conditions. Soil conditions that can damage pottery include excessive acidity, alkalinity, and salinity.

Acidic soils ( $\text{pH} < 7$ ) exert a weakening effect on certain types of pottery, particularly low-fired ceramics and those with temper that is easily affected by acidity, such as crushed limestone or shell. Acids can react with these temper types and leave the pottery exceedingly porous.

Alkaline soil conditions ( $\text{pH} > 7$ ) result in the deposition of carbonates, sulfides, or silicates of calcium on the surfaces of sherds. These compounds are known as insoluble or slightly soluble salts because they are not readily dissolved in water. Again, low-fired pottery is more susceptible to encrustation and penetration by these compounds. Caliche, a crusted calcium carbonate, is an insoluble salt that is often encountered in dry, arid regions. It leaves a whitish encrustation on sherd surfaces.

Soluble salts such as nitrates, chlorides, and sulfates can occur in pottery buried in semi-arid conditions. 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. This crystallization can exert tremendous force, and may cause spalling or disintegration of the ceramic body. Soluble salts cause more damage to pottery than any other agent. If the salts are not removed, they can promote loss of surface decoration and can eventually cause complete disintegration of the ceramic body.

Cleaning and repair are the two treatments commonly applied in processing ceramics. The most common methods of cleaning are washing with water and a soft brush or gentle dry brushing. All ceramics are porous, so any that are cleaned with water or solvents must be thoroughly air dried before any additional processing can proceed. They should not be enclosed in airtight bags until they are completely dry. **Poorly fired or low-fired ceramics and those with friable or poorly glazed surfaces should not be soaked or cleaned with water.** In general, it is best not to over-clean ceramics, as this can lead to surface abrasion, and may even weaken or alter the fabric.

As new residue analysis techniques develop, it is not uncommon for selected samples to be spot cleaned—restricted to the area needed for labeling the specimen—with the remaining surfaces gently dry brushed to remove excess soil. Ceramics with salt encrustations should be cleaned under the supervision of a professional conservator to ensure that the proper techniques are applied.

Although ASM does not encourage extensive artifact reconstruction by archaeological contractors' laboratories, we recognize that reconstruction of fragmented artifacts (vessels, figurines, etc.) may be necessary for analytical purposes and illustration. However, if an object is reconstructed, it must be done using approved reversible adhesives and appropriate supports. **Once reconstructed, an object MUST NOT be deconstructed.** This invariably results in damage to the object, and often renders future reconstruction impossible or nearly so.

Although there are a number of adhesives currently available, laboratories must select specific brands that are known to be fully reversible. ASM recommends the use of acrylic adhesives, such as Acryloid B72 or Rhoplex B60A. Acryloid B72 is the same as Paraloid B72. It is a heat-



and waterproof acrylic resin adhesive that is soluble in chemical solvents. (Note: Some solvents are highly volatile and potentially toxic.) Rhoplex B60A is the same as Primal B60A. It is a water-soluble, water-based acrylic emulsion adhesive. Some conservators also use Polyvinyl Acetates (PVA) such as Jade 403N, which is a reversible polymer adhesive. In any event, **DO NOT use white glue (e.g., Elmer's Glue), cellulose nitrate adhesives (e.g., Duco Cement), or epoxy resins.**

Some friable or actively deteriorating ceramics 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 only be undertaken upon the advice of and under the supervision of a professional conservator.**

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, tubular cotton Stockinette filled with polyester batting, or other supports similar to those constructed for large baskets (see D16.2, Basketry and Cordage).

When it is necessary to handle a whole pot directly, use both hands to lift it by the base. Never lift a vessel by the rim, spout, or handles. Ceramic materials should be stored in a stable environment. Avoid fluctuations in humidity levels within the storage environment; maintaining stable humidity levels will prevent the reactivation of soluble salts in the ceramic.

## D.5 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 which is more vulnerable to decay. The appropriate preservation method for that component should be employed. Examples of some composite items include furniture, knives, pistols, rifles, and cutlery. **Never disassemble an artifact** for conservation treatment unless instructed to do so by a professional conservator.

## D.6 Glass

Glass is generally composed of a network former, a modifier, and a stabilizer; additional colorants may be added. The basic former of glass is silica ( $\text{SiO}_2$ ), randomly arranged in a three-dimensional network. Network modifiers such as potash ( $\text{K}_2\text{O}$ ) or soda ( $\text{Na}_2\text{O}$ ) are added and behave as fluxes, lowering the melting point of the silica and allowing it to fuse more readily. However, in doing so, the fluxes break the continuous network structure, and become unstable themselves. For this reason network stabilizers such as lime ( $\text{CaO}$ ) or magnesia ( $\text{MgO}$ ) are also added in order to hold the fluxes within the network. Color in glass is produced by transition metal ions that are held in the network, which occur naturally or are intentionally added. Decolorizers and opacifiers can also be added to glass. The substitution of some of the silica former with lead produces lead crystal, and lead is also used in the production of enamels.

The type and rate of weathering (deterioration) of glass is largely dependent upon its chemical composition, firing history, post-use burial environment, and the length of time that it was

buried. In general, soda glass is almost twice as durable as potash glass. The weathering of soda glass results in the formation of thin layers of silica, which can separate and refract light unevenly, making the glass appear dull or even iridescent. These layers are very fragile, and they flake off easily. The weathering of glass can also result in devitrification, a process through which the glass surface becomes crystalline with patchy areas of iridescence. Prolonged contact with moisture is the primary cause of chemical and physical changes in glass that ultimately result in its deterioration. Archaeological glass, if chemically stable, is best preserved in dry environments, and can also be reasonably well preserved in acidic soils. Alkaline soils, on the other hand, can cause severe deterioration, because under these conditions the network modifier is leached out. This renders the glass porous, pitted, and covered with layers of carbonates. Not unlike ceramics, glass can also undergo degradation as a result of the activation of soluble salts (See D.4 Ceramics). Furthermore, scratches and flaws on the surface of glass tend to facilitate the overall weathering process.

Upon excavation, glass can undergo further chemical changes, which can lead to the development of weathering crusts, exfoliation, delamination, flaking and crumbling. Air pollutants can cause chemical changes in glass that contribute to the degradation process. Glass excavated from damp deposits must be treated with extreme care and kept damp to prevent dehydration. Depending on its degree of saturation, its level of preservation may be difficult to determine. A small fragment can be allowed to dry out in order to gauge any reaction that may occur. If deterioration does occur, glass should be packed damp and a professional conservator should be consulted. Glass excavated from dry deposits should be stored in relatively dry conditions.

When removing glass from its burial deposition, leave a layer of soil or sediment attached to the surface to prevent loss. Loosely adhered dust and debris can be gently brushed away using a soft sable brush. **Do not attempt to wash glass or immerse it in water. Do not attempt to remove tenacious dirt or encrustations** from the surface, as such action may cause irreversible damage to the weathering crust. **Do not attempt to remove any of the weathering crust or any thin iridescent layers**, as this is part of the original object and should not be disturbed. **If further cleaning is required, consult a professional conservator.**

Glass that is in poor condition and actively deteriorating or delaminating may require consolidation. This is also true for painted glass and enameled surfaces. **Consolidation should only be undertaken upon the advice of and under the supervision of a professional conservator.**

Following basic handling precautions may help to prevent additional glass decay. Bare hands can transfer moisture, oils, and acids onto the surfaces of the glass, and these can accelerate its deterioration. Snug-fitting latex gloves are recommended (rather than cotton gloves) because the glass surface might be slippery. Jewelry such as rings, bracelets, and long necklaces should be removed from the person handling the glass in order to prevent scratches or chips from accidental impacts. Glass objects should never be picked up or supported by any extending knobs, handles, rims, or decorative motifs. **Handling should be kept to a minimum.**

Fragile pieces of glass should be packed as flat as possible in rigid inert containers, such as acid-free boxes or Tupperware containers padded with polyethylene foam and acid-free tissue paper. Do not use cotton batting. Small and more robust shards can be individually packed in perforated polyethylene bags. Whole vessels or part of vessels should be lightly wrapped in acid-free tissue

and stored in rigid inert containers that have been padded with polyethylene foam or more acid-free tissue. Again, be careful not to disturb any unstable surfaces.

Although glass decay is irreversible, it can be stabilized by maintaining a stable relative humidity level and moderate temperature in the storage environment. Excavated glass should never be stored at less than 42% RH; this will prevent dehydration of the weathered surface.

## D.7 Horn and Other Keratinous Materials

Horn and a range of other materials including tortoiseshell, feathers, hair, wool, claws, hooves, and baleen (whale bone) are all based on the fibrous protein keratin. Keratin, like other proteins, is a food source for some insects, fungi and bacteria, and materials composed of keratin are susceptible to biological attack. Like most other organic material, items composed of keratin can survive in an archaeological context only under very specific burial conditions (i.e., waterlogged or desiccated). Within these extremes keratin is generally resistant to both alkaline and acidic conditions.

### D.7.1 Horn

Horn is the material that forms the outer sheath of the bony outgrowths on the skulls of cattle, sheep, goats, and antelopes. It is composed of keratinized cells that are arranged in layers with a distinct striated structure. It is a relatively soft, flexible material that can be flattened and reshaped. When separated from its bony core it can appear translucent.

Horn and objects made of horn are rarely preserved archaeologically. If horn is preserved, the preserved portion is usually the hollow core, which is bone, and can be treated accordingly (see D.2 Bone). If the keratinous outer sheath is preserved, do not abrade the surface, which under burial conditions tends to soften and even delaminate. In arid regions the keratin fibrils can become dehydrated, causing the material to shrink and warp.

Upon excavation of dry horn, dirt and debris can be gently brushed away using a soft brush. **Do not attempt to wash horn or immerse it in water.** Depending on their fragility, objects made of horn should either be packed in perforated polyethylene bags or in rigid containers padded with acid-free tissue paper or polyethylene foam. Horn should be stored away from direct sources of heat and light and at a relative humidity between 45 and 50%.

### D.7.2 Tortoiseshell

Tortoiseshell is made of layers of keratinized cells that build up to form scales. These scales form the shells of the reptile group Chelonia. It is a rigid but relatively soft material. Because it is quite similar to horn, it should be dealt with in the same manner.

### D.7.3 Feathers

All parts of feathers are composed of keratin. A feather consists of a hollow shaft from which hundreds of barbs branch. The barbs are actually an outgrowth of the shaft. Smaller finer barbules project off the barbs.

Feathers rarely survive archaeologically. They can, however, survive under very dry desert conditions. Upon excavation, any dirt surrounding the feather can be carefully removed using a soft brush. **Never wash feathers.** Feathers should be packed flat in rigid acid free containers. **Handle feathers as little as possible.** Like horn, feathers should be stored away from direct sources of heat and light and at a moderate relative humidity.

#### D.7.4 Hair and Other Proteinaceous Fibers

Proteinaceous fibers such as hair, wool, and kemp are all strands of keratin that are derived from the outer layers of skin. Wool fibers are generally fine and short, and hair and kemp tend to be longer and thicker. These fibers are formed from cells of keratin fibrils that comprise a cortex, and from an outside layer of flattened scale cells.

Like other keratinous materials, hair and other proteinaceous fibers are likely to be preserved only in extreme environmental conditions. They can be preserved in wet anaerobic environments. They can also be fairly well preserved in very dry arid environments, though they may suffer from loss of bound water and consequently become weak and brittle.

Upon excavation, the dirt surrounding dry proteinaceous fibers and objects made from them can be carefully removed using a soft brush. **Dry proteinaceous fibers should never be washed or immersed in water.** Objects should be packed as flat as possible in rigid acid-free containers. **Handle fibers as little as possible.** Like other keratinous material, these fibers should be stored away from direct sources of heat and light and at a moderate relative humidity. This material is also susceptible to insect attack, specifically by the larvae of the webbing clothes moth, and it should be monitored for pest infestation.

### D.8 Leather and Other Collagen-based Materials

Rawhide, parchment, semi-tanned leather, tanned leather, fur, gut and sinew products are all composed of the fibrous protein collagen. Collagen is a polymer of four different amino acids. Chains of collagen are wound together to form fibrils. Bundles of fibrils are bound together to form the fibers that make up skin tissue. Skin consists of three distinct layers, and skin products are made from the thickest of these three layers, called the corium. This layer is made of a network of collagen fibers surrounded by fats and blood vessels, which are removed when the material is processed for use. The corium layer has two distinct sides, the flesh side, which shows the loose ends of the less compact fibers, and the grain side, which is more compact and distinguishable by fissures that, prior to processing, contain hair follicles. As this material is processed there is a degree of shortening of the collagen fibers by hydrolysis, or loss of water. Variations in the processing of skin tissue result in different types of leather and skin products.

#### D.8.1 Leather

Leather is skin tissue that has been tanned or chemically treated in some other way that makes it soft, flexible, resistant to putrefaction, and reasonably impermeable to water. Leather can be made through different degrees and types of tanning. Semi-tanned leather is processed either by using unsaturated fats, alum, or salt. Tanned leathers are processed either by smoking or by the use of vegetable tannins. The tanning process is irreversible and hence more durable, whereas the semi-tanning process can be reversed through use of the material over time.

In general, leather does not survive archaeologically unless the burial environment is very stable and extremely wet or extremely dry. **Waterlogged leather** is particularly fragile; upon excavation it is susceptible to accelerated degradation. If found, it **should be packed wet with a biocide to prevent mold growth, and stored in a sealed polyethylene bag. Consult a professional conservator for instructions on further treatment.** In dry climates leather is preserved through desiccation, causing it to become rigid and brittle. Leather in this condition should be handled with extreme care. If leather is in a dry, stable condition, no treatment may be necessary other than dry brushing to remove loose dirt and debris. **Do not attempt to wet clean**

**dry leather. Do not apply any leather dressings to dry, stable leather. Do not attempt to flatten or relax pieces of leather that are folded.** Any further cleaning, repair, or reshaping of leather should only be carried out by a professional conservator. Dry leather should be stored in perforated polyethylene bags or acid-free containers.

Leather artifacts recovered from archaeological sites present numerous preservation problems. Moisture and heat are the main sources of deterioration. Control of temperature, humidity, and ventilation are crucial to the preservation of leather. Upon excavation leather should be stored away from direct sources of heat and light and at a moderate relative humidity. Extreme heat will cause leather to harden and become embrittled. 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 it deteriorates, leather cannot be returned to its original condition. Therefore, the most important elements in preserving leather goods are optimum storage conditions and appropriate handling.

“Red rot” is the common term for the deterioration of leather objects, particularly vegetable-tanned skins. This deterioration is due to reaction with sulfuric pollutants. Although it is not reversible, it can be stabilized with appropriate treatment. Red rot is commonly found on leather bookbindings made between 1850 and 1900.

#### D.8.2 Rawhide

Rawhide is skin tissue that is desiccated but has not undergone a tanning process and still contains a degree of putrescible fats and blood vessels. Desiccation causes the tissue to become inflexible, but also unaffected by certain agents of deterioration such as bacteria and hydrolysis. It is often coated with oil to provide some degree of flexibility and waterproofing. It is highly unlikely that rawhide would be found under wet conditions, but it could be preserved in an arid archaeological environment. For preservation and conservation of rawhide see the recommendations for dry leather.

#### D.8.3 Parchment and Vellum

Parchment is made from the skins of sheep, goats, and pigs; vellum is made from calf skin. During processing the collagen fibers of the skin are shortened, and those that are on the surface are turned almost to gelatin. Lime is adsorbed onto the fibers to dry it out, and the surface is then bulked with chalk to make a suitable writing surface. Historically, the surface was also bulked with oil in the preparation of window dressings. As with rawhide, it is highly unlikely that parchment or vellum would be found under wet conditions, but these materials could be preserved in an arid archaeological environment. For preservation and conservation of parchment and vellum, see the recommendations for dry leather. Additionally, it should be noted that parchment found in exceedingly dry environments must be maintained initially at a very low RH.

#### D.8.4 Fur

Unlike leather, fur is a skin product that retains hair follicles, which contain oils, cellular material and the hair shafts embedded in the grain surface. It also tends to have a great deal more of the flesh surface of the corium layer removed. Furs undergo either a semi-tanning process by oiling and tawing or a tanning process by smoking.

The conditions required for the preservation of fur are similar to those for both leather and proteinaceous fibers combined. One problem that fur is faced with as a type of composite object

is that bacteria can attack the roots of hairs, causing them to fall out, and resulting in the separation of the hair from the skin. For further discussion on the preservation of hair and other proteinaceous fibers see section D.7.4.

## D.9 Masonry

Masonry refers to stonework or brickwork used in construction. Examples of stonework collected from prehistoric or historic sites should be treated according to the conditions discussed under D.15 Stone. Brickwork is a manufactured ceramic material and should be treated accordingly.

## D.10 Metals

Metals are broadly classed as either ferrous or non-ferrous. Ferrous metals contain iron and non-ferrous metals do not. Ferrous metals (e.g., cast iron, wrought iron, and steel) generally comprise a large portion of metal artifacts found at historic sites. Metals such as copper, copper alloys (e.g., bronze, brass), lead, tin, tin alloys (e.g., pewter), silver, and even gold are examples of non-ferrous metals that are also found at historic sites. Magnets provide a simple way to identify ferrous metals in the field. If there is an attraction, the metal is ferrous and there is sufficient sound metal remaining.

Metals are also classified as either base or noble. Base metals corrode more easily than noble metals. The chart below depicts the reactivity of metals to chemical corrosion, from the most reactive base metals to the least reactive noble metals.

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

Metal artifacts degrade by means of corrosion processes, which can occur in surface or subsurface depositional environments. The degradation of the metal results from electrochemical reactions that can lead to the formation of mineral crusts. The rate of these reactions is dependent upon the nature of the metal and the microenvironment and chemical composition of the surrounding soil. Once a metal object has been deposited—and often even before deposition occurs—it will begin to corrode in order to achieve a state of equilibrium with its surroundings. When the item is excavated and placed in a new environment, the equilibrium is destroyed, usually accelerating corrosion. In general, any exposure of metal objects to oxygen, moisture, and various air pollutants activates the corrosion process. Additionally, metals, particularly iron, can have problems related to the presence of soluble salts, not unlike ceramics.

Take immediate action to inhibit the corrosion process in freshly excavated metal objects. Remove any moisture from the object (i.e., allow the object to dry out completely) and its storage environment, thus prohibiting aqueous corrosion. Loose dirt and debris should be carefully removed from the object using soft brushes and wooden tools (e.g., tooth picks, bamboo skewers). Adhered dirt can retain moisture close to the object's surface. Never use metal tools or stiff brushes, as they can scratch the object's surface and break the crust. Corrosion products are extremely difficult to remove without causing damage to the object; it is best to leave them intact. If little or no metal remains, overly aggressive mechanical cleaning by an inexperienced person may cause loss or irreparable damage to the object. **Conservation of metal objects can**

**require difficult mechanical or chemical treatments. Any further interventive treatments should only be carried out by a professional conservator.**

Pack freshly excavated metal objects in perforated unsealed plastic bags to avoid the build up of condensation. Acid-free paper and cardboard can also be used to pack metal objects. **Never use newspaper or other acidic paper material.** These will only promote corrosion of the metal. A small, desiccated storage environment can be created on site using a well-sealed container and silica gel desiccating agent. Silica gel absorbs moisture from its surrounding environment, helping to lower the overall relative humidity. Self-indicating silica gel or a separate humidity indicator strip should be used in order to monitor the RH level within the sealed container. **For further advice on creating desiccated storage containers consult a professional conservator.**

Often many metal objects are better left untreated, as long as they can be placed in a dry, stable storage environment. Preventive conservation may be the best option for the bulk of archaeological metal objects. In general metal artifacts should be stored separately from other materials so that the acids and vapors that off-gas from various organic materials do not cause further corrosion. Inert materials such as polyethylene bags, polyethylene foam, acid-free paper, and acid-free cardboard should be used to store 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.

## **D.11 Plaster, Cements, Mortar, and Concrete**

### D.11.1 Cements

Cements are divided into two groups: non-hydraulic cements, which only set in air and are not completely water resistant, and hydraulic cements, which can set under water and are much stronger and insoluble. Non-hydraulic cements include clay, gypsum cement, and lime cement. Hydraulic cements are composed of both lime and finely divided silica or alumina, which are calcined together producing a mixture of different alumino-silicates and silicates of calcium. This mixture is set by the addition of water and subsequent hydration of the silicates.

### D.11.2 Mortar, Concrete, and Plaster

Mortars, concretes, and plasters are very similar in composition. They all consist of a mixture of lime cement, sand, and water. Concrete usually also contains much larger inclusions, like gravel, and it is much coarser. Mortar is less coarse than concrete and should only contain inclusions that are less than 5mm in diameter. Lime plaster is usually even finer still. All three materials may also contain fibrous materials.

Another way in which they are distinguished has more to do with their function and how they are used than any significant differences in their composition. Mortar, for example, has other, more resilient materials embedded in it. Concrete is a hard, compact material used in the construction of buildings, bridges, dams, and so on. Plaster is used to cover or protect exposed surfaces such as walls and ceilings. The plaster used for the production of wall painting or *fresco* is similar, but is even finer still: instead of sand, it is made with marble dust.

A distinction should also be made between lime plaster and gypsum plaster, more commonly referred to as plaster of Paris. Plaster of Paris consists of calcined gypsum that, when mixed with

water, forms a thick paste that sets very quickly. This type of plaster is used for making casts, statuary, and moldings.

These types of materials will be retained in archaeological collections for a variety of reasons. For example, 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 interpretive potential.

Because of the composition of these materials (i.e., non-hydraulic lime cement), moisture presents the greatest hazard to preservation. Absorption of moisture over time in any form can weaken the original bonds and cause swelling, distortion, decomposition, cracking upon re-drying, and eventual loss.

Each of these materials reaches equilibrium with the water content in the environment at its own rate. Samples removed for study or storage should not be subjected to rapid desiccation, and they should not be enclosed in airtight containers that might promote mold growth. If polyethylene bags are used to transport plaster items, the bags should be perforated to permit air exchange.

Mortar and plaster tend to be more brittle, and may require external support to maintain their structure. Pack samples in rigid-walled containers, adding support with polyethylene foam if necessary. Extremely brittle or crumbling plaster, particularly painted plaster or plaster of Paris, may require consolidation by a professional conservator.

## **D.12 Plastics**

Plastic materials are manufactured from complex organic compounds produced by polymerization. They are capable of being molded, extruded, cast into various shapes and films, or drawn into filaments used as textile fibers, communication lines, and so on. Natural plastic materials such as amber, horn, bone, tortoiseshell, shellac, lacquer, and latex have been used for many centuries to manufacture items by heat treating and shaping the original material.

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). 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 by-products 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 is flammable, particularly if stored in conditions with poor air circulation. In general, the semi-synthetics are more susceptible to deterioration, whereas 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 humidity, temperature, and light levels. Plastics and synthetic rubbers should be kept in a dry environment with low temperature and light levels. If humidity cannot be controlled, serious damage can be avoided if plastics are placed in an environment with minimal light, cool stable temperatures, and good ventilation. The latter is particularly important, as plastics tend to off-gas as they undergo chemical reactions. Do not place these materials in sealed polyethylene bags, as the off-gassing vapors can accumulate and accelerate the deterioration. Cellulose nitrate objects should be segregated from other materials, and should never be enclosed together or allowed to touch each other. Cellulose nitrate film is stored at freezing temperatures to prevent combustion.

### D.13 Shell

The shells of freshwater and saltwater mollusks have been used for personal adornment throughout history and prehistory. They were highly valued and traded over long distances, and appear in the archaeological record even in the most unlikely places.

Shell is composed of layers of calcium carbonate. This material is decomposed by acid, and exposure to acids in surface and subsurface environments will weaken and soften these layers, causing exfoliation and crumbling. Shell is susceptible to degradation by Byne's disease, an efflorescence that is triggered by storage environments with acetic and formic acids. A common source of these pollutants is the off-gassing of unsealed wooden trays or shelving.

Upon excavation examine all shell carefully before cleaning. Shell that is unweathered, stable and in good condition when recovered needs little treatment beyond light brushing. If necessary, shell can be washed gently with water, but it should not be soaked or scrubbed. **Do not use cleaning agents of an acidic nature.** Material that exhibits evidence of surface deterioration should not be brushed, as abrasion can cause further degradation of the surface. Some unmodified shells may have been used as containers for food or pigments, and as such should not be cleaned at all.

Shell should be thoroughly air-dried before packaging. Because shell is hygroscopic (absorbs moisture easily), it should never be stored in airtight containers. Furthermore, it should never be stored in wooden trays, shelving, or cabinets in order to prevent any future degradation of the material caused by off-gassing. Perforated polyethylene bags or inert rigid-walled containers are acceptable. Acid-free paper and polyethylene foam can also be used to pad out containers if necessary. Shell should be stored in areas with stable and controlled temperature and relative humidity levels.

### D.14 Soil Samples

Soil samples are collected and analyzed in order to learn more about the geographical location of or activities at a site. Common analyses include pollen and phytolith analysis, particle size analysis (PSA), archeomagnetometry, phosphate and acidity level analysis, and flotation. Recovery techniques vary by type of analysis. Outside contamination is the key problem for any kind of soil samples. **The analytical expert should instruct the field archaeologist on how and where to remove the soil samples, or recover the samples themselves to ensure proper removal techniques and minimize the possibility of contamination.**

**Soil samples should be stored in a dry environment to prevent the growth of microorganisms that cause deterioration of organic content and to prevent contamination of the sample. They should be thoroughly air-dried before being placed in inert storage containers.**

Given the cost of storing archaeological materials and space limitations, ASM cannot store large soil samples (e.g., flotation in matrix) that were not considered significant enough to warrant processing during the original investigation's analysis. ASM encourages projects with significant samples to process these from the soil matrix and submit the light fraction. As long as it is feasible, ASM will continue to accept small samples such as pollen and phosphate samples.

## **D.15 Stone**

There are several different classifications of rock: igneous rocks, sedimentary rocks, and metamorphic rocks. Rocks are classified by their manner of geological formation. Igneous rocks such as precious gems, granite, basalt and obsidian are formed by the rapid cooling and crystallization of molten material. Sedimentary rocks are composed of individual minerals that are either welded together under extreme pressure or held together within a matrix of cementing material. Sandstone, limestone, alabaster, flint, clay, and shale are all examples of sedimentary rocks. Metamorphic rocks are sedimentary rocks that have been altered by extremes of temperature and pressure, which cause recrystallization of the minerals and produce a less porous rock with an intermeshed crystalline structure. This category of rocks includes quartzite, which is metamorphosed sandstone, as marble is from limestone, and slate is from shale. All three classifications of rock have been used throughout human history to make many different types of stone artifacts.

Compared to other materials, stone is relatively inert. However, it is still subject to deterioration and damage as a result of geological weathering and exposure to environmental pollutants. Mineral content, type and kind of inclusions, hardness, porosity, and the environmental conditions in which a stone is deposited all affect its durability.

Temperature and moisture are the primary agents of stone deterioration. Fluctuation in temperature is particularly problematic when fluid-saturated rock is repeatedly frozen and thawed. Any water held within the rock will expand as it is frozen, exerting pressure from within. As rock is exposed to continuing freeze/thaw cycles it will become more likely to undergo fissuring from this expansion and subsequent contraction, and ultimately segments of rock will spall from the parent rock. Degradation can also be caused by repeated saturation and moisture loss. If soluble salts are present they will crystallize upon drying and appear as an efflorescent layer on the surface of the stone. If the salts crystallize beneath the surface, they will exert pressure that may cause delamination of the surface or fissures in the body of the rock. Extreme heat can also contribute to degradation.

The hardness (resistance to scratches as measured with a Mohs' scale) of the stone will also determine how susceptible it is to damage from abrasion. Excavated stone specimens can suffer damage from abrasion as a result of poor storage conditions or mishandling, particularly when specimens are very large or heavy. Depending on its hardness and porosity stone can also absorb oils from hands, or become stained by minerals in its burial deposition or by materials used in storing, studying or exhibiting the object.

The feasibility of cleaning stone artifacts should be considered in light of the increasing use of analytical techniques to study microwear patterns and residues. **If any further analysis is required stone artifacts should not be cleaned.** The adhered surface dirt and debris should be allowed to dry before the object is packed. Likewise, if stone artifacts are made from soft porous rock or have any painted or gilded decoration, surface dirt should be left intact. In these situations surface cleaning should only be performed under the advice or supervision of a professional conservator.

If stone is to be cleaned, the cleaning methods should be suited to the hardness and durability of the stone. Some objects may only require dry brushing with soft brushes. Others may require wet cleaning to remove more tenacious dirt and debris. **Only hard, non-porous, undecorated stone artifacts should be washed on site.** Any stone that is cleaned with water should be permitted to air dry thoroughly before it is processed further. Stone artifacts that may contain soluble salts should not be wet cleaned. Depending on their durability, they may require desalinization treatment, which should only be conducted under the advice and supervision of a professional conservator.

Once dry, stone artifacts can be stored in polyethylene bags. Large objects can be draped in polyethylene sheeting to prevent buildup of surface dust.

Stone artifacts that have broken and are in two or more pieces may require joining. Stone can be difficult to join because it may be too dense to allow solvents in the adhesive to evaporate. This prevents a secure bond from forming. **Small pieces of stone can be rejoined using Paraloid B-72 resoluble adhesive.** Larger pieces, however, are more difficult to join. Because of their weight they may require stronger, chemically-setting polyesters, or even doweling. Both of these are permanent non-reversible treatments that should only be carried out if absolutely necessary, and only by a professional conservator.

## **D.16 Textiles and Basketry**

Textiles and basketry are made from small fibers that are bound together through various means to create a larger material. Vegetable and animal fibers as well as fibers made from natural and synthetic polymers are used. Vegetable fibers are composed of cellulose and are obtained from the seeds and stems of a wide variety of plants. Cotton, which is one of the most common vegetable fibers, comes from the hair cells on the tips of the cottonseeds. Other vegetable fibers include linen and other fibers obtained from the bast stems of plants, grasses, reeds, and sedges. Animal fibers, on the other hand, are composed of protein and include hair, wool, kemp, and silk. (For further discussion of proteinaceous fibers see D.7.4.) Some fibers can be spun into thread and yarn, and others can be used with very little processing.

Textiles and basketry are produced in a variety of ways. Both textiles and baskets can be woven. Textiles can also be knitted. Other methods of construction include coiling and binding to make baskets, and twisting and plaiting to make ropes and cordage.

### **D.16.1 Textiles**

Primary causes of textile deterioration include the natural instability of the fibers, mechanical damage, detrimental environmental conditions, and attack by insects or microorganisms. All organic fibers contain some percentage of moisture within their structure. In general animal fibers tend to contain more moisture than plant fibers. Excess moisture, however, can over-

saturate and break down the structure of the fibers, and excessive heat can cause fiber desiccation and embrittlement. However, textiles can be preserved in an archaeological context under very specific environmental and pH conditions.

Mechanical damage may result from handling during production, use, or, in the case of archaeological materials, even after excavation. Damage that resulted from original use may be preserved as a record of the artifact's function and use. Environmental conditions such as light, heat, and pollution can also damage textiles. Exposure to light will cause fading and subsequently weaken the fibers. In subsurface contexts organic fibers are also susceptible to deterioration by the chemical and physical conditions of the soil. Insects and microorganisms may utilize textiles as habitation sites and as a food source. Likewise, textiles are subject to attack by molds and bacteria.

When handling textiles, always wear gloves to protect the artifact from the oils and acids on human skin. Cloth gloves are recommended, but if the textile has frayed surfaces that might snag more easily on cotton gloves, latex or nitrile gloves should be used.

If textiles are found under wet archaeological conditions, do not allow them to dry out. Carefully pack them in rigid inert boxes or sealed polyethylene bags with an internal support. They should be kept as cool as possible, and preferably refrigerated, to prevent the growth of mold and bacteria. If textiles are found under dry conditions, they should be packed dry using rigid acid-free supports or boxes. They 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 and wool. Textiles should generally be stored in the dark at a stable temperature and relative humidity.

**If a textile is folded or crumpled, do not attempt to unfold or flatten** the textile without the assistance or supervision of a professional conservator. For textiles in good condition, light surface cleaning with a soft brush and low-suction vacuum can be carried out to remove loose dirt and debris. Extreme care must be taken not to cause further damage by vacuuming up fibers. **Do not attempt to wash textiles.** Any other cleaning treatments that may be required should only be undertaken if absolutely necessary, and again only under the supervision of a professional conservator. These include both wet and dry cleaning methods that employ solvents, including water. Any treatment used to clean or stabilize a textile 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.

#### D.16.2 Basketry and Cordage

Like textiles, basketry and cordage may be recovered from dry archaeological sites. When they are preserved, these materials are usually desiccated and very fragile, and they require special handling. Basketry and cordage recovered from a dry environment must be packaged and stabilized according to their condition.

Dry basketry or cordage tends to be brittle and highly prone to breakage. Take extra care when handling these materials. Always wear gloves—preferably cotton, latex or nitrile. **When handling whole baskets, never lift them by the rim or any handles.** Place both hands beneath the basket if feasible, or one hand against the side of the basket for support. Basketry and cordage should be packed and stored using rigid supports made of acid-free cardboard, acid-free

paper, and polyethylene foam. Such supports provide both structural reinforcement and a means of handling the material without coming into direct contact with it.

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.

**For cleaning and storage of basketry and cordage see the recommendations for textiles.**

## **D.17 Wood**

Wood is composed of cellulose and lignin. Fibrils of cellulose are bundled together to form cell walls, which form the structure of plants. In trees these cells are elongated along the vertical axis of the trunk, giving the direction of the grain of the wood. There are two different groups of trees, each with its own cell type; hardwood trees and soft wood trees. The density, porosity, hardness, strength and flexibility of the wood differ for each species of tree. These characteristics all affect the level of preservation of wood in an archaeological context.

Preservation of wood and wood artifacts is generally very poor at most archaeological sites. Exceptions include arid cave environments, tombs, or anaerobic conditions such as those found underwater or when submerged in silt. Wood is vulnerable to damage from a host of agents, particularly moisture, light, fire, infestation, and human reuse.

Wood is hygroscopic, shrinking and swelling with variations in relative humidity. These contractions and swelling are not dimensionally uniform. This can result in cracking and distortion of the original shape of the wood. **Dry wood 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). A conservator should be consulted for assistance with these methods or any further treatment.

The most important consideration for the archaeological lab is to maintain a constant level of humidity and temperature. Temperature is critical in so far as it affects relative humidity. 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 detrimental.

Appendix E

**Glossary of Terms**

## Appendix E

### GLOSSARY OF TERMS

<b>Glossary Term</b>	<b>Definition</b>
36 CFR, Part 79	Federal legislation governing the curation, storage, and maintenance of archaeological collections from federal lands.
Accession Number	A unique Identifying Number that is assigned by ASM and used for tracking purposes. It covers all material from and documentation of an archaeological project.
Acid-free paper/folders/tissue	Acid-free materials have a pH of 7.0 or higher. Active acid is eliminated from pulp during manufacture.
Acryloid B-72	A commercially available brand of acrylic resin used as an adhesive (Rohm and Haas Co.).
Archaeological Data Recovery	Archaeological field investigations (usually involving intensive excavations) following an approved research plan that are designed to recover the information from a site for research purposes or to mitigate the potential loss of information due to the impact of development.
Archaeological Mitigation	See Archaeological Data Recovery.
Archaeological Monitoring	Observation of non-archaeological excavations or other activity within a site area or in areas that may contain archaeological resources in order to record and mitigate the immediate impact these activities might have on those resources, and to prevent any unnecessary impacts to the resource.
Archaeological Records Management Agreement	A records management agreement is required to deposit survey records at ASM for work on private or federal lands. Some city ordinances and federal agencies also require submission of survey records and reports to ASM. All other activities (systematic surface collection, monitoring, testing, or data recovery efforts) require a project specific Curation/Repository Agreement.
Archaeological Repository	A museum, archaeological center, laboratory, or storage facility. The facility may be managed by a museum; by educational or scientific institutions; by federal, state or local government agencies; or by an Indian tribe. The management must provide professional, systematic, and accountable curatorial services on a long-term basis (36 CFR Part 79.40), along with appropriate public access to the material.
Archaeological Survey Material	Artifacts collected from the ground surface during pedestrian survey in order to obtain a sample of material (systematic, representative, or diagnostic). At ASM, this material can be organized and stored one of two ways: 1) large-scale systematic collection surveys are boxed by site and stored with the bulk materials because they are packed in larger boxes, and because we anticipate that they may be reviewed more frequently; 2) items recovered during non-collection or limited collection surveys are boxed by site and stored on shelves sequentially by quad.
Archaeological Test Excavations	Archaeological excavations guided by a formal research design that are intended to define and evaluate the presence, nature, and extent of subsurface archaeological remains, and to evaluate these resources in order to determine their eligibility for the National Register of Historic Places (NRHP).

Archives	A department within the Collections Division that curates documentary materials, including paper records (e.g., original field notes and forms, analysis records, maps, correspondence, and project reports) and sound recordings. The term also refers to the documentary materials themselves.
Archival Quality	Describes materials such as inks, papers, and labeling and packaging materials that have been manufactured of inert materials. These items are designed such that they do not harm an object or substantially degrade over time.
Associated Documentation	Any field notes, profiles, plans, maps, project records, and photographic material related to an archaeological project.
Bulk Material	High volume materials such as sherds, lithic debitage, ground stone fragments, manufacturing debris, broken glass, metal fragments, and soil samples. These materials may or may not have been analyzed. Moderate or more intermittent research attention is anticipated, so bulk materials are stored in boxes on shelves. Bags of material are tracked within boxes.
Burial Agreement	An agreement between the landowner, archaeological contractor, and groups or tribes claiming affinity to Remains as outlined in ARS 41-865 (private lands) and ARS 41-844 (state lands). Prepared by ASM, the agreement governs the treatment and disposition of human remains, associated objects, sacred ceremonial objects, and objects of national and tribal patrimony encountered by the contractor during the course of field work and for all Remains discovered on the land thereafter.
Cataloging	The process of assigning and applying a unique identifying number to an object, and completing the written description of an object and its associated information.
Catalog Specimen	An artifact that has particular aesthetic or research value. These items typically require special treatment or receive significant research attention. Specimens are tracked individually and stored in drawers by ASM site number, or, in the case of large items or whole pots, on shelves.
CD-R Disks	"Compact Disc, Recordable." These are blank compact discs onto which data or audio tracks can be recorded and read by any CD drive. The different colors of the disks are related to the color of the dye used to create the recording layer and the color of the reflective coating that is applied over it. At present there is some discussion about the merits of these different dye structures.
CD-RW Disks	"Compact Disk, Rewritable." Similar to CD-R disks, CD-RWs can be overwritten and reused; thus, they are often used for back-up systems. Like the CD-R, the disk is composed of a polycarbonate plastic substrate, a thin reflective metal coating, and a protective outer coating. Unlike CD-Rs, which have a layer of organic polymer dye as the recording medium, the CD-RW has an alloy phase-change recording layer (commonly a mix of silver, indium, antimony, etc.) that will shift its structure when exposed to specific light frequencies. As a result, CD-RWs are not considered archival. Moreover, the specifications vary among different recording systems, so disks recorded on one system may not be readable by another.



Cleaning	The removal of foreign or degraded material from an object's surface. This should be undertaken only as necessary to facilitate analysis and documentation of an object. Some residues may be useful for specialized analyses, so care should be exercised in deciding if the object should be cleaned. A number of material-specific cleaning techniques are available; consult a conservator prior to extensive cleaning of any objects.
Complete Collection	The inclusive set of material remains and associated documentation that were assembled in connection with an archaeological survey or excavation. This includes, but is not limited to, all artifacts, field/analysis notes, electronic data sets, correspondence, maps, and photographs.
Contact Sheets	Photographic prints created by sandwiching the negative against photo paper and then exposing it. The resulting image is an exact print (same size and image) of the negative. An entire roll of 35 mm film may be printed onto one or two pages for documentation purposes.
Contractor	A qualified individual, institution, organization, or corporate entity that is hired to conduct archaeological investigations.
Correspondence	Letters, postcards, memoranda, notes, telecommunications, emails, and any other form of addressed, written communication pertaining to a collection, both sent and received.
Curation	The process of managing and preserving a collection according to professional museum and archival practices (36 CFR Part 79.4.b)
Curation/Repository Agreement	A curation or repository agreement is an agreement with an accredited museum or other recognized public repository to store and protect the artifacts, photographs, and digital or paper records that may result from monitoring on a known site, testing, phased data recovery, or an authorized research survey.
Deed-of-Gift	A legal document transferring ownership of artifacts that were recovered from privately- or corporately-owned land to the Arizona Board of Regents (with the Arizona State Museum as their representative). This document must be signed by the land owner or their authorized representative and submitted prior to (or at the time of) transfer of the material to ASM.
Depositor	The individual or corporate entity that transfers archaeological material to ASM for storage within the collections repository. Generally, this is the archaeological contract company that was hired by the sponsor to conduct the project.
Digital Format: JPEG (*.jpg)	"Joint Photographic Experts Group," the organization that developed this format. One of the most widely used digital formats, JPEG can be accessed by virtually all imaging programs. The JPEG format can compress image data, which results in smaller file sizes; however, the compression procedure is a lossy compression system, which means that image resolution is sacrificed during the process. Each time an image is opened, edited, and saved, a certain amount of resolution is lost.

Digital Format: TIFF (*.tif)	"Tagged Image File Format." Although this widely used format can be accessed by most image programs, it is not typically used for the World Wide Web because of the large file sizes. The compression method employed in storing TIFF files is a system called LZW compression, a lossless compression scheme (i.e., no image data is lost) that does not significantly reduce file size. Thus, TIFF files are often very large. THIS IS THE FORMAT THAT SHOULD BE EMPLOYED FOR ARCHIVING AN IMAGE.
Digital Pixels (dpi)	The term pixel stands for "picture element": tiny squares of color that, in aggregate, form the digital image. Image resolution is often stated in terms of ppi (pixels per inch) or dpi (digital pixels per inch). These measures indicate both the resolution and the type of print or enlargement that can be made from an image. Another measure of image quality is pixel dimensions, the number of pixels wide by the number of pixels high. In both cases, the higher the number, the better the image; however, a greater number of pixels corresponds to a larger file size.
Electronic Inventory	An electronic version of the inventory of all artifact material and environmental samples that are being submitted to ASM for curation. This must be in a format that can be transferred and uploaded into ASM's Collections Information System (CIS). The CIS will be provided with a routine that will integrate datasets submitted in ACCESS format that include the fields summarized and defined in Table 3.7. A version of this database is provided in the CD-R supplied with this manual.
Labeling	Applying identifying or tracking numbers to an artifact. This must be done by approved methods with approved materials. See Table 2.2 and Section 2.4.2.
Limited Surface Collection	Diagnostic materials collected from the surface of a site, or as isolated occurrences, during archaeological survey. These are limited to no more than 20 objects per loci per site. NOTE: Surveys conducted under state permit are NOT limited collection surveys. Any survey that is defined as a limited collection survey MUST obtain a project specific repository agreement if the material is to be deposited at ASM. Survey collections are NOT covered under the terms of the Records Management Agreement.
NAGPRA	The Native American Graves Protection and Repatriation Act of 1990 (NAGPRA—Public Law 101-601; 25 U.S.C 3001 et seq.) provides a process for museums and federal agencies to return certain Native American cultural items—human remains, funerary objects, sacred objects, or objects of cultural patrimony—to lineal descendants and culturally affiliated Indian tribes and Native Hawaiian organizations. NAGPRA includes provisions for intentional and inadvertent discovery of Native American cultural items on federal and tribal lands, and penalties for noncompliance and illegal trafficking.
Oversized maps	All maps and areial photographs that are larger than 11 x 17 inches. This includes any constructed (taped/glued together) maps.
Person-field Day	A person-field day equals each individual person in the field on each day. 10 fpd = 2 people over 5 days or 5 people over 2 days. A person-field day is equal to an 8-hour day, and should be rounded up to the nearest full day figure (i.e., 23.25 fpd must be submitted as 24 fpd).

Photographic Prints	This is the positive paper print created from a negative (B/W or color).
Polyethylene	A chemically stable, highly flexible, transparent or translucent plastic.
Polypropylene	A stiff, heat-resistant, chemically stable plastic.
Project Registration Form	This two page summary of a project MUST be submitted in full with every project submitted to ASM for curation. This document, which is the basis for the accession record, is a statement of the project's effort, location, composition of the collection, and transfer of materials to ASM.
Reconstruction	The rebuilding of a fragmented object using the pieces that were recovered. Although some bracing and infilling may be required in order to create a stable object, this is not undertaken to such a degree as to restore the object to its original appearance.
Restoration	Treatment procedures intended to return objects to a known or assumed state, often through the addition of non-original material.
Rhoplex	A commercially available brand of water-based acrylic emulsion (Rohm and Haas Co.). This adhesive is preferred because it dries clear and is soluble.
Site Number	A unique identifying number assigned to each identified archaeological resource within a state that meets a minimum standard established by that state. For collections at the Arizona State Museum, this number is assigned through the AZSITE system at the site files office of the ASM.
Specimen Released Form	A document tracking the physical disposition on any artifacts or project materials that are not on the premises of the contracting depositor. Typically this form is used to release specimens to the control of an analyst, or to document mortuary items that have been turned over to a Native American tribal representative.
Sponsor	The individual, agency, corporation, or authorized representative of such entities that is responsible for the project's completion, and the hiring of the archaeological contractor. The sponsor has ultimate responsibility for ensuring the completion of the project in a timely manner.
Survey Collection	A set of material that has been collected from the ground surface during examination of an area for the purpose of identifying, locating, and evaluating archaeological and/or paleontological resources. The nature and scope of the collecting should be defined in a research plan. In general, state-permitted surveys do not allow the collection of material except by special permission.
Systematic Surface Collection	A special type of project that involves the collection of artifacts from the surface of a site following a defined strategy. This may involve collecting within a grid system, or point locating and collecting all objects conforming to a set of specified criteria.
Transcript	A word-for-word (or as close as possible) text record in the language of the original document or recording.
Translation	A translation of a recording or text from one language to another. Generally, a translation involves some interpretation of the original text.
Unprovenanced Specimens for Educational Use	Archaeological materials that lack contextual information and, as such, have diminished scientific value. These artifacts are, however, ideal for teaching purposes.

Appendix F

**Arizona State Museum Curation Forms**