Wyoming State Museum

ARTS. PARKS. HISTORY.

Wyoming Department of State Parks & Cultural Resources

Index

I. General Handling and Artifact Tracking Procedures

Any time an artifact is handled the chance of damage increases. The damage may be catastrophic breakage, or only a subtle degradation unnoticed by the handler. But, every bit of damage reduces the longevity of the artifact to some degree. Many collection pieces have components which have reached or exceeded their life expectancies. Many have been improperly treated or stored in the past and are weak or brittle. Very few are as sturdy as they were when new. Therefore, the number of people allowed to handle collections should be limited. These individuals should be thoroughly trained in proper handling methods. And artifacts should be handled only when absolutely necessary. Casual visitors should never be allowed to handle artifacts, and neither guides nor other personnel should do so in their presence. Researchers should be instructed in proper handling techniques, supplied with white cotton or nitrile gloves and supervised while handling collection artifacts.

A. Gloves

White cotton gloves should generally be worn when handling artifacts to avoid leaving stains, finger prints, skin oils and salts. It is especially important to wear gloves when handling any metal artifact or part of an artifact, since salt and other secretions in skin oil cause corrosion. This is much easier to prevent, by wearing gloves, than to remove after it has occurred. The only time gloves should not be worn is when handling very smooth, heavy artifacts where gloves increase the chance of dropping the artifact, or very fragile flaking materials are present which could snag on the fibers of the gloves. In these cases wash your hands just before handling, and as they become soiled. Nitrile gloves can also be worn when white cotton gloves are not appropriate. Nitrile gloves can also be worn for heavily soiled artifacts, flaking or slippery artifacts, or for times when more of a barrier is required between the artifact and the handler.

Gloves should be clean. As soon as they begin to show signs of becoming soiled, exchange them for a clean pair. Depending on the condition of the artifacts being handled, the frequency of replacement could be several times a day. Soiled white cotton gloves should be laundered with a mild laundry detergent (don't use scented laundry detergent or dryer sheets) before they are reused.

Generally wear white cotton gloves when handling:

- paper
- photographs
- paintings
- unglazed ceramics
- horn, antler, bone, ivory jewelry
- furs
- textiles
- wooden artifacts
- guns and edged weapons
- books and albums
- framed artifacts
- painted wood or metal
- stone (unpolished)
- leather
- metal artifacts
- tools

vehicles

Generally wear nitrile gloves when handling:

glass
glazed ceramics
heavy, slick furniture
heavily soiled artifacts
taxidermy specimens

Disposable nitrile gloves should be worn when handling hazardous materials. These may include leaking medicine or chemical containers and/or artifacts that were treated with insecticides. Many older natural history specimens such as mounted animal heads, birds and hides were treated with toxic chemicals as part of their preservation. Disposable nitrile gloves should be worn when handling these.

B. Moving Artifacts

When an artifact is to be examined, first provide a clean, flat, padded work space. Assemble the necessary equipment for examination, such as a magnifying glass, pencils, paper, auxiliary lighting, etc.

Before moving the artifact, plan the route to be taken. Make sure pathways are clear and there will be a place to put the artifact once your destination is reached.

When it is necessary to pick up or move an artifact, examine it carefully first, looking for weakened structural areas, such as tears, cracks, breaks, friable or flaking materials, or old repairs. These areas should be fully supported when handling. Check to see if the artifact has removable components (lids, funnels, drawers, chair seats, etc.) and place these smaller pieces aside in a safe place. Reunite these parts as soon as the move is completed. Never lift an artifact by its handles. Always use both hands to support an artifact. Clean hands, white cotton gloves, or nitrile gloves (see list above) are essential when handling collection material; dirt, acids, oils, and salts from hands can cause corrosion or stains.

To move large items, such as furniture, at least two people are required. For anything larger than a small side chair, use at least two people. If no help is available, wait. Never push a piece of furniture across the floor. Before lifting, make sure that the parts which will be grasped are well attached to the rest of the artifact. Don't bend your back; instead, squat, keeping your back straight and upright. Lift with your legs. When lifting a chair, grasp it by the sides of the seat. Don't wear white cotton gloves when moving very heavy, smoothly finished furniture; they will reduce your grip and may even cause your hands to slip. Instead, be sure your hands are clean before touching the artifact, or use nitrile gloves. A four-wheeled cart is excellent for moving heavy artifacts around inside a building or to a loading dock. Pad furniture with movers' blankets to absorb shocks and avoid abrasion.

Marble table tops can be transported on a cart, but make sure they are well padded. Even the slightest shock may crack them. Support them well and keep them vertical. If they are carried, carry them vertically, like a piece of glass, never horizontally, as their weight can cause them to crack.

Before moving a framed artifact hanging on a wall, inspect its manner of attachment. Also check the frame closely because the joints are often weak. Sometimes the gilded plaster surface decoration of very ornate frames is loose, or poorly attached. If the frame is solid, grasp it firmly at the center of the bottom and along one side. Two people may be required for a large artifact. Lift it upwards until it is free.

When carrying a framed artifact, hold it upright with the design facing toward you, grasping the frame firmly in the center of the bottom and midway up one side. Never carry it by its hanging wire. Avoid touching the front or back of a painting. This causes stress to the paint structure and may lead to cracking or cleavage.

To review and expand upon the above guidelines, the following suggestions are provided:

Handle artifacts only when necessary.
Move artifacts one at a time.
Have your plan well thought out before moving an artifact.
Before moving, make sure there will be a secure padded surface upon which to set the artifact.
Use both hands to support the artifact.
Carry sheet glass, mirrors, marble tops and framed items vertically.
Avoid placing artifacts where they may be easily bumped.
Make sure that artifacts are stable and will not fall over or roll off a table after you set them down.
Always use a stable ladder or step stool and work with a partner when moving artifacts stored in high places.
Avoid stacking artifacts on top of each other. If you must, due to space limitations, use common sense and place lighter, more fragile artifacts on top of heavier, sturdier ones.
Never push an artifact along the floor or table top.
Always have help when moving heavy artifacts. Use a cart if necessary.
When lifting heavy items do the following:
- Bend at the knees.
- Keep back straight.
- Lift with your legs.
- Avoid twisting motions. Instead, pivot on your feet.
- When setting an item down again, keep back straight and bend at the knees, not at the waist.

To lift a chair, grasp it at the sides of the seat.
Never assume that an artifact or any of its parts are in stable condition. Inspect everything before lifting.
Always pick up an artifact by a stable area where you will have a secure grip. Do not lift artifacts by their handles.
Support fragile artifacts from beneath with hands, cardboard, plywood, etc.
When moving a framed artifact, support it from the bottom with one hand, and steady it with the other hand on the side. (Do not lift frames by the hanging wire or decorative appendages.) If the framed artifact is small enough for one person to carry, position the piece so that the art surface is toward, but not against, your body. For large framed artifacts always use two people.

Avoid working on, or placing, artifacts near heating and air conditioning ducts. Also avoid having lights nearby which could scorch surfaces.
Avoid wearing jewelry, it can snag textiles and scratch finished surfaces.
Always work on a padded counter top or table to reduce the chances of breaking artifacts which may be accidentally dropped or knocked over.
Always be alert and pay attention to the work at hand. If excessively tired or on medication, please do not work with artifacts.

Special Precautions

Metal artifacts

Always wear clean cotton or nitrile gloves when handling metals.
Watch for abnormal corrosion (odd-colored material that isn't a "normal rust" or patina.)

Paper artifacts (art, prints, advertisements, newspapers, photographs, etc.)

Never pick up by a corner.
Never bend.
Watch for tears and loose backing boards.
Always support unframed works from underneath with a piece of clean matboard.

Leather

Always support from underneath.
Do not attempt to unfold creases.
Avoid folding or bending.

Textiles

Never pick up by a corner.
Avoid folding more than necessary. Pad folds with acid-free tissue.
Always be aware of the possibility of snagging.
Some hats, gloves, shoes, purses, etc. may require bulking with acid-free tissue paper from inside and underneath to maintain shape during handling, exhibit, and/or storage.
Provide solid support (such as foam core or cardboard) under small textiles when moving.

Glass and ceramics

Always support from underneath. Never pick up by edges or handles.
Watch for hidden breaks or cracks.
Avoid stacking too deep in storage boxes as weight can easily crack these types of artifacts.

Books

Support with both hands when opening.
Never open a book more than 180 degrees (less is better.)

Edged Weapons

Always wear cotton or nitrile gloves when handling metal parts.
Treat all blades as if they were extremely sharp.
Never flex a blade.

Firearms

Always wear cotton or nitrile gloves when handling metal parts.
Do not work mechanisms.
Do not point at anyone.
Be sure firearms and explosives are disarmed. (See section on firearms cleaning.)

C. Transporting Artifacts

The transporting of collections to new locations requires not only great care, but proper paper work. One of our responsibilities is to leave a paper trail so that anyone can locate an artifact. Do not assume you'll always be available. Write it down. (See storing artifacts section for information about recording artifact moves. If artifacts are leaving the museum for a loan, the registrar needs to complete the appropriate paperwork.)

Collections staff should generally be the only staff allowed to move artifacts. However, artifacts being loaned can be retrieved by approved staff from the borrowing institution.

For artifacts to be transported long distances for loans, an appropriate artifact moving company should be hired. As of 2010, Reid Schell, ((307) 349-1633) has been hired by the Wyoming State Museum on many occasions for such moves.

Packing and transporting: Boxes generally provide a safe way of transporting artifacts. It is important to use plenty of padding or packing material. Bubble wrap, styrofoam pellets and even crumpled, unprinted, newsprint make good packing materials (don't use newspapers, the ink rubs off onto artifacts very easily). Padding should prevent any movement of the artifact which could lead to damage, including rubbing, bumping against other artifacts, or vibration, as well as providing protection against impact from sliding, dropping, etc. The size and structure of the box must be appropriate to the contents. For example, heavy artifacts may not be sufficiently protected in a cardboard box which would give ample protection to lighter artifacts.

Also, be aware that artifacts can undergo physical shock if exposed to extreme temperature and humidity variations. When transporting artifacts in winter, always cover them with a few blankets even if only traveling a short distance. Cover each artifact when taking it out of the building and make sure the interior of the vehicle has already been warmed. After unloading, leave the blankets on at least an hour or two, preferably overnight. This allows the artifact to adjust to the new environment without suffering thermal shock.

Care should also be exercised in the summer. Do not load artifacts into a vehicle that has been sitting in hot sunlight for any length of time. It is best to park in the shade or run the vehicle's air conditioner so it reaches an equilibrium with the environment from which the artifact came.

D. Exhibiting Artifacts

The safety and security of the artifacts must be carefully considered when planning an exhibit. No nails, screws, pins, tacks, staples, tape, glue or wax should ever be used directly on any artifact. Mounts must be planned to provide support for fragile artifacts without straining them. Mounts must be made of inert materials and be easily removable, not permanently attached to the artifacts. Generally, plexiglass mounts are made on-site by collections or exhibit staff. These mounts are custom designed to provide the utmost

support for artifacts while on exhibit. Adequate padding must be included to prevent the mount from marking the artifact. A sheet of Mylar D plastic film should be placed under any artifact which rests on furniture, wooden shelving, or any other surface, especially exhibit furniture that has been recently painted.

Framed artifacts must have a window mat or other spacer to maintain an air space between the artifact and the glass. Glass, or plexiglass, should be used whenever possible to protect the surfaces of framed artworks.

Proper light levels, temperature/humidity levels, and protection from pests or visitor handling must be ensured for all artifacts on exhibit. All small artifacts must be secured in locked cases. Large artifacts should be protected behind plexiglass barriers or reader rails.

Never allow food, drink, smoking, or pets (other than guide animals) in exhibit areas. All can be harmful to collections by attracting pests.

Artifacts on exhibit must be separately inventoried by exhibit. (See Registrar's Manual for more information.) A notebook containing current exhibit photos should be maintained and regularly updated for museum security staff by collections staff. This notebook is kept at the front desk.

E. Storing Artifacts

It is just as important to maintain proper conditions in storage spaces as it is in exhibit areas. A storage facility must be secure from theft and vandalism. It should not be accessible to visitors. It should be dark, except when actually occupied. It must be insect-free and inaccessible to insects, rodents, or other pests. If at all possible there should not be any overhead pipes which could leak and damage artifacts, and it must not be subject to flooding. The temperature and relative humidity should be moderate, stable, and controllable.

Artifacts should not be stored directly on the floor, in case of flooding. Shelves, drawers or cabinets should be used for smaller artifacts. Larger artifacts can be placed on pallets or blocks. Any wood which contains or comes into contact with collection artifacts, such as shelving, cases, etc. must be sealed with a two part epoxy, varnish such as Rexthene, or moisture curing polyurethane paint to reduce the release of natural wood acids which damage collection artifacts. There must be sufficient clearance under shelves, pallets and blocks to permit easy and efficient cleaning.

Artifacts should be protected from dust. Furniture (especially upholstered) and other large artifacts should have dust covers of prewashed, unbleached muslin which should be laundered regularly. Smaller artifacts can be stored in well sealed cabinets or in acid-free boxes. In either case they must not be crowded. Packing too many artifacts into too small a space increases the chances of bumping, knocking, rubbing and other damage when artifacts are being removed from or returned to storage. Dust covers of acid-free tissue may be made for small artifacts. Polyethylene bags can be used as well, provided they are either not completely sealed or have holes punched in them, to avoid the danger of condensation. Very small artifacts can be housed in individual clear, hard plastic (polystyrene) boxes. Using these, the artifacts can be viewed without being handled, and a number may be packed into a drawer, shelf or larger box without crushing.

Fragile artifacts may need acid-free tissue or ethafoam padding or specially made mounts of acid-free matboard, plexiglas, unbleached cotton fabric, or other inert materials to support parts which cannot support themselves. These mounts must be easily removable and should never be permanently attached. As in exhibiting, never use nails, screws, pins, tacks, staples, tape glue or wax directly on collection artifacts.

Labeling shelves and keeping inventory lists reduces the amount of handling needed to find an artifact. Each artifact must be listed on an inventory sheet for boxes, drawers, shelves, etc. If several boxes are on a shelf, or drawers are in a cabinet, etc., each drawer or box should be separately inventoried. These inventories should be printed in a standard format with the photo from PastPerfect. They can also be hand-written on a standard inventory form (see Inventory Form in appendix). Then all inventories for the shelf or cabinet should be clipped together and placed on the shelf or in an envelope inside the cabinet door. Besides having the original inventories with the artifacts, a copy should be made for a notebook to be stored off-site at the Barrett Building. The artifact location should also be added to the proper location fields in PastPerfect.

A guide to storage locations should also be compiled in notebooks at the Unicover warehouse and the Barrett Building. It should be organized by artifact categories (e.g. *Building Structures/Building Fragments*, etc.) and list boxes/locations where those types of artifacts are stored (see Guide to Storage Locations in appendix).

Moving Artifacts from Storage

If artifacts are removed from storage for research, loan, or exhibit, the move must be recorded. A notebook is located in each storage room at Unicover and the Barrett Building. Note accession number, artifact name, storage location, new location, and reason for move (see Temporary Inventory Form in appendix). The temporary location should also be recorded in PastPerfect. When artifacts are returned to their home location, their return must be noted on the Temporary Inventory Form and in PastPerfect.

Storage Access

Staff/volunteer procedure: A logbook is kept in each WSM storage area to record entry (see Collections Storage Entry Log in appendix). Non-collections staff and volunteers must sign in and note the time, date, and purpose of entry each time a storage area is entered. Entry of the first collections staff member each day is recorded by A&I when the space is disarmed.

Visitor procedure: At times it is necessary that non-staff enter collections storage for security inspections, repairs, etc. As with other entries, they must sign in and note the date, time of entry, and purpose of entry. Non-staff must be accompanied by an appropriate staff member at all times. Tours or visits are only approved for a specific reason. The supervisor of collections or museum manager should approve this type of tour.

F. Photographing Artifacts

Care must be taken while photographing artifacts to see that no harm is done. The heat produced by photographic lights can damage artifacts. Lights should be evenly spaced and far enough away from the artifact so that there is minimum heat. Lights with photographic umbrellas attached aid in reflecting heat away from the artifact being photographed. Artifacts can undergo thermal shock if they are brought directly from cool storage areas to a hot photographic set-up. Heat can cause drying and shrinking of organic materials, discoloration, and even scorching.

A permanent photography area should be established in the Barrett Building and Unicover warehouse. All artifacts to be photographed should be brought to these areas, if possible. If a table or easel is required, see that it is secure enough to hold the artifacts to be photographed. Flat artifacts should be photographed on an easel or table, on a copy stand, or hanging on the wall, if they are framed and have appropriate hanging hardware. Small three-dimensional artifacts can be photographed on a table. Mannequins can be used to photograph clothing, or it can be hung on a hook by its padded hanger. Larger pieces, especially furniture, can be photographed where they stand. All photographs are taken with a digital camera and images are added to the appropriate section of PastPerfect. (See Registrar's Manual for further information.)

II. Environment and Its Effects on Artifacts

No artifact is immune to the effects of the environment around it, and even the best conservation treatment cannot completely reverse damage caused by poor environmental conditions. It is much too expensive and time consuming to try to individually treat every artifact in the collections of the Wyoming State Museum, and it makes no sense to treat any artifact which will simply be returned to a damaging environment.

It is therefore of primary importance that we do all that we can to provide safe surroundings for all artifacts; on exhibit, in storage, and in transit. Of all environmental factors, relative humidity, temperature, and light have the potential to cause the most damage.

A. Relative Humidity

Relative Humidity or RH, which is expressed as a percentage, is the amount of moisture actually in the air compared to the maximum amount of moisture the air could hold at that temperature. The warmer the air is, the more moisture it can hold. As air cools, its ability to retain moisture declines and as a result, water vapor condenses on cooler surfaces, such as glass or metal.

High humidity will cause many materials, such as wood, paper, textiles, leather, rawhide, bone, horn and hides, to absorb moisture from the air and swell, which in turn leads to warping, cracking, splitting, and delamination. It also encourages mold growth, metal corrosion, and the migration of soluble salts in stone and ceramics. When the humidity decreases, materials release moisture, resulting in shrinking, cracking, delamination, embrittlement, and desiccation.

Some materials, especially metals, are more stable at very low RH, while most others, such as wood, paper, photographs, textiles, and ethnographic material should be housed at a more moderate relative humidity.

B. Temperature

The chief importance of temperature lies in its effect on relative humidity. In addition, high temperatures accelerate the chemical reactions responsible for the deterioration of artifacts, causing drying, color changes, and aging. Some materials soften and lose their shape if they get too hot. Very low temperatures can cause damage through the formation of ice crystals within an artifact when it freezes, which may in turn cause swelling, shrinking, or cracking.

An environment which is acceptable to most materials is around 40 percent RH (plus or minus 5%) and 68 degrees Fahrenheit (plus or minus 5 degrees).

More important than the exact temperature or RH is the stability of these conditions. Stability is important because rapid fluctuations, even within these parameters, can cause expansion and contraction of artifacts which can result in damage. Reducing daily fluctuations to a minimum, and slowing and moderating seasonal changes, will help control one of the least obvious, but most damaging problems for all museum artifacts.

C. Temperature and Humidity Readings Schedule

Temperature and humidity readings (via HOBO Data Loggers) will be taken by the appointed collections curator in all storage and exhibit areas of the Wyoming State Museum according to the following schedule.

Barrett Building Third Floor Storage	Four Week Intervals
Barrett Building Museum Galleries	Four Week Intervals
Unicover Building Storage	Two Week Intervals
Retention	Paper Copies – 10 years Computerized Copies - Indefinitely
Readings Provided To	Collections Section Supervisor – paper Appointed Collections Curator – paper and digital

The HOBO Date Logger download procedure is as follows:

Barrett Building data loggers are downloaded once a month
Unicover data loggers are downloaded every two weeks.
Data loggers are attached to the handheld HOBO shuttle device and the files in the readers are downloaded to the shuttle. The shuttle will hold around 150 files before it is full.

The shuttle is then attached to the computer and the reader files are downloaded onto the computer. All files are saved in the following ways.

1. All information is saved on the “museumshare” drive under the “HOBO Files” folder.
2. In the “HOBO Files” folder each year has its own subfolder for information. For example, everything dealing with the readers in 2011 is stored in the folder “2011.”

3. Raw data files are downloaded from the Shuttle into the subfolder for the current year.
    a. The Shuttle automatically saves the file with the day and time of the download. (Time is erased just to make the file easier to read). For Unicover, the file name should look like "ShuttleReadout02_23_11."
    b. The only difference with the Barrett Building files is that "BB" is placed in front of each file name so it looks like "BBShuttleReadout02_23_11"
4. Each file is then edited adding graph labels giving the *room the logger is in* and the *location in the room*. Each one of these edited graphs is saved as a "project" and is saved with the name of the logger and the date downloaded. Example: "Logger_B_2_23_11" or "GREEN_ROOM_1_12_11."
5. All of the labeled graphs for Unicover are put into a Word document. This Word document is saved with the dates that the graphs cover. Example: "HOBO Unicover 1_26_11-2_9_11" (Barrett Building graphs are not put into a Word document).
6. Each graph is printed and kept in a notebook by the curator for at least ten years. A paper copy is also provided to the Supervisor of Collection.

D. Temperature and Relative Humidity Problems

The following chart indicates some of the effects of RH and temperature on various materials.

Material	**Problem - Low RH**	**Problem - High RH**	**Problem - Temperature Extremes**
Paper	embrittlement, adhesive failure	mold, distortion, reaction w/grime	can discolor and weaken
Photos	adhesive failure, embrittlement, curling	mold, fiber swelling	can discolor and weaken
Textiles	embrittlement	fiber swelling mold reaction w/grime	can discolor and weaken
Wood	shrinking; loosening of joints, veneers, moldings; hardware checking, splitting	finish bloom, swelling, adhesive softening, veneer lifting, mold growth	
Leather	embrittlement, color changes	mold growth, swelling	weakens structure

Paintings	embrittlement discoloration checking, splitting delamination (separ- ation of layers)	canvas sagging, swelling, mold, cracking,cleavage, bloom	high temp. weakens
Metals		corrosion	

Material	**Problem - Alternating High and Low RH**	**Problem - Temperature Extremes**
Ceramics	salt efflorescence (eruption), spalling (scaling)	cracking from rapid fluctuations
Stone	salt efflorescence, spalling	cracking from rapid fluctuations
Glass	crizzling (fine cracks), weeping (droplets accumulating on surface)	cracking from rapid fluctuations
Wood	splitting, warping	Drying
Leather	splitting,	
Paintings	delamination, cracking, splitting	

E. Light

Light is a form of radiant energy. It causes chemical reactions which degrade artifacts. All types of light cause damage, but ultraviolet (UV) light, present in very high amounts in sunlight and some fluorescent lighting, is especially harmful to many materials. Light causes bleaching or discoloration of surfaces, fading of wood as well as dyes on paper, textiles, feathers and many other artifacts. It also causes embrittlement and weakening of many materials. Damage caused by light is irreversible; it can't be reversed or "healed." Light damage is also cumulative; the total light damage is the product of the light intensity multiplied by the time of exposure. High light levels for a short period degrade materials as much as low levels over a long period. Light damage can be compounded by high humidity and/or air pollutants, including dust.

Sunlight, whether direct or indirect, is very high in UV and very damaging to many artifacts. It should be eliminated if at all possible.

Fluorescent light: Many standard fluorescent tubes are high in UV radiation and have a bluish or cool color. There are sleeves available which can be slipped over regular fluorescent tubes to filter out UV. These sleeves should be replaced every three or four years or as recommended by the

manufacturer. Compact fluorescent bulbs should generally not be used because UV filters are not available for them.

Incandescent light: This type of light source (the common light bulb) produces relatively little UV, but can generate excessive heat, so care must be exercised to avoid placement too close to artifacts. Lower wattages produce less heat. Incandescent light will usually have a color distortion towards warm tones.

No matter what type of light is used, the exposure time and intensity should be limited to prolong the life of your artifacts. **Maximum suggested limits are:**

For furniture (not upholstered), paintings and other painted surfaces, wooden tools, and most other materials: 150 lux (=15 foot candles)

For colored textiles, watercolors, color photographs and paper artifacts, dyed feather or quill work and any other dyed artifact: 50 lux (=5 foot candles)

Unpainted stone, metals and ceramics are not effected by light.

Fiber Optic light: Fiber optic light removes most infrared and ultraviolet light and should be installed in exhibit cases whenever possible.

Lowering light levels sometimes leads to complaints about poor visibility. This is often due not to the lighting of the displays and artifacts but to the contrast between the low light levels in the exhibits and excessively bright lighting near windows and doors and elsewhere in the galleries. This can usually be corrected by lowering the overall illumination, eliminating bright spots and arranging the entrance to allow time for visitors' eyes to adjust to the lower, and safer, light levels. A sign explaining the need for lower light levels to preserve the collections can also help foster public understanding.

F. Pests

Pests can cause enormous damage to many different types of museum artifacts.

Insects can be responsible for the destruction of all sorts of organic materials. Wood-destroying beetles attack furniture, wooden artifacts, structural timbers, woodwork and floor boards. Infestation may occur at any stage, from the live tree to a finished artifact. Dark-colored exit holes show that insects were present, but do not necessarily indicate recent activity. Light-colored holes and frass (sawdust-like powder) indicate recent or ongoing activity. To identify fresh insect activity in furniture and other wooden artifacts, place the artifact on a clean piece of dark paper. If within a few days fresh deposits of frass appear on the paper, the artifact is invested. Isolate any infested artifact, sealing it in a plastic bag if possible. Use plastic sheets and duct tape for enclosing larger artifacts. If not checked at an early stage, an infested artifact can fall apart and the insects can move on to other artifacts in the collection.

Termites nest underground; wood-to-ground contact usually must exist for infestation to occur. Termites consume wood along the grain. They hollow out the wooden structure, leaving behind mud and frass beneath a thin surface layer of wood.

C**arpet beetles (dermestids)** and **clothes moths:** The main enemies of textile fibers are carpet beetles and clothes moths. In the larval stage, carpet beetles will feed on anything containing or made of protein (silk, wool, feathers, quills, hair, fur, horsehair, horn, rawhide and leather). They also feed on the carcasses of insects and other animals. The adult beetles feed on pollen, and therefore their most common means of introduction into houses and museums is on flowers. The larvae emerge from small tubular cases which are covered with short bristles and split up one side. Clothes moths consume wool and other proteinaceous materials and are active only in darkness. As with the carpet beetle, the larvae do most of the damage. They leave small silken cocoons which can often be found in infested material.

Silverfish are the major threat to paper and photographic material. They are attracted by conditions of poor housekeeping such as "dirt" and by “food” containing starch and cellulose. They also thrive around moisture and mold. Silverfish will consume the surface of a photograph, including the emulsion. They also eat completely through paper, but may avoid inked areas.

Cockroaches will also damage paper artifacts kept in dirty conditions that attract this type of insect.

Insect excrement is acidic and will damage inorganic material. **Flying insects and spiders** are the primary perpetrators. These "fly specks" are commonly seen as small black, brown or white spots on walls, shelves, paintings, and other artifacts.

Insect infestations can be very difficult to eliminate. Most insecticides and fumigants are hazardous to people, collection artifacts, or both, and are not recommended for use in museums. Prevention **is** therefore especially important.

Collections must be monitored for signs of the presence of insects. Glue board or sticky insect traps (fold up cardboard tubes with a very sticky coating on the floor of the inside) should be set in inconspicuous places against walls, cases, or cabinets in exhibit and storage areas and checked regularly to see if any harmful insects are being trapped. Traps will not eliminate an infestation but can alert you to a problem. Check windowsills and floor sweepings regularly for dead insects.

In addition to frequent inspection, a program of scrupulous cleaning is necessary. The use of screens and closed doors is encouraged. Stored wood, grain, and food items will attract a variety of insects and are prohibited in museum storage and exhibit areas. If necessary for interpretation, use plastic foods in exhibits. Clutter, dust, and dirt should not be allowed to accumulate, and storage areas should be kept clean at all times. Eating and drinking should be prohibited in rooms containing collections. Staff members should eat only in a designated staff room, located as far from collections as possible. All garbage receptacles containing food scraps or residues should be emptied and removed from the building daily. All materials entering the building should be checked for insects and rodents. This includes new items for the collection, items being returned after a loan, and all equipment, supplies, and packing materials.

If an insect infestation is detected:

1. Isolate the infested artifact from other artifacts. If possible, seal the suspected artifact in a plastic bag.
2. If possible, place the bagged artifact(s) in one of the two available chest freezers. Record the date of freezing on the freezer log (see Freezer Log in appendix). Items generally need to be frozen and thawed twice to kill any infestation. Each freeze/thaw cycle should last two weeks. After this the artifact should be unbagged, carefully examined, and cleaned of any insect residue.
3. Check other nearby pieces for signs of infestation. Look for damage, droppings, frass, shed skins or cocoons, live insects or eggs. If any other infested artifacts are located, bag and freeze them as well.
4. If you find any of the insects, cocoons or shed skins, place them in a jar or film canister, write on the container exactly where and when they were found. Identifying them will help determine the next course of action. Assistance in identification can be sought from the Entomology Department at the University of Wyoming. Dr. Scott Shaw ((307) 766-5338) is the current curator of the University of Wyoming Entomology Museum.

Other Creatures

Rodents are very destructive; their gnawing and tearing can cause considerable damage in a very short time. The corrosive nature of their excrement compounds the problem. Most may be kept out by plugging up holes and adding screens. Mouse and rat traps can help eliminate any which do get inside. Do not use poison because it often does not kill them until after they have reached the shelter of their holes. Decomposing rodents not only stink, they also provide food for carpet beetles and clothes moths. The droppings or carcasses of birds and bats occasionally cause problems, but these can usually be eliminated by screening the entrances they use.

G. Integrated Pest Management Monitoring Schedule

Insect and rodent traps will be placed and monitored by the appointed collections curator in all storage, work, and exhibit areas of the Wyoming State Museum according to the following schedule. Each trap is systematically examined; insects found noted on a chart, and the trap replaced if necessary. (see Integrated Pest Management Chart in appendix).

Barrett Building Third Floor Storage	8 weeks
Barrett Building Museum Galleries	8 weeks
Barrett Building Offices, Work Areas, and Store	8 weeks
Unicover Building Storage	8 weeks
Retention	Results are kept by the appointed collections curator in paper and digital format. Digital files are also placed on the museum shared drive for access by collections staff. Problems noticed are brought to the attention of the Supervisor of Collections.

H. Mold and Mildew

Mold and mildew are caused by cellulose-digesting fungi. They feed on the cellulose found in plant fibers such as cotton, linen and paper, and on wood, breaking it down, weakening it, and often causing staining. Although not common, micro-organisms have been known to attack wool also.

The spores of these fungi are almost always present and are only waiting for a dark, warm, moist, stagnant environment in which to develop and thrive. Of these environmental factors, high humidity is the most important.

To prevent mildew damage, keep the relative humidity below 55%. Dehumidifiers and heaters can be used to reduce the humidity in closed spaces. Whenever this is not possible, use fans to keep the air circulating. Do not store artifacts in chronically damp places. Always wear rubber gloves and a respirator when handling moldy material to avoid allergic reactions. If mold is suspected, the Occupational Safety and Health Administration (OSHA) can be contacted to conduct testing at (307) 777-7786.

I. Air Pollution and Airborne Particulates

Air pollutants are harmful factors not normally considered when one thinks of the Wyoming environment. However, air pollutants are present even in relatively small cities, towns, and rural areas. When airborne pollutants such as dust, carbon dioxide, sulfur dioxide, hydrogen sulfide, nitrous oxide, smoke and soot, acids, alkalies and salts come in contact with an artifact, chemical reactions take place. In the presence of humidity, oxygen and light, numerous damaging compounds form. These airborne pollutants will darken pigments, discolor surfaces, accelerate tarnish and corrosion of metals, degrade paint and other finishes and make paper and textiles brittle. These substances can be carried by air currents to every portion of a storage or exhibition area.

Paper, textiles and other materials will act like sponges and absorb airborne materials with which they come in contact. For this reason, insecticides, paints, solvents, lacquers, polishes, air fresheners, and any other materials in aerosol cans should be kept away from artifacts.

Dust and surface dirt are composed of fine particles that are difficult to observe without a microscope. They are deposited wherever air currents pass; through galleries, through storage drawers, between frames and the artifacts in them. Dust not only obscures surfaces upon which it settles, but also causes damage. It is abrasive, acidic and hygroscopic; so it scratches, corrodes and holds humidity, which in turn speeds corrosion and encourages mold growth. If airborne deposits are greasy, such as from cooking, they will attract insects, rodents, and mold.

It is virtually impossible to eliminate all airborne particulates and pollution from the environment, but clean exhibition and storage areas and proper storage containers are the best protection against contamination by airborne pollutants.

Artifacts should be placed in cabinets or boxes whenever possible. If they are placed on open shelving instead, they should be wrapped with muslin, acid-free tissue paper, or ethafoam. Furniture or other large artifacts, especially those made of fabric or leather, should have muslin dust covers to protect against dust and particulates.

Keep all collections areas as clean as possible. Sweep, dust, and vacuum thoroughly and frequently. Vacuums used by custodial or collections staff should be equipped with HEPA filters. Storage areas not cleaned by custodial staff should be cleaned at least once a year by collections staff. Keep windows and doors closed and screened. Use filtered ventilation systems if at all possible. Clean or change ventilation system filters frequently.

Inspection

Careful periodic inspection is an essential part of caring for any collection. If the guidelines relating to environment, handling, exhibition, storage and cleaning are followed, then periodic inspection is all that remains to insure proper maintenance.

At least once a week it is necessary to do a "walk-through" to check the storage and exhibit areas. Problems to look for are: water leakage from pipes or ceilings; condensation on walls, windows, pipes, artifacts or other surfaces; mildew; insect and pest damage, infestation and nests; dust and dirt; excessively high light levels; changes in the condition (shape, color, finish or surface details) of the artifacts in the collection. If anything out of the ordinary is discovered, the proper supervisors should be notified and the appropriate steps taken to remedy the problem.

III. Care and Cleaning of Artifacts

In this section specific instructions are given for the care and cleaning of various types of materials most commonly found in collections. Any extensive cleaning or repairs should be referred to a trained conservator. However, minor cleaning and maintenance may be undertaken by collections staff.

A. Metal

When examining or maintaining metal artifacts, all work surfaces and storage boxes should be well padded to avoid dents, scratches and abrasions. Always wear clean cotton or nitrile gloves when handling any metal artifact. Keep metal artifacts clean (see following section on cleaning metals). Dirt, dust, and grime scratch metal and induce corrosion. Do not use adhesive tape or other adhesives to secure the lids of metal pieces. They leave a residue that is damaging. Never attempt to remove dents.

Cleaning removes dust, grime, grease and other foreign material. It does not polish. The following steps are safe for many metal artifacts, except where noted.

To remove dust: Use a soft dry paint brush. Be careful not to scratch the artifact with the metal ferrule of the brush. The best type of brush is natural sable.

To remove grime, grease, etc.: Never use water to clean any metal artifact or part. Ethyl alcohol on a clean cloth or cotton swab will safely remove most types of grimy accumulations from metal artifacts.

Do not clean polychromed (painted), inlaid, or coated (lacquered) metal artifacts with alcohol; it may damage these coatings.

Lubrication: To lubricate moving parts such as hinges, apply a small amount of paste wax to the area of friction. A small amount of mineral spirits can be added to help carry the wax into a tight fitting or

frozen mechanism. Wipe off excess.

Polishing: Every time a metal artifact is polished, a small amount of the metal is removed. For this reason polishing is not recommended and regular polishing is strongly discouraged. Brass, bronze, copper and pewter should never be polished because this prevents the formation of a protective patina.

Never polish any of the following:

Iron (blued or otherwise)
Ormolu (gilded bronze)
Gold
Lead
Zinc
Hardware on furniture
Painted or patinated metal
Niello (black metallic alloy of sulfur, copper, silver, and lead used as an inlay on engraved metal
Plated artifacts
Composite artifacts (made from metal and another material, such as a metal box inlaid with ivory)

Do not attempt to remove heavy rust from iron artifacts, either mechanically or with commercial rust removers. This job should be referred to a conservator.

Do not use dip cleaners or copper brighteners. Some are acidic or contain chlorides, which cause a serious corrosion, nicknamed "bronze disease." For the same reason, do not use the traditional home recipes of vinegar (an acid) and salt (sodium chloride). Never use buffing wheels or steel wool.

B. Ceramics

Most damage to ceramics is caused by human error, usually occurring when the artifact is handled for cleaning or movement.

Inspect the artifact for repairs or weak points before picking it up. Never pick up a ceramic artifact by its handle, spout, neck, or other appendage. Always support it from underneath with both hands and wear clean white cotton gloves for unglazed ceramics. Do not wear gloves, or wear nitrile gloves, when handling glazed ceramics, as the slippery surface could cause you to lose your grip. Always make certain your path is clear and you have a clear padded surface to set the artifact on before moving it.

Handling for inspection of an artifact to verify its marking, signature or hallmark, generally located on its bottom, can often by eliminated by placing a photocopied image in the accession file and a digital photograph of the marking in the artifact's PastPerfect record.

Many additional problems can be encountered with Native American and other ethnographic pottery, including flaking decoration. In the case of excavated pieces it is recommended that a conservator be consulted before any extensive cleaning is done, especially if the surface is powdery or flaking. Never wet unglazed surfaces, repairs, cracks, or broken edges.

Cleaning: Ceramic artifacts should be periodically dusted with a soft dry brush. Dust is absorbent and will hold moisture on the ceramic surface. Grime creates a good environment for mold, which secretes enzymes that stain, discolor, or damage glazed and unglazed surfaces.

Washing should not be a part of routine cleaning. It should only be done in the case of extremely dirty glazed artifacts. Do not wash ceramic artifacts which have repairs; the adhesive may be water soluble and could fall apart in water.

Before beginning to wash a glazed artifact, cover the bottom of a sink or a tub with a thick, clean towel; or use a plastic tub as a wash basin. Pad a nearby table with a thick clean towel to receive the washed artifacts. Use only warm water, not hot, which can crack the glaze. Do not add detergent, soap or any other cleaning agent to the water; and never use an abrasive powder, abrasive pad, or metal cleaning device.

Do not wash more than one artifact at a time. Soak each piece for two to three minutes or less. When the piece is clean, rinse it thoroughly under warm tap water. A lint-free cotton cloth is best for drying. Occasionally stains or dirt accumulate in crazed glaze, causing a brown discoloration. If the stain cannot be removed by routine washing, do not use detergents or bleaches. Harsh solutions may cause further pitting or crazing. Stains such as these should be brought to the attention of a conservator.

If any metal is attached to the piece, or it is gilded, do not attempt to wash or polish the metal components.

Breakage: In the event of breakage of ceramics or glass, the first reaction people usually have is to pick up the pieces and try to fit them together, as if it were a jigsaw puzzle. This is the worst thing to do because fragile areas around a clean break can be abraded, making it impossible for subsequent repairs to be invisible. Instead, protect the broken pieces by carefully wrapping them individually to prevent further chipping of their edges. Store all the pieces together in one box. Save all fragments, no matter how small. If possible, do not touch the edges of freshly broken pieces because skin oils and salts interfere with adhesives used in repair.

C. Glass

As with ceramics, glass artifacts suffer most often as a result of human error during handling, storage, and cleaning. Eliminate all unnecessary handling, including routine washing. Remember, if the artifact isn't handled, the most common cause of damage is eliminated. Glass artifacts should be stored in cabinets or boxes to reduce dust accumulation. Each artifact should be well padded and a small number should be placed in each box to prevent breakage.

Wash glass on exhibit only when necessary. Dust as necessary to remove dulling film. Surface deterioration in the form of clouding or opalescence suggests a change in the stability of the artifact. Prolonged wetting, changes in relative humidity and sudden temperature changes can adversely affect glass.

Cleaning: Never wet any archaeological glass or glass which is flaking. Never attempt to clean a glass artifact which is in need of repair or has old repairs. Old glue joints may break, causing additional damage. These items should be cleaned by a conservator. If any metal is attached to the piece, or if it is gilded, do not attempt cleaning.

Before beginning to clean a glass artifact, cover the bottom of a sink or a tub with a thick, clean, towel; or use a plastic tub as a wash basin. Pad a nearby counter with a thick, clean, towel to receive the washed artifacts. Use only warm water, not hot. A little ammonia or dish washing liquid can be added (wear protective gloves when using ammonia). Never use an abrasive powder, abrasive pad, or metal cleaning device.

Soak each piece a short time and do not wash more than one artifact at a time. When the piece is clean, rinse it thoroughly under warm tap water. A lint-free cotton cloth is best for drying.

Breakage: In the event of breakage of ceramics or glass, the first reaction people usually have is to pick up the pieces and try to fit them together, as if it were a jigsaw puzzle. This is the worst thing to do because fragile areas around a clean break can be abraded, making it impossible for subsequent repairs to be invisible. Instead, protect the broken pieces by carefully wrapping them individually to prevent further chipping of their edges. Store all the pieces together in one box. Save all fragments, no matter how small. If possible, do not touch the edges of freshly broken pieces because skin oils and salts interfere with adhesives used in repair.

D. Stone

Different kinds of stone have been used for sculpture, monuments, and tools since earliest times. Extremely hard materials such as basalt and granite wear well but are difficult to carve. These very hard stones are also relatively difficult to disfigure. Softer marbles, alabasters, sandstones and limestones are popular, but tend to absorb grime and are easily scarred by abrasion. Always wear gloves when handling stone unless a firm grip is necessary.

Cleaning: Keep large stone artifacts free of dust by periodic cleaning with a vacuum and a brush attachment. Never use cloths. The rubbing action can push dirt into the pores, creating a shiny and discolored surface. Surfaces should always be brushed from top to bottom. No other cleaning or stain removal should be attempted because of the possibility of further staining.

E. Bone, Ivory, Tooth, Antler, and Horn

Fluctuating relative humidity is the most frequent cause of deterioration of these artifacts. They are all hygroscopic, which means that they expand and contract by taking in or giving off moisture in response to changes in the humidity of the air around them. This flexing can result in cracks, splits, and warping. When these materials are used as inlay in conjunction with wood veneers, this flexing can cause the inlays to separate from the base to which they are attached.

Highly desirable patinas formed over many years can be destroyed in a short period of time by sunlight or unfiltered fluorescent lighting or by inappropriate cleaning.

Cleaning: When cleaning, wear clean white cotton gloves. Acid and oil from the hands can easily discolor these materials. To clean, use a soft dry brush or, if necessary, wipe with a cloth slightly dampened (never wet) with water and immediately wipe dry with a soft dry cloth.

F. Leather

Try to keep humidity around 40%. Extremely low humidity causes shrinkage, embrittlement, and cracking; high humidity encourages mold growth. Keep leather artifacts in an environment where there is circulating air. Damp, still air will rapidly encourage mold growth on leather.

Leather items should never be stored or exhibited in direct sunlight, unfiltered fluorescent, or strong incandescent light. Such exposure causes long-term deterioration and fading. Examine leather artifacts for splitting, tearing, creasing and surface cracking. If an artifact has leather buttons, thongs, ties or straps, handle with extreme care since they are easily broken or torn.

Flexible hollow leather artifacts such as gloves, shoes, and hats should be stuffed and padded with acid-free tissue to prevent unintended folds or crumpling. Never fold leather. Creases become set within a relatively short time and are often impossible to remove. Do not attempt to unfold pieces stiffened and creased from neglect and improper storage.

Never attach adhesive labels or tape to leather. Tapes can produce stains that are impossible to remove. Leather maintenance depends on a knowledge of the different types of leather and their specific problems. The wrong remedies can cause irreparable damage.

Cleaning: Most leather artifacts are over-saturated with oils, waxes, greases, dressings, and other commercial formulations from years or decades of dedicated, but misguided, care. The last thing they need is more dressings. It is natural and unavoidable for leather artifacts to become less flexible as they age, and in most cases, collection artifacts no longer need to be flexible. Therefore, do not apply saddle soap, waxes, greases, oils or other leather treatments to collection artifacts. Any apparent benefit from these products is at best temporary, and most cause undesirable changes in the leather as well as accelerating its deterioration.

Leather artifacts should never be cleaned with water. Instead, use a soft, dry brush or cloth, or a vacuum. Gloss may often be restored by light buffing with a soft, dry, white flannel cloth. Verdigris on metal studs on leather saddles can be removed with a dry cotton swab. Any more extensive treatment should be referred to a conservator.

G. Firearms

For care and cleaning of firearm exterior surfaces, please refer to both the wooden and metal artifact headings in this section. Do not attempt to reblue the metal parts of firearms.

Make sure your firearms and other explosive collection pieces have been checked for safety. TREAT ALL WEAPONS AS LOADED UNTIL YOU HAVE PROVEN OTHERWISE. To determine if a firearm is loaded, call your local police department or follow these procedures:

For breech loading weapons, you will need to open the door to the breech in order to check the chamber at the back of the barrel for any cartridges. The procedure for this will vary from firearm to firearm. Check firearms websites for the specific way to open the breech on the weapon you are checking. Place the weapon on a padded table, ensuring that the barrel is pointed in a safe direction in case of an accidental discharge, and make sure the weapon is not cocked. Follow the procedure for opening the breech. If a cartridge is discovered in the chamber, remove it with your fingers. If it appears stuck, do

not use a screwdriver or other tool to pry it out. Contact your local police department for assistance.

To check a muzzleloader firearm, you will need a wooden dowel smaller in diameter than the firearm's caliber and longer than its barrel. Select a safe, dedicated work area. Place the firearm on a padded table. Point the muzzle so nothing will be harmed if it accidentally fires. Be sure the firearm is not cocked. Standing to the side of the firearm, gently push the dowel into the muzzle until it stops. Hold the dowel between the thumb and forefinger so that the dowel will be propelled between the fingers should the firearm discharge. Do not hold the dowel in such a way that it can be propelled into your hand. Place a pencil mark on the dowel where it just clears the muzzle of the barrel. Gently withdraw the dowel from the barrel. Place the dowel on top of the barrel with the pencil mark aligned with the end of the muzzle. If the other end of the dowel extends the full length of the barrel, the weapon is not loaded. However, if the measurement indicates that the dowel stopped forward of the touch-hole (small hole in the barrel near the hammer of the firearm), consider the firearm to be loaded with a live round. Label the firearm as unsafe and arrange to store it in a secure space. Contact your local police department for assistance.

H. Furniture and Other Wooden Objects

Furniture was designed to be functional. It was used in a household and subjected to wear and abuse. Therefore, on a collection piece, dents, scratches, burns and stains are part of the artifact's history and should be preserved. By placing an artifact in our collections, we are arresting its destruction, therefore, today's abuses are not part of that history. As an historic artifact, it should be removed from daily functional use and protected from staff and visitor handling.

General Housekeeping: Poor housekeeping encourages damage from dust, pollution, rodents, and insects. Periodic vacuuming and dusting are essential. The importance of routine dusting cannot be overemphasized. A soft cloth or a magnetic cloth (such as a Dust Bunny available from Gaylord) makes an excellent dusting cloth. When it begins to darken with soil, switch to a clean one and wash the dirty one. Be careful not to snag loose parts when dusting veneered or inlaid surfaces.

Collect any furniture fragments that brush off and place them in labeled envelopes or zip lock-type bags and attach with twill tape to the piece of furniture. Note the damage on a damage report form and in PastPerfect.

While sweeping, be careful not to brush furniture with the broom bristles. Do not wet mop near furniture. Repeated contact with abrasive bristles or wet strands will eventually remove a finish.

Cleaning: To clean furniture that has not been cleaned recently proceed as follows:
Vacuum the surface with a soft brush attachment. For peeled veneer or frayed upholstery, hold a piece of fiberglass or plastic window screen, with its ragged edges taped, between the artifact and the brush. This prevents bits of veneer or fabric from being sucked into the vacuum cleaner. Corners and elaborate carvings can be dusted by hand with a soft brush.

If the surface is covered with a grime which the above steps do not clean sufficiently, or if you wish to remove wax buildup, contact a conservator.

Do not clean marble tops with any solution. Cleaning solutions can actually increase staining by carrying the foreign matter deeper into the stone. If marble must be cleaned, contact a conservator. For routine dusting, use a fleece duster or a vacuum cleaner, not a cloth which may actually force dirt particles into the porous stone.

If the rest of an artifact looks its age, shouldn't its hardware look its age also? Normal patination (browning of the surface) forms a protective layer. Furniture hardware should be cleaned, but never polished.

Alcohol is a safe cleaning agent for most uncoated brass furniture hardware. While cleaning, if possible, slip a piece of mylar or aluminum foil behind the brass to protect the wood finish, but do not loosen or remove hardware. Wipe the brass with a cotton swab, damp, not wet, with alcohol. An alcohol cleaning will not polish, but will remove damaging greasy fingerprints and allow a protective brown patina to form. If the hardware has a coating or finish on it, do not use alcohol as the finish might be soluble in alcohol.

Do not polish furniture hardware. Polishing wears some metal away every time it is done, so repeated polishing actually destroys part of an historic artifact. Polish residue also accumulates in recesses, causing a hard, whitish discoloration which is disfiguring and difficult to remove. And polish can damage the wood finish.

Wax: Waxing furniture and wooden artifacts is not recommended. Wax can protect an earlier finish, but the wax on non-functional furniture in a museum is not being worn off by use, and so does not often need to be replaced. Frequent polishing is encouraged by furniture polish manufacturers to increase sales. Frequent applications of wax actually cause surfaces to attract dust and can soften the underlying finish.

Wax is not recommended as a finish on bare wood because once applied, it is difficult to remove. It should only be used as a protective coat over finishes of varnish, shellac, etc., and then only after consulting a conservator. Furniture in a museum collection should not require polishing any more than once every five years or more.

The drawers of furniture in the collection should not be used. Where this is unavoidable, paraffin wax (available from your local hardware or grocery store) can be used as a lubricant for the drawer runners. The wax will reduce friction, helping the drawer to slide with less force, and retard the wearing away of the wood.

Avoid liquid or aerosol products that promise to clean, wax, and polish in one application. To liquify wax, chemicals are added which may attack finishes and cause their surfaces to become tacky. Some contents can permanently change a finish. The damage may not be apparent for some time, but can eventually result in major discoloration of the artifact. Never use spray cleaners like Pledge or Endust on furniture. Dust only with clean cotton or magnetic dust cloths.

Finishes: Refinishing or restoration is not generally appropriate for furniture or other wooden artifacts in museum collections. Refinishing frequently includes the stripping or removal of an early finish. This may be advocated by commercial restoration shops but violates ethical principles of museums because it is an unacceptable alteration of the artifact and destroys the historic and informational value of the piece.

Never use a recipe for "feeding" a finish: finishes do not have digestive systems and that type of "nourishment" may harm them. In a few years the feeding material will darken and someone may attempt to remove it. This may result in the destruction of the original finish below.

Feeding recipes found in books on furniture and weapon restoration often prescribe linseed oil, which polymerizes as it dries to form a very tough, hard film which darkens with age. As the finish changes appearance from the effects of high temperature and low humidity, moisture is lost, causing a dry appearance. Oil, however, cannot replace this moisture. It will merely change the surface characteristics to make it appear handsome for a short while. Under no circumstances apply anything containing linseed oil to a collection artifact.

I. Functional Wooden Artifacts are items whose main structural components are wood, including artifacts with moving parts such as spinning wheels, looms, and carriages. They may also have parts of other materials including leather, metal, etc. This category also includes wooden artifacts with no moving parts such as kitchen utensils, farm implements, and tools.

Use of functional artifacts should be avoided, since they may become worn, abraded, broken, or stained. Every attempt should be made to use reproductions for demonstration.

Maintenance and Care: To properly care for functional wooden artifacts, refer to the above sections on furniture. Additionally, if the artifact is composed of movable wooden parts which are required to move, it may be advisable to lubricate them. However, avoid lubricating oils, since they will permanently stain; instead, use paraffin wax.

As with furniture, do not apply any finish to bare wood on these artifacts; apply wax only if the surface is clean and has an existing finish. Wax application is not recommended as a general rule, however.

J. Painted Wooden Artifacts include artifacts such as polychromed (painted) wood sculpture, furniture, clock dials, carriages, etc. Secondary components may be composed of other materials.
Painted wooden artifacts are usually very complex in structure and are greatly affected by environmental changes. Every attempt should be made to exhibit and store these artifacts in a controlled environment. At the very minimum, they should be placed away from extreme temperature fluctuations. They should also be protected from handling by visitors. Their condition should be continually monitored.

Maintenance and Care: Due to the complexities of painted wooden artifacts, refer all questions to a conservator.

For general periodic cleaning of artifacts with stable paint layers, dust only with a soft brush. Apply no moisture or commercial polish, wax, cleaner, etc.

K. Textiles

Most historic collections contain numerous artifacts that fall into the category of textiles, such as rugs, curtains, bed coverings, household linens, upholstery, clothing, flags, samplers, and other types of needlework.

Textiles can be composed of many different fibers. The most common in historic collections are silk, wool, cotton, and linen (flax), but you may also have rayon and other manmade fibers.

All textiles become fragile with age. This process is irreversible and is accelerated by improper environmental conditions. Thus, it is necessary to handle, exhibit and store textiles properly. Preventative care and maintenance are most important.

Light, whether natural or artificial, is extremely damaging to textiles. Silk, often weighted with metallic salts in the nineteenth century, is especially sensitive and will "shatter" (the fibers will break) with excessive light. Light damage is cumulative, irreversible and often takes place slowly, without being noticed until it is too late.

Ideally, all textiles should be kept in the dark, never to see the light of day. Of course this is not possible, but there are ways of minimizing the problem of exposure to light on exhibit. Textiles should not be exposed to light levels higher than five foot candles or 50 lux. Fiber optic lighting should be used in textile exhibits whenever possible.

The combined factors of relative humidity and temperature are crucial. High temperature and low humidity dry out and embrittle fibers until they powder away. Low temperature and high humidity encourage condensation, which can cause stains and color changes. High temperature and high humidity combined provide the perfect environment for mold growth and can also increase fading with exposure to light. Humidity fluctuations cause expansion and contraction of the textile fibers which results in abrasion and degradation of the fibers.

Air pollutants and dust easily damage textiles. When not kept to a minimum, dirt can become so embedded in the textile that it is impossible to remove. This embedded dirt will abrade fibers during movement or handling of the textile. To prevent dirt, store artifacts in cabinets or boxes whenever possible.

Insects cause serious damage and can be difficult to control. They can easily enter through a window, door, or on the clothing of a visitor. Good housekeeping is essential as insects seek dirt and crevices in which to breed. Keep areas clean and don't allow food or drink in areas where textiles are stored or exhibited. Cover or repair exterior wall holes, set traps, and keep windows and doors closed.

Exhibiting textiles: Only textiles that are in good, stable condition should be exhibited. Exhibition time should be no more than six months out of the year. Many collections, however, are not large enough for frequent changes or rotation, so protecting these textiles from light, heat, humidity extremes, and air pollutants becomes extremely important. These steps will help:

- Protect carpets and rugs from heavy furniture by placing the feet into plexiglas or glass cups.
- Avoid setting heavy artifacts on textiles, especially those with a pile such as velvets, furs, etc.
- Do not place textiles on unfinished wood as the acids given off by the wood are harmful. Separate with a layer of mylar, de-sized muslin (washed several times in hot water) or acid-free tissue. If the wood is not part of the collection, it may be sealed with several coats of polyurethane varnish.
- Do not place textiles directly on furniture that has been heavily oiled in the past. Place a layer of mylar between the wood and the textile.
- Avoid sharp creases and corners. Pad with acid-free tissue or de-sized muslin.

Clothing that is not structurally sound (i.e. has tears, holes, incomplete weaves or seams) should not be exhibited, but if it is, it should be properly supported on a museum-quality mannequin (available from Dorfman Museum Figures, Inc. (1-800-634-4873). If a mannequin is used, it is best to use one that is too small and pad it to fit, rather than forcing the clothing onto a larger mannequin.

Never hang clothing directly on wood or wire. Rusty wire can stain and damage the fabric. In addition, all the weight of the clothing is concentrated on the small area in contact with the hanger, straining the fabric. Instead, purchase or make padded hangers. Apply several coats of polyurethane varnish to a sturdy wooden hanger. Pad it with cotton or polyester batting and cover with de-sized muslin. Be sure to use the appropriate size hangar for each garment. Padded hangars of various sizes can be purchased from Hollinger Metal Edge (1-800-862-2228).

Do not use pins, staples, monofilament line, adhesives, or tapes with textiles.

Never iron a textile from the collection. If textiles are severely wrinkled, a hand-held steamer can be used to smooth fabrics for exhibit.

Textiles are very tactile and people naturally want to touch them. Create barriers with plexiglas, rope, distance or platforms. Signs, although obtrusive, also help. Look for similar replica materials if needed for long-term exhibit or for hands-on use in the exhibit, if desired. Do not allow eating, drinking, smoking, or pets in the exhibit area.

Storing Textiles: The storage room should be in an untraveled area which is light tight, devoid of insects and other pests, and have stable temperature and humidity. Most important, it must be clean. Do not allow eating, drinking or smoking in the storage area. Ideally, all textiles should be stored flat in cabinets, but this is usually not practical, as it would require an incredible amount of space. Therefore, other methods must be considered.

Acid-free boxes are good for the storage of small textiles and fragile clothing that cannot be hung. If a textile requires folding to fit into a box, pad the folds with crushed acid-free tissue. Also pad clothing, hat and shoe interiors to avoid creasing and collapse. Try to avoid stacking textiles in the box, but if necessary, pad between layers and place heavier textiles on the bottom. Do not stack these boxes on the floor (use shelves or pallets) or to great heights, as the weight may crush the lower ones.

A better alternative to folding large flat textiles such as quilts, flags, or rugs is rolling. Acid-free tubes provide an easy and proper means of storage. Cardboard tubes can be used; but they must be covered with mylar to protect the textile from acid migration from the tube. It is important that the tube be three inches or more in diameter, sturdy enough to support the weight of the textile and extend at least one inch beyond each end of the rolled textile. It is helpful to have one person on each end during the rolling procedure. Carefully roll the flat textile onto the tube, right side outward. Avoid creases. Cover the rolled textile with de-sized muslin or acid-free tissue and tie loosely with cotton twill tape. Attach an identification tag to the outside of the roll, listing the accession number, artifact name and type of fabric. Wood dowels or metal pipes can be inserted in the tubes and supported horizontally on storage racks.

If clothing is strong enough, it should be hung on padded hangers. Never hang directly on unfinished wood or metal hangers. Do not cover clothing with dry cleaner plastic bags, as these are usually manufactured from a poor grade of plastic. Sleeves may be lightly stuffed with crushed, acid-free tissue if necessary to hold shape. Always fasten buttons, hooks and eyes, and zippers. Do not hang very heavy artifacts such as heavily beaded dresses, or those which have very narrow straps.

Clothing should be hung in museum-quality cabinets.

Label or tag the outsides of boxes, wrappings, cabinets, etc. with the accession number and textile name. This will allow for easy identification without disturbing the textile. Work tables in the storage room must be clean and have no protruding nails or jagged edges to snag textiles.

Cleaning: The only form of textile cleaning that can readily be done by staff is vacuuming, which removes dust, loose dirt, and debris. Textiles in period room settings such as rugs, upholstery, drapes, bedding, etc. will require more frequent cleaning than those in enclosed exhibit cases or in storage. The textile should be on a flat, clean surface. Place a piece of bound fiberglass screen between the vacuum nozzle and the textile. Binding the screen edges with cloth tape prevents snagging. Use minimum suction (a brush attachment helps) and stroke with the weave, rather than in a diagonal direction. Do not vacuum fragile or torn areas.

Even if textiles are heavily soiled or stained, do not attempt wet cleaning. Museum artifacts should never be sent to a commercial dry cleaner. Consult a conservator for more extensive cleaning needs.

L. Paper Artifacts

Paper is a non-woven, felted material of individual fibers, usually cellulose, which is formed into continuous sheets. The material's life span depends upon its fiber content and manufacturing procedures. Paper made of wood pulp can be very unstable and acidic. Unfortunately, wood pulp is common in historical artifacts. Within historical collections, there are forms of paper that were never intended to be permanent. Newspapers, posters, and handbills were intended to convey current information then be thrown away. This creates a difficult situation when it comes to preservation. No matter what the paper's quality, natural aging factors will eventually cause deterioration. It is, however, careless handling, bad storage conditions, and contact with improper materials that destroys most papers.

Like textiles, paper is very hygroscopic and is damaged by humidity which is too high**,** too low, or which fluctuates too much. It is easily yellowed and degraded by exposure to high light levels and to air pollutants.

Exhibiting paper: For exhibit, artworks on paper should be matted on acid-free matboard with archival hinging material and framed. The acids which occur naturally in ordinary matboard, cardboard, and wood will migrate into the artifact causing embrittlement and discoloration. An acid-free window mat should be used to provide an airspace between the artifact and the glazing of the frame. Never dry-mount a paper artifact. This is an irreversible process which not only makes the artifact look unnaturally flat and stiff, but will also eventually yellow and embrittle the artifact. Never apply any kind of pressure sensitive (scotch-type) tape, glue, or rubber cement to a paper artifact. Fragile paper artifacts can be enclosed between two pieces of mylar, a process called encapsulation. This provides a completely reversible means of protecting the artifact while allowing both sides to be viewed.

Storage: Unmatted paper artifacts in storage must be kept in acid-free folders or interleaved with acid-free paper. These may be either buffered or unbuffered. By using acid-free materials you can ensure that the folders/papers are not producing acids which will contribute to the breakdown of the artifacts. The buffer is a chemical which absorbs acids naturally produced by the paper as it ages. Absorbing these acids

prevents them from further accelerating the deterioration of the paper. Folders and interleaving materials should be replaced periodically because they will absorb acids from the paper artifacts.

When handled, paper artifacts should be laid on a piece of acid-free matboard and the board, rather than the paper, handled. Paper is easily stained and soiled and should be handled only with clean white cotton gloves, unless it is extremely brittle and fragile.

Paper artifacts can be stored upright in folders, in drawers, or flat in boxes or drawers. Very large paper artifacts (posters, etc.) should be stored flat in map drawers.

Cleaning: Do not attempt to clean or repair paper artifacts. Due to the fragile nature of old paper, no form of cleaning can be routinely recommended. Virtually all commercially available tapes and adhesives eventually become irreversible and brittle, and stain the paper. Paper artifacts in need of cleaning or repair should be referred to a conservator.

M. Photographs

Photographs are usually made up of microscopic silver particles or, in the case of color photos, dyes, suspended in an emulsion layer of gelatin which is adhered to a paper backing. This complex structure makes photos especially sensitive to relative humidity problems. The dyes of color photographs are very sensitive to light and fade quickly.

In general, photos should be exhibited and stored like paper artifacts. It is important to wear clean cotton gloves while handling photographs; touching the front of a photograph with bare fingers will leave permanent fingerprints in the emulsion layer.

When selecting sleeves and other storage enclosures for photographs, use acid-free, unbuffered materials, because the emulsion layer of a photograph is naturally somewhat acidic and would be damaged by the buffer.

N. Paintings

Paintings are fragile structures comprised of several layers. Each layer in the structure reacts differently to changes in relative humidity and temperature and to aging. Materials such as canvas and wood undergo extreme dimensional changes as they absorb and release airborne moisture. Components of other layers such as the size, ground, and paint will also react to moisture. Because these materials become brittle with age, expansion and contraction becomes increasingly destructive, causing splits, cracks and deterioration of the bonds between layers. Canvas supports can become slack or tight during environmental fluctuations. Curators are encouraged to become familiar with the appearance of their painting collection so that changes will be quickly noticed.

If damage and/or changes occur to a painting, contact a conservator concerning what steps to take.

The following will familiarize you with what you need to think about, and look for, during periodic inspection.

The **support** is the rigid or semi-rigid surface upon which the paint is applied. In most cases a painting support is canvas, though it is occasionally silk, wood, or cardboard.

For canvas paintings the auxiliary support consists of a wooden stretcher or strainer. For panel paintings there may also be a "cradle" of wooden battens attached to the back of the panel. Cradles were frequently applied to panel paintings by restorers in attempts to prevent the panels from warping. They are usually unsuccessful and often cause further damage in the form of checks and/or splits.

A **stretcher** is a wooden frame-like expandable structure to which the canvas is tacked. At each corner, stretchers usually have wooden keys or metal devices for expanding the stretcher if the canvas becomes slack. Keys often become dislodged.

A **strainer** is similar to a stretcher but has no corner keys. Instead the corners are nailed or glued and cannot be adjusted.

Size is a layer of a sealer such as shellac, animal glue or gelatin applied to the support to prevent absorption of the priming or paint. This layer may be extremely reactive to changes in relative humidity and temperature.

Priming is the filler, usually a chalk solution, applied over the size to even up irregularities in the weave or grain of the support and to provide a uniformly colored surface.

The **paint film** creates the visual design layer. It is composed of pigment suspended in a medium, usually linseed oil or, in some modern paintings, an acrylic.

Surface coatings may be varnish, lacquer or wax, and serve to protect the paint from the accumulation of dirt, dust, and grime and to saturate the paint colors, increasing their intensity. Not all paintings have a surface coating.

The **frame** surrounds the painting, enhancing its appearance and protecting it. Wood frames with plaster and gilt ornament, wood veneer, or paint are often fragile.

The **rabbet** is the small ledge which runs around the inside of the fame to hold the picture and against which the picture rests.

A **backing board is** a sheet of rigid material attached to the back of the frame to prevent accidental damage. It also serves to keep grime away from the back of the painting.

Inspections of the painting collection should be done several times during the year. Any changes in the paintings should be noted and reported to a conservator.

Stand directly in front of the painting at a distance of six to eight inches. Examine the entire surface. Then stand to the side and slightly in front. This will insure that you check the entire surface carefully as you look for the following:

Cleavage is lifting and separating between the layers of a paint film and/or the ground separating from the support. Cleavage is usually the beginning of further deterioration.

Flaking or loss is the actual loss of adherence of the paint to the support. If you find that a painting is flaking, place it in horizontal storage (face up) after referring to the handling section.

A **check** is an incomplete split in a piece of wood along the grain which did not travel entirely through the piece. A **split** is a complete separation. Record the length and location of checks/splits in PastPerfect and watch for any increase in size.

Bloom is a bluish-white surface discoloration that appears on varnished paintings. If you note bloom appearing on a painting, check the area for excess moisture.

Slack Canvas may occur with high humidity.

Before hanging paintings, check wire, screws, hangers, and frame. All parts that are to bear weight must be capable of carrying the load. Obtain the appropriate authorization before making new holes in the walls of any historic structure. Artworks exhibited in public areas of the state capitol, governor's residence, etc. can be equipped with motion detectors to alert staff when moved by unauthorized personnel or the public. A system for this type of monitoring is already in place at the state capitol. Check with capitol police for further information.

Stored framed paintings should be hung on mobile art racks or placed on shelving specifically designed to hold paintings. Shelf uprights and shelves should be padded. Unframed pictures can be stored in map cases with acid-free tissue interleaved between each work.

Cleaning: Limit cleaning of stable paintings to dust removal with a soft, dry sable hair brush once a year. If the paint is cleaving or flaking or the varnish is cracked or damaged, do not dust the painting.

Starting at one side of the top of the painting, gently sweep the hairs of the brush horizontally across the surface without applying pressure, moving to the opposite side. Away from the painting, vacuum the tip of the brush to remove dust. Work your way across the surface, from top to bottom, always moving in the same direction. Never vacuum a painting.

If a frame is in good condition, it may be vacuumed once a year by using a clean, soft brush attachment. When vacuuming the frame, do so with gentle action and care. A careless blow to a painting or frame could severely damage it. Do not vacuum any frame which has loose elements or flaking paint or gilding. Never under any circumstances use commercial cleaning solutions, solvents, water, or oils on paintings. Cleaning beyond that outlined above is to be done only by a trained conservator.

Attempts to tighten loose canvas with a stretcher should not be done without consulting a conservator.

O. Musical Instruments

Large instruments, such as pianos and organs, should be stored and treated like furniture and other large wooden artifacts. There is no need to tune them on a regular basis because they should not be played. Small musical instruments should be stored in their own cases whenever possible. These cases can be stored in cabinets or wrapped in ethafoam for storage on open shelves. Again, these instruments should never be played. The strings/bows for stringed instruments should be loosened prior to storage to reduce tension on strings/hairs. No cleaning,

other than light dusting, should be undertaken without consultation with a conservator.

Appendix A – Inventory Form

Wyoming State Museum Inventory

Building_____ Date_____

Location_____ Initials_____

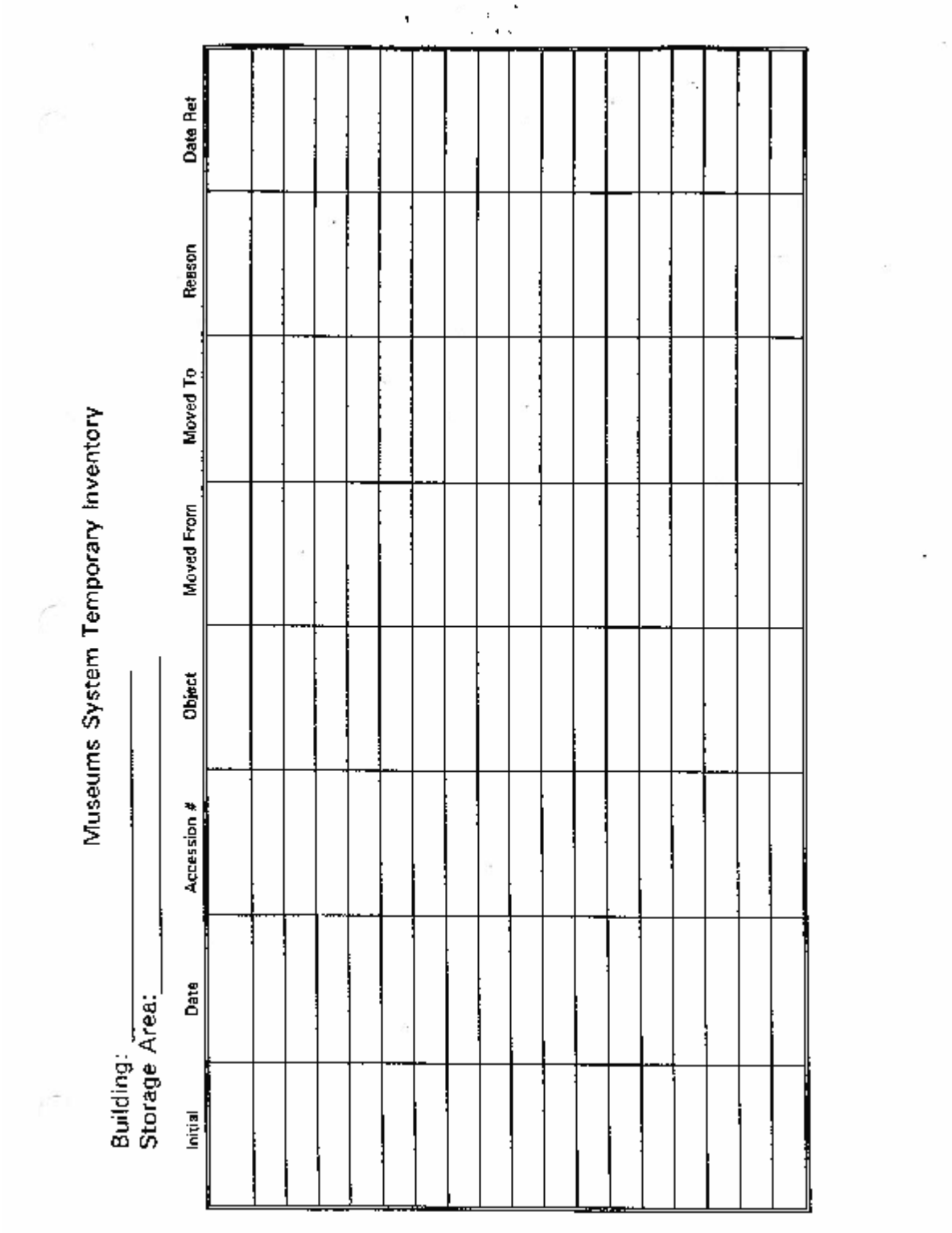
Accession Number	Object Name	Notes

Appendix B - Guide to Storage Locations Example

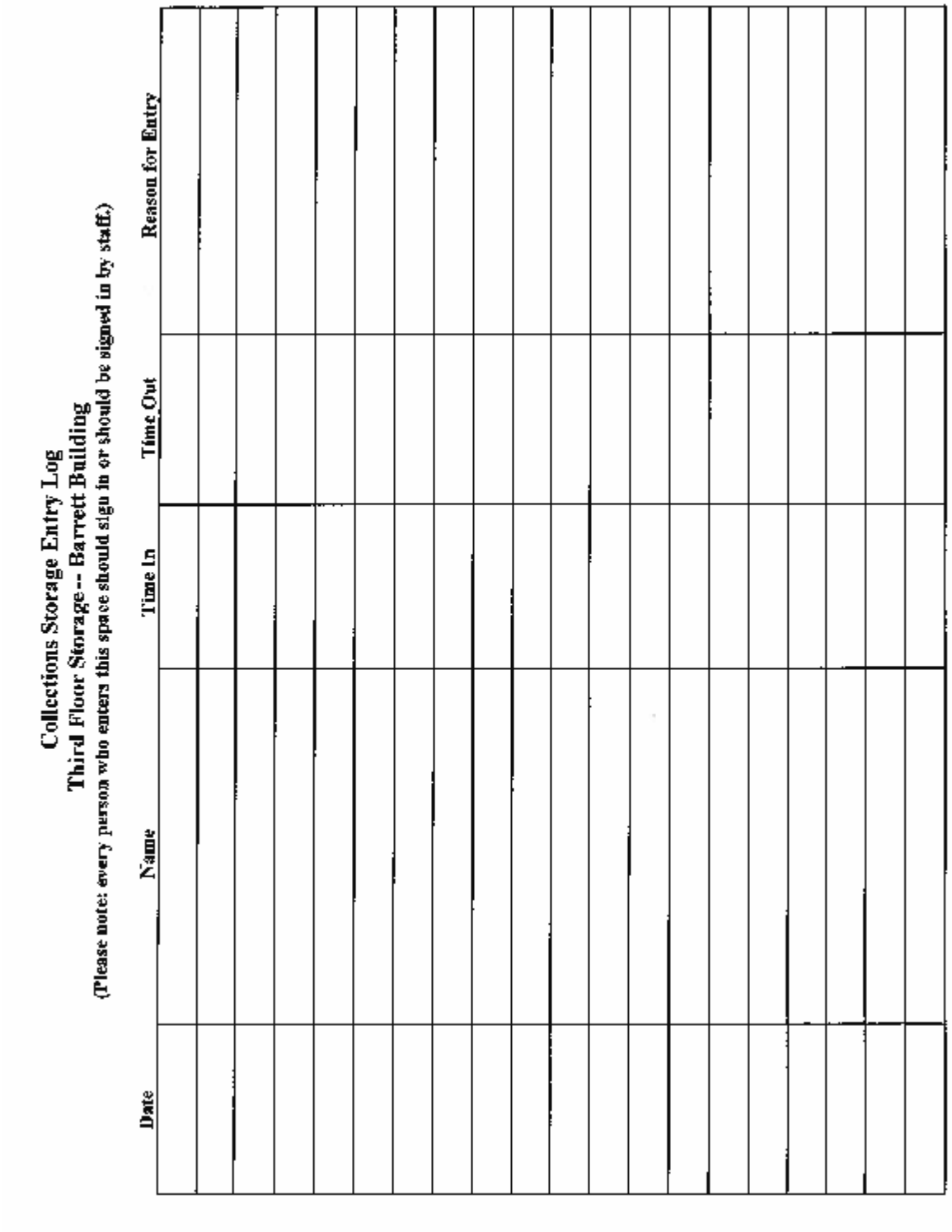
Building Furnishing
Temperature Control Device
BF/TCD

Box	Description	Location
1	portable stove	Orange-R5/S19
2	electric heater	Orange-R5/S19
3	fans, thermostat	Orange-R5/S19
4	shovels	Orange-R5/S19
5	grate, stove fragments	Orange-R5/S19
6	radiator valve	Orange-R5/S19
7	kerosine heaters	Orange-R5/S19
8	fire set stand, stove rake, stove frag.	Orange-R5/S19
9	miscellaneous	Orange-R5/S19

Appendix C – Temporary Inventory



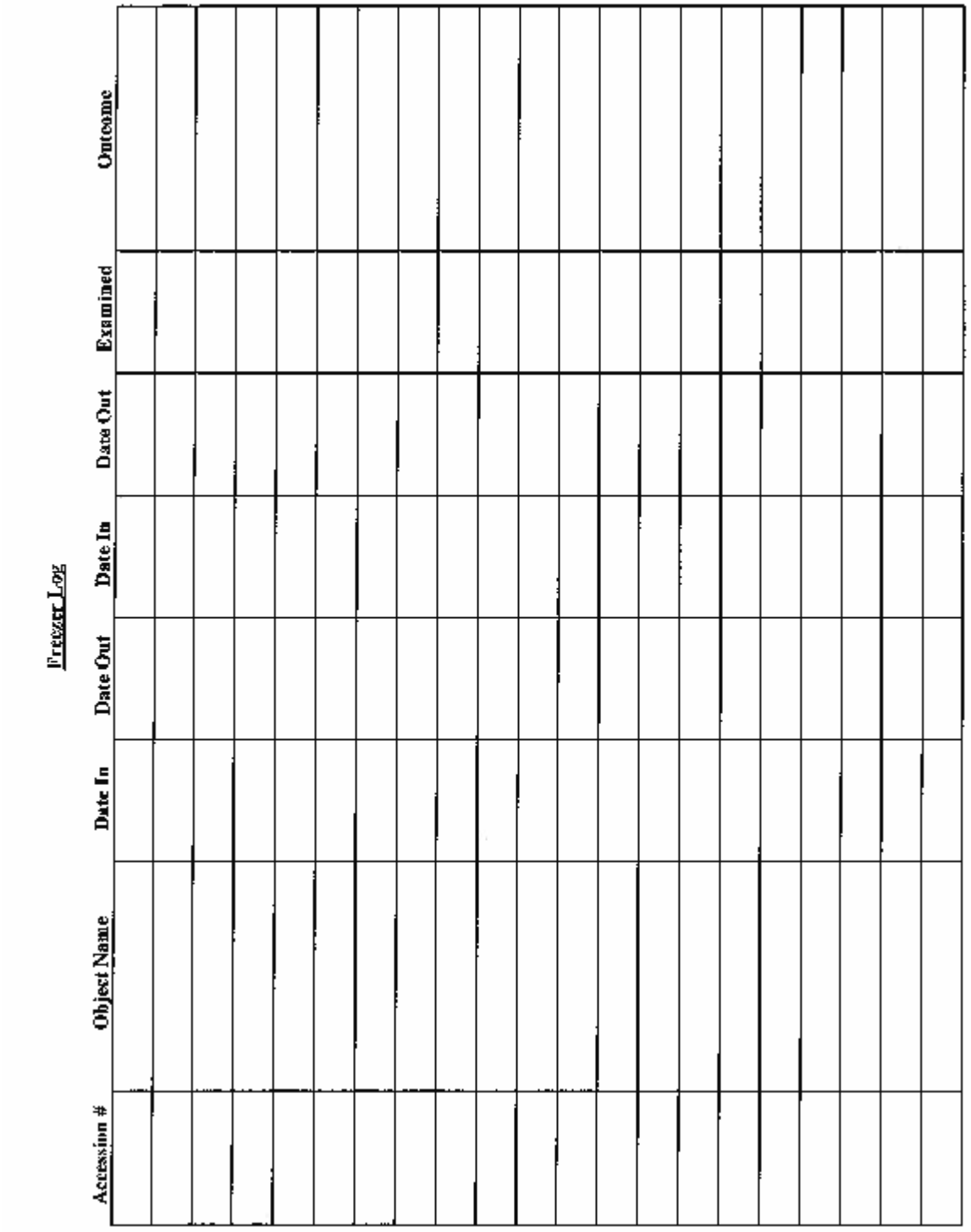
Appendix D – Collections Storage Entry Log Example



Collections Storage Entry Log
Third Floor Storage -- Barrett Building
(Please note: every person who enters this space should sign in or should be signed in by staff.)

Date	Name	Time In	Time Out	Reason for Entry

Appendix E – Freezer Log



Appendix F – Integrated Pest Management Chart

Date	Initials	Trap #/location	Report