



For the past four years, the Hoosier National Forest (NF) has taken great strides to improve trail and resource conditions in the Charles C. Deam Wilderness, and to provide opportunities for solitude and an overall quality recreation experience for Forest visitors. To improve conditions, the Forest has partnered with the Bridger-Teton National Forest (NF) in Region 4 (R4), to provide two packers and a mule string of eight animals for the month of May each of the past four years. At the same time, the Forest has hired a summer seasonal trail crew to assist with reconstruction for the entire summer. During this time, 13 miles of trail have been constructed and over 650 tons of gravel has been moved using only a mule string and hand tools.

Project location

The Charles C. Deam Wilderness is located on the Hoosier NF about 15 miles southeast of Bloomington, Indiana. The 12,953 acre area was designated in 1982 and includes features such as continuous forest canopy, steep ridges, five caves, five cemeteries, and 12.5 miles of shoreline on Monroe Lake. The area at one time supported 78 homesites connected by 57 miles of road.

Negative effects due to past uses, a proliferation of user made trails, erosion, and areas where improper drainage and flooding was causing sedimentation into the Monroe Reservoir, which serves as the municipal water supply for the city of Bloomington, Indiana, prompted the Forest Service to address the most appropriate way to protect the wilderness resource.

Project

Through partnering with the Bridger-Teton NF, a total of 5.2 miles of new trail has been constructed, one-half mile of trail has been reconstructed, and heavy maintenance has been accomplished on about 30 miles. Trail construction and maintenance within congressionally designated wildernesses require that the minimum tool necessary is utilized, specifically, non-motorized equipment. In addition, a 7.7 mile hiking trail outside of wilderness was constructed utilizing the same techniques. The Hoosier NF is not properly equipped with all the required tools to complete several miles of trail construction. Specifically, the soil types in Indiana require additional hardening/surfacing to protect the trail tread from eroding. Transporting enough gravel to surface trails within a wilderness setting using minimum tools, requires a mule string to move materials. Three years of collaborative efforts between the Bridger-Teton NF and Hoosier NF has led to successful completion of all projects utilizing minimal tools.

All employees involved with these projects have gone beyond normal duties-working extra hours while the Bridger-Teton mule string was in Indiana. The construction crew worked 12-hour days, six days a week each May, to ensure the Forest Service and the resource received the greatest benefit while the mule string was available.

Trail Construction

Trail construction and reconstruction for these projects was unique and innovative to meet the requirements for trail work in a congressionally-designated wilderness. Special efforts were taken by the Forest, since only primitive tools can be used. All aspects of the projects required creativity to properly protect soil, water, and wilderness resources.

The following procedures were used during work in the Charles C. Deam Wilderness:

- Layout and design – The forest engineer, wilderness ranger, and wilderness manager designed and laid out all the projects by walking the proposed routes several times. During layout and design, trail grade was not allowed to exceed 10 percent. Each new section of trail was walked, flagged, and trail grade checked.
- Clearing – Minor clearing of some vegetation along the selected route was completed using crosscut saws, bow saws, and clippers. In some cases, the original route was slightly altered to minimize vegetation that needed to be removed. No overstory trees were removed during this process.
- Plow – A Vulcan Hillside Plow was used to cut a “scratch line” along the new trail segments. The plow was harnessed to a Forest Service mule and a minimum of two drivers were required during the plowing operation. Utilizing a plow in a wooded setting is very difficult work for the mule and drivers. The Hoosier NF is the only forest in Region 9 to utilize this unique and technical method of trail construction.
- Grade – After plowing the trail, a grader was harnessed to the Forest Service mule to establish a trail tread. During the grading process, the trail was outsloped, to reduce the chance for water to run directly down the new trail. As with the plowing process, grading is difficult, hard work.
- Turnpikes/switchbacks – Special structures, such as turnpikes and switchbacks, were constructed to minimize the potential for erosion. Large rocks were carried by hand to the structures location. Approximately 250 large, flat rocks were used for each of the switchbacks. Geotextile was also applied in some areas to further reduce the risk for sedimentation. Materials such as logs and rolls of geotextile were packed to the sites using the mule string.
- Surfacing – Due to soil types found in Indiana, a gravel surfacing was added to protect the soil and minimize the chances for soil erosion, boggy areas, or sedimentation. According to Forest Service Handbook (FSH) 2309.18, some type of surfacing is often required for very high-use trails, or when soil, moisture, and volume of traffic make it impossible to hold the trail tread. When available, river gravel from nearby dry streambeds was shoveled into five gallon buckets and hand loaded into gravel panniers and then hauled to the trail utilizing horses and mules. When a native supply was not available, gravel was hauled by mule string to the site from the nearest trailhead. However, one project was located along Lake Monroe, five miles from the nearest trailhead. Gravel was

hauled in five-gallon buckets by boat, and then loaded on the mule string, where it was finally taken to the trail. To load the gravel on the boat, the Forest designed a conveyor system that was 60 feet long. Gravel was loaded into buckets, sent down the conveyor, and loaded on the boat.

Use of primitive tools, including mule strings, is very rare in Indiana. Since the Charles C. Deam Wilderness is the only congressionally-designated wilderness in the state, Forest visitors are not used to seeing primitive tools in use. While preparing the mule string every morning at the trailhead or completing work on the trail, interested observers would stop by and ask questions about the project, the use of minimum tools, wilderness management in general, and the unique methods that were used to construct the trails. Forest employees took extra time to answer questions and improve the visibility of the work being accomplished in wilderness. The Forest has also received many emails and phone calls complimenting the work that has been accomplished. All the notoriety and one-on-one time with the public has improved our credibility with the public.

Due to the cooperation of two national forests, countless hours of hard work, and tremendous creativity, trails within the Charles C. Deam Wilderness are properly protecting the resources and meeting the needs of the wilderness visitors.