Western Center for Historic Preservation

National Park Service
U.S. Department of the Interior

Grand Teton National Park
P.O. Drawer 170
Moose, WY 83012

Dewey Gifford Barn Completion Report

Preservation Carpentry and Craft Assistance Project

Start Date: August 4, 2008
Completion Date: October 9, 2008

Partners: Western Center for Historic Preservation and Capitol Reef National Park

Project Leader: Robert Williams, WCHP Project Manager
Supervisor: Craig Struble, WCHP Director

Background:
The Dewey Gifford Barn, also known as the Pendleton Barn or Jorgenson Barn, is part of the Fruita Rural National Register Historic District. It was constructed in 1919 by Jorgen Jorgenson and is an excellent example of Mormon vernacular architecture. The barn is rectangular in plan and of post and beam construction with vertical plank siding. The roof is gabled, with a lower shed roof lean-to attachment and is covered with board and batten roofing material. Today the barn is used by Capitol Reef National Park for hay storage and is a popular tourist destination within the park.

In August 2000, the Historic Preservation Training Center (HPTC) from Frederick, Maryland completed an emergency stabilization project to support the failed structural framing system in the barn. Work entailed erecting a temporary shoring and support system to stabilize the failed framing until future preservation work could be funded. The system was comprised of timber frame bracing between the support posts of the main, gabled section of the barn. Half-lap repairs were made to the main posts on the east side of the barn.

Problem Statement:
An assessment completed by the Western Center for Historic Preservation (WCHP) in February 2008 concluded that much of the roof and wall support structure was deteriorated and needed repair or replacement. The following conditions were noted:

(1) The stabilization treatment completed by HPTC in 2000 was still in good condition and functioning as designed to support the structure
(2) There was a large buildup of manure and mud on the west and southwest sides of the barn causing deterioration of shed Juniper posts
(3) The entire roof covering had reached the end of its lifespan and needed replacement, as evidenced by large holes and water damage to interior framing

Further analysis would show that:

(1) Three shed Juniper posts on the west elevation needed full replacement

(2) Three support posts in the main section of the barn (southwest Post A, northwest Post A, and southwest Post C) needed partial replacement
(3) The top plate was undersized to properly support the roof structure

Overview of Project:
Project work consisted of providing craft assistance, preservation treatment, and training to park staff in appropriate craft techniques and methods. Assistance was provided as part of a cooperative effort between WCHP and Capitol Reef National Park (CARE). WCHP preservation specialists were responsible for overall project coordination, material selection, treatment recommendations, and subject matter expertise. CARE staff members assisted the project while receiving preservation training. Preservation crews from Yosemite National Park and Point Reyes National Seashore provided additional craft assistance.

The treatment plan included repair/replacement of the following with in-kind materials: the top plate, three main barn support posts, three shed Juniper posts, rafters, purlins, bent bracing, all of the board and batten roofing, and portions of the exterior siding. Stabilization work completed by HPTC in 2000 provided the structural support necessary for the roof replacement to take place safely.

Summary of Work:
Under the project agreement, work was divided into three tasks. Task #1 involved mobilization and documentation. Task #2 involved roof replacement and select repairs to the wall and roof support structure. Task #3 involved demobilization and preparation of a Record of Treatment. The supplemental framing installed by HPTC was removed incrementally throughout the course of the project.

Task #1:
Prior to arrival onsite, it was determined that the barn top plates were undersized. WCHP recommended that a structural engineer be contacted to determine the best treatment. After inspection by NPS engineer Preston Fisher, three solutions to repair the top plate were considered:

(1) Full replacement duplicating the original with structural grade material
(2) Full replacement with a piece of angle iron bolted to the top plate and nailer, and hidden either with paint or covered with another piece of four quarter material
(3) Full replacement with a rough sawn 6” x 8” and a rough sawn 2” x 8” nailed together to cover the joints, make it a full 8” x 8”, and meet the nailing requirements of the shed roof rafters (see Attachment C)

The third choice was agreed upon by WCHP, CARE Cultural Resource Manager Don Corbeil, and Preston Fisher.

Lumber and project materials were procured and delivered to the park prior to the arrival of the WCHP and stored in the bone yard. On August 4, 2008 WCHP project staff mobilized from Grand Teton National Park to begin site preparation at the barn. WCHP staff brought its equipment trailer and two-thirds of the scaffold to begin the project.

Once onsite, WCHP documented existing conditions with photographs and field sketches. Special attention was paid to dimensions and details of post, rafter, and plate failure.

WCHP installed orange safety fence around the perimeter of the barn to secure visitor safety. The crew erected scaffolding up to roofline on the exterior and interior of the east elevation. Scaffold was also erected in the center of the barn to the ridge and on the west elevation to the roofline.

A preconstruction meeting was held during the first week onsite addressing safety, emergency protocols, and general understanding of the work to be done. Don Corbeil assigned specific parking areas in anticipation of additional parking and storage needs. Task #1 was completed in early August.

Task #2:

Preservation work included repair/replacement of roofing, the roof support structure, posts, and siding. The following paragraphs outline work in each area.

The entire board and batten roof (on both the gabled section and the shed) had reached the end of its lifespan and was removed. The size and location of every board and batten was measured and documented to ensure that the new roof would match the existing in appearance. The boards and battens on the shed roof were removed first. After, the gabled roofing was removed. Removal progressed from Bay 4 towards Bay 1 (see Attachment A for bay locations). Boards and battens were removed from the west elevation of each bay first, then from the east elevation.

Shed siding was completely removed to allow access to shed roof support members and damaged Juniper posts. As siding was removed, the boards were documented and numbered for accurate reinstallation. The boards were removed by cutting the nails from the inside to avoid damaging historic fabric.

Cables were installed at each bent from the west to the east posts to prevent the barn from expanding as the work continued. Due to age and a failing roof, the barn had settled and walls and rafters were no longer aligned properly. Using the framing bents and grip hoists the walls of the gabled section were adjusted or straightened to meet rafters. The ridge was raised and straightened in Bays 2 and 4. The raised gabled rafter on the northwest end of the shed was also straightened.

The process for removing existing/installing new top plates was as follows:

- The existing top plates were cut from the rafters and removed
- The tops of existing posts were cut down approximately 6” to accept the new top plates (see Attachment B)
- New 6” x 8” plates were cut and sized on the ground and then raised into place
- The 6” x 8” plates were tied together using half-lap joinery, with the half-lap joints resting on posts (see Attachment C)
- The half-lap joints were tied together with 3/8” x 6” carriage bolts (see Attachment C)
- The bolts were recessed into the timber and dowels were inserted to cover the bolts and enhance the aesthetic appearance (see Attachment C)

In addition to the new top plates, broken and missing purlins were replaced across Bays 1-4 of the gabled roof (totaling approximately 450 linear feet of timber). The shed roof was reframed using 2" x 6" rafters and 2" x 4" purlins to match original fabric.

Hurricane ties were installed on the rafters (see Attachment D for example of hurricane tie). Ties were covered by 1" x 3" boards to shield from public view.

After repairs to the timber frame sub-structure were completed, the board and batten roofing on the gabled section and the shed was replaced. The new boards and battens were installed to match the original configuration based on the documentation taken at the beginning of project work.

Three posts in the main, gabled section of the barn were deteriorated and in need of partial replacement. These were: Post A in the southeast corner, Post A in the northeast corner, and Post C in the southwest corner (see Attachment A for post locations). Soil was dug out around the base of the posts and the deteriorated sections removed (approximately 3' up from grade). The partial replacements were connected to the existing posts using half-lap joinery.

Three Juniper posts on the west wall of the shed were severely deteriorated and required full replacement. Soil was dug out to expose the base of the posts, and then the existing posts were removed using a backhoe. New Juniper posts were cut and sized then installed at these locations.

In addition to post and roof work, minor siding repairs were made to the barn. Deteriorated siding was replaced where needed on the east elevation reusing boards removed from the roof. Damaged or missing boards were also replaced on the north and south shed doors.

Task #2 was completed from mid-August to early October 2008.

Task #3:
The WCHP preservation crew packed equipment and materials, cleaned the site, and removed scaffolding and security fences upon project completion. The last day onsite was October 9, 2008. The Record of Treatment was submitted to Capitol Reef National Park in July 2009.

Financial Summary:
The estimated cost for the Dewey Gifford Barn preservation project was $87,610.00. Materials purchased for the project totaled $8,793.02. Time (personal services), meals and incidental expenses (M&IE), and lodging were calculated separately for each of the preservation crews. The total cost for the Point Reyes preservation crew was $19,460.25. The Yosemite preservation crew contract and contract extension amounted to $27,151.70. The WCHP crew costs totaled $33,888.36. The final project cost, including preservation crew expenditures and materials, was $89,293.33.

Dewey Gifford Barn Project Financial Summary

Point Reyes Preservation Crew		
Personal Services		$ 14,436.00
M&IE		$ 2,047.50
Lodging		$ 2,976.75
	Sub Total	**$ 19,460.25**
WCHP Preservation Crew		
Personal Services		$ 23,634.42
M&IE		$ 3,315.00
Lodging		$ 6,938.94
	Sub Total	**$ 33,888.36**
Yosemite Preservation Crew		
Contract Estimate		$ 21,502.00
Extension		$ 5,649.70
	Sub Total	**$ 27,151.70**
Materials		
	Sub Total	**$ 8,793.02**
	Total Project Costs	**$ 89,293.33**
	Project Cost Estimate	**$ 87,610.00**
	Balance	**$ (1,683.33)**

Conclusion for Future Preservation:
In order to acquire a patina of age and match historic fabric, the WCHP recommends that the new timber be left exposed for a period of one year. This will provide a closer match to historic fabric than staining or other treatments. After weathering, a water repellant (such as X100 preservative) should be applied to shed water and preserve exposed wood.

Attachments:

A: Dewey Gifford Barn floor plan identifying Bays 1-4 and labeling posts. This drawing is part of the set created by HPTC and included in the 2000 Historic Structures Record of Treatment.

B: Post profile drawing generated by the WCHP.

C: WCHP drawing exhibiting the design of the top plate.

D: Example of Hurricane tie installed during preservation treatment.