APPENDIX B

BONE PREPARATION FORMS

SWCA ENVIRONMENTAL CONSULTANTS
## 2011 Mammoth Bone Preparation Record Form

**Project Name:** Mammoth Bone Preparation  
**Date Began:** 09/12/2011  
**Finished:** 12/09/2011  
**Preparer:** MERCEDES G. GUDOY

<table>
<thead>
<tr>
<th>BIN#</th>
<th>BAG#</th>
<th>BONE#</th>
<th>PPN: 1001.3</th>
<th>PPE: 196.24</th>
<th>PPElev: 196.24</th>
<th>PPDepth: 46 cmbd</th>
</tr>
</thead>
</table>

**TREATMENTS:**
- Matrix removal
- Consolidation
- Repair
- Bedding / Support
- Molding / Casting
- Consolidant Removal (PREVIOUS VINAC)
- Other: CHEESE CLOTH
- Other: WOODEN CUTICLE STICKS

**TECHNIQUES/TOOLS:**
- Dental Picks
- Airabrasive
- Pneum Impact
- Grinder
- BRUSH / ERASE / PAINT BRUSH
- Other: CHEESE CLOTH
- Other: WOODEN CUTICLE STICKS

**CONSOLIDANTS:**
- √ 2oz B-72/0.5 gal ace
- √ 6oz/0.5
- √ 16oz/0.5
- Butvar B-72: 25%/75% 50/50
- √ 4oz B-72/0.5 gal ace
- √ 8oz/0.5
- Vinac-15
- B-72 in Acetone: 25%/75% 50/50

**APPLICATION BY:**
- Vented wash bottle
- Pipet / Syringe
- Dip
- Brush
- Other: CHEESE CLOTH
- OTHER: WOODEN CUTICLE STICKS

**AREA BONDED:**
- NUMEROUS

**SOLVENTS / CLEANERS:**
- Acetone 100%/1%
- Acetone / Ethanol % / %
- Water

**AREA CONSOLIDATED:**
- Not Cleaned

**SEPARATORS:**
- Tissue Paper
- Sand
- Plastic Wrap
- Foil

**STATUS:**
- Returned to Collections
- Returned to:

**BONE CONDITION:** Overall: Cancellous / High cortical matrix / Low cortical matrix (Mixed)  
**NUMBER OF PIECED TOGETHER FRAGMENTS:** NUMEROUS

**REINFORCER:** BUTVAR B-72 ADHESIVE (50/50)

**PHOTO LOG:**
- Roll # 1 Frame #s 1 THRU 4
- Roll # 2 Frame #s 1 THRU 11 & 35
- Roll # 3 Frame #s 10
- Roll # 6 Frame #s 13 THRU 24

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Page 1 of 3
**PREPARER'S NOTES:**

<table>
<thead>
<tr>
<th>BIN#</th>
<th>BAG#</th>
<th>BONE#</th>
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</thead>
<tbody>
<tr>
<td>0</td>
<td>94</td>
<td>B-23</td>
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</tbody>
</table>


04/21/11 - 04/26/11

MERCEDES BEGAN CLEANING, PREPARATION & CONSOLIDATION PROCESS ON THE TRAY WITH BUBBLE WRAP HOLDING THE BONE. AS EACH COMPLETE BONE FRAGMENT OR CLUSTERS OF BONE WERE PROGREDDED THEY WERE TRANSFERRED TO ANOTHER TRAY LINED WITH CHEESE CLOTH MAINTAINING THE ORIGINAL ORIENTATION & ORIENTATION FROM THE BOTTOM HALF OF THE JACKET. THE SEDIMENT & SAND ENGULFING THE BONE ARE EXTREMELY HARDENED & DIFFICULT TO REMOVE. THIS IS PROBABLY IN PART DUE TO THE VENAL APPLIED IN THE FIELD DURING FIELD WORK. MULTIPLE SMALLER BONE FRAGMENTS RECOVERED FROM THE SEDIMENT CLUSTERS WERE GROUPED TOGETHER ON THE CLEAN/CONSOLIDATED CHEESE CLOTH LINED TRAY.

THE SEDIMENT & SAND REMOVAL FROM THE BONE WAS DIFFICULT & TIME-CONSUMING. THIS IS BEING DONE CAREFULLY TO NOT CAUSE DAMAGE TO THE BONE. SOME OF THE LARGER BONE FRAGMENTS ARE STILL COVERED WITH MUCH EXTERIOR SEDIMENT FACES. HOWEVER, OTHER BONE FRAGMENTS PARTICULARLY IN SEDIMENT CLUSTERS CONSISTS OF CANELLICUS TISSUE THAT IS VERY FRAGILE IN NATURE. DUE TO THE NATURE & PREPARATION OF THE BONE GOING ON THE CLUSTER WAS LEFT IN PLACE FOR ANY CONVERSATION WITH STEVE TO AVOID THE BREAKING APART INTO MANY SMALL PIECES.

04/26/11 - MERCEDES IS FINISHING CLEANING, PREPARATION & CONSOLIDATION PROCESS ONCE COMPLETED Began Piecing Together Process Utilizing Butvar Adhesive. ALL BONE FRAGMENTS WERE TRACKED & PIECED TOGETHER AS MUCH AS POSSIBLE. ANY FRAGMENTS WITH POSSIBLE CUT MARKS OR ANY OTHER MARKS OF CONCERN WERE FLAGGED FOR FURTHER REVIEW DURING ANALYSIS. ALL OF WHAT REMAINS OF THE CONTENTS OF THIS BIN / JACKET ARE NOW CLEANED, PREPARED, CONSOLIDATED & PIECED TOGETHER ON THE PROCESSED TRAY LINED WITH CHEESE CLOTH INCLUDING WHAT LAURA PROCESSED.

04/26/11 - AFTER BREAKING AWAY FROM THE EXCAVATION TO WORK ON OTHER RUNS MORE SITES BECAME APPARENT TO MERCEDES UPON RETURNING TO THIS BIN. THESE WERE GROUPED TOGETHER UTILIZING THE BUTVAR ADHESIVE. THE END PRODUCT OF PROCESSING WERE PHOTOGRAPHED. EACH FRAGMENT OR GROUPING OF FRAGMENTS WERE ASSIGNED A LETTER DESIGNATION (A, B, C, ETC...) FOR TRACKING PURPOSES.
PREPARER/S NOTES:

<table>
<thead>
<tr>
<th>BIN#</th>
<th>BAG# 27 (+ smaller bag)</th>
<th>BONE# 23</th>
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</table>

ACUIN #: 9/12/11 10:00 AM

Screened bottom jacket of Bin #6. Placed on tray and picked thru using lighted magnifying glass. All pieces that looked like bone or consolidated sediment was removed and placed on tray w/ cheese cloth.

Cleaning process began @ 12:00pm. Used acetone, cheese cloth, wooden pick w/ cloth, wooden pick direct, and toothbrush to remove sediment from pieces.

Pieces where consolidated sediment was harder, wooden pick was used directly. Minimal scraping seemed wiped clean w/ cheese cloth.

After long cleaning process only 31 pieces of actual bone were<ref>remained. Two pieces of bone very porous kept sediment w/ bone. Few structure. Five pieces appeared to be attachable. 1 set of three and 1 set of two. Bone was consolidated w/ solutions 1 & 3.</ref>

In addition, extra bone pieces separated out under Bag #27 (5 pieces) were cleaned. After cleaning, only 3 pieces of bone. 1 piece appears to have cut marks further examination needed.

These three pieces w/ be bagged separately from larger piece being cleaned by museum:

- 1 bag of bottom jacket pieces (w/ two baggies for refite) Lot 62
- 1 bag for original loose pieces (2)
- 1 bag for cut mark piece - designated as ➔ Lot 02.2
2011 Mammoth Bone Preparation Record Form

Project Name: Mammoth Bone Preparation
Date Began: 10/27/2011
Finished: 12/24/2011

Job Number: 2011 (Formerly 12864&14188)
Preparer: MATT CARVER (W/JACKET & TISSUE PAPER REMOVAL)

BIN# 12  BAG# 20  BONE# B-26

PPN: 10.01.74  PPE: 199.22  PPElev: 91.3  PPDepth: 40 cm db

TAXON: Mammutthus sp.
Initial description: Mammoth LIMB BONE - LARGE FRACURED SPECIMEN W/STAR SMALLER FRAGMENTS
Final description: A) LARGE DIAPHYSIS FRAGMENTS; B) LONG BONE FRAGMENT NEAR DISTAL PROXIMAL END; C) EXTERIOR BONE FRAGMENTS; D) CANCELLOUS BONE FRAGMENTS; E) RESIDUAL FRAGMENTS

TREATMENTS:
- Matrix removal
- Consolidation
- Repair
- Bedding / Support
- Molding / Casting
- Consolidant Removal (PREVIOUS VINAC)
- Other: WOOD STICKS
- Other: CHEESE CLOTH

TECHNIQUES/TOOLS:
- Dental Picks
- Airabrasive
- Pneum Impact
- Grinder
- Brush

CONSOLIDANTS:
- 2oz B-72/0.5 gal ace 6oz/0.5 16oz/0.5
- 4oz B-72/0.5 gal ace 8oz/0.5 Vinac-15

ADHESIVES:
- Butvar B-72: 50/50
- B-72 in Acetone: 25%/75%

APPLICATION BY:
- Vented wash bottle
- Pipet / Syringe
- Brush
- Dip
- Other: Acetone 100%
- Other: Acetone / Ethanol % /

SOLVENTS / CLEANERS:
- Water
- Acetone

AREA BONDED: NUMEROUS
- LOOSE FRAGMENTS TO MAIN LIMP SECTION (TOP/NORTH BNN AREA)
- LOOSE FRAGMENTS TO EACH OTHER (MEDIUM TO LARGE FRAG (BOTTOM/SOUTH BNN AREA)

AREA CONSOLIDATED:
- Not Cleaned

ENTIRE SPECIMEN
- Entire Specimen
- Other: Tissue Paper

SEPARATORS:
- Sand
- Plastic Wrap
- Foil

STATUS:
- Returned to Collections

BONE CONDITION:
- Overall: Cancellous / High cortical matrix / Low cortical matrix (Mixed)

NUMBER OF PIECED TOGETHER FRAGMENTS: NUMEROUS

REINFORCER: BUTVAR B-72 ADHESIVE (50/50)

PHOTO LOG:

Roll # A Frame # 1 THRU 32
Roll # B Frame # 6 THRU 12
Roll # C Frame # 1 THRU 4
Roll # D Frame # 8 THRU 32
B-5

PREPARER/S NOTES:

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<td>12</td>
<td>29</td>
<td>B-26</td>
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</tbody>
</table>


10AM BEGAN REMOVING TISSUE PAPER FROM BONE. 2 PHOTOS TAKEN (ROLL 5) FINISHED.

11/09/11-11/11/11 (MERCEDES)

AFTER PUTTING THIS BIN ASIDE TO DEAL WITH THE LARGER SPECIMEN IN BIN 15 I HAVE PROCEEDED TO BIN 12-13-26 TO CONTINUE WITH LAB PROCESSING. THE MAIN PIECE OF THE LIMB HAS MOST OF THE EXTERIOR BONE EXCEPT FOR THE ENDS. IT IS SOMEWHAT CRUSHED & HELD TOGETHER.

HARDENED OSTEODIMENT IN AREAS. THREE FRACTURES WERE ON THIS MAIN PIECE OF THE LIMB LOCATED IN THE TOP NORTH SECTION OF THE BIN. WERE PREPARED DURING THE PREVIOUS STABILIZATION/PROTECTION PROCESS BY SWCA IN 2008. LOOSE FRAGMENTS WITH MUCH EXTERIOR BONE SURFACES ARE ADJACENT TO & ALONG THE PERIPHERY OF THE MAIN LIMB. THEY APPEAR THAT THEY WILL NOT BE USED IN THE PLATE/PACK THE MAIN LIMB. IN THE BOTTOM/SOUTH END OF THE BIN THERE ARE TWO LARGER FRAGMENTS MOSTLY MADE UP OF CANCELLOUS TISSUE W/ ONE FACE OF DEGENERATED EXTERIOR BONE. THESE WERE PREVIOUSLY PREPARED DURING THE STABILIZATION/PROTECTION PROCESS BY SWCA IN 2008 AS WELL. THESE FRAGMENTS ARE EXTREMELY FRAGILE & LOOSE PIECES OF JUNKY.

EXTERIOR BONE FRAGMENTS W/ IN THE SAND THAT WAS SORTED FOR BONE. ALL BONE WAS TRANSFERRED FROM THE BIN TO A TRAY LINED WITH PULP WRAP SMOOTH SIDE UP FOR CLEANING, PREPARATION & CONSOLIDATION. A COMBINATION OF CHEESE CLOTH & ACETONE, DRY & RINSED SOFT TOOTHBRUSH IS BEING UTILIZED FOR THE PROCESSING. THE EXTERIOR BONE FRAGMENTS ARE RATHER STURDY COMPARED TO THE EXTERMELY FRAGILE CANCELLOUS BONE AND/OR ENDS OF BONE & BONE SHAFTS. AS EACH FRAGMENT OR GROUPING OF FRAGMENTS WERE PROCESSED THEY WERE TRANSFERRED TO A CLEAN LINED WITH CHEESE CLOTH TRAY. THE ORIGINAL ORIENTATION & PLACEMENT FROM THE JACKET WAS MAINTAINED. FRAGMENTS TRACKED. ALL PROCESSING IS BEING DONE WITH UP MOST CARE NOT TO DAMAGE BONE. ONCE THIS PART WAS COMPLETED BEGAN PIECING TOGETHER FRAGMENTS UTILIZING BUTVAR ADHESIVE. THE FRAGMENTS ALONG THE PERIPHERY OF THE MAIN LIMB FRAGMENT DID NOT REQUIRE BUTVAR AS THEY WERE STURDY. TARDY OF THE CONTENTS OF THE BIN 12-JACKET ARE NOW CLEANED, PREPARED, CONSOLIDATED & PIECED TOGETHER ON THE PROCESSED TRAY LINED WITH CHEESE CLOTH.

12/11/11 12/11/11 (ARGENTO)

BONE MORE REPTS HAVE BECOME APPARENT & WERE PIECED TOGETHER USING BUTVAR ADHESIVE. THE END PRODUCTS WERE PHOTOGRAPHED. LETTER DESIGNATIONS (A, B, C, ETC...) WERE ASSIGNED TO EACH BONE FRAGMENT OR GROUPING OF FRAGMENTS.
# 2011 Mammoth Bone Preparation Record Form

**Project Name:** Mammoth Bone Preparation  
**Job Number:** 2011 (Formerly 12864&14188)  
**Date Began:** 9/20/11  
**Preparer/s:** TINA NIELSEN, MAT CARTER  
**Finished:** 12/07/11

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<th>PPE</th>
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<th>PPDepth</th>
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<tbody>
<tr>
<td>1001.04</td>
<td>999</td>
<td>96.28</td>
<td>172.0MBD</td>
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<table>
<thead>
<tr>
<th>TAXON:</th>
<th>Mammutthus sp. (watered down)</th>
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<table>
<thead>
<tr>
<th>Initial description:</th>
<th>Mammoth Bone Fragment - Identified as Partial Axis (wall thickness fragment)</th>
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<tbody>
<tr>
<td>Final description:</td>
<td>A) Possible Astragalus; B) Residual Fragments</td>
</tr>
</tbody>
</table>

## TREATMENTS: |

- [x] Matrix removal
- [ ] Consolidation
- [x] Repair
- [x] Bedding / Support
- [ ] Molding / Casting
- [x] Consolidant Removal
- [ ] Other: Wooden Pick
- [ ] Other: Cheese Cloth

## TECHNIQUES/TOOLS: |

- [ ] Dental Picks
- [ ] Airbrasive
- [ ] Pneum Impact
- [ ] Grinder
- [ ] Brush
- [x] Other: Wooden Pick
- [ ] Other: Cheese Cloth

## CONSOLIDANTS: |

<table>
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<tr>
<th>2oz B-72/0.5 gal ace</th>
<th>6oz/0.5</th>
<th>16oz/0.5</th>
<th>Butvar B-72:</th>
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<tbody>
<tr>
<td>[x] 4oz B-72/0.5 gal ace</td>
<td>8oz/0.5</td>
<td>Vinac-15</td>
<td>B-72 in Acetone:</td>
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## ADHESIVES: |

<table>
<thead>
<tr>
<th>Butvar B-72:</th>
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<tr>
<td>Vinac-15</td>
<td>25%/75%</td>
<td>50/50</td>
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## APPLICATION BY: |

- [x] Vented wash bottle
- [x] Pipet / Syringe
- [ ] Dip
- [ ] Brush
- [ ] Other: Cheese Cloth

## AREA BONDED: |

## SOLVENTS / CLEANERS: |

- [x] Acetone
- [ ] acetone / ethanol
- [ ] Water

## AREA CONSOLIDATED: |

- [x] Entire Specimen
- [ ] Other:

## SEPARATORS: |

- [ ] Tissue Paper
- [ ] Sand
- [ ] Plastic Wrap
- [ ] Foil

## STATUS: |

- Returned to Collections
- Returned to:

## BONE CONDITION: Overall: Cancellous (High cortical matrix) / Low cortical matrix / Mixed

## NUMBER OF PIECED TOGETHER FRAGMENTS: 5

## REINFORCER: Butvar 50/50

## PHOTO LOG: |

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<td>2</td>
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</tr>
<tr>
<td>2</td>
<td>29</td>
<td>2</td>
<td>37</td>
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</table>

Page 1 of 3
THE BONE B-12 CAST WAS OPENED ON 9/20/11 BY MERCEDES, STEVE AND TINA AT 9 AM. THE CAST HAD A WIDE LIP SO DRUMMEL WAS NOT VERY USEFUL, SO WE USED MOSTLY CLIPPERS TO OPEN THE CAST. THE BONE APPEARS TO BE IN GOOD CONDITION AND IS ALL IN THE TOP OF THE CAST. THE SAND FROM THE BOTTOM WAS KEPT AND WILL LOOK FOR LOOSE BONE AT A LATER DATE.

B-12 WAS THEN PLACED ON BUBBLE WRAP TO BEGIN REMOVING CONSOLIDATE AND MATRIX. USED ACETONE, TOOTHBRUSH, CHEESE CLOTH AND WOODEN PICK TO REMOVE SEDIMENT. GENTLY USED WOODEN PICK DIRECTLY TO REMOVE HARDER SEDIMENT. TISSUE SURROUNDING BONE IN CAST WAS REMOVED AFTER LUNCH ONCE SEVERAL PASSES WITH ACETONE LOOSENED CONSOLIDATE. LEFT OF AFTERNOON USED TO REMOVE ADDITIONAL SEDIMENT.

9/21/11

RESUMED CLEANING OF B-12 BONE (BIN 13). BONE IS SOMewhat FRAGMENTED AND HELD TOGETHER WITH SEDIMENT. TRIED TO KEEP TOGETHER BUT HAS SPLIT INTO 3 CLUSTERS NOW. PHOTOS TAKEN. WORKED ON CLEANING 11/15 THEN CONSOLIDATED WITH 1 AND 3. UNTIL SOMEONE ELSE CAN CONTINUE CLEANING. A FEW SMALL BONE FRAGMENTS FROM MATRIX AND/OR FALLEN OFF MAIN BONE CLUSTER HAVE ALSO BEEN UNJUTED AND PLACED ON TRAY. ALSO LOOKED THROUGH BOTTOM CAST AND DID NOT FIND ANY ADDITIONAL BONE. JUST SAND.
### 2011 Mammoth Bone Preparation Record Form

#### PREPARER/S NOTES:

<table>
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<tr>
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<th>BAG#</th>
<th>BONE#</th>
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</thead>
<tbody>
<tr>
<td>9/24/11</td>
<td>34</td>
<td>B-12</td>
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</tbody>
</table>

9:30 AM - SETTING THROUGH PACKING SAND AND MATRIX REMOVED FROM BONE, LOOKING FOR STRAY BONE FRAGMENTS. SEVERAL FRAGS CAME FROM THE MATRIX, NONE FROM THE SAND. ONE POSSIBLE MICRODEBRIDGE CAME FROM THE SAND. MATRIX WAS GIFTED BY HAND/THREADERS UNDER LIGHTED MAGNETIC GLASS, SIMPLE 10 SCREEN WAS USED WITH THE SAND.

1 PM - BEGAN CLEANING B-12 WITH ACETONE, CLOCKED PROX. TOOTHBRUSH, CHEESECLOTH. AFT 4 SATISFACTORY INSPECTION BY L. ARENA. I SET THE PIECES TOGETHER IN A TUB OF SAND FOR STABILIZATION.

4:30 PM - BEGAN GLUING 2 "HALVES" OF BONE. SOME FRAGMENTS WERE TOO SMALL TO BIND A RACE TO FIT THEM WITHIN THE BONE. 24 SMALLER FRAGMENTS HAVE BEEN SET ASIDE SINCE THEY DID NOT FIT ANYWHERE ON THE LARGER BONE FRAGMENTS. GLUED-TOGETHER BONE WAS PHOTOGRAPHED (TOP & 2 SIDES).

9/27/11

8:30 AM - COATED BONE B-12 IN 8.2% "#7" SOLUTION (2 OZ 8.2% PER 1/2 GAL ACETONE) CONSULTANT. ALSO CLEANED & COATED SMALLER BONE FRAGMENTS.

10:00 AM - PHOTOGRAPHED ASSEMBLED BONE AND SEPARATE FRAGMENTS (TOP & SIDE VIEW).

11 AM - FINISHED NOTES

12/7/11 - MATRIX HAS BEEN SCREENED AND OBVIOUS BONE FRAGMENTS HAVE BEEN REMOVED AND PLACED WITH OTHER FRAGMENTS.
# 2011 Mammoth Bone Preparation Record Form

**Project Name:** Mammoth Bone Preparation  
**Date Began:** 10/25/11  
**Finished:** 12/7/11  
**Preparer/s:** Matt Carter

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**BIN##:** 13  
**BAG#:** 08  
**BONE##:** B-22

**PPN:** 1001.8  
**PPE:** 999.72  
**PPElev:**  
**PPDepth:**

**TAXON:** Mammut hus sp.

**Initial description:** 6 Non-diagnostic bone fragments

**Final description:** A) Distal radius fragment; B) Long bone fragments

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### TREATMENTS:

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<thead>
<tr>
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<tr>
<td>√</td>
<td>Matrix removal</td>
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<tr>
<td>√</td>
<td>Consolidation</td>
</tr>
<tr>
<td>√</td>
<td>Repair</td>
</tr>
<tr>
<td>√</td>
<td>Bedding / Support</td>
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<tr>
<td></td>
<td>Molding / Casting</td>
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<td></td>
<td>Consolidant Removal</td>
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<td></td>
<td>Other: Cheese Cloth</td>
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<tr>
<td></td>
<td>Other: Loom / Pick</td>
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### TECHNIQUES/TOOLS:

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<td>Dental Picks</td>
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<td>Airabrasive</td>
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<td>Pneum Impact</td>
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<tr>
<td>Grinder</td>
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<tr>
<td>Brush</td>
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### CONSOLIDANTS:

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<tr>
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<tbody>
<tr>
<td>2oz B-72/0.5 gal ace</td>
<td>6oz/0.5</td>
</tr>
<tr>
<td>4oz B-72/0.5 gal ace</td>
<td>8oz/0.5</td>
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### ADHESIVES:

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<tbody>
<tr>
<td>Butvar B-72:</td>
<td>25%/75%</td>
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<tr>
<td>B-72 in Acetone:</td>
<td>25%/75%</td>
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### APPLICATION BY:

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<tbody>
<tr>
<td>Vented wash bottle</td>
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<tr>
<td>Pipet / Syringe</td>
<td></td>
</tr>
<tr>
<td>Dip</td>
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### AREA BONDED:

**VARIOUS REPAIRS**

### SOLVENTS / CLEANERS:

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<tr>
<td>Acetone 100%</td>
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<tr>
<td>Acetone / Ethanol % / %</td>
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<td>Water</td>
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### AREA CONSOLIDATED:

Not Cleaned

### SEPARATORS:

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<td>Plastic Wrap</td>
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<td>Foil</td>
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### STATUS:

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<td>Returned to Collections</td>
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### BONE CONDITION:

Overall: Cancellous / High cortical matrix / Low cortical matrix / Mixed

**NUMBER OF PIECED TOGETHER FRAGMENTS:** 6

### REINFORCER:

Butvar B-72

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### PHOTO LOG:

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<td>Time</td>
<td>Event Description</td>
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<tr>
<td>10/25/11</td>
<td>10am</td>
<td>OPENED PLASTER JACKET WITH A DREMEL TOOL AND TOE SNAPE LUNITET. AFTER TISSUE &quot;CRADLE&quot; WAS EXTRACTED FROM THE JACKET, LOOSE PACKING SAND WAS BUSHED AWAY TO EXPOSE STABILIZED BONE.</td>
<td></td>
</tr>
<tr>
<td>10/25/11</td>
<td>11:45am</td>
<td>TISSUE CRADLE APPLIED TO TISSUE CRADLE TO REMOVE TISSUE PAPER LAYER BY LAYER</td>
<td></td>
</tr>
<tr>
<td>12:15pm</td>
<td>BEGAN REMOVAL OF MORTAR &amp; VINYL-SOFTENED PACKING SAND FROM BONE PIECES</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>BONE IS IN GOOD SHAPE OVERALL, THOUGH FRAGMENTED WITH A NUMBER OF PIECES. THE MAIN BONE CLUSTER IS A GREATER CHALLENGE DUE TO THE NUMBER OF BONE FRAGMENTS THAT NEED TO REMAIN TOGETHER, BUT STAND A CHANCE OF PASSING AROUND DURING THE CLEANING PROCESS. ALSO, THE VINYL CONSOLIDATE USED TO STABILIZE THE BONES IS VERY THICK AND DIFFICULT TO REMOVE WITHOUT DAMAGING SOME OF THE BONE. DESPITE THE BONE'S FAIRLY GOOD CONDITION, PHOTOS HAVE BEEN TAKEN THROUGHOUT THE JACKET REMOVAL AND BONE CLEANING PROCESS.</td>
<td></td>
</tr>
<tr>
<td>10/26/11</td>
<td>4pm</td>
<td>STOPPED CLEANING TO WRITE NOTES UNTIL 4:15</td>
<td></td>
</tr>
<tr>
<td>10/26/11</td>
<td>7:30am</td>
<td>RESUMED CLEANING MAIN BONE CLUSTER. ALL SEPARATE FRAGMENTS HAVE BEEN CLEANED AND COVERED WITH #34 B-72 CONSOLIDATE.</td>
<td></td>
</tr>
<tr>
<td>10/26/11</td>
<td>3:30pm</td>
<td>BONE AND FRAGMENTS ARE CLEANED, TREATED WITH CONSOLIDATE, AND RE-ASSEMBLED. DURING THE CLEANING/CONSOLIDATION, SOME FRAGMENTS Fell OFF THE MAIN CLUSTER. AFTER CLEANING &amp; CONSOLIDATION, CLUSTER WAS RE-ASSEMBLED AND IS NOW A RECOGNIZABLE BONE FRAGMENT. BUTVAR B-72 50/50 HAS BEEN USED TO GLUE FRAGMENTS BACK TOGETHER. PHOTOS WERE TAKEN AFTER CLEANING/CONSOLIDATION/RE-ASSEMBLY.</td>
<td></td>
</tr>
<tr>
<td>10/27/11</td>
<td>LOOSE MORTAR HAS BEEN SCREENED AND ANY obOvIous BONE FRAGMENTS HAVE BEEN REMOVED AND PLACED WITH OTHER FRAGMENTS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# 2011 Mammoth Bone Preparation Record Form

- **Project Name:** Mammoth Bone Preparation
- **Date Began:** 2/7/2011
- **Finished:** 4/28/11
- **Job Number:** 2011 (Formerly 12864&14188)
- **Preparer:** M. Carter

## Bin Information
- **BIN #:** 14
- **BAG #:** 27
- **BONE #:** B-24a
- **PPN:** 1001.7
- **PPE:** 99.95
- **PPElev:** 98.24 - 99.1'
- **PPDepth:** 42 - 52 cm db

## Taxon
- **TAXON:** Mammutthus sp.

## Initial and Final Description
- **Initial Description:** Mammoth - Possible Rib Bone - Well preserved Rib Fragment
- **Final Description:** A) Rib shaft fragment; B) Rib shaft fragment; C) Posidal fragments

## Treatments
- **Matrix removal:** X
- **Consolidation:** X
- **Repair:** X
- **Bedding / Support:**
- **Molding / Casting:**
- **Consolidant Removal:**
- **Other:**

## Techniques/Tools
- Dental Picks
- Airbrasive
- Pneum Impact
- Grinder
- Brush
- Other: CHEESECUTTER
- Other: 1800 W PICK

## Consolidants
- 2oz B-72/0.5 gal ace
- 6oz/0.5
- 16oz/0.5
- 4oz B-72/0.5 gal ace
- 8oz/0.5
- Vinac-15

## Adhesives
- Butvar B-72:
- 25% / 75%
- 50 / 50
- B-72 in Acetone:
- 25% / 75%
- 50 / 50

## Application by
- Vented wash bottle
- Pipet / Syringe
- Dip
- Brush
- Other:

## Solvents/Cleaners
- Acetone
- Acetone / Ethanol
- Water

## Area Consolidated
- Entire Specimen
- Other:

## Status
- Tissue Paper
- Sand
- Plastic Wrap
- Foil

### Bone Condition
- Overall: Cancellous / High cortical matrix / Low cortical matrix / Mixed

### Number of Pieced Together Fragments
- 4 - 2 x Large; 2 x Small (61cm)

### Reinforcer
- Butvar B-76

## Photo Log

<table>
<thead>
<tr>
<th>Roll #</th>
<th>Frame #s</th>
<th>Roll #</th>
<th>Frame #s</th>
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<td>1-9</td>
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<tr>
<td>3</td>
<td>11-12</td>
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<td>4</td>
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</tr>
</tbody>
</table>

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Page 1 of 2
11AM I BEGAN OPENING PLASTER JACKET BY SAWING 3 EDGES OFF THE CAST, USING THE 4TH EDGE AS A HINGE. 

COLLECTED ALL PACKING SAND AND LOOSE MATRIX (THEY HAD MIXED TOGETHER IN THE JACKET). 

MULTIPLE BONE FRAGMENTS IN LOOSE MATRIX AND SAND.

TAGS FOR B-24 A AND B-24 B MAY HAVE BEEN SWITCHED DURING TACKING.

1230 PM TISSUE PAPER "PEEL" HAS BEEN REMOVED. SHAPES OF RIB IS VISIBLE. PHOTOS WERE TAKEN THROUGHOUT THE JACKET REMOVAL PROCESS.

1 PM REMOVING MATRIX FROM BONE CLUSTER USING ACETONE, CHEESECLOTH, TOOTHBRUSH, AND WOODEN RAKE. MATRIX IS EASILY REMOVED AND THE BONE IS IN GOOD CONDITION WITH VERY MINIMAL BREAKAGE.

4PM MATRIX IS COMPLETELY REMOVED FROM LARGER RIB SEGMENTS. DURING CLEANING, THE MAIN SEGMENT OF THE RIB SEPARATED INTO 3 SECTIONS. THESE 3 SECTIONS AND ONE OTHER SECTION HAVE BEEN COATED IN B72 "#7" SOLUTION CONSOLIDATION AND ARE BEING LEFT TO COMPLETELY DRY OVERNIGHT.

8:30 AM SORTED THROUGH SAND AND MATRIX FOR BONE FRAGMENTS. SCREENED WITH A 3 INCH DRUM SCREEN, THEN PICKED THROUGH THE REMAINDER BY HAND, USING TWEEZERS UNDER A LIGHTED MAGNIFYING GLASS.

FOUND 12 INDETERMINATE BONE FRAGMENTS, ONE HELICODISCUS SNAIL SHELL, ONE POSSIBLE MICRODEistrate THAT NEEDS FURTHER ANALYSIS.

1 PM 2 OF THE 4 MAIN PIECES OF RIB FIT TOGETHER, AND WERE GLUED TOGETHER USING BUTVAR 50/50.

2 PHOTOS WERE TAKEN OF BONE FRAGMENTS, BONE MICRODEistrate, AND SNAIL SHELL.
2011 Mammoth Bone Preparation Record Form

Project Name: Mammoth Bone Preparation
Job Number: 20111 (Formerly 12864 & 14188)
Date Began: 9/29/2011
Preparer: Matt Carter

BIN# 14 | BAG# 27 | BONE# B-24 B
---|---|---
PPN: 1001.7 | PPE: 99.95 | PPElev: 98.29 - 98.18 | PPDepth: 42.52 cm/6

TAXON: *Mammuthus sp.*

Initial description: *Mammoth Bone Fragment - Vertebrae & Rib Bones*
Final description: *A) Distal Tibia Fragment; B) Rib Shaft Fragment; C) Exterior (Cortical) Bone Fragment, D) Cancellous Bone Fragments*

<table>
<thead>
<tr>
<th>TREATMENTS:</th>
<th>TECHNIQUES/TOOLS:</th>
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<tr>
<td>√ Matrix removal</td>
<td>Dental Picks</td>
</tr>
<tr>
<td>√ Consolidation</td>
<td>Airabrasive</td>
</tr>
<tr>
<td>√ Repair</td>
<td>Pneumatic Impact</td>
</tr>
<tr>
<td>Bedding / Support</td>
<td>Grinder</td>
</tr>
<tr>
<td>Molding / Casting</td>
<td>Brush</td>
</tr>
<tr>
<td>√ Consolidant Removal</td>
<td>Other: CHEESECLOTH</td>
</tr>
<tr>
<td>Other:</td>
<td>Other: WOOD/PLASTIC PICK</td>
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<tr>
<th>CONSOLIDANTS:</th>
<th>ADHESIVES:</th>
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<tbody>
<tr>
<td>2oz B-72/0.5 gal ace</td>
<td>16oz/0.5</td>
</tr>
<tr>
<td>4oz B-72/0.5 gal ace</td>
<td>8oz/0.5</td>
</tr>
<tr>
<td>B-72 in Acetone: 25%/75% 50/50</td>
<td></td>
</tr>
</tbody>
</table>

APPLICATION BY:
| Vented wash bottle | BUTVAR |
| Pipet / Syringe | 50/50 |
| Dip | |
| Brush | Acetone |
| Other: | Acetone / Ethanol |
| Water | |

AREA CONSOLIDATED:
| Entire Specimen | Tissue Paper |
| Other: | Sand |
| Returned to Collections | Plastic Wrap |
| Returned to: | Foil |

BONE CONDITION Overall: Cancellous / High cortical matrix / Low cortical matrix (Mixed)

NUMBER OF PIECED TOGETHER FRAGMENTS: Numerous

REINFORCER: Butvar B-72 50/50

PHOTO LOG:
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<th>Frame #s</th>
<th>Roll #</th>
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PREPARER/S NOTES:

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<th>BAG#</th>
<th>BONE#</th>
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<tbody>
<tr>
<td>14</td>
<td>27</td>
<td>B-048</td>
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</table>

9/14/11 8:15AM  SAVED OPEN PLASTER CAST ON 3 SIDES, USING 4TH SIDE AS HINGE. MULTIPLE BONE FRAGMENTSoured WITH PACKING SAND OUT OF THE FIRST SAWED EDGE. REMOVED ALL SAND AND LOOSE MATRIX FROM JACKET BEFORE REMOVING TISSUE PAPER "CRADLE." IT APPEARS THAT SOME CONSOLIDATED BONE + MATRIX HAS BROKEN OFF AND FRAGMENTED WHILE INSIDE THE JACKET. PHOTOS TAKEN OF THIS PROCESS.

9:30 AM  JACKET IS COMPLETELY EMPTY; SAND, MATRIX, AND CRADLE ARE SEPARATED. BEGAN SCREENING SAND + MATRIX THROUGH 1/4 INCH SCREEN AND BY HAND. BONE IS IN POOR CONDITION AND CRUMBLES WHEN DIRECTLY EXPOSED TO ACETONE. SOME FRAGMENTS CURRED WHEN #4 CONSOLIDANT WAS APPLIED. MULTIPLE ATTEMPTS AT REPAIRING BONE WERE MADE, BUT MUCH OF THE BONE IS TOO FRAILE. ~45 BONE FRAGMENTS CAME FROM THE LOOSE SAND; ALSO COLLECTED 11 CONCRETE/ROCK INCLUSIONS FROM MATRIX.

3:10 PM  LOOSE MATRIX & SAND HAVE BEEN PICKED CLEAN OF BONE FRAGMENTS. FINISHED UP NOTES UNTIL 3:45.

9/30/11 8:30AM  Began removing bone cluster from 'tissue paper "cradle." Photos taken while still in cradle.

9:15AM  Tissue paper cleared off bone cluster. Began cleaning matrix from bones. Multple large (4-9 cm) fragments of bone becoming visible. Some bone is very flaky while some holds together pretty well. Have been using conservative amounts of acetone in very localized parts of the cluster to avoid damaging bones. #5 consolidant used to reinforce the matrix-bone bands until more matrix can be cleared away. During cleaning, a large portion of the cluster broke off, glued back together and set to dry until work begins on 5th again.

2:45PM  Photo taken of cluster after broken piece glued back on.
10/17/11 7:45AM | Cleaning resumed after 2 week break while M. Cutter was on another project. The cluster of 2 major pieces has held up, and the bone cluster is very stable after being soaked in a #4 B-72 solution (8.8g 0.72% per .5 gal acetone) and set to dry for 17 days.

2PM | After K. Miller and L. Acuna decided that a main element of bone needed to be separated from the bone cluster, a more aggressive strategy was adopted. Matvey was soaked with 100% acetone, and the cluster split in two pieces, exposing fragmented bone where the split occurred. 2 photos were taken after the separation.

3PM | Removed Matvey from main bone and other part of bone cluster. Bones are mostly very fragile and are fragmentive during cleaning. Some effort is being made to repair what breaks, but further damage is very likely in the repair process. 9 photos taken at end of day showing separate pieces and incidental fragmentation.

10/24/11 9:15AM | Further separation of bone fragments from cluster reveal poor condition of some of the bone. Pieces softened by acetone crumble easily when cleaning is attempted. 2 photos taken of multiple bone fragments.

12:50PM | Main bone (vertebra?) and red fragment are now completely cleaned and stabilized. Additional multiple fragment of bone ready to be cleaned. 5 photos taken of cleaned/stabilized bones.

10/25/11 7:45 | Attempts to clean more bone fragments are doing more damage than good. #3, 4, 5 consolidate crumble the fragile bone and dissolve any Matvey holding bone together. All unscreened Matvey removed from bone cluster has been set aside in a curative gas and is identified by a strip of boric flagging tape. One photo was taken of the mesh bone fragments.

12/7/11 | Loose Matvey has been screened and obvious bone fragments have been removed and filled with other mesh bone fragments.
2011 Mammoth Bone Preparation Record Form

Project Name: Mammoth Bone Preparation
Job Number: 2011 (Formerly 12864 & 14188)
Date Began: 10/27/2011
Preparer(s): Matt Carter & Mercedes C. Colón

BIN # 15
Bag # 26
Bone # B-36
PPN: 1001.04
PPE: 999.26
PP Elev: 90.90-97.90
PP Depth: 84-72 cm QED

TAXON: Mammutthus sp.
Initial description: Mammoth Bone - Partial ulna
Final description: a) ulna (almost complete b) segments); b) radius (almost complete & articulated with ulna b) segments); c) possible ulna form; d) possible ulnae; e) proximal fragments; f) middle fragments; g) distal fragments; h) residual fragments

TREATMENTS:

- Matrix removal
- Consolidation
- Repair
- Bedding / Support
- Molding / Casting
- Consolidant Removal
- Other: Cheesecloth

TECHNIQUES/TOOLS:

- Dental Picks
- Airabrasive
- Pneum Impact
- Grinder
- Brush
- Other: Bamboo Picks

CONSOLIDANTS:

- 2oz B-72/0.5 gal ace
- 6oz/0.5
- 16oz/0.5

ADHESIVES:

- Butvar B-72:
- 25%/75%

APPLICATION BY:

- Vented wash bottle
- Pipet / Syringe
- Dip
- Brush
- Other: Acetone 100%
- Acetone / Ethanol % / %
- Water

AREA BONDED:

Numerous

SOLVENTS / CLEANERS:

- Acetone
- Acetone / Ethanol
- Water

AREA CONSOLIDATED:

Not Cleaned

Entire Specimen

Other:

TEPARETORS:

Tissue Paper

STATUS:

Sand

Returned to Collections

Plastic Wrap

Returned to:

Foil

BONE CONDITION Overall: Cancellous / High cortical matrix / Low cortical matrix / Mixed

NUMBER OF PIECED TOGETHER FRAGMENTS: Numerous

REINFORCER: Butvar B-72

PHOTO LOG:

Roll # 5
Frame #s 5-36

Roll # 6
Frame #s 1-99

Roll # 4
Frame #s 1-7

Roll # 8
Frame #s

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B-17

PREPARER/S NOTES:

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10/27/11 10:30 AM WITH MERCEDES PREPARED THE TUB CONTAINING THE JACKET IN THE LAB AREA.

11:00 OPENED JACKET USING DREMEL FOR INITIAL CUT, THEN TOOLS TO CUT ALL SECTIONS OF JACKET. REMOVED TOP 6 PHOTOS TAKEN.

11:30 BEGAN REMOVING TISSUE PAPER. 6 PHOTOS TAKEN.

12:30 ASSIGNED BONE 3 "SECTIONS" DUE TO HOW IT IS FRACTURED. MERCEDES AND MAT CARNER ARE WORKING AT EITHER END OF THE BONE, REMOVING THEIR CONCENTRATE AND TISSUE PAPER. A LOT OF ACETONE IS REQUIRED TO REMOVE THE TISSUE AND CONCENTRATE FROM THE BONE.

10/29/11 8:45 RESUMED CLEANING/REMOVING TISSUE PAPER. ONE SECTION OF THE ULNA IS RELATIVELY INTACT AND THE BONE IS IN GOOD SHAPE, DESPITE BEING FRACTURED. THIS IS DUE TO PART OF THE MATRIX AND PREVIOUSLY APPLIED CONSOLIDATE HOLDING IT ALL TOGETHER.

11/2/11 CONTINUED CLEANING PROXIMAL DISTAL ENDS OF THE ULNA. WE'RE DOING OUR BEST TO KEEP BONE FRAGMENTS INTACT BY USING ACETONE CAREFULLY SPARINGLY. FRAGMENTS ARE OFTEN DIFFICULT TO RE-ATTACH TO THEIR ORIGINAL LOCATION.

11/4/11 MAT GARDENED FINISHED CLEANING AND CONSOLIDATING THE PROXIMAL SECTION OF THE ULNA. SECTION IS COATED IN 5% HYDROGEL. 4 PHOTOS WERE TAKEN OF THE CLEANED SECTION.

12/12 PM REMOVED THE SECTIONS OF BONE FROM THE JACKET AND THE SAND AND MATRIX REMOVED.

12:30 AM BEGAN CLEANING CENTER SECTION (SHANK). VIMAC COATING AND SATURATION IS VERY DENSE, CALLING FOR AN AGGRESSIVE APPROACH TO CLEANING AND REMOVAL ALL THE EXCESS MATRIX.

MATT

11/2/11 CONTINUED CLEANING THE SHANK SECTION THROUGHOUT THE DAY. MERCEDES CONTINUED WITH THE DISTAL SECTION. AFTER REMOVING A MAJORITY OF THE MATRIX, IT IS NOW OBVIOUS THAT 8-36 IS ACTUALLY AT LEAST 2 SEPARATE ELEMENTS, THE SMALLEST OF WHICH IS LIKELY A PARTIAL RADIUS. MERCEDES ALSO HAS 2 BONY BONE FRAGMENTS THAT DON'T APPEAR TO BE FRAGMENTS OF THE ULNA. STEVE CARMER SUGGESTED THEY MAY BE HUMAN EYEBONE/ANKLE BONES, BASED ON THEIR OWN LOCALIZATION JUST BEYOND THE DISTAL END OF THE ULNA.

11/4/11 MERCEDES & MATT CONTINUED CLEANING & CONSOLIDATING ELEMENTS OF 8-36. BY 3:30 PM, ALL MAJOR FRAGMENTS HAD BEEN CONSOLIDATED. 4 PHOTOS WERE TAKEN OF THE ULNA & RADIUS ASSEMBLY.

Page 2 of ___