

REPORT

**2005 Lower Cliff Dwelling Emergency Preservation,
Tonto National Monument**



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Introduction

The following report describes work completed during a recent emergency preservation project at Tonto National Monument. The project was conducted on June 28, 2005 and stabilized several areas in the Lower Cliff Dwelling that were deteriorating due to visitor and animal impacts. According to a 2004 condition assessment of the Lower Cliff Dwelling (LCD), which included the examination of 87 individual wall faces and 17 NPS elements such as steps or retaining walls, 94% of the rooms (15/16) contain impacts attributed to daily visitation. These impacts were addressed during the 2005 stabilization project, which achieved the following goals: 1) eliminated safety hazards by repairing steps throughout the ruin; 2) mitigated rodent damage and burrowing; 3) stabilized damaged roof sections; and 4) stabilized eroding basal sections of walls.

While NPS guidelines state that park archeological resources are to be left in situ and undisturbed, the same guidelines state that removal of artifacts or intervention into cultural material is justified in the planning process by preservation treatment, protection, research, interpretation, or development requirement (DO 28, Release No. 5, 1997:69). Although the rooms of the Lower Cliff Dwelling have been undoubtedly eroding for hundreds of years, heavy visitation and close visitor contact with both historic fabric and modern elements has weakened these areas in recent years. The result of these forces is severe basal erosion, severe roof erosion, rodent damage, and dangerously loose modern steps in areas throughout the LCD. Impacts were addressed during this emergency stabilization project.

Background

Tonto National Monument (TONT) is located in the center of Arizona and has a total acreage of 1,120 acres (Figure 1). Visitation recorded in 2004 was 63,213. The Monument is located within the lower Sonoran Desert Scrub Zone which includes cactus, jojoba, palo verde, catclaw and creosote. Summer thunderstorms are generally associated with moisture flowing north from the Gulf of Mexico and produce approximately 12” to 15” of the annual precipitation. The Lower Cliff Dwelling is located at approximately 3,160 feet (963 meters) above sea level and a riparian area is located within a 20 minutes walk below the ruin.

The Lower Cliff Dwelling (AZ U:8:47 or TONT 85A-51) consists of a 16 room masonry/adobe pueblo built into a large rockshelter. The site primarily represents a Late Classic Period dating ca.1300 – 1450 AD. Significant elements of the ruin include a fully intact roof in Room 14 and numerous wood elements still present in the walls. The preservation of the Lower Cliff Dwelling began in 1907 when President Roosevelt established the Monument based on its “great ethnologic, scientific, and educational interest” (Proclamation No.787-Dec. 19, 1907-35 Sta. 2168).

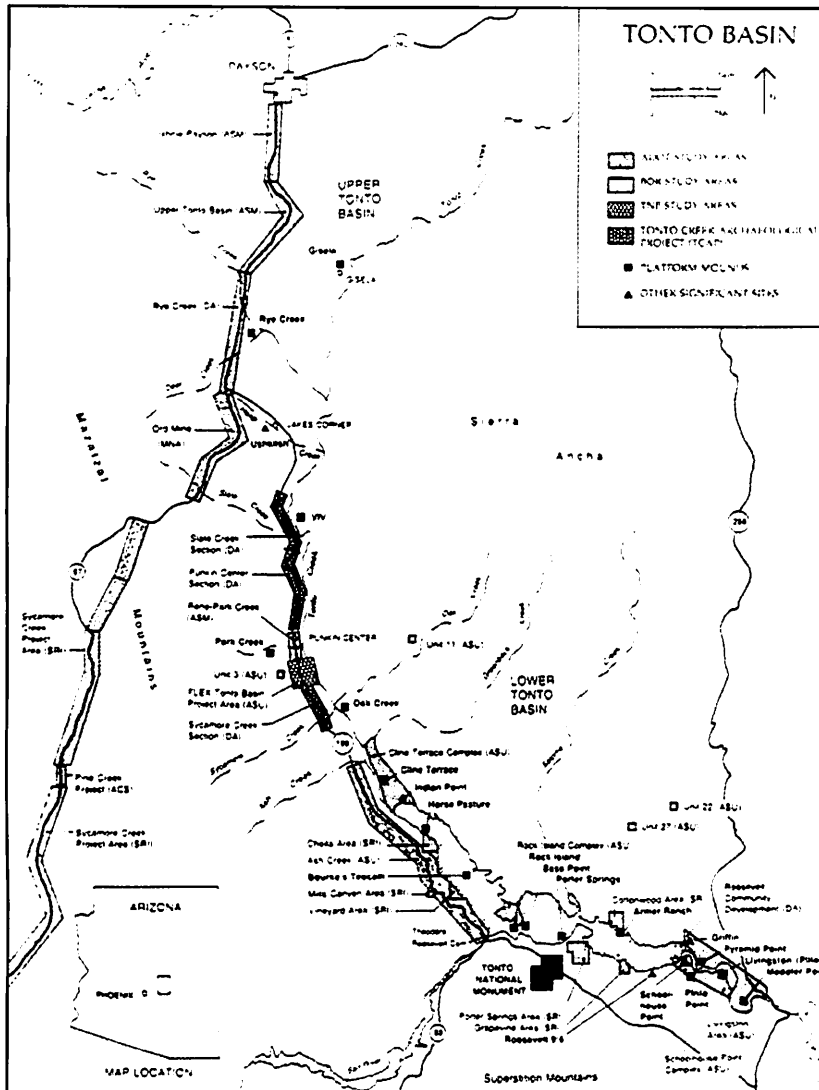


Figure 1. The location of Tonto National Monument relative to Tonto Basin geography and other prominent archeological sites (after Clark 1997).

Native American Consultation

Section 106 of the National Historic Preservation Act and its associated regulations ensure Native American Groups a full opportunity to participate in the review of federal undertakings. The Monument staff has identified the following groups as potentially affiliated with the resources at Tonto National Monument: Hopi Tribe, Salt River Pima-Maricopa, Tohono O'odham Nation, Ak-Chin Indian Community, Gila River Indian Community, San Carlos Apache Tribe, Tonto Apache Tribe, White Mountain Apache Tribe, Yavapai Apache Tribe, Yavapai Prescott Indian Tribe, and the Pueblo of Zuni. Consultation will continue on a government to government basis and adjusted or directed

at the request of the Native American Groups. Should the project discover previously unearthed human remains, provisions outlined in the Native American Graves Protection and Repatriation Act (1990) would be followed and the site would be secured.

Project Location

This project affected several areas throughout the Lower Cliff Dwelling (Figure 2), including historic fabric on the roof of Room 10, and on the walls: 51.10.03 and 51.09.04, as well as modern NPS features: 51.00.02NPS, 51.00.05NPS, 51.00.06NPS, 51.00.07NPS, 51.00.08NPS, 51.00.09NPS, 51.00.10NPS, and the Lower Cliff Dwelling entryway steps. Table 1 lists all previous stabilization projects undertaken by NPS in areas of the Lower Cliff Dwelling affected by the current project.

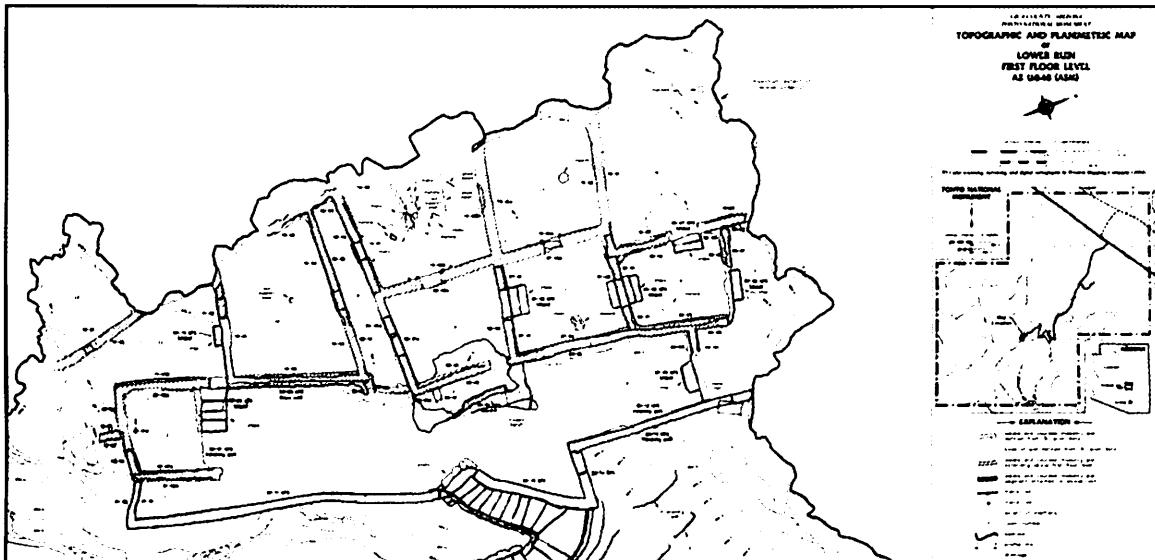


Figure 2. Plan view map of the Lower Cliff Dwelling (AZ U:8:47 or TONT 85A-51).

Table 1. Summary of stabilization and construction events for treated areas of the Lower Cliff Dwelling.

Year	Personnel	Document
1937	William A. Duffen, 2 laborers	Duffen_1937.pdf
1952	Roland Richert, Gordon Vivian, and Welito Wero, Art Werito, Nelwood Willitis, John Clyde, Jim Wero, and Harry Etsitty (Navajo laborers from the Chaco Mobile Ruins Stabilization Unit)	Vivian and Richert_1952.pdf
1957	Roland Richert and six Navajo laborers from Ruins Stabilization Unit (based at Chaco Canyon NM)	Richert_1957.pdf
1973	George J. Chambers, Peter M. Laudeman, and a five-man masonry crew	Laudeman_1973.pdf
1985	George Chambers and TNM personnel	Chambers_(NPS_Compliance)_1985b.pdf
1990	Dessamae Lorrain, Jim Rancier, Faye Morrison, Joel Straw, Bobby Adair, volunteers Paul and Jan Lorrain, and Youth Conservation Corps members Steve Heck, Sherrill Baca, and Sarah Dodd. Andrea Maliarik (one day)	Lorrain(Stabilization_Report)_1990.pdf
1991	Morrison, Jim Rancier Joel Straw, Dessamae Lorrain, Bobby Adair, Ruben Avalos and Youth Conservation Corps members Teri Harlan, Eric Lovato, George Anderson, Martha Renteria and Anthony Guerrero	StabilizationReport_1991.pdf
1992	Faye Morrison, Rick Martinez, Kelly Angels, Keith Rex and YCC members Justin Dorothy and Danny Rice	Stabilization_Report_1992.pdf
1993	Ruben Avalos, Dan Perez, Larry Carreau, Bill Nichol, Monte Houghtling and VIP Lisa Piaskowsky	Stabilization_Report_1993.pdf
1995	Rueben Avalos, Joel Straw, Jeff Johnson, Mike Garcia	StabilizationReport_1995.pdf
1997	Ruben Avalos, Denny Matthews, Michelle Freeman and Don Payson	StabilizationReport_1997.pdf

Results

The following four major objectives were met through this project. Detailed information on preservation activities and materials used is also included below.

Objective 1: Eliminate safety hazards by repairing steps throughout the ruin

Objective 2: Mitigate rodent damage and burrowing

Objective 3: Stabilize damaged roof sections

Objective 4: Stabilize eroding basal sections of walls

Repair Non-historic Steps

TONT Archaeologist Matt Guebard and Northern Arizona University Archaeologist Jeanne Stevens Schofer repointed eight steps that exhibit minor loss of mortar. The steps include 1) the entryway into the dwelling; 2) the steps leading from Room 2 into Room 11 (51.00.02NPS); 3) the steps leading from Room 4 into Room 5 (51.00.05NPS); 4) steps leading from Room 5 into Room 6 (51.00.06NPS); 5) the steps leading from Room 6 into Room 16 (51.00.07NPS); 6) the steps leading from Room 6 into Room 7 (51.00.08NPS); 7) the steps leading from Room 7 into Room 8 (51.00.09NPS); and 6) the steps leading from Room 11 to Room 10 (51.00.10NPS). Amended mortar, Western Stucco Products # 458 (Hacienda color), was used for the repointing, due to the amount of traffic that these steps receive. The color is similar to the surrounding prehistoric mortar, however, through documentation and upon close inspection future managers will be able to tell that it's not original fabric.

- LCD entryway steps
These modern steps were repointed by Jeanne Stevens Schofer and Matt Guebard using 3000 mL stucco mix (12 lbs) and 700 mL water. This included filling cracks as well as making the first step uniformly flush with masonry stones. Wet burlap was placed over the newly applied mix in order to reduce cracking.
- 51.00.02NPS
These modern steps were repointed by Matt Guebard using 3300 mL stucco mix (13 lbs) and 700mL water. The base section of the bottom stair was completely reconstructed. Small holes and cracked were filled throughout. Wet burlap was placed over the newly applied mix in order to reduce cracking.
- 51.00.05.NPS
These modern steps were repointed by Matt Guebard using 700mL stucco mix (3 lbs) and 70mL water. Extensive cracking and holes were filled throughout the entire southward facing portions of the stairs. Cracking was also filled at the base of the stairs. Cracking at the juncture between the retaining wall and stairs was filled. The sill of the top stair was made flush. Wet burlap was placed over the newly applied mix in order to reduce cracking.

- 51.00.06NPS
These modern steps were repointed by Jeanne Stevens Schofer using 2100 mL stucco mix (8 lbs) and 400 mL water. Wet burlap was placed over the newly applied mix in order to reduce cracking.
- 51.00.07NPS
These modern steps were repointed by Matt Guebard using 1000 mL stucco mix (4 lbs) and 150 mL water. The majority of work was done around the base of the stairs and the juncture between the stairs and the wall. Wet burlap was placed over the newly applied mix in order to reduce cracking.
- 51.00.08NPS
These modern steps were repointed by Matt Guebard using 200 mL stucco mix (1 lbs) and 20mL water. The entire mixture was used to fill the northward facing joint separating the first and second stair. Wet burlap was placed over the newly applied mix in order to reduce cracking.
- 51.00.09NPS
These modern steps were repointed by Jeanne Stevens Schofer using 2400 mL stucco mix (9 lbs) and 600 mL water. Wet burlap was placed over the newly applied mix in order to reduce cracking.
- 51.00.10NPS
These modern steps were repointed by Jeanne Stevens Schofer using 2200 mL stucco mix (8 lbs) and 550 mL water. Wet burlap was placed over the newly applied mix in order to reduce cracking.

Repair Room 10 Roof

The roof in Room 10 has undergone deterioration from visitors picking at roof covering material (saguaro ribs and adobe).

- Room 10 Roof
This historic fabric was repaired by Duane Hubbard (TONT Archaeologist and Cultural Resources Program Manager) using 4800 mL (19 lbs) unamended, screened soil, 480 mL micro-beads, and 480 mL water. Five non-prehistoric saguaro ribs were added to the roof, all on the southern roof margin. All of the non-prehistoric elements can be identified with a wire marker that was tied to each rib. An unamended mortar was mixed with abrasive glass micro-beads and applied over the saguaro ribs on the south and west margins of the roof. Wet burlap was placed over the newly applied mix in order to reduce cracking.

Repair Basal Erosion

Minor basal repair in the form of plaster patches was completed on two small basal sections in the ruins. A 4:1 mixture was used for the patches (4 parts soil, 1 part # 458).

- 51.09.04
This historic fabric was repaired by Duane Hubbard using 1600 mL (6.5 lbs) screened soil, 400 mL (1.5 lbs) stucco mix, 200 mL (1 lbs) micro-beads, and 200 mL water. Hubbard applied a small patch to the wall base (west wall section) near northwest corner of room. A slight amendment was used and abrasive micro-beads added as a marker.
- 51.10.03
This historic fabric was repaired by Duane Hubbard using 1600 (6.5 lbs) screened soil, 400 mL (1.5 lbs) stucco mix 160 mL water, 200 mL (1 lbs) micro-beads, and 200 mL water. Hubbard applied a small patch to the wall base (middle wall section). A slight amendment was used and abrasive micro-beads added as a marker.

51.10.03 (Room 9/10 Doorway)

This historic fabric was repaired by Duane Hubbard using 800 (3 lbs) screened soil, 200 mL (1 lbs) stucco mix, 100 mL (.5 lbs) micro-beads, and 100 mL water. Hubbard applied a small patch applied to west side of doorway (mid-height). A slight amendment was used and abrasive micro-beads added as a marker.

Conclusions

The emergency stabilization project undertaken at Tonto National Monument's Lower Cliff Dwelling addressed the effects of visitor use on both historic fabric and modern steps. As Tonto National Monument is one of the last places in the Southwestern United States where visitors have almost full access to tour prehistoric dwellings in unreconstructed condition, the signs of visitor-use are pervasive throughout the dwelling. Those that received immediate attention during this preservation project are only the first impacts to be addressed by the Monument's Cultural Resources Division. Archaeologists intend to address the effects of recent visitation through emergency treatment and all long-term effects through a comprehensive stabilization plan scheduled for FY06 to FY08.

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Vivian, Gordon, and Roland Richert

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Appendix A

Before and After Photos of Treated Areas in the Lower Cliff Dwelling

Room 10 (51.10) Roof

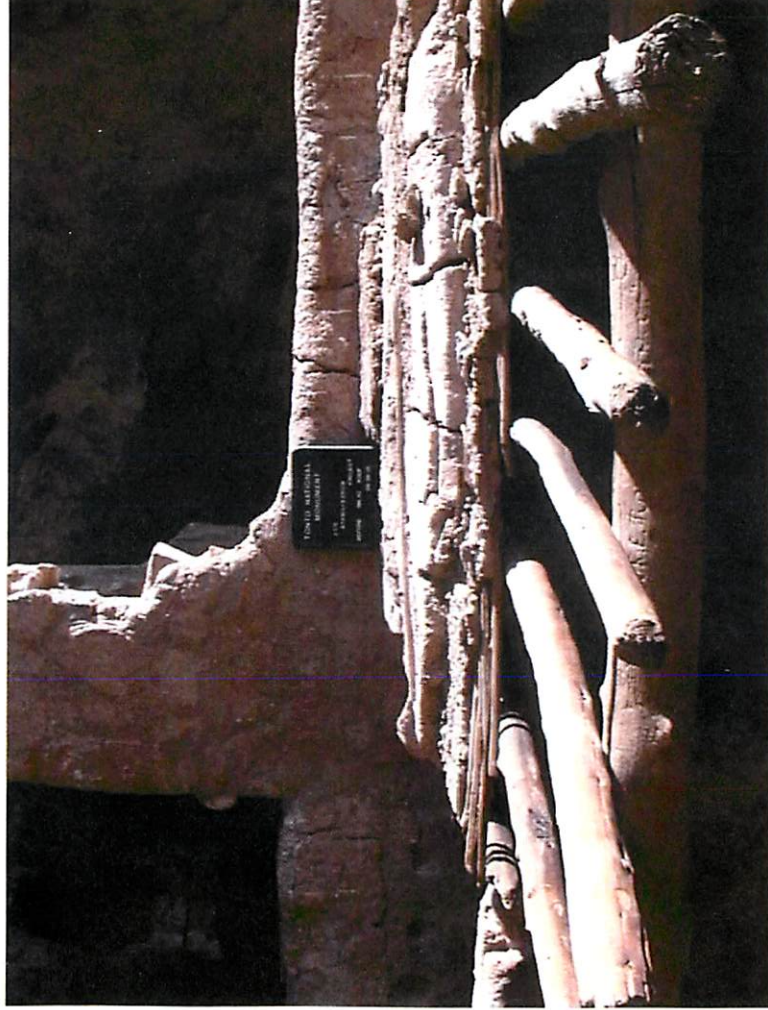


Figure 3. Before photo of the Room 10 roof, west end.

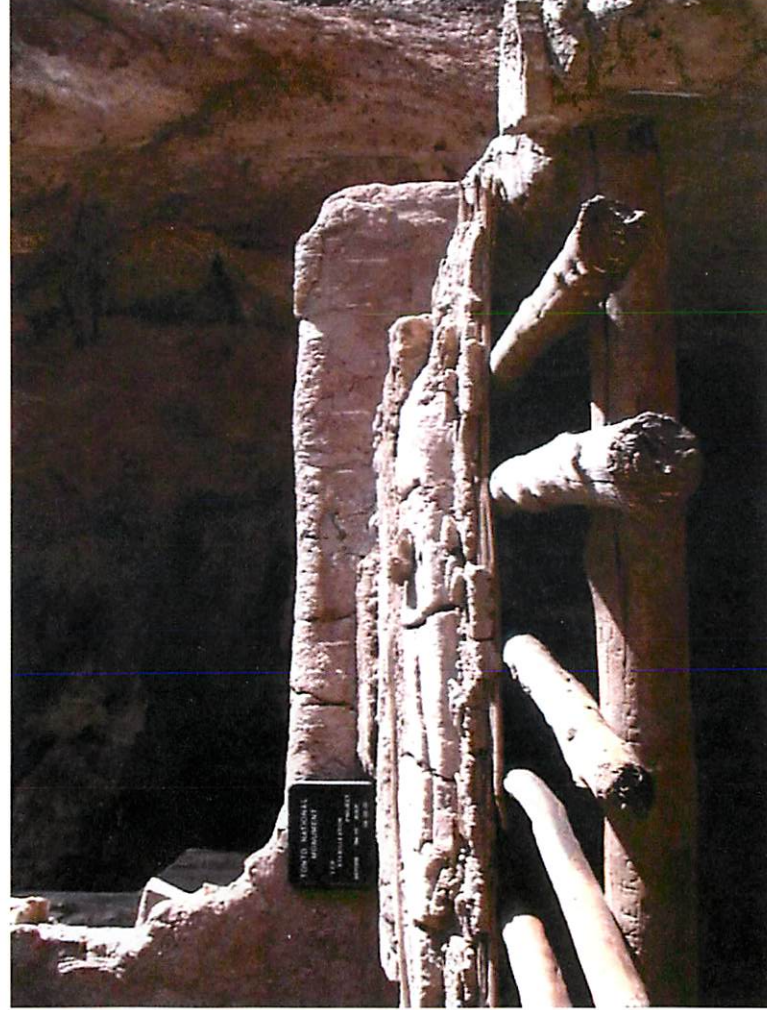


Figure 4. Before photo of the Room 10 roof, east end.

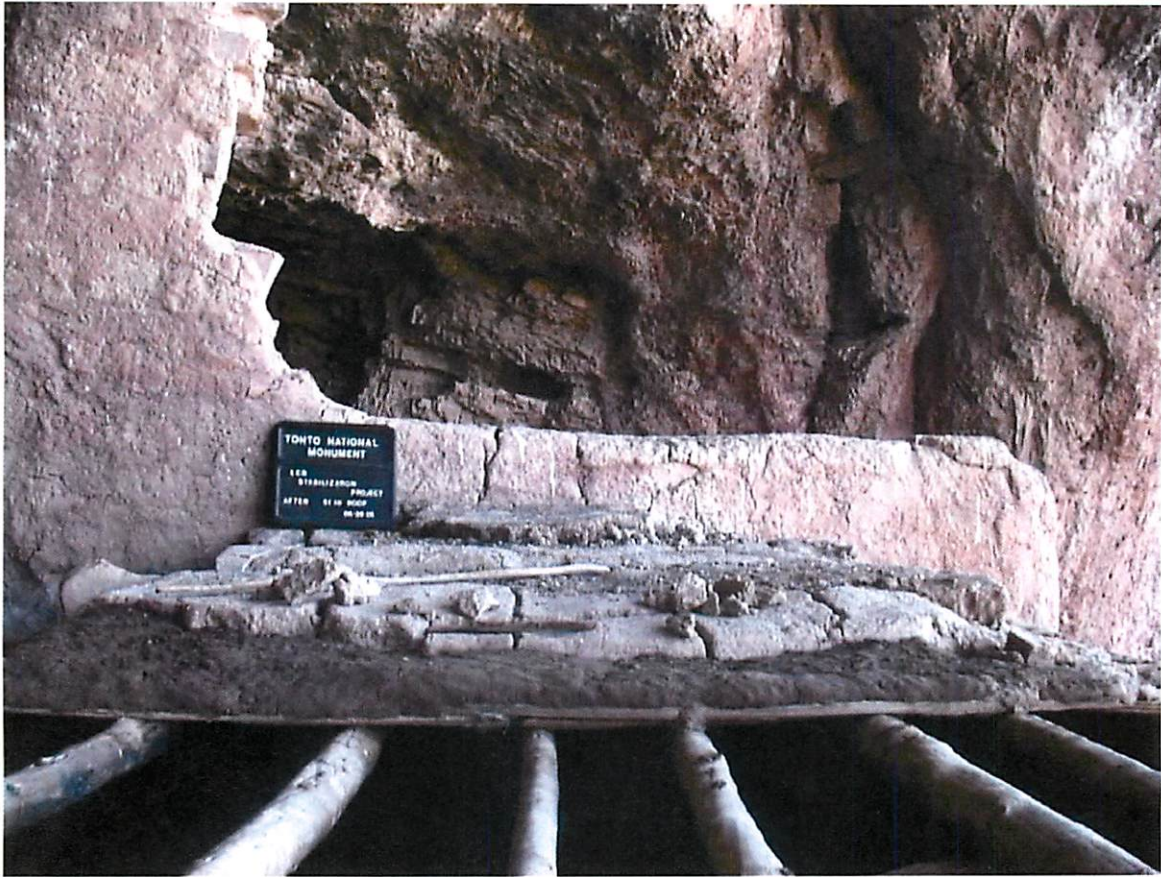


Figure 5. After photo of the Room 10 roof.

Room 10 North Interior Wall, West End (51.10.03)



Figure 6. Before photo of wall 51.10.03.



Figure 7. After photo of wall 51.10.03.



Figure 8. After photo of wall 51.10.03, detail area of doorway between Rooms 9 and 10.

Room 9 North Interior Wall, West End (51.09.04)

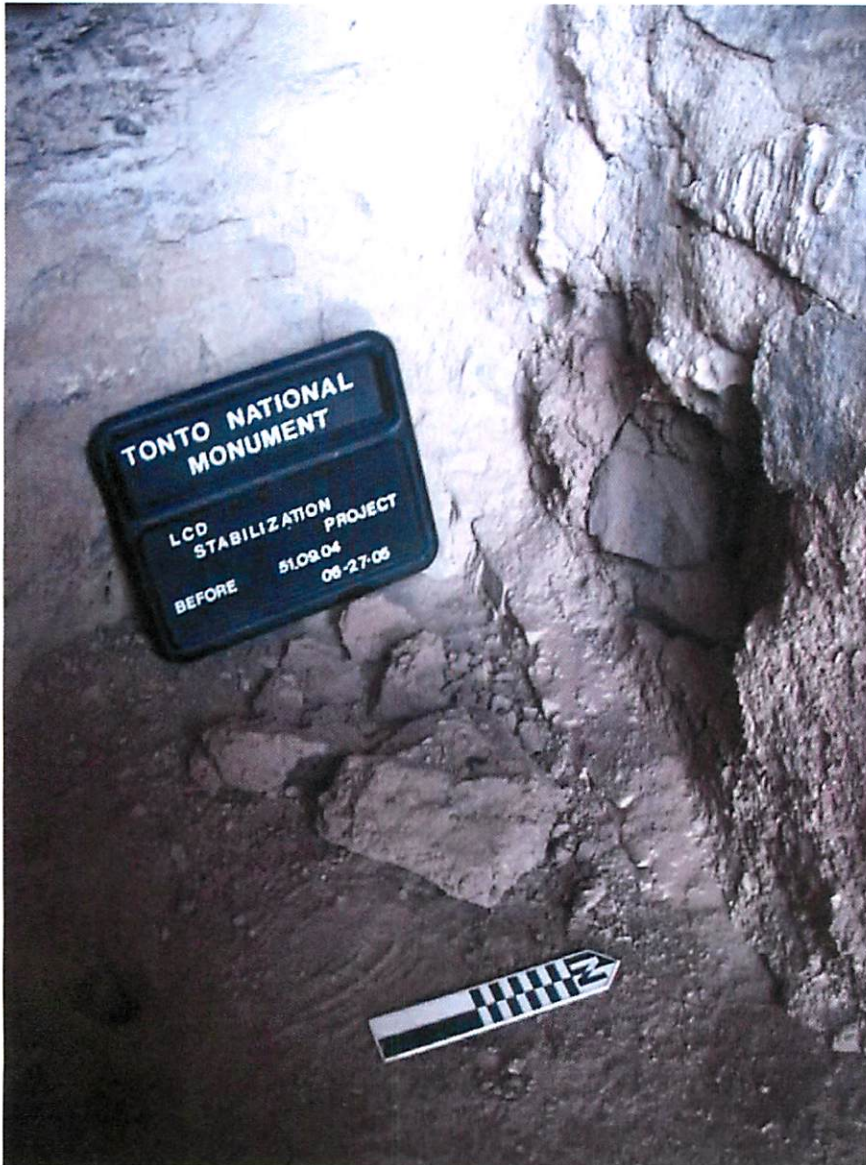


Figure 9. Before photo of wall 51.09.04.

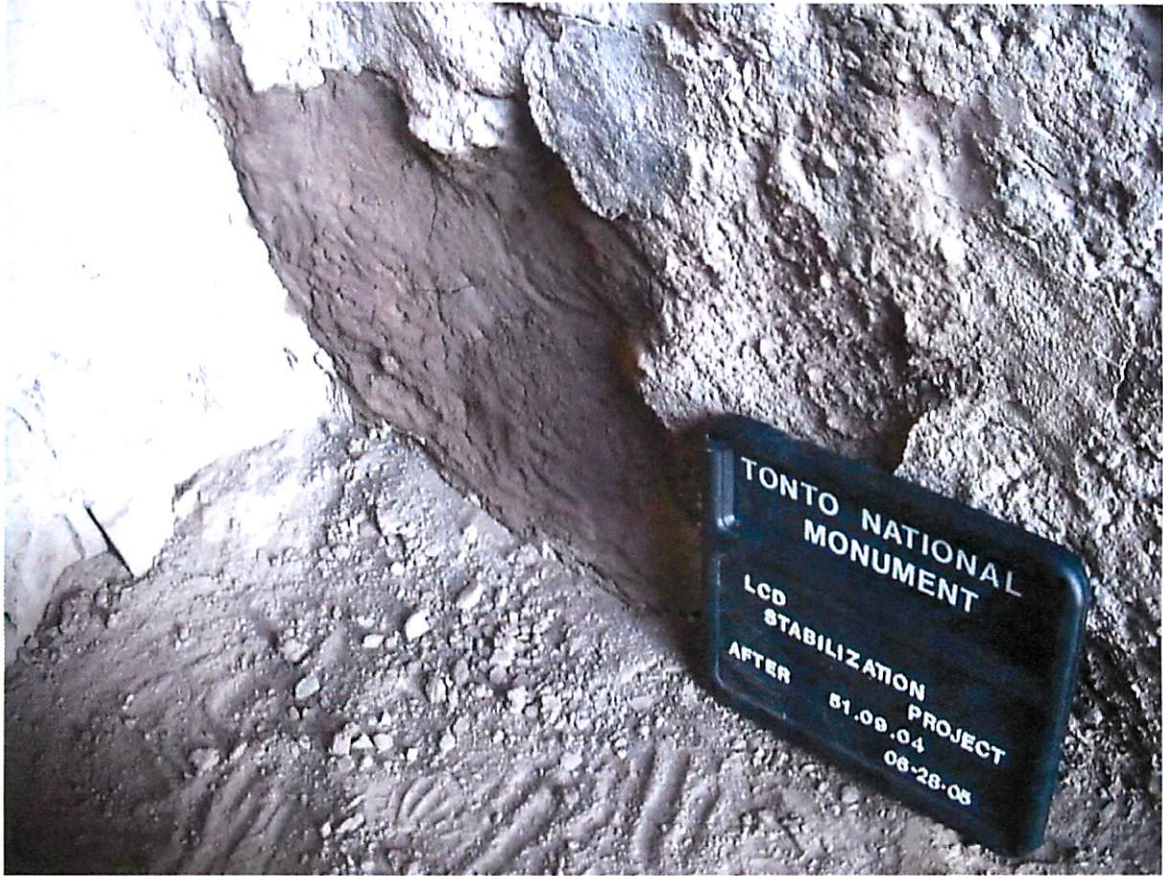


Figure 10. After photo of wall 51.09.04.

Steps leading from Room 2 into Room 11 (51.00.02NPS)



Figure 11. Before photo of NPS construction 51.00.02NPS.



Figure 12. After photo of NPS construction 51.00.02NPS.

Steps leading from Room 4 into Room 5 (51.00.05NPS)



Figure 13. Before photo of NPS construction 51.00.05NPS.



Figure 14. After photo of NPS construction 51.00.05NPS.

Steps leading from Room 5 into Room 6 (51.00.06NPS)



Figure 15. Before photo of NPS construction 51.00.06NPS.



Figure 16. After photo of NPS construction 51.00.06NPS.
(Note: photo board is incorrect.)

Steps leading from Room 6 into Room 16 (51.00.07NPS)

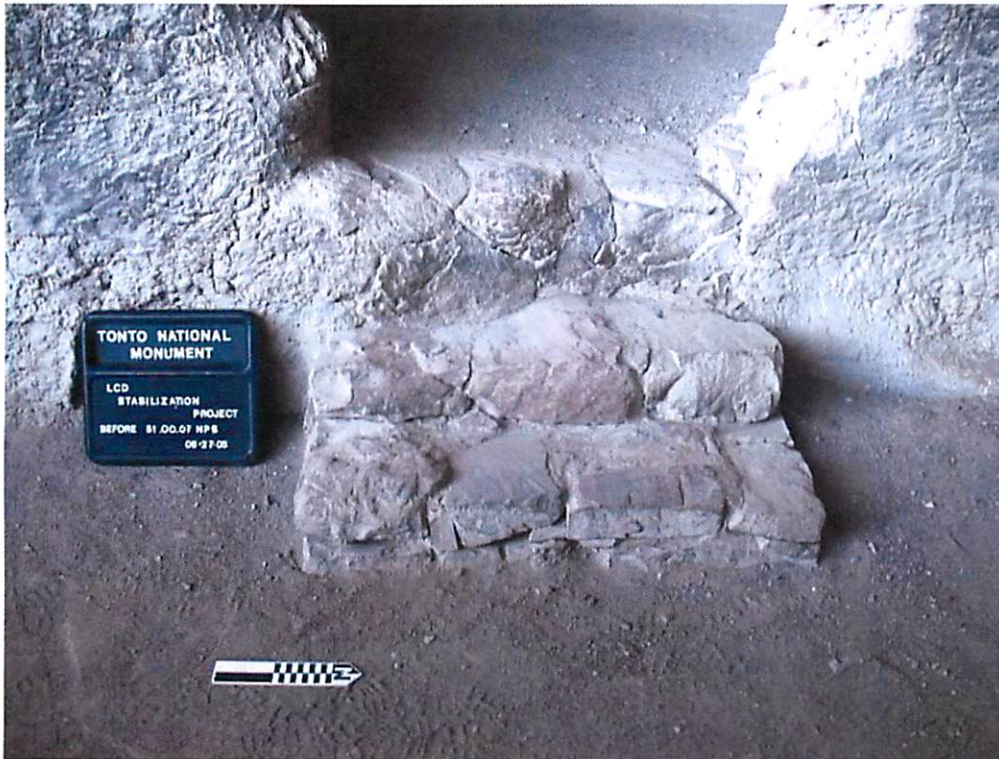


Figure 17. Before photo of NPS construction 51.00.07NPS.



Figure 18. After photo of NPS construction 51.00.07NPS.

Steps leading from Room 6 into Room 7 (51.00.08NPS)



Figure 19. After photo of NPS construction 51.00.08NPS.

Steps leading from Room 7 into Room 8 (51.00.09NPS)



Figure 20. Before photo of NPS construction 51.00.09NPS.



Figure 21. After photo of NPS construction 51.00.09NPS.

Steps leading from Room 11 to Room 10 (51.00.10NPS)

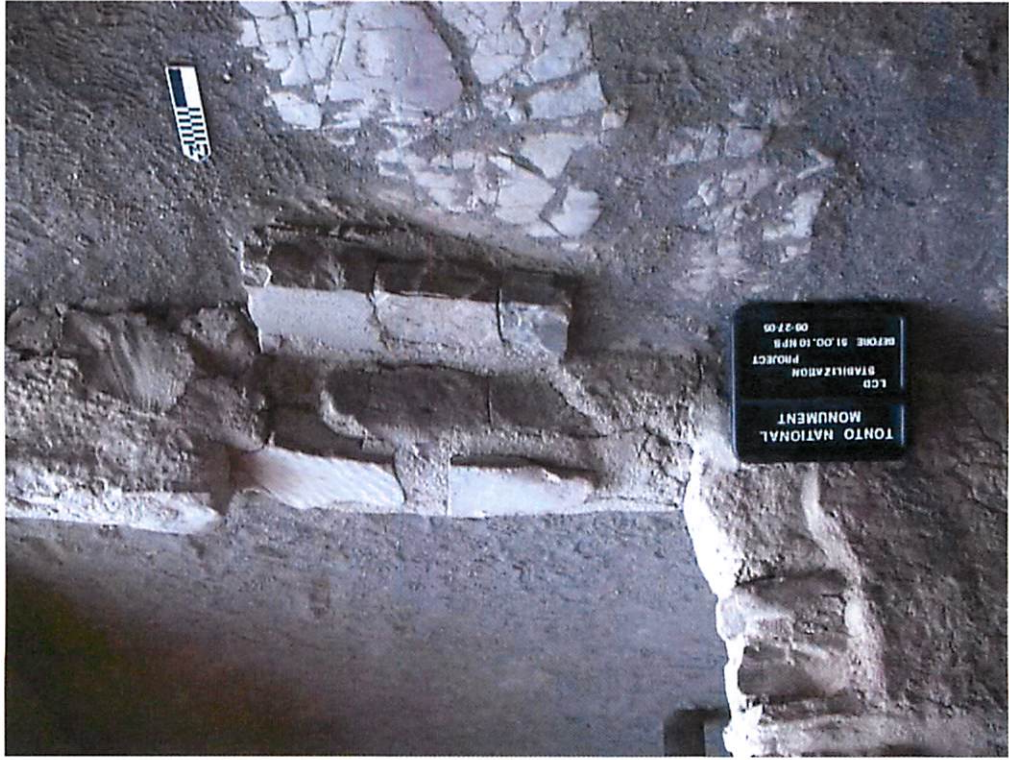


Figure 22. Before photo of NPS construction 51.00.10NPS.



Figure 23. After photo of NPS construction 51.00.10NPS.

LCD entryway steps



Figure 24. Before photo of NPS construction entryway steps.

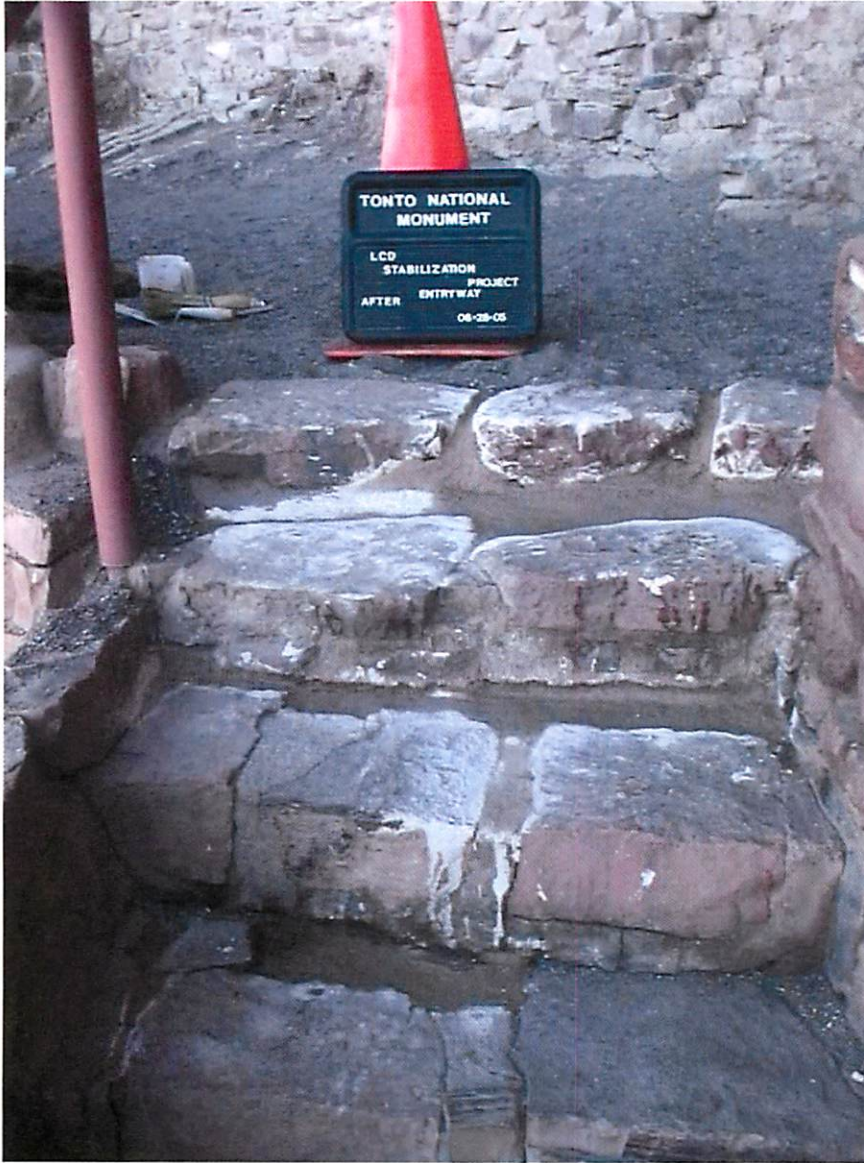


Figure 25. After photo of NPS construction entryway steps.