



Bureau of Archaeological Research

Conservation Lab

Conservation Field Guide for Archaeologists

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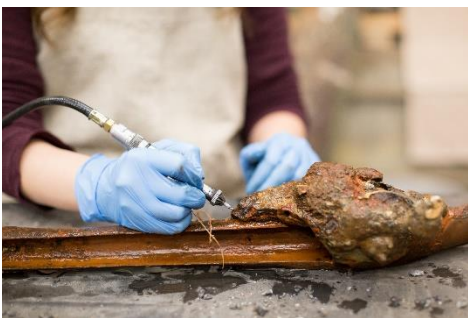


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1. General Recommendations

This guide provides steps for preventing further deterioration of artifacts before they are treated at the Florida Bureau of Archaeological Research Conservation Lab. These instructions are for archaeologists conducting research in Florida, specifically those who hold 1A-32 permits with the Florida Bureau of Archaeological Research. However, this information serves anyone who is conducting archaeological field research in Florida or the Southeast. While the information would be useful elsewhere, the guide focuses on artifacts and environmental conditions found in Florida. This guide is not a substitute for general conservation of objects and any harm that befalls an object due to any advice listed here, failure to follow the advice, or neglect to fully conserve the artifact, is not the responsibility of the Florida Bureau of Archaeological Research. Please consult with Bureau of Archaeological Research conservators if you have any questions.

The Five Golden Rules of Conservation

1. If it's wet, keep it wet. If it's dry, keep it dry.

If an artifact originates from a submerged site, the object must remain wet until it reaches the Conservation Lab. Allowing artifacts from submerged sites to dry out almost always results in significant, yet avoidable damage.

If an artifact originates from a terrestrial site, it must remain dry until it reaches the Conservation Lab. Soaking or needlessly washing artifacts can do extensive harm.

2. Document.

The most important aspect of conservation is documentation. Keep a record of everything that was done to treat an artifact, including, but not limited to:

- How the artifact was found?
- In what condition was it found? (Wet, dry, saltwater?)
- Application of any chemical, adhesive, or consolidant. Be specific.
- How the treatment was done and under what conditions.

All of this information is important to a conservator, especially if the actions need to be undone or the object requires any further analysis. An example conservation record is shown in Section 1a.

3. All treatments must be reversible.

Any treatment conducted on an artifact must be able to be undone in the future, or at the very least able to be easily retreated in the future. Do not use any other materials than those recommended in Section 4. Those listed in this guide have proven sustainability, stability, durability, and, above all, reversibility.

4. Less is more.

The best treatment for artifacts in the field is usually the least treatment. Aim for the least amount of something that is necessary; the least amount of handling, the least amount of water, or the least amount of adhesive or consolidant.

5. Contact a conservator.

When in doubt, contact a conservator. Conservation Lab staff information is listed on the front page of this guide. Please do not hesitate to ask a question or seek advice.

1a. Example Artifact Conservation Record

Here is an example of what an artifact conservation record might look like. These should be kept for every artifact that receives a conservation treatment in the field or back at the lab. These records are extremely useful in case the object needs retreatment or is needed for future analysis. While BAR does not have a specific artifact conservation record form, the example below should guide you in creating a version specifically for your site. Please contact the BAR Conservation Laboratory if you would like a general form for recording conservation information.

Site: 8LE01

Completed by: Indiana Jones

Artifact Number(s): 01.01.01, 01.01.02, and 01.01.03

Artifact Description: Small ceramic sherds

Condition: Dry, in slightly damp dirt.

Treatment:

- 6/20/2016 Removed sherds from Level 1. These three sherds appear to belong to the same vessel. Photographed in situ.
- 6/22/2016 Rinsed sherds in gently running water to remove excess dirt. Brushed surface with tooth brush. 01.01.01 had larger chunks of dirt that required removal with a wooden pick. Allowed sherds to dry slowly in shade, away from heat or direct sunlight.
- 6/25/2016 Glued the sherds together using 25% Paraloid B-72 in acetone, as directed by the PI. Allowed to dry before replacing into plastic bag. Final photograph taken.

2. Packing and Labeling

This section offers some basic advice on packing and labeling artifacts from both terrestrial and submerged sites. Please follow the instructions provided on the 1A-32 Curation Guidelines for specific information on packing and labeling for curation at the BAR Collections Facility.

Golden Rules of Packing:

- Always assume every object is fragile and treat it as such. Even iron objects, which generally look very robust, can often have structural problems under the surface.
- Use common sense; more packing material is usually better than less.
- Separate material types.
- Only archival material (bags, foam, or tissue paper) should come in contact with the artifacts. Examples are listed below and on the 1A-32 Curation Guidelines.

Packing Materials to Use:

- Bags must be of archival quality, 4 mil thickness, and have a zip lock closure. These are available from plastic and conservation suppliers.
 - o Polyethylene tubing, in conjunction with a heat sealer, is useful for large amounts of waterlogged material of varying shapes and sizes.
- Polyethylene foam is a great packing material for both dry and waterlogged artifacts.
- Use acid free and buffer free tissue paper for packing fragile dry artifacts.
- Plastic food containers, with snap-on or air tight lids, are excellent for waterlogged material.
 - o Small waterlogged material can be stored in individual plastic bags, with water inside the artifact bag. Holes are punctured into the plastic bag and the bags are placed into the air-tight plastic container, filled with water. Please include sharpie labels on the outside of the individual bags and Mylar or waterproof labels on the inside of the bag.
- For anything else, contact the Conservation Lab first. Temporary use of other, more readily available, materials is acceptable when necessary, as long as they are not used for long-term storage.

Packing Materials to Avoid:

- Do not use newspaper, colored tissue paper, toilet paper, or paper towels.
- Cotton wool or pads are useful, but should not come into contact with artifact. The small fibers are difficult to remove from coarse surfaces.
- Please avoid string, metal staples, uncoated wire or paper clips, and rubber bands.

Labeling an Artifact:

- Artifact labels should be written on the outside package, according to the 1A-32 Curation Guidelines.
- Plastic labels (ex. DYMO brand) and fishing line make excellent labels for waterlogged artifacts of various shapes and sizes.
- Nail polish should never be applied to an artifact. Nail polish has a low pH, yellows with age, and tends to smear ink.
- Do not label the artifact directly on the surface, but if it becomes necessary to use a label written on an artifact, follow instructions on this webpage: http://www.nps.gov/archeology/collections/mgt_01a.htm. If you do label the artifact, use FS and lot numbers only. Do NOT use project field numbers or any other information. Any field numbers or information should be provided separately.

3. General Instructions by Material Type

The following are basic instructions for removing, cleaning, consolidating, and/or packing artifacts by material type. Only commonly found artifacts from archaeological sites in Florida are included in this list. Please contact the BAR Conservation Lab if you have any questions about these or other materials.

Always keep a record of any conservation treatment used! This may include, but is not limited to, any glue used to join ceramics, any consolidants used in the field, and any photographs that are taken of artifacts while in the ground or freshly excavated. Submit records of conservation treatments when submitting artifacts to the Bureau of Archaeological Research.

Please use proper safety equipment when handling artifacts or chemicals. These may include, but are not limited to, gloves, dust masks, safety goggles, and respirators. This guide does not attempt to dictate any safety protocols but recommends using common sense when working with these materials. Please contact the Conservation Lab if you have any questions.

Cleaning: Only surface level dirt and mud should be cleaned from artifacts. Any other cleaning should be left to the conservator.

- To clean away dirt, use brushes (soft bristle tooth brushes work great!), wooden tongue depressors, wooden skewers or toothpicks, cotton swabs, dental tools, or scalpels.
 - o If you are using water to clean ceramics or stone tools, the water should be as pure as possible, especially in areas where the local tap water has a high salt or chloride content. Use distilled water if available.
 - o Another option is to clean with a solvent, such as acetone or ethanol. Please use these in a well-ventilated area and wear safety equipment such as eye protection, gloves, masks, or respirators.
- Be gentle. Leave any stubborn dirt for removal later in the Conservation Lab.
- For dry artifacts, or those from terrestrial sites, only use water when absolutely necessary.
 - o Use cotton swabs (rolled along the surface) or small sponges (dabbed on the surface), without immersing the entire object.
- For waterlogged artifacts, or those from submerged sites, do not allow them to dry out during cleaning. The objects should be kept as wet as possible.
- Metal or fragile objects should not be cleaned in the field, but only by a trained conservator in the lab. Do not wash metal artifacts.

Consolidating while in the ground: A consolidant is a diluted adhesive applied to an object to strengthen the material, so that it can be lifted safely from the ground. This should be used only when absolutely necessary.

- Use a consolidant sparingly. It will most likely have to be removed once back in the lab. Keep a record of any consolidant used, including its concentration.
- Clean the object as thoroughly as possible, apply the consolidant, and allow the consolidant to dry. Damage can occur if not dried thoroughly.
- Do not consolidate any sherds or material to be used for dating or other forms of analysis. This will contaminate the sample.
- **Dry objects:** Use a resin and solvent combination like 5-10% Paraloid B-72 in acetone. See instructions under Section 4a.
- **Wet objects from terrestrial sites:** Use an emulsion, or adhesives in water. Dilute the emulsion in water with a ratio of 1:4 emulsion to water.
- **Waterlogged objects:** Consolidation may not be possible. Please contact the BAR Conservation Lab for advice.



Always keep a record of any conservation treatment used!



3a. Bone

Human bone: Immediately consult Jason O'Donoughue at jason.odonoughue@dos.myflorida.com or at (850) 245-6481 if human remains are encountered in the field.

Dry objects: When excavating, brush away dirt and allow to dry if damp. Handle carefully, using consolidation or a support for removal.

- Do not attempt to clean or work with fragile bone or bone that has been consolidated.
- Structurally sound bone may be gently washed. Use as little water as possible when washing, or none at all. Do not brush too vigorously. Frequent wetting and drying can damage the structure of the bone.
- After washing, allow to dry evenly and slowly, away from direct sources of heat, including sunlight.
- Bulk collections of animal bone may be rinsed in water, but do not allow to soak.
- Worked bone: Use as little water as possible, only swabs dipped in distilled water when absolutely necessary.
- If the object is from a damp terrestrial site, place it in an archival bag with surrounding mud. Do not allow the object to dry out completely. Bring it to the Conservation Lab as soon as possible.

Dry objects with chlorides or soluble salts: store in a dry place away from humidity until they can be brought to a conservator.

Waterlogged objects: Store in water with similar salinity until the object undergoes desalinization.

- If structurally sound, can be placed directly into fresh water.

3b. Horn and Antler

Dry objects: Gentle, dry brushing is permitted. Do not use any water.

- Store away from heat and at a relative humidity of 45-50%.
- If the object is from a damp, terrestrial site, place it in an archival bag with surrounding mud. Do not allow the object to dry out completely. Bring it to the Conservation Lab as soon as possible.

Waterlogged objects: Do not allow the object to dry out. Any cleaning or drying must take place in the Conservation Lab.

3c. Leather

Dry objects: Carefully remove leather from the ground, brushing dirt away from the surface and undercutting the object before removing. Place the artifact in an unsealed archival bag and allow to thoroughly dry.

- Never wash dry leather with water. Only use gentle, dry brushing with a soft brush. Frequent wetting and drying can damage the structure of the leather.
- For larger chunks of dirt, use a wooden tool or a swab filled with a solvent to soften the dirt for removal. Do not allow the solvent to touch the leather surface.
- Do not use any metal tools and do not attempt to join leather fragments.
- Store flat and well-padded, with acid-free tissue. Keep in an environment with a relative humidity between 45-50%.

Waterlogged objects: Waterlogged leather is more commonly encountered than dry leather objects, but waterlogged leather is usually very fragile.



Always keep a record of any conservation treatment used!



- Do not allow leather to dry out, even during drawing and photographing. Rinse frequently in water if it is necessary to remove it from its water storage container.
- Store in archival bags in plastic containers.
- Do not attempt to clean or conserve. Leave this for a trained conservator.

3d. Charcoal and Charred Plant Remains

Submission of charcoal samples for curation is discouraged. These become contaminated over time and will not provide accurate C-14 dates when curated for long time periods. See instructions in the 1A-32 Curation Guidelines for information on faunal material and plant remains.

Dry objects: Brush away dirt, remove carefully from the ground, and wrap in tissue in a paper bag or envelope. Keep in a dry location away from heat.

Waterlogged objects: Store wet until brought to the Conservation Lab.

3e. Shell

In general, bulk shell samples, such as the matrix from a shell mound or midden, will NOT be accepted into collections. If you decide to collect bulk shell samples, they are to be noted on the Excel spread sheet and discarded or curated by the permit holder.

Dry objects: Shell tools are usually found in good states of preservation.

- Shells are easily cleaned with a soft brush or wooden pick. Do not attempt to pry off any lumps of dirt.
- Shells can be washed in water using a soft brush. Swabs can also be used if they are rolled over the surface. Do not rub the shell with a swab, as this can do more damage.
- Shells with pigment or stains should not be washed.
- After washing, dry thoroughly before packing.
- Pack in archival bags, using acid-free tissue or polyethylene foam for support.
- Do not attempt to join.
- Fragile shells can be consolidated using methods described for ceramic objects. If in doubt, contact a conservator.

Waterlogged objects: These can be allowed to dry. Follow recommendations for dry shells.

3f. Textiles

Textiles require very stable environments and must be handled with extreme care to avoid damage. Store textiles in a cool place until they are able to reach the Conservation Lab.

Dry objects: Do not use any metal tools to clean textiles and avoid unnecessary handling or folding.

- Store in a rigid container, supported by acid-free tissue or polyethylene foam.
- Never try to wash textiles or allow them to come into contact with water.

Waterlogged objects: Keep wet once removed from the site and until the textile can be brought to the Conservation Lab. Handle as little as possible.

- Store in a sealed plastic container, using polyethylene foam for support.
- Impressions of textiles can be preserved on corrosion products or on ceramics. Please consult a conservator.



3g. Wood

Dry objects: Store dry, in a low humidity location, away from heat and do not attempt to wash in water.

- Clean only using gentle dry brushing. Do not attempt to pry off any large clumps of dirt.
- If consolidation is necessary, use 5% Paraloid B-72 in acetone.
- If the artifact is to be used for radiocarbon dating, do not apply any consolidant to the wood.
- Do not attempt to join fragments of wood.

Waterlogged objects: Waterlogged wood is usually in a very fragile condition. Handle with extreme care. If in doubt or if you have any questions, contact a conservator.

- Keep wet from removal from the site until treated in the Conservation Lab. If allowed to dry out, waterlogged wood can lose up to 80% volume and 90% weight. It can bend and warp, so the original shape is completely unrecognizable and diagnostic information is lost.
- Large pieces can be supported on a rigid support such as wooden pallets covered in polyethylene foam. Do not wrap any waterlogged wood with string.

3h. Brick, Daub, and Other Building Material

Bulk samples will NOT be accepted for curation at BAR Collections. Small samples or diagnostic examples are acceptable.

Dry objects: Remove and pack in archival bags, making sure the objects are thoroughly dry.

- **Cleaning:** Only use gentle brushing with a stiff brush. Do not pry off any adhering lumps of dirt. Dip brush in solvent, brush the lump softly, and brush or scrape with wooden tool. Do not allow the solvent to touch surface of object.
- **Consolidating:** Only use consolidation where it is necessary, using 5% Paraloid B-72 in acetone. Refer to the beginning of Section 3 and Section 4 for further instructions.

Waterlogged objects: Keep wet and store in cool place. Monitor to make sure the artifact stays wet until conservation.

3i. Ceramics

Dry objects: *Do NOT dry sherds in direct sunlight. Dry in the shade, away from heated areas.*

- Store sherds in archival bags, after making sure the sherds are thoroughly dry. Use supports, foam, or acid-free tissue where necessary.
- **Cleaning:** Not all ceramics need to be washed in water. Gentle, dry brushing with a stiff brush can be used to remove dirt.
 - Hard, well-fired sherds can be rinsed in water. Allow these to dry evenly and away from any heat source or sunlight. **Do NOT dry sherds in direct sunlight.** Store in a dry area.
 - For any low-fired sherds, or any sherds with a slip, wash, or paint, test a small piece in water before rinsing.
 - If a white efflorescence, or white grainy substance, appears on the surface after cleaning, keep in dry location and contact a conservator. This may be salts migrating to the surface of the object.
 - If the pottery is cracked or fragile to the point of needing consolidation, refer to the consolidation steps listed above. If in doubt, contact a conservator. Do not attempt to clean, mark, or join consolidated ceramics.
- **Joining:** If the PI feels it is necessary to reconstruct a vessel in order to take measurements, determine a vessel's shape, or for photographs, please adhere to the guidelines outlined in this manual.



Always keep a record of any conservation treatment used!



Any complicated mends should be done in the Conservation Lab. Only join ceramics when it is necessary to do so. This is best left to a trained conservator. In many cases, the joins have to be redone in the lab, which results in damage to the edges once the adhesive is removed. Do not attempt to join damp pottery.

- Make sure the joins are cleaned by brushing away dirt. Please see the beginning of Section 3 for more instructions.
- Always use a reversible adhesive. 10-25% Paraloid B-72 in acetone is recommended.
- Do **NOT** use any of the following adhesives: Elmer's, tacky glue, rubber cement, DUCO, epoxy of any kind, hot glue, wood glue, super glue, gorilla glue or anything with unknown proprietary ingredients, or tape of any kind, shape, or color.
- Apply adhesive and hold together until it dries. Allow the adhesive to set in a manner that does not place force on the join. A tray of rice or sand works well. If using sand, make sure the sand is not allowed near the drying adhesive and is thoroughly removed once set.
- For large vessels, lay out the sherds where they are going to be placed. Then start joining at base, working around in a spiral fashion. This avoids locking out any sherds.
- On more robust sherds, masking tape or painters tape may be used to reinforce adhesive while the glue sets. Do NOT leave masking tape on the surface after, only use to support adhesive while it sets, then remove immediately.
- Clean edges of joins. Do not leave glue or adhesive visible on the surface of ceramic. If the vessel requires external supports or gap filling, please consult a conservator.

Waterlogged objects: Do not allow sherds to dry until they are treated.

- Do not attempt to remove encrustations or insoluble salts. Leave these for removal at the Conservation Lab.
- From sites with high soluble salts: Do NOT attempt to mend. These need to have soluble salts removed before any joins are attempted. Please consult a conservator.

3j. Glass

Dry objects: Keep glass artifacts dry and do not wet or immerse in water. Frequent wetting and drying can damage the structure of the glass.

- Cleaning: Only gentle brushing with a soft brush. Do not pry off any adhering lumps of dirt. Dip brush in solvent, brush the lump softly, and brush or scrape with wooden tool. Do not allow the solvent to touch the surface of the glass.
- Do not attempt to join. Leave this for a conservator. If joining is absolutely necessary, follow the steps in joining ceramics.
- Store in stable and dry environment.

Waterlogged objects: Keep glass artifacts wet and do not allow them to become dry. Store in plastic containers with enough support and with a tight-fitting lid. Store in a cool location.

3k. Stone

Stone artifacts, or lithics, are generally found in good, robust condition and usually require little conservation. There is very little difference in treating dry or waterlogged stone objects. Use care when removing from the ground and place into an open archival bag until the stone is thoroughly dried. Use acid-free tissue or polyethylene foam when necessary.

- If the object is in fragile condition, consolidate with a 5% solution of Paraloid B-72 in acetone.



Always keep a record of any conservation treatment used!



- Use a soft brush or wooden tool to remove dirt. Rinse in water and clean with a stiff brush to remove larger clumps. Be careful not to apply too much force and dry thoroughly before packing.
- If the stone has paint on its surface, pack carefully in a rigid container and bring to a conservator as soon as possible.
- Do not attempt to remove encrustation or insoluble salts.
- Broken fragments can be joined following the recommendations for ceramics, although complicated joins should be done by a conservator.
- If a white efflorescence, or white, grainy substance, appears on the surface after drying, allow the stone to dry out thoroughly and bring object to a conservator.

Please note: Stone artifacts, which are recovered from submerged salt water sites and have, at one point, been exposed to anaerobic, sulfate enriched water, can undergo a special type of corrosion. These conditions can occur frequently along the shores of Florida, where artifacts were deposited in terrestrial contexts which became brackish marsh, and finally marine contexts. This special pyritization corrosion can result in the formation of corrosion products and pyrite along the surface of the object. This causes significant damage and loss of diagnostic information. If you expect to excavate stone artifacts from this type of site, please contact the Conservation Lab for more information PRIOR to excavating the objects.

3l. Iron

Iron objects may appear robust, but they may actually not be structurally sound. Please remove them carefully from the ground and store with proper support.

Dry objects: Keep dry and do not wash with water. Any contact with water or excess moisture will cause the object to corrode further. Do not allow the iron object to come in contact with water. Do not attempt to join.

- Store in a dry environment, away from excessive humidity.
- If the artifact exhibits active corrosion, in the form of wet droplets or “weeping iron”, bring the artifact to a conservator right away.

Waterlogged objects: Keep wet until it can be brought to the Conservation Lab. Do not allow the object to dry out for any length of time.

- If the iron object is concreted, or covered in a shell of corrosion product, do NOT attempt to break open the concretions. Consult a conservator.

3m. Copper Alloy or Cupreous Artifacts

Do not attempt to clean away corrosion products or join any fragments, leave for a conservator. If any bright green spots of bronze disease are observed on the object, take to a conservator right away. If the objects are stored for a lengthy period before they are brought to the Conservation Lab, monitor the objects for any development of bronze disease.

Dry objects: Remove carefully, without pulling the object from the dirt.

- If the object is fragile, consolidate with 10% Paraloid B-72 in acetone. Do not use a water emulsion.
- Pack in a paper bag or envelope with correct labeling. Do not store in a plastic bag, especially if still wet. Store in a cool, dry place, away from sunlight.

Waterlogged objects: Store in water in archival bags or appropriate plastic container until they can be brought to the Conservation Lab. Do not allow to dry out. Do not attempt to remove any corrosion products.



Always keep a record of any conservation treatment used!



3n. Lead, Tin, or Pewter

Do not allow the metal or its storage water to come into contact with your skin. Wear gloves! Wash your hands after handling. Do not pack lead with paper, cardboard, or wood. Use only acid-free tissue or archival bags and polyethylene foam. Do not attempt to join lead fragments.

Dry objects: Remove carefully from the ground and place into an archival bag. Leave the bag open for the lead to thoroughly dry.

- Remove superficial dirt with a brush, but do not attempt to clean the metal or wet the object.

Waterlogged objects: These can be allowed to dry because their corrosion products are stable. Treat like dry lead or pewter objects.

3o. Gold

Dry objects: Gentle, dry brushing is permitted. Take care not to scratch the surface. Any other cleaning should be left to a conservator.

- Resist the temptation to unfold or reshape gold objects.
- Do not attempt to join.

Waterlogged objects: These materials do not need to be kept wet and can be allowed to dry. Follow procedures for dry gold objects.

3p. Silver

Silver is usually difficult to recognize in excavations. Silver can be extremely fragile, brittle, and easily cracked.

Dry objects: Carefully remove it from the ground. If it is in need of consolidation, use 10% Paraloid B-72 in acetone.

- Do not attempt to wash or clean silver objects. Do not allow them to come in contact with water. Contact with water or excess moisture will cause further corrosion. Also, do not attempt to join any fragments.
- Pack individually in acid-free tissue or polyethylene foam. Do not allow silver artifacts to receive any undue pressure when packing.

Waterlogged objects: Keep wet until they are brought to the Conservation Lab. Follow recommendations for packing dry silver objects.

3q. Miscellaneous, Composites, or When in Doubt

Please consult a conservator. Do not attempt to clean or conserve in the field. Bring the artifacts to the Conservation Lab as soon as possible.

Dry objects: Do not allow to become wet and keep in dry environment.

Waterlogged objects: Store in water until conservation.



4. Adhesives and Consolidants

Please follow these guidelines on adhesives and consolidants if you choose to conduct conservation treatments before the artifacts are submitted to the Bureau of Archaeological Research. Otherwise, please allow any conservation to be completed at the BAR Conservation Lab.

An **adhesive** is a glue used to adhere fragments of an artifact together and is applied only to the edges being joined together. These can be made from resins, mixed with a solvent, such as Paraloid B-72 mixed in acetone. A **consolidant** is a more diluted adhesive, used to coat the entire surface of an object for structural support and to prevent the surface from flaking.

Contact a conservator before applying any adhesive or consolidant not on this list. Most adhesives readily available at hardware or grocery stores are NOT suitable for conservation. Please take care when using any dangerous or flammable chemicals or solvents. Use with protective gear and in a well-ventilated area. The Bureau of Archaeological Research is not responsible for any accidents or misuse of any recommended chemicals.

Do's:

- Use Paraloid (or Acryloid) B-72 in acetone.
 - o Paraloid B-72 or Acryloid B-72 is an acrylic resin that is a good, all-purpose consolidant and adhesive. B-72 is a durable and stable resin, which remains colorless and should not alter the material to which it was applied, if done so properly. Paraloid B-72 is soluble in acetone and toluene, and is readily reversible.
 - o General percentages for mixing Paraloid B-72 and acetone solutions are below:
 - For use as a consolidant: 5-10% Paraloid B-72 to acetone.
 - For use as a glue or adhesive: 10-25% Paraloid B-72 to acetone.
 - o For specific percentages for mixing Paraloid B-72 and acetone solutions, see the recommended ratios by artifact material type, listed in Section 3.
 - o Follow the guide for mixing the solution in Section 4a.
- Rhoplex is a secondary option if Paraloid B-72 is not available. Rhoplex is an emulsion of acrylic resins, similar to, but different than, Paraloid B-72. It may become insoluble over time.

Don'ts:

- Polyvinyl acetate (PVA) should not be used as a glue or adhesive.
 - o PVA can soften when it is hot and easily flow. In the hot climate of Florida, this makes PVA more difficult to use. PVA is flexible, and does a poor job in supporting fragile artifacts. PVA *can* be used if you have flexible organics, but must be removed in the laboratory before curation. Please keep a record if this is used.
 - o Sometimes referred to as "pH neutral white adhesive", which is a water-based emulsion of PVA. This *can* be used in a diluted form to consolidate wet artifacts on terrestrial sites. Please keep a record of any use.
- White glues are NOT recommended. This includes Elmer's School Glue. These include proprietary ingredients that are unknown and not suitable for conservation. They can crosslink over time, and become insoluble, and therefore irreversible.
- Do not use cellulose nitrate, in the form of Duco Cement. It dries out and becomes brittle over time. The object will fall apart.
- Other glues and adhesives to avoid: tacky glue, rubber cement, epoxy of any kind, hot glue, wood glue, super glue, gorilla glue, anything with unknown proprietary ingredients, or tape of any kind, when used as the permanent adhesive.



If in doubt, or if you would like to use any adhesive not included on either of these two lists, please consult a conservator.



4a. Mixing Solutions: Paraloid B-72 in a Solvent

Paraloid B-72 can be purchased in a clear, odorless pellet form which is dissolved in either acetone or toluene to create a concentration for a consolidant or adhesive. B-72 is available from any conservation or museum-related supplier. Acetone or toluene are available from local hardware stores.

Please use acetone or other solvents in a ventilated area, in a fume hood, outside, or while wearing a respirator, for example. Wear gloves when using acetone, solvents, or the adhesive made from using acetone or solvents. Safety goggles and aprons can also be used for the protection of eyes and clothes.

Supplies:

- Scale
- Small glass jar with lid
- Cheese cloth or mesh
- Cotton string or twine
- Sharpie or permanent marker
- Measuring cup, beaker, or graduated cylinder, in mL
- Tap water
- Paraloid B-72
- Solvent- acetone or toluene

1. Decide on a desired volume and concentration. Use the graduated cylinder or beaker to measure out the desired volume in milliliters, using water. Transfer the water to your glass jar.
2. Mark the volume of water onto the side of the glass jar, dump out the water, and wipe the jar dry.
3. Use your scale to weigh out the desired concentration of Paraloid B-72 in grams. You need to know what percentage of weight to volume you are making.

Here are some common measurements:

For 100 mL of solution at 5% B-72, weigh out 5 grams.

For 100 mL of solution at 10% B-72, weigh out 10 grams.

For 100 mL of solution at 25% B-72, weigh out 25 grams.

For 200 mL of solution at 25% B-72, weigh out 50 grams.

4. Bundle the measured out B-72 in the mesh or cheesecloth and wrap in the cotton string or twine, leaving six inches or so of string for a handle. Suspend the bundle inside the glass jar, below the line you made for your desired volume.
5. Add solvent to the jar until it reaches the mark you made on the outside of the jar. Pull the string handle to the outside of the jar and secure the lid as tight as possible.
6. Allow the B-72 to dissolve. This may take hours to a couple of days depending on your concentration. Once the B-72 is dissolved, remove the mesh and string, and discard.

If the solution begins to thicken as the acetone dissolves over time, add more acetone to reach your desired viscosity. Swirl the jar around to mix.

This solution can also be made by adding the Paraloid B-72 to the jar without the mesh and string. Place the B-72 directly into the jar and add solvent to your black line. Swirl the jar or stir every few hours. This method takes a longer amount of time and requires more monitoring. However, if your jar has a very tight fitting lid, the time can be shortened by turning the jar upside down and right side up again, every few hours.

This information is credited to this webpage: <http://www.workbenchdiary.com/2012/12/how-to-mix-weight-volume-paraloid-b-72.html>. Please refer to this webpage, or the sources listed at the end of this document, for more details on this procedure.

5. Sources

Here are some excellent sources for further information on conservation for the field:

Sease, Catherine.

1988 *A Conservation Manual for the Field Archaeologist*. Archaeological Research Tools Vol 2. University of California, Los Angeles.

Hamilton, Donny.

1999. *Methods for Conserving Archaeological Material from Underwater Sites*. Texas A&M University, College Station, TX.

This manual can be viewed at this website: <http://nautarch.tamu.edu/CRL/conservationmanual/>

Here are some excellent sources for information on archaeological conservation:

Pearson, Colin.

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