Shawnee National Forest
Hidden Springs Ranger District
Trails Designation Project Accomplishments
Months of May - August 2008

The following are highlights of trail work accomplished in early **May 2008**:

Lusk Creek Wilderness: During the month of May, the trail crew continued work on the re-route for Forest Service (FS) Trail 481B (Wishing Well Trail) in the Lusk Creek Wilderness. Approximately 1.25 miles of this re-route was originally plowed in by mule during the summer of 2007; further work with hand tools is necessary to define the trail's slope, bench-cut, and erosion control features, such as outflow ditches. The re-route is intended for all-weather equestrian riding; as such, several sections required a foundation of gravel to withstand trail traffic during the wet season. The gravel, locally referred to as red-fines, is a rust colored, smooth river rock with a clay consistency. The clay allows the gravel to be compacted into the trail tread, and later harden into a firm surface. The gravel is provided by a local source and brought into the wilderness by mule teams in accordance with wilderness principals.

Because of the area's thin, poorly drained soil and lack of natural outslope for drainage, special preparations to the trail tread were necessary before gravel was spread. The preparation involved a cup trench dug in several sections of the re-route, its purpose is to prevent treadway fill (gravel) from dispersing in seasonably wet areas. The trail crew used shovels to dig nearly one half mile of cup trench 24 inches wide by 6 to 8 inches deep. The trench was lined with 600 yards of geotextile fabric. The fabric's felt-like layers made it easy to cut, and its flexibility easy to place on curved trail sections (Figure 1). The purpose of the fabric is to act as a separation between two layers of soil with different particle size distributions. For example, geotextiles are used to prevent trail base materials (gravel) from penetrating into soft underlying subgrade soils, thereby maintaining design thickness and trail tread integrity.

Figure 1. Geotextile fabric lay in a cup trench.

A twenty-two foot, two directional Y-style turnpike, built of native cedar and pine logs, was installed at the junction of FS Trail 481B and the upper section of FS Trail 483 (Barger Branch Trail). The Y-style turnpike provides traffic from three different directions a smooth transition to access FS Trail 483, or continue in either direction on FS Trail 481B. Turnpikes play a critical role in areas where there is no alternative pathway location by lifting the tread above water-saturated soil carrying the trail across problematic terrain (Figure 2 and 3).

Figure 2. FS Trail 481B – before installation of turnpike.

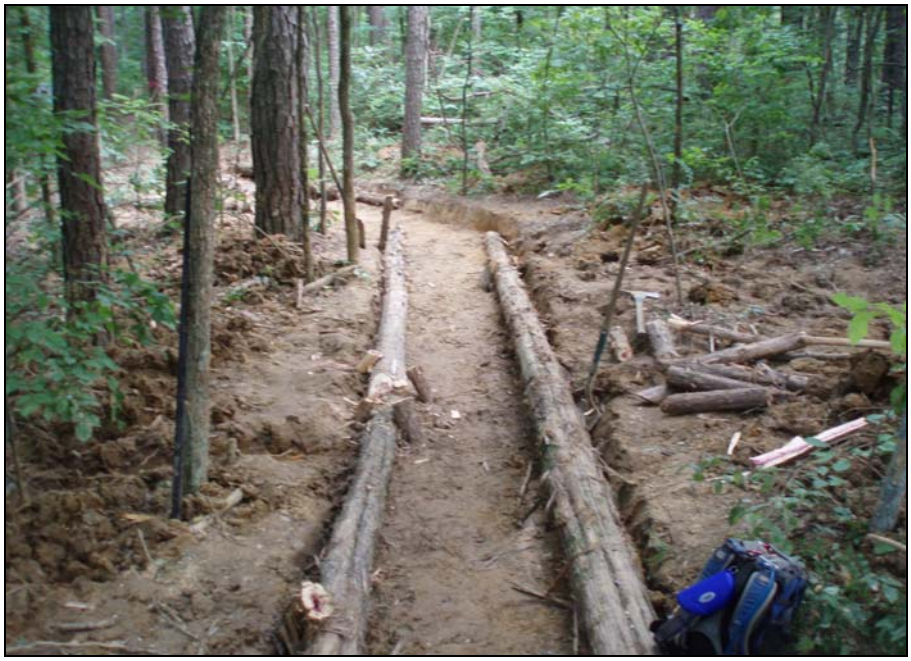

Figure 3. FS Trail 481B – during construction of turnpike.

In addition, the trail crew made improvements to the Blanchard Church Creek Crossing on Lusk Creek. Unseasonably strong winter storms caused extensive flooding of Lusk Creek. Overall the Blanchard Church Creek Crossing withstood the flooding; however, the north side of the crossing sustained some erosion at the base of the last step leading to the creek. The constant eddying of water washed out the gravel, causing a three to four foot drop to the creek bed. To correct this, the trail crew built two additional steps, and a retaining wall. Heavy sandstone rocks were used to form the steps and the wall (Figure 4). Once the rocks were in place, the steps were filled in with crushed sandstone and capped with the red-fines gravel (Figure 5).

Figure 4. Sandstone rocks form the walls of the new step.

Figure 5. East embankment of Blanchard Church Creek Crossing with two additional steps and a retaining wall.

A new method of rigging grip hoists, called a single-line pull, was employed to move the large sandstone rocks used in the installation of the creek crossing. For this method, a winch was anchored to a large tree by looping a sling around the trunk. Once secured, a cable was stretched out and attached to a loop sling and chain netting wrapped around a large rock (Figure 6). One person could then use the winch to pull the rock across the ground (Figure 7). This method is much safer than the previous method of several persons lifting heavy rocks in a prefab chain-link basket, and carrying it by hand.

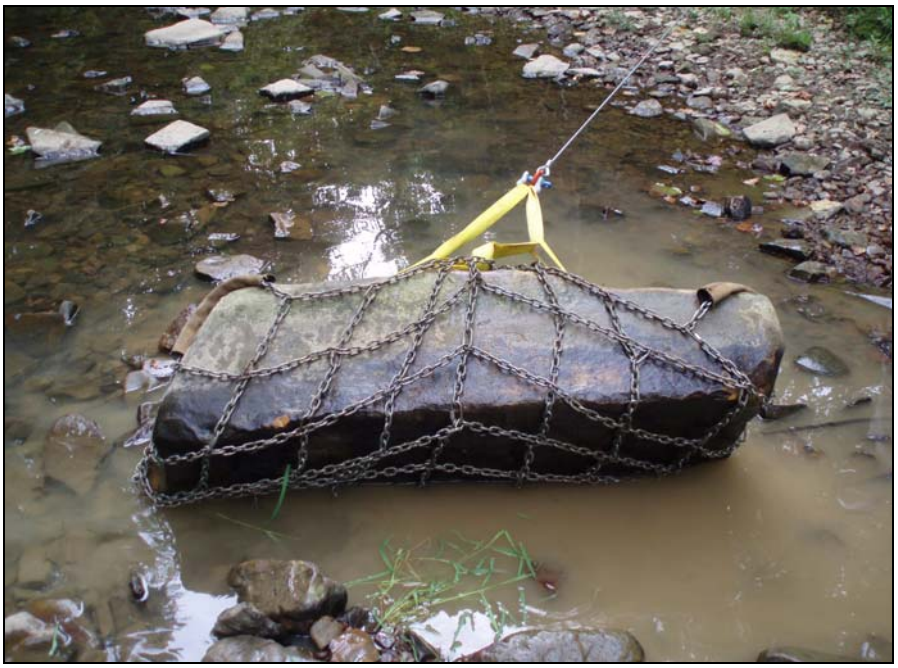

Figure 6. Sandstone rock being moved with a single-line pull.

Figure 7. Maneuvering a rock into place with the grip hoist.

In addition, on FS Trail 457, the trail crew installed a 75-foot causeway/turnpike leading to the Blanchard Church Creek Crossing, located along the east embankment. The original approach was re-routed with the causeway to provide a more sustainable access to the crossing. One hundred thirty-five flat sandstone rocks were carefully selected, and buried two-thirds into the ground to form the walls of the causeway, thereby directing trail traffic to the crossing (Figure 8).

Figure 8. New causeway at the east embankment of the Blanchard Church Creek Crossing on Lusk Creek.

A more advanced winch technique called a skyline was used to move three tons of sandstone gravel, in 5-gallon buckets, over 200-feet. Although a skyline requires additional equipment and setup time, it proved an efficient, less strenuous way to move large quantities of rock. This technique allowed the buckets filled with gravel to be lifted and transported above the ground from quarry to trail along a tensioned wire rope. The wire rope was suspended above the ground by trees, and a system of pulleys (Figures 9 and 10). Once in the causeway, the gravel was used as a base layer, and later capped with the red-fines gravel. The clay consistency of the red-fines gravel compacted and provides an excellent surface for trail traffic.

Figure 9. Trail crew members setting up the skyline.

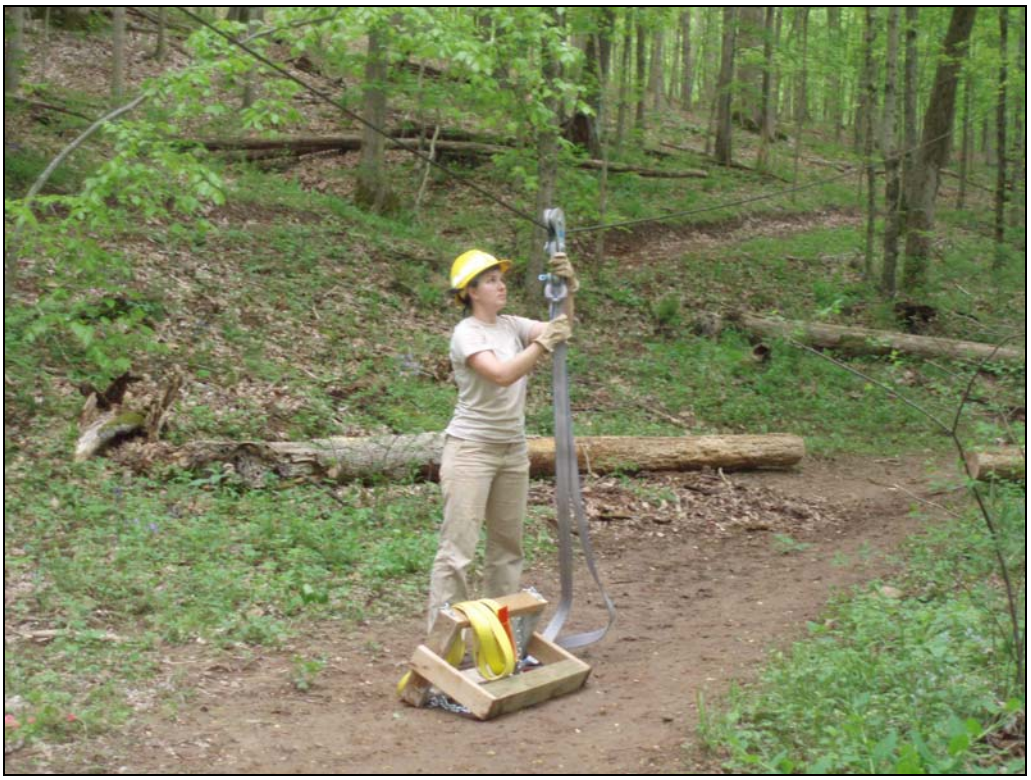

Figure 10. Trail crew member setting up the rock box with a pulley system.

The following are highlights of trail work accomplished in **late May and June 2008**:

Lusk Creek Wilderness - Hauling Gravel with Pack Stock (Bridger-Teton and Hoosier National Forest Detail): During the later part of May, and into early June, the Bridger-Teton National Forest (NF), out of Wyoming, sent a team of eight mules with staff to the Shawnee NF. In addition, a mule team from the Hoosier NF, out of Indiana, with four mules and staff were on Forest during the same time period. This was the second year in a row both mule teams provided gravel hauling for the Shawnee NF trails. This year, the mule teams, while working in concert with the trail crew, hauled 320 tons of gravel, the equivalent of 21 dump truck loads, into the wilderness for use on FS Trail 481B. In addition, 27 students from the Southern Illinois University's Forestry Department volunteered with the trail crew for a day to load mules with gravel. Once transported by gravel hauler to the wilderness boundary, the gravel was shoveled into 5-gallon buckets and loaded by hand into specially designed gravel bags on each mule. Each bucket held approximately 60 pounds of gravel, while each gravel bag held two bucket loads. Tons of gravel were shoveled into buckets, lifted at shoulder height, and poured into specially designed bags on the back of each mule. The mules were lead down the trail, and once at their destination, unloaded and the gravel spread by hand in the trail tread (Figure 11).

Figure 11. Mule teams were led down the trail to their destination; gravel bags were emptied, and the gravel spread in the trail tread.

Both the Bridger/Teton and the Hoosier mule teams hauled tons of gravel to the new re-routes where it was spread and compacted by hand in the trail tread, and trail features, such as the many turnpikes and cribbed stone steps (Figures 12 and 13).

Figure 12. FS Trail 481B – re-route during construction.

Figure 13. FS Trail 481B – after construction. The red-fines gravel spread in the trail tread allows for all-weather rideability.

In addition, other sections of the old, user created FS Trail 487B (Wishing Well Trail) ascended long, steep gradients. As a result, gullies formed by erosion were deteriorating the old trail route. The new FS Trail 481B re-route replaces these old, non-designated sections. The re-route continues to cross hills and knolls, and climbs into and out of small hollows; however, its careful design and lay out on the sidehill locations provide a happy medium between the trail's function of gaining elevation, and the tendency of surface water runoff and user traffic to rapidly erode trails on steep grades (Figure 14). The new sidehill locations allow running water to cross the trail, but not run down the treadway at high velocities that aggravate erosion. The variations in the topography also provide the elements of a stimulating and interesting trail design, while subtle turns and undulations in grade steepness offer trail users an appealing and satisfying trail experience.

Figure 14. New sidehill location of FS Trail 481B (Wishing Well Trail).

In areas where FS Trail 481B crossed over natural drainages, the trail crew installed features such as rock steps and water bars to maintain sustainability. A total of nine drainages had rock steps installed on either side of the trails approach to the drainage (Figures 15 and 16).

Figure 15. FS Trail 481B. Rock Steps and water bars provide stability for the approaches to the natural drainage crossings.

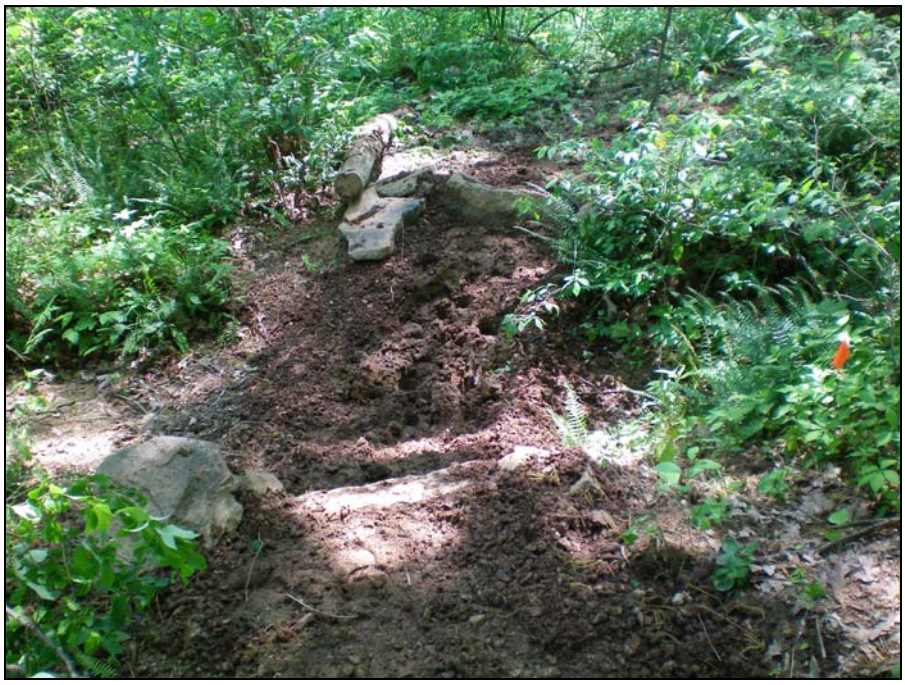

Figure 16. FS Trail 481B. Rock steps and water bars with gravel.

Several tons of native sandstone were used in the construction of the steps and water bars at the drainages. To accommodate stock animals (equestrian trail traffic), each step formed a platform measuring several feet in width and six feet in length. Some drainage locations were the result of natural seepage where the approach required mucking out of mud with shovels. Once the area was prepared, sandstone rock weighting hundreds of pounds were moved into place, and used to form the walls of the platform and provide a solid foundation of the step. Additional sandstone was crushed by hand and used as backfill for the step (Figure 17). The red-fines gravel was hauled in my mule teams and used to cap the crushed sandstone in the platform. The smooth red-fines gravel, with its clay binder, packed tight as a backfill. A great deal of effort and detail went into the installation of the drainage crossing in an effort to provide enhanced trail sustainability.

Figure 17. FS Trail 481B. Sandstone rock is used to form the walls of a rock step/platform at a natural drainage, crushed sandstone provides the foundation.

The following are highlights of trail work accomplished in **July 2008**:

Lusk Creek Wilderness - During the month of July, the trail crew continued working on trail sections in the Lusk Creek Wilderness. A total of six turnpikes were built in several sections of FS Trail 457 (Coyote Club Trail). The turnpikes play a critical role in areas where there is no alternative pathway location by lifting the tread above water saturated soil, and carrying the trail across problematic terrain (Figure 18).

Figure 18. Turnpike installed in areas of water saturated soil.

Non-designated Wilderness - In addition, mechanized work was conducted outside of non-designated wilderness areas. One and a quarter miles of re-routs on sections of FS Trail 487H were completed. The new re-routes, located immediately north of Frank's Tract, follow the natural contour of the terrain, and like the original sections, loop back to the boundary of the Lusk Creek Wilderness (Figure 19).

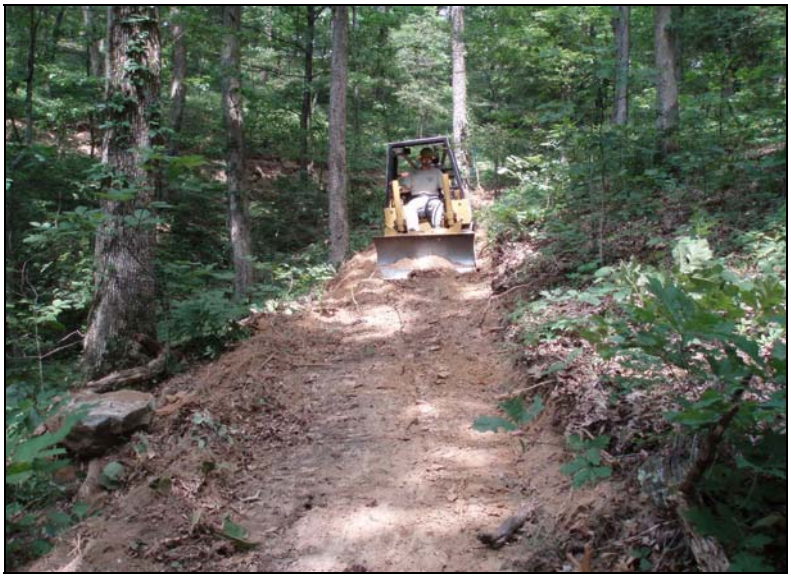

Figure 19. Sweco trail dozer cutting in new trail tread.

The following are highlights of trail work accomplished in **August 2008**:

Lusk Creek Wilderness - Because the entire length of Lusk Creek is a designated Zoological Area along both sides of the embankment, a limited number of authorized creek crossings are available for equestrian use. As such, the existing crossings must be able to sustain frequent trail traffic, such as horse and mule use. Some of these crossings were historically user-created and required relocating and proper installation. The Salt Peter Cave Creek Crossing, located northeast of the ride-through-only trail segment opposite Salt Peter Cave, was one such crossing that required construction. The actual site of the user-created crossing was suitable. The approach to the crossing on the south side of Lusk Creek is flat and level, as such, it did not need improvements; however, the north embankment dropped approximately five feet to the creek. Trail traffic was climbing up out of the creek on this embankment at a 40 percent slope. As a result, the old crossing was eroded on the north embankment, and had the potential to add sedimentation to Lusk Creek (Figure 20).

Figure 20. Before construction. Old, user-created Salt Peter Cave Creek Crossing on north embankment of Lusk Creek.

Salt Peter Cave Creek Crossing - To prepare the creek crossing for equestrian use, the trail crew used shovels and 5-gallon buckets to excavate tons of soil in order to achieve the desired rise and run (slope). Each step of the crossing was constructed to allow a stock animal's four legs to stand, before advancing to the next step. A total of nine steps were installed, each step built with native cedar and sandstone (Figure 21). The creek crossings, reconstructed during the Trails Designation Project in designated wilderness areas, are an excellent example of what can be accomplished in accordance with Wilderness Principals. The use of native building materials and pack stock, primitive tools to shape timber, and dry stack masonry were all incorporated into the improvements of the Salt Peter Cave Creek Crossing.

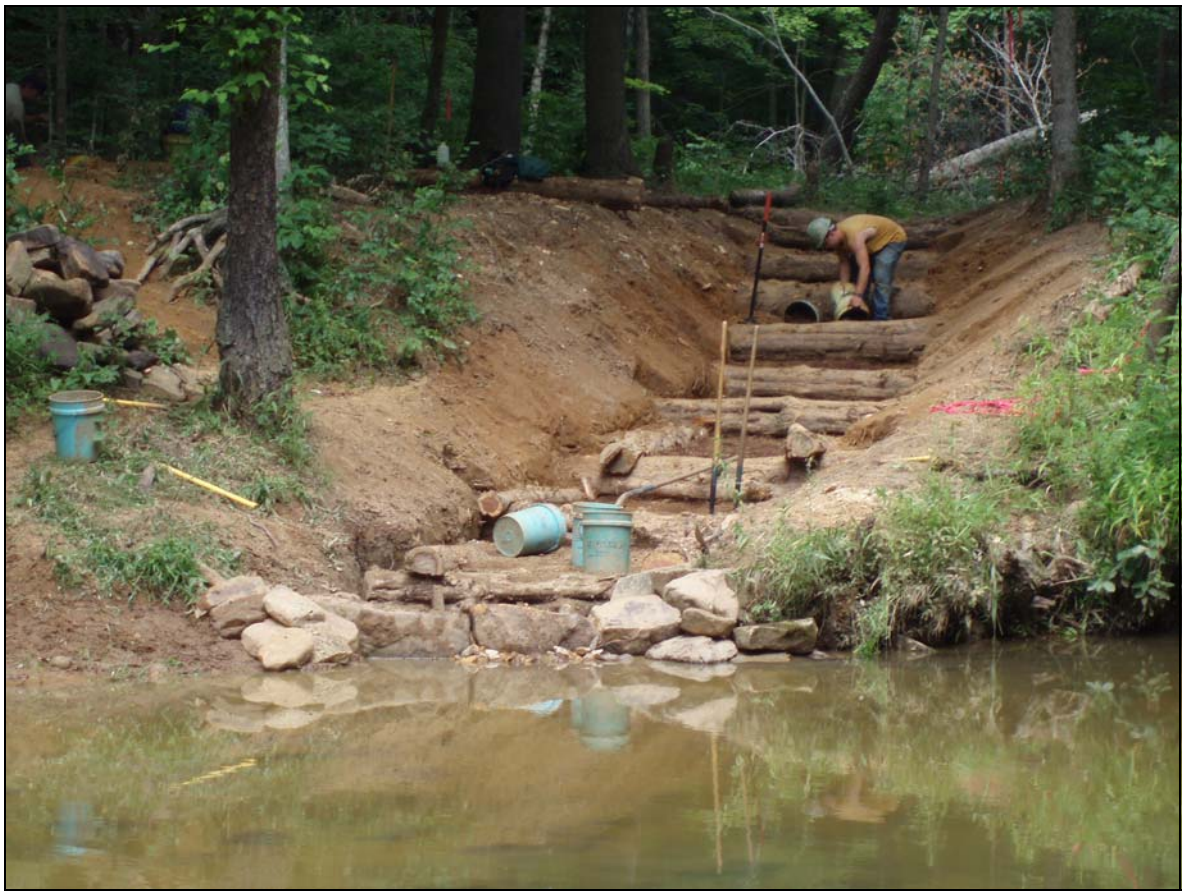

Figure 21. During construction - north embankment of Salt Peter Cave Creek Crossing on Lusk Creek.

Salt Peter Cave Creek Crossing - Cedar logs were hauled by mules from the wilderness boundary to the site of the crossing. The mule team, hired from the local area, hauled the logs nearly one mile into the wilderness. The logs were used to construct the cribbed walls of the stairway (Figure 22). This rustic timber construction uses the traditional technique of *joinery*, the art of joining pieces of wood with notches rather than nails, screws, or bolts.

Figure 22. Cedar logs being used to form the steps.

To withstand seasonal creek flooding, several tons of native sandstone was used in the construction of steps and retaining walls which play a critical role in stabilizing the crossing (Figure 23). To complete the crossing, over ten tons of red-fines gravel was hauled to the site by mules. The gravel was used as a top surface in the cribbed stair steps making travel more comfortable for hikers and equestrians.

Figure 23. Sandstone rock forms the retaining walls.

Salt Peter Cave Creek Crossing - Improvements to the north embankment of the Salt Peter Cave Creek Crossing help to mitigate resource damage and provide improved recreational opportunities.

Figure 24. Salt Peter Cave Creek Crossing <u>before</u> construction.

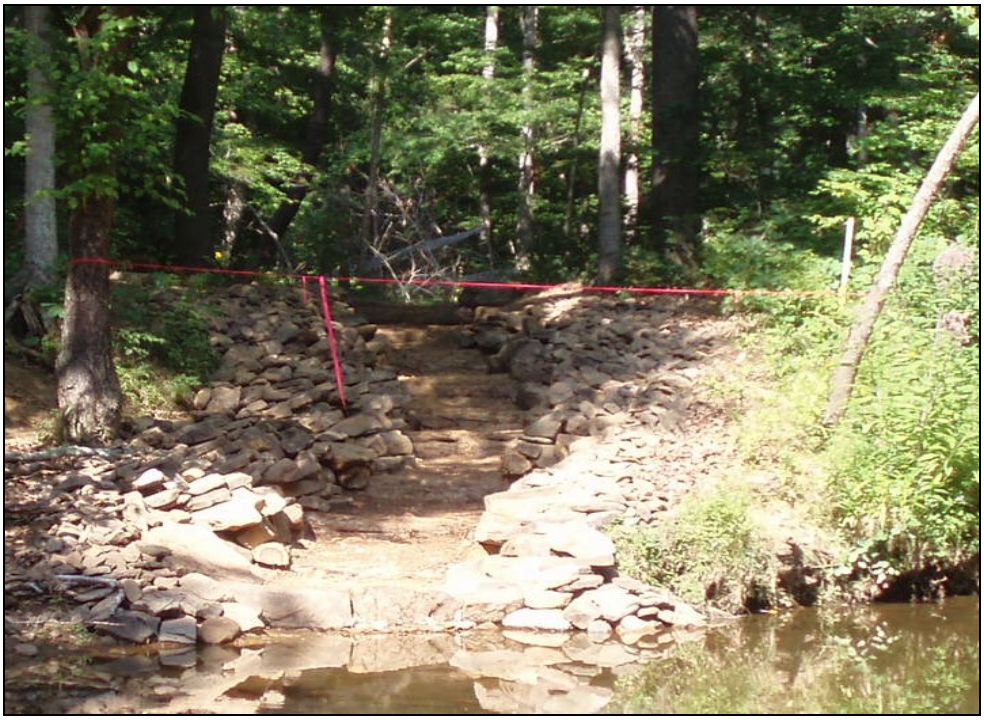

Figure 25. Salt Peter Cave Creek Crossing <u>after</u> construction.