

# **MONITORING REPORT**

## **TRAILS DESIGNATION PROJECT, PHASE ONE October 1, 2006 – September 30, 2007**

### **SHAWNEE NATIONAL FOREST HIDDEN SPRINGS RANGER DISTRICT**



**Monitoring trail conditions in Lusk Creek Wilderness.**



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## MONITORING REPORT

**Monitoring Plan:** In accordance with the Trails Designation Project (TDP, project), Phase One, record of decision, monitoring of the project is required. The monitoring plan for implementation of the project is designed to:

- Ensure that the project is implemented as designed and is effective at accomplishing desired results;
- Collect and maintain accurate information on resource conditions and recreational use and user satisfaction, focusing on the three wildernesses in the project area.

This information is essential to ensure that management protects resources and improves the quality of the recreational experience. The overall structure of the monitoring plan is designed to provide the information needed for management. The monitoring plan structure is found in Appendix B of the Final Environmental Impact Statement (FEIS) on the TDP.

**TDP Monitoring Report:** This monitoring report follows the general structure of the FEIS monitoring plan. Similar to the plan, the report is organized in sections, each related to the resource being monitored.

### HERITAGE RESOURCES (Forest Archaeologist)

**Objective:** Ensure that heritage resources are protected and preserved during and after implementation of this project.

**Desired Result:** There will be no additional affects to identified heritage resources as a result of project implementation.

**Methods Used:** Prior to implementation, conduct an inventory of the project area. Ensure through trail redesign that parts or segments of trails do not pose a threat to significant archaeological sites or heritage resources. Public education will ensure the continued preservation of archaeological sites. Heritage resource education and preservation signage will be placed on all information boards at trailheads. Heritage resources in the project area will be monitored upon project implementation to assess the nature and degree of damage to historic properties due to vandalism, visitor use and natural deterioration, at which time protective mitigation measures will be identified.

**Introduction:** The primary heritage resource goal of the proposed action is to ensure that management actions that potentially affect heritage resources comply with applicable laws, executive orders, and regulations (National Historic Preservation Act of 1974, as amended; Executive Order 11593; Executive Order 13007; Archaeological Protection Act of 1979).

To date, monitoring has been conducted on forest trail (FT) segments that have been constructed and/or reconstructed as part of the project. All proposed trail routes were surveyed prior to project implementation. Monitoring fieldwork included documenting unwanted and undesirable effects to heritage resources associated with trail construction and reconstruction activities (earth-disturbing activities such as bulldozing, water-bar construction, ditch construction and graveling, or any other activity that moves, removes, or otherwise disturbs the archaeological sites). Monitoring for this report was conducted in November 2007.

### **Trail Construction/Reconstruction**

FT 497, Upper Bay Creek, Eddyville Quadrangle (Quad) Sections 1 and 36, Township (T) 11 South (S), T12S, Range (R) 5 East (E), Pope County: Reconstruction of reroute east of Jackson Hole near Wilson Tract. Prior survey of this trail section identified five heritage resources (0908040819—historic farmstead potentially eligible for inclusion on the National Register of Historic Places (NRHP), 0908041246—not eligible rock wall and rock piles, 0908041247—not eligible historic artifact scatter, 0908041248—potentially eligible historic farmstead, and 0908041249—not eligible historic rock pile). Regarding 0908040819, the present unplanned, user-developed trail ran through the middle of the site and was causing resource damage. This section of trail was identified only for reconstruction on the proposed trail map; however, in the FEIS this section was identified for redesign.

The proposed route was approved, with the exception of the trail section near site 0908040819, which was identified for redesign and to be moved away from the heritage resource to avoid future damage. (See Trail Reroutes/Reconstruction—Franks Tract (FT 481)/Wishing Well (FT 481B) and Jackson Hole (FT 497) Trails Heritage Comment). A proposed reroute around the site was flagged and surveyed, and approved by the Assistant Forest Archaeologist. Post-construction trail monitoring determined that all potentially eligible sites were avoided and no new heritage resources were identified.

FT 001 (River-to-River/Goat Trail), Eddyville Quad Sections 28 and 33, T11S, R6E, Pope County: New construction from turnpikes on River-to-River Trail to original Goat Trail and down to Bowed Tree Crossing. Prior survey identified no heritage resources and post-construction monitoring determined that no heritage resources were affected by this activity.

FT 457, Eddyville Quad Section 22, T11S, R6E, Pope County: New construction of re-route upslope from Blanchard Church stream-crossing and south until trail turns east. Prior survey identified no heritage resources. This section of trail will be monitored in FY08 after construction is completed.

FT 481A, Eddyville Quad Section 28, T11S, R6E, Pope County: New construction from County Road 1628 south to Barger Branch Creek and new section of Cactus Trail. Prior survey identified two heritage resources (0908041222—rock wall, 0908041226—isolated find) that were both determined not eligible for inclusion on the NRHP and, therefore, require no protection. Post-construction monitoring identified one new heritage resource (0908041252—rock pile) that is also not eligible for the NRHP. Therefore, no potentially eligible heritage resources were affected by this activity.

FT 001 (River to River Trail). Eddyville Quad Section 33, T11S, R6E, Pope County: New construction of Little Bear Branch and Bowed Tree stream-crossings with section of trail between. Prior survey identified no heritage resources and post-construction monitoring determined that no heritage resources were affected by this activity.

FT 457 (Coyote Club reroute), Eddyville Quad Section 33, T11S, R6E, Pope County: New construction of reroute from Natural Bridge under the southern end of Coyote Club to 492D towards Secret Canyon. Prior survey identified two heritage resources (0908041220—rock pile and rock wall, 0908041221—rock pile) that were both determined not eligible for inclusion on the NRHP and, therefore, require no protection. Post-construction monitoring determined that no heritage resources were affected by this activity.

FT 481, Eddyville Quad Section 21, T11S, R6E, Pope County: New construction of reroute at Frank's Tract from County Road 1628 south to the Lusk Creek Wilderness boundary. Prior survey identified no heritage resources and post-construction monitoring determined that no heritage resources were affected by this activity.

FT's 487 and 487C, Eddyville Quad Section 21, T11S, R6E, Pope County: Reconstruction of existing trail sections beginning at Frank's Tract and continuing north. Prior survey identified no heritage resources and post-construction monitoring determined that no heritage resources were affected by this activity.

FT 498, Eddyville Quad Sections 1 and 6, T12S, R6E, Pope County: New construction of existing trail section near private property/Wilson Tract. Prior survey identified one heritage resource (0908041246—rock wall and rock piles) that was determined not eligible for inclusion on the NRHP and, therefore, requires no protection. Post-construction monitoring determined that no heritage resources were affected by this activity.

FT 472C (Yo Sam Trail), Eddyville Quad Section 31, T12S, R6E, Pope County: Reconstruction of existing trail section from County Highway 145 west to FR 1741. Prior survey identified no heritage resources and post-construction monitoring determined that no heritage resources were affected by this activity.

*Summary and Conclusions:* Eight trail segments in Lusk Creek and two trail segments in upper Bay Creek have been monitored for impacts on heritage resources after project-related construction/reconstruction activities. Of the ten heritage resources that were identified prior to construction activities, two were determined to be potentially eligible and both were successfully avoided during all trail construction/reconstruction activity. One new heritage resource was identified post-construction; however it has been determined not eligible for the NRHP and, therefore, requires no protection.

## **SOIL AND WATER RESOURCES (Forest Soil Scientist)**

*Objective:* Ensure that site productivity and water quality are maintained or improved throughout implementation of the project.

*Desired Result:* Mitigation will be effective at controlling erosion and sedimentation on trails and trail features. If monitoring exposes an increase in trail-braiding, erosion and widening, mitigating actions would be implemented or the trail segment closed.

### **System Roads**

*Methods Used:* Check condition and maintenance need (drainage, gravel needs) to mitigate the effects of recreational use.

*Results:* (as reported by Soil Scientist and Civil Engineering Technician)  
Two sections of FT 001 had construction/reconstruction in FY 2007. A quarter-mile of the River-to-River Trail had new construction at Little Bear Branch and Bowed Tree stream-crossings, with trail in between. One mile of the River-to-River/Goat Trail had new construction from turnpikes on the River-to-River Trail to the Bowed Tree Crossing and to the Goat Trail. Work was done by trail crew and gravel was hauled with pack stock. A general walk-through last summer and this fall has indicated that the actions taken this year have stood up to the traffic.

### **System Trails in Wilderness**

**Methods Used:** Monitor to identify additional maintenance requirements (graveling) necessary to mitigate damage, including braided trails and broken drainage features.

**Results:** No trail segments were closed until maintenance operations were performed, but some new segments were closed until relocation/construction operations were completed. The system trails in wilderness are FT 481A, FT 457 (Coyote Club Reroute), FT 457 (Blanchard Creek East), FT 001 (Goat Trail, River-to-River Trail), FT 001 (River-to-River Trail). Those needing additional maintenance include FT 457 (east of Blanchard Crossing) (out-sloping of the trail) and areas of FT 001 (Goat Trail).

**Further Results** (as reported by the HSRD Recreation Staff Officer): In the 2006 Monitoring Report, trails in the Lusk Creek Wilderness were identified as needing maintenance, such as wet, muddy sections of trail, and those that required additional drainage features. Other sections required further evaluation for re-routing. During the FY 2007 trail season, maintenance and reconstruction was conducted on some of the trails discussed in the 2006 Monitoring Report. This is discussed below in WILDERNESS RESOURCES, Trail Design Standards.

### **Stock-Confinement Areas**

**Methods Used:** Monitor the size of these areas (located in riparian areas) for compliance with Forest Plan riparian standards and guidelines and the size and general conditions of 25 percent of them in the wilderness.

**Results:** The restriction of horses to designated trails will be key to lessening the impacts from the stock-confinement areas. In 2006, the confinement area at Saltpeter Cave was moved to a location east of Natural Bridge. Observations in July, 2007 indicate the move was successful, as there was no evidence of horses being tied to trees at Saltpeter Cave. Monitoring will continue at this location. The stock-confinement area east of Natural Bridge was in compliance with Forest Plan riparian guidelines and the level of site-disturbance was minimal.

A stream-crossing was also noted at Jackson's Hole on FT 497. This stock-confinement area was in compliance with Forest Plan riparian guidelines. The level of site-disturbance was minimal.

A stream-crossing was noted on FT 481. While this area was in compliance with Forest Plan riparian guidelines, the path from the trail to the confinement area was rutting.

The stock-confinement areas at other locations have been modified during the past year. Monitoring will continue.

**Further Results** (as reported by the HSRD Recreation Staff Officer): A determination of the level of use at stock-confinement areas and identification of impacts in areas without highlines are discussed below in RECREATION AND TRAIL RESOURCES, Stock-confinement areas.

## **Trail Drainage**

**Methods Used:** Spot checks will be done of spacing and construction of drainage features and visible rutting near the trails.

**Results:** FTs 496, 497, 498, 487, 487C, and 472 C received surfacing (4 inches deep and 36 inches wide) of crushed aggregate outside the wilderness area. FT 497 and 498 are showing ruts of a few inches. FT 487 and 487C are beginning to show minor rutting as well. Maintenance will be needed on each of these areas. FT 481, 481A, FT 457, and FT 001 received compacted red gravel with fines within the wilderness. Some areas of 457 may require maintenance during the next year. Overall, the wilderness trails are holding up well, as traffic appears to be limited to the trails and drainage structures and crossings are well constructed.

**Further Results** (as reported by the HSRD Recreation Staff Officer): ensuring that trail-design standards and maintenance specifications and scheduling are appropriate for the type and frequency of use that each trail receives are discussed below in WILDERNESS RESOURCES, Trail-Design Standards.

## **All Streams**

**Methods Used:** Review Illinois Environmental Protection Agency (IEPA) water-quality data.

**Results:** The 2006 IEPA 303d lists were reviewed. The lists for 2007 are not yet available. Three stream reaches in Lusk Creek were evaluated. Two reaches were rated as fully supportive of aquatic life, fish-consumption, primary and secondary contact, and not assessed for aesthetic quality. The third reach was rated as fully supportive of aquatic life and fish-consumption, but was not assessed for primary or secondary contact, or aesthetic life.

Segments of Bay Creek were identified for impaired designated use for aquatic life and primary contact information. The potential causes for impaired aquatic life were dissolved oxygen, total phosphorus, sedimentation/siltation, and total suspended sediments; potential sources were channelization, crop production, and sources unknown. The potential cause for impaired primary contact recreation was fecal coliforms, with source unknown. A total maximum daily load (TMDL) report on various segments of Bay Creek begun in 2004 is in Stage 1 of the process. Of these segments, only Bay Creek Lake Number 5 is in the project area. The cause addressed in the TMDL report is phosphorus. Bay Creek Lake Number 5 was identified for impaired designated use (aesthetic quality), with potential causes identified as total phosphorus and total suspended solids. The potential source was runoff from forest/grassland/parkland. None of the 2007 TDP activities occurred in the Bay Creek watershed.

## **Trail Condition**

**Methods Used:** Record condition, width and depth at several cross-sections at a range of grades on trails within and outside wilderness, graveled and native-surface, and re-routed.

Recently maintained trails (2007) in wilderness areas include FT 457 (two sections—Coyote Club re-route and east of the Blanchard stream-crossing), two sections of Trail 001 (River-to-River Trail and Goat Trail), FT 481 and 481A. These trails were surfaced in areas with compacted red gravel with fines.

Results:

Wilderness

FT 481A: Trail relocation and new construction appear to be effective at minimizing rutting and erosion. Noted were minimal wear in the middle and minimal rock displacement outside the prism.

FT 481: Minimal erosion and rutting were noted even in the steeper grades and side slopes. Some sedimentation was noted at the stream-crossing before Natural Bridge. The general grade of this section is gentle, with minimal erosion noted mainly where ephemeral streams cross the trail.

FT 457: Coyote Club reroute—New construction and water-diversion and erosion-control measures (grade-dips, waterbars, turnpikes, steps, etc.) were well done and appear to be effective. Hoof prints are only present at stream-crossings. No hoof prints were noted away from the designated trail.

FT 457: Blanchard Crossing—Re-routing of the trail upslope out of the stream and re-construction reduced sedimentation into the stream. Future maintenance will be necessary.

FT 001 (Goat Trail): Surfacing on this trail appears effective in minimizing erosion. Water diversion structures appear to be effective.

Non-wilderness

FT 487 and 487C: Both trails are reconstructed oldfield roads. Wide corridors were present on both trails. Aggregate re-surfacing appears effective thus far, but regular maintenance will be critical as ruts are beginning to form. Monitoring of 487C will be necessary, especially in the spillway section.

FT 497: Aggregate has been applied and appears to have been moderately effective. Ruts are beginning to form and rock is beginning to be moved to the sides in some areas. Maintenance will be critical.

FT 498: Aggregate and gravel have been applied and appear to have been moderately effective. Maintenance will be necessary in the future as some ruts are beginning to form.

FT 472C: Aggregate and gravel have been applied and appear to have been moderately effective. Maintenance will be necessary in the future as some ruts are beginning to form due to the heavy use.

**Closed User-Developed Trails**

Methods Used: Check closed user-developed trails for a natural trend toward stabilization. If unstable conditions are observed, check-dams and brush may be used to promote stability.

Results: In Lusk Creek Wilderness, 9.1 miles of user-developed trails were closed.

Trails closed along FT 481 were well marked, flagged off, and signed. The closed areas were frequently also covered with branches and brush. A visual inspection of these areas showed

minimal erosion and no hoof prints. Some trail sections closed along the refurbished area on FT 481A were to make way for trail relocation along gentler grades via use of switchbacks. A visual inspection also showed minimal erosion and no hoof prints were noted.

Trails leading into private sections off of FT 457 (Coyote Club reroute) were closed with brush and dams. Equestrian traffic appears to be on the designated trail.

Further Results (as reported by the HSRD Recreation Staff Officer): The objective of allowing natural ecological processes to proceed unhindered by human influence on brushed-in trails is discussed below in WILDERNESS RESOURCES, Untrammled.

### **System Trails**

Methods Used: A trail-condition survey to identify maintenance needs, visible rutting near the trails, and segments of trail that continue to erode quickly and/or are braided.

Results: A trail-use condition report for approximately 39 miles in Lusk Creek Wilderness classified trails into three conditions: low-, moderate-, and high-use.

## **RECREATION AND TRAIL RESOURCES**

### **Access (HSRD Recreation Staff Officer)**

Objective: Determine if access provided at public trailheads and commercial equestrian camps is sufficient to meet the needs of trail-users.

Desired Result: Trailhead location and capacity meet demand adequately.

Method Used: Query outfitter-guide permit-holders to determine the level of day-parking and survey occupancy of Forest Service trailheads.

Results: Six commercial equestrian horse camps were queried to determine the average day-parking they had during the height of the equestrian riding season—fall and spring. Three had no day-parking and three had an average of four day-users per month. Horse-camp owners and equestrians in the field were queried regarding current trailhead locations and whether capacities adequately meet demand. Two responses:

- “Not enough parking spaces at Lusk Creek (Circle B) trailhead during the height of the trail riding season, its not uncommon to see two dozen horse trailers parked there.”
- “There is a bottleneck of equestrians entering the wilderness on the River-To-River Trail just north of the Lusk Creek (Circle B) trailhead.” This response was also recorded in the 2006 TDP Monitoring Report.

The area of the bottleneck mentioned above is a section of the River-To-River Trail north of Lusk Creek trailhead. The trail is routed through a narrow section of Forest land bordered by private property, resulting in limited options for re-routing. On this section, the majority of equestrian traffic comes from the Lusk Creek trailhead and two horse camps, Circle B Ranch and Bear Branch Campground. Reconstruction of this section is needed and is scheduled for 2008. Also, a re-route of Trail 481B (Wishing Well Trail) is currently under way in Lusk Creek Wilderness. This re-route will be open in late summer 2008 and should help alleviate some of the equestrian traffic entering the wilderness from the area of the bottleneck.

The 2006 TDP Monitoring Report also offered suggestions for upgrading several existing and proposed trailhead locations outside Lusk Creek Wilderness. These locations could help to spread out impacts, if additional parking was provided at them:

- Old Frank's tract off County Road 23 in the general northwest area of Lusk Creek Wilderness (Barger Parking Area), located at T11S, R6E, Section 21. General desire to see ten trailer parking sites at this location.
- Just north of New Liberty Church off Forest Road 1867 next to the wilderness boundary sign in the general northeast area of Lusk Creek Wilderness (Blanchard Parking Area), located at T11S, R6E, Section 23.
- Near Bethesda Church off County Road 25 north of Hartsville, located at T11S, R6E, Section 24.
- "There is some demand for additional trailheads, but there is more demand for fixing up and improving what is already out there." Some improvements have been accomplished; new hitching rails were installed at the Hitching Post Trailhead above Herod. Additional work is scheduled for early spring, 2008.
- "Need a trailhead near the site of the annual Nine-Day Trail Ride Event." This annual permitted event is located on private property northwest of Leisure City near Benham Ridge. Currently, there are no plans to build a trailhead near this event; however, One Hose Gap Lake has sufficient room for several trailers at its General Forest Area at the boat ramp. Designated trails would allow access to ride to and from the event.
- "The trailheads do not have enough amenities to warrant the proposed bridle-tag fees; want a toilet at the Lusk Creek (Circle B) trailhead."

The following considerations are offered, and were provided in the 2006 TDP Monitoring Report:

- Consider parking improvements, spread gravel and post signage at Old Frank's tract off County Road 23 in the northwest area of Lusk Creek Wilderness (Barger Parking Area).
- Consider parking improvements, spread gravel, post signage, and allow for pull-through access north of New Liberty Church off Forest Road 1867 next to the wilderness boundary sign in the northeast area of Lusk Creek Wilderness (Blanchard Parking Area).
- Consider parking improvements for Garden of the Gods Wilderness and improvements along the River-To-River Trail at the east and west sides of the wilderness. This could be provided at two dispersed recreation sites, one at the intersection of County Road 156 and Forest Road 1454 on the east side of the wilderness (outside the boundary), located at T11S, R7E, Section 4, and another off County Road 17 near the River-To-River Trail on the west side of the wilderness, located at T10S, R8E, Section 31 (Hitching Post trailhead above Herod). Both sites are near the River-To-River Trail and would need graveling and some improvements to provide parking for three to five trailers.
- In addition, the need to inform users of this additional parking would be necessary in order to get the information circulated among equestrians, both local and non-local.
- Two requests have been received for special-use permits for access from private land to the designated trail system. It was determined there is no need for these permits after alternative access routes to designated trails were identified.

## **Stock-Confinement Areas (HSRD Recreation Staff Officer)**

**Objective:** Determine the level of use at stock-confinement areas and identify impacts in areas without highlines.

**Desired Results:** Stock-confinement areas are suitable for the level of use they receive and are meeting their intended of mitigating stock-confinement impacts.

**Method Used:** Sample visitation at stock-confinement areas when use is expected to be high. Look for stock-confinement areas in conjunction with other trail surveys.

**Results:** In its original location, the user-developed Jackson Hole stock-confinement area had no highlines with tie-ups to secure stock, which were simply tied to trees. The area has been relocated to a sustainable and suitable site with gravel spread at the entrance (Figure 1) and within the confinement area to provide wet-weather ridability. Hayes Canyon Horse Campground volunteered assistance during the relocation and provided the new tie-ups made of old horseshoes (Figure 2). The relocated and reconstructed area provides equestrians with a safe and effective means of securing stock while offering protection of natural resources by confining stock to a suitable area.



Figure 1. Entrance to reconstructed Jackson Hole stock-confinement area.



Figure 2. New tie-up on highline at Jackson Hole.



Figure 3. Stock tied to highlines at Secret Canyon stock-confinement area.



Figure 4. Secret Canyon stock-confinement area.

Monitoring of the stock-confinement areas at Natural Bridge, Secret Canyon, and Owl Bluff has shown the sites are suitable for the level of use they are receiving and meet the intended purpose of mitigating stock-confinement impacts (Figures 3 and 4).

Continued monitoring of the confinement area in the pine plantation shows equestrians are tying stock to pine trees, despite segments of rope hanging from the highline that offer opportunities to tie stock with relative ease. This observation was also noted in the 2006 TDP Trail Monitoring Report.

There were no observations of equestrians stopping or tying stock to the trees at the ride-through-only trail section opposite Saltpeter Cave (Figures 5 and 6). Monitoring shows evidence (stock hoof imprints) that some stock have strayed from the delineated path (rocks placed along the trail edge) in the ride-through-only section opposite Saltpeter Cave, however, this has caused little impact.



Figure 5. Saltpeter Cave ride-through-only trail, fall 2006.

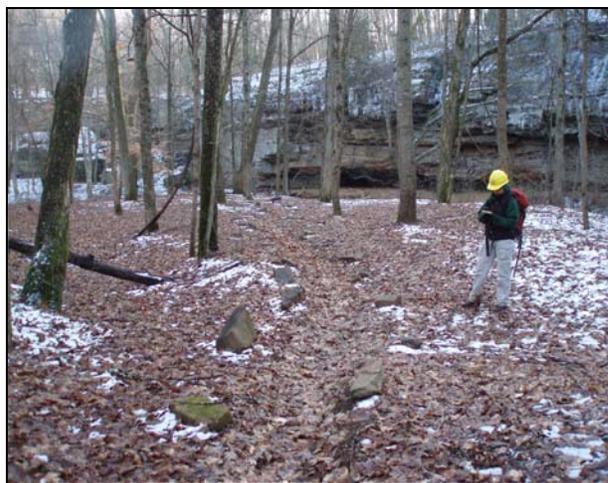


Figure 6. Saltpeter Cave ride-through-only trail one year later, winter 2007.

### ***User Conflicts (HSRD Recreation Staff Officer)***

***Objective:*** Look for areas where conflicts occur and determine cause.

***Desired Result:*** Conflicts between users are mitigated promptly. Quality recreation experiences are maintained for all authorized users.

***Methods Used:*** Wilderness monitoring surveys. Monitor telephone and email comments received from users.

***Results:*** The HSRD trail crew kept daily logs of their activities. In addition to the tasks completed each day, the crew leader recorded encounters with equestrians. During these encounters, the trail crew leader would ask users how they liked the recent trail improvements. Comments received from Forest users regarding the trail work were generally positive, ranging from "...great job with the trails;" to "thanks and keep up the good work."

Monitoring telephone and email comments received from users resulted in a majority of positive comments regarding trail improvements:

- “Overall, Forest Service did a great job with the trails.” (Bob Tyson, Sierra Club Outings Leader)
- “...wanted to let you know the (Goat) trail is great.” (Hayes Canyon Campground Owner)
- “Good job on filling in the eroded creek bank” (Bowed Tree stream-crossing). (Brian DeNeal, staff writer for the *Harrisburg Daily Register*)
- “You folks should take a bow...outstanding example of getting a lot done in some challenging circumstances using traditional skills.” (Tom Carlson, Forest Service Representative, Arthur Carhart National Wilderness Training Center)
- “...fantastic work on the trails.” (Judge J. Phil Gilbert, United States District Court Southern District of Illinois)

This fiscal year, several newspaper articles were published regarding the trails and the TDP. These articles were positive regarding the progress of the project:

- *The Trail Rider* (Equestrian Trail Riding Magazine). “Exclusive Update, Shawnee National Forest: Open to Equestrians” by Genie Stewart-Spears, equine journalist and photographer. July/August 2007. Interview with HSRD Trail Technician Brian Bourne reported on the trails in Lusk Creek Wilderness and the accomplishments of the TDP.
- *Daily Register*, Harrisburg, Illinois. “Adding a hitching rail.” August 21, 2007. Article on volunteer efforts by members of the Shawnee Trail Conservancy, Illinois Trail Riders and the Horsemen’s Council of Illinois working together with the Shawnee National Forest to provide improvements to the Hitching-Post Trailhead north of Herod.
- *Daily Register*, Harrisburg, Illinois. “Bridger-Teton mule team aids in building trail” by Brian DeNeal. June 6, 2007. Article reported on the mule team from the Bridger-Teton National Forests that was on the Forest during May; the team hauled over 300 tons of gravel into the wilderness for trail reconstruction.
- *Hardin County Independent*, Elizabethtown, Illinois. “Building trail re-routes in Shawnee National Forest” by Bob Monroe, HSRD Recreation/Lands Staff Officer. September 13, 2007. Article reported the accomplishments of the TDP and work conducted in Lusk Creek Wilderness.
- *The Vienna Times*, Vienna, Illinois. “Miles of Forest Trails Designation Project Completed” by Bob Monroe, HSRD Recreation/Lands Staff Officer. September 13, 2007. Article reported the accomplishments of the TDP and work conducted in Lusk Creek Wilderness.

There have been very positive comments from Forest users regarding the trail improvements in Lusk Creek Wilderness. As was recorded in the 2006 Monitoring Report, no conflicts between users have been received by the District other than reports of hunters using All-Terrain Vehicles (ATVs) and Off-Road Vehicles (ORVs) on the Forest in areas not authorized, such as wilderness. Forest Service Law Enforcement and Forest Protection Officers continue to actively patrol the Forest and issue violation notices when appropriate to those who violate Forest regulations. Monitoring of telephone and e-mail comments from users will continue.

### **Wet-Weather Ridability (Forest Civil Engineering Technician)**

**Objective:** Ensure that primary, graveled trails withstand wet-weather use. (Note: Sections of trail were reconstructed to meet the criteria in the TDP before the aggregate and red gravel was added.) Determine if other trails are being impacted by wet-weather use and if remediation should include additional graveling or temporary closure.

***Desired Result:*** Trails system withstands all-season use and requires minimum level of restriction on access.

***Method Used:*** A general walk-through was done on surfaced trails within the project area to note how the surface is withstanding use after a partial riding season. Special attention was given to measuring the depth of hoof impressions and wet-area evaluation.

***Results:*** See Tables 1 through 5.

**Table 1. Trail design standards.**

Attribute	Trail-User Type			
	Hiker		Hiker/Equestrian	
	Wilderness	Non-wilderness	Wilderness	Non-wilderness
Clearing Width	4-6 feet (')	6'	6-8'	8'
Tread Width	Up to 24 inches(")	Up to 24"	Up to 24"	Up to 36"
Tread Stability	Goal for tread stability: Horse/pack-stock hooves sink less than 4 inches			
Trail Grade*	8 percent (%) recommended, 10% allowable			
Trail Signage	Outside of wilderness, signs may have destinations and mileages, reassurance markers may be used with line-of-sight frequency. Inside wilderness, signs may include destinations; reassurance markers may be used only as necessary.			
*Some steeper grades acceptable with application of gravel.				

**Table 2. Trails outside wilderness surfaced with compacted crushed aggregate 4 inches deep and 36 inches wide.**

Trail Number	Results with Noted Condition
FT 496	Aggregate added to portion of trail reconstructed fall 2006 has greatly improved condition of trail. Soil was compacted well due to use during spring and summer, making base adequate for applying the aggregate. This created firm and stable riding surface for reducing impacts of hoofs on wet soil. Aggregate also was added to portion of new construction completed fall 2006 that was less than eight percent sideslope, creating adequate base in flat areas to increase wet weather ridability.
FT 497	Crushed aggregate applied to entire length of new construction of this trail. This was done because sideslope of area is less than 1-5 percent and not able to properly shed water. Trail is mostly in pine stands; little light gets to trail surface. Aggregate has hardened trail surface to compensate for location. Due to horses walking down middle of the trail, there is a 3" - 4" rut developing. Rock is being compacted; little is being pushed out to the sides. Needs maintenance in future to level surface to avoid erosion.
FT 498	Both crushed aggregate and red gravel was placed on this section of trail. The rock has improved the surface. Width is approximately 4'-5' and horses are walking on same path, creating a rut. The rock tends to be a little thicker along portions of the trail; therefore, rutting is only 2" - 3" deep.
FT 487C	Crushed aggregate was added to this trail to harden it after reconstruction. Trail is on flat terrain and in need of hardening. Aggregate was installed 36" wide and about 4" deep. Surface is holding up well, but needs to be spot-graveled after wet season. Where crosses dam spillway, needs to be monitored.
FT 487	Trail is the same as FT 487C. Crushed aggregate was added to this trail to harden it after reconstruction. Trail is on flat terrain and in need of hardening. Aggregate was installed 36" wide and approximately 4" deep. Surface is holding up well, but needs to be spot-graveled after wet season
FT 472C	Trail was spot-surfaced to harden earth, water bars and flat areas; has improved for wet-weather riding.

### ***Trail-Design Standards (Forest Civil Engineering Technician)***

***Objective:*** Ensure that trail-design standards, maintenance specifications and maintenance scheduling are appropriate for the type and frequency of use that each trail receives.

***Desired Result:*** Trails are constructed and/or maintained to appropriate standards and are sustainable over time.

***Methods Used:*** A general walk-through utilizing the Trail Assessment and Condition Survey method was conducted on trails worked on. The trail condition was recorded to include the

width and depth, trail grade, surface, and any reroutes. Condition of any closed sections of trail was also noted.

**Results:** See Tables 1 through 5.

**Table 3. Trails in Lusk Creek Wilderness spot-surfaced with compacted red gravel with fines to 4 inches deep and 20 inches wide.**

Trail Number	Results with Noted Condition
FT 481A	Trail relocated with full bench cut; erosion controls installed. Gravel installed on areas with less than 10 percent sideslope. At entrance a 660' turnpike was installed through pine stand. Structure withstanding horse traffic with little rutting in center of path. Grade-dips and climbing turns reinforced with rock to increase effectiveness. All rock well compacted, creating suitable wet-weather trail.
FT 481	Larger rock steps constructed and backfilled with red rock. Holding up sufficiently to increased traffic compared to steps installed previous year at creek going south up-slope. Rock installed on surface of hill where side slope is >15 percent. Has helped stabilize tread and installed erosion control.
FT 457	Portions of trail were spot graveled. Section east of Blanchard stream-crossing relocated upslope and hardened. This area has increased use and installed rock has been compacted into trail surface. Difficult to see rock due to use and leaf litter. Section from intersection with 492A east to Secret Canyon steps was hardened; has held up well. Area relatively flat with little sideslope for drainage. Area through pine was soft; by adding rock it has become more durable for horse traffic.
FT 001 (Goat Trail)	Rock was spread on grade-dips, turnpikes and steps to help eliminate erosion; spot-graveled in areas with minimum sideslope. Has been open for a full season and held up well. Bowed Tree stream-crossing constructed to withstand high water and extensive use.

**Table 4. Constructed or reconstructed sections of trails outside wilderness meeting TDP standards, with noted results.**

Trail Number	Results with Noted Condition
FT 497	TDP criteria for trail design met. Work was done with trail-building machine, with crushed aggregate applied on entire length of new construction. Riding surface is 36 inches wide, with average sideslope throughout trail of less than 8 percent. Trail bed constructed with either grade-dip or rolling dip every 50 feet at minimum, or as necessary for adequate surface drainage. These were incorporated in tread construction to maximized existing topographic features. Maintenance needs to be done on grade-dips because hoof prints are two inches deep, creating damming effect and impeding water flow in lead-off ditch. This seems to be recurring problem with earthen grade-dips in wet weather.
FT 498	Work was done with trail-building machine, with crushed aggregate and red rock added. This portion of trail has much use due to its location near a camp. The grade-dips and rolling dips are properly located and working sufficiently. This section needs maintenance more frequently due to the heavy use.
FT 487C	Trail was reconstructed for a wider corridor. Brush was removed and grade-dips installed, with long lead-off ditches due to flat terrain. Crushed aggregate used to harden trail-tread. Maintenance necessary to ensure rut is not created. Spot-graveling may be needed, also.
FT 487	Trail was reconstructed for a wider corridor. Brush was removed and grade-dips installed, with long lead-off ditches due to flat terrain. Crushed aggregate used to harden trail-tread. Maintenance necessary to ensure rut is not created. Spot graveling may be needed, also.
FT 481	TDP criteria for trail design met. Frequency of grade-dips adequate for use and terrain. Side-slope greater than 15 percent on most of trail. Work was done with trail-building machine; grade-dips, rolling dips and climbing turns with lead-off ditches were constructed. Rock surfacing should be added at start of trail in open field area.
FT 472C	Trail was constructed through pine stand with earthen grade-dips and waterbars. Lead-off ditches clear of debris; flat areas hardened with crushed aggregate. Receives extensive use due to location.

**Table 5. Constructed or reconstructed sections of trails in wilderness meeting TDP standards, with noted results.**

Trail Number	Results with Noted Condition
FT 481A	Trail constructed with full bench cut where adequate side-slope, with grade-dips and waterbars. Through pine stand at start of trail terrain is flat; therefore, a 660' turnpike was constructed to eliminate water standing in trail-tread. Several rock fords with rock retaining walls were installed on shallow stream-crossings. Climbing turns with steps gain elevation while maintaining minimum slope.
FT 457 Coyote Club Reroute	Tread constructed according to TDP standard: full bench cut with grade-dips, water bars, turnpikes, climbing turns, switchbacks, and steps. Tread developing minor cupping, with 1"-2" berm on out-slope portion, but not entire length. No sloughing occurring due to rock reinforcement on down-slope where needed. Grade-dips constructed deeper than on previous sections of trail; withstanding horse traffic. Only a couple of lower steps leading out of stream-crossings are muddy, with hoof imprints 3 inches deep. Trail meanders through open timber; takes advantage of natural features to keep user on trail and avoid cut-through. Much work in construction of this section. All trails leading to private land closed with brush; check-dams installed. Users staying on designated trail.
FT 457 East of Blanchard Crossing	This section relocated upslope out of creek bottom with 3"-4" berm on outside of tread. Grade-dips draining water from tread as needed. Out-sloping of trail-tread necessary in the spring.
FT 481	Two stone steps on west side of creek were replaced with larger and wider rock steps. This section now adequate. Water bars reinforced with redcedar logs and red rock standing up to increased traffic.
FT 001 Goat Trail	Full bench-cut tread and back-slope good; very rocky area. Several shallow stream-crossings constructed of large rock steps and turnpikes withstanding use. Switchback constructed to standard, retaining walls solid. Below switchback is natural seep from hillside, with mud and hoof imprints 3 inches deep. All rock waterbars going down hill to Bear Branch are solid and adequate. Lead-off ditches clean. Bowed Tree stream-crossing constructed to withstand major flooding and swift water. Large boulders and redcedar logs used and backfilled with red rock. Great craftsmanship in this particular structure.

***Trail Signage, Wilderness and Non-wilderness (Forest Civil Engineering Technician)***

A total of 133 trail directional signs were installed in the TDP area outside of the wildernesses. These signs are made of oak with one-inch routed letters installed on treated 4x4 posts. Signs are located at most major junctions. These signs were dipped in preservative and are not turning black from the weather as quickly as the previous signs.

A total of 26 wilderness trail destination signs were installed. These signs are the traditional five-sided wilderness signs also made of oak with one-inch routed letters on cedar posts. These signs are located at major junctions and stream-crossings to guide the user to the designated trails. These also were dipped in preservative but are slowly turning black, but not as quickly as the others.

Additional signs will be installed as new sections of trail are constructed. No reassurance markers were installed by the Forest. Local camps have been installing reassurance markers along the trails that seem to be helping the user.

**AQUATIC RESOURCES (Forest Fisheries Biologist)**

***Abstract:*** In 2006, the Shawnee National Forest began implementation of the TDP, the culmination of a multi-year effort to develop a designated trails system in the Bay, Big Grand Pierre, Eagle, and Lusk Creek watersheds. During the environmental analysis, two significant issues were identified: 1) the effects of sedimentation on least brook lamprey, a state-threatened species, and 2) the effects of sedimentation on 3 Regional Forester sensitive and state-listed mussels: purple lilliput, little spectaclecase, and spike. As part of the environmental analysis, a monitoring plan was developed to assess the impacts of project implementation on these species, including from new trail construction and trail rehabilitation. Monitoring in 2007 found no implementation effects on least brook lamprey. During 2007 sampling, 1,684 lamprey

were found spawning at 127 sites, compared to 707 lamprey at 86 sites in 2006, and 181 lamprey at 38 sites in 2005. Within the Little Lusk Creek drainage, several spawning sites were lost due to beaver activity, not to the implementation of the TDP decision. Sedimentation samples in Lusk Creek Wilderness showed some increases in sedimentation, but these increases were not the result of trail rehabilitation or construction and were only slightly elevated from 2005 levels. Available evidence to date suggests that implementation of the TDP has had no effect on least brook lamprey spawning or available habitat for this species.

Monitoring of sedimentation in the Big Grand Pierre drainage was conducted in 2006. However, in 2007 no trail construction was done within the drainage; therefore, no monitoring was done in 2007. Data collected in 2006 will serve as the baseline for future monitoring when implementation occurs within the Big Grand Pierre drainage.

For a comprehensive summary of the survey data, refer to “The Impacts of Trails Designation Implementation on the Aquatic Biota of the Shawnee National Forest, 2007 Monitoring Report,” M. Welker, in the monitoring record.

### ***Effects at Stream-Crossings on Least Brook Lamprey Spawning***

***Objective:*** Ensure that least brook lamprey spawning activity and spawning habitat are not reduced by implementation of the TDP.

***Desired Result:*** Spawning sites and habitat will remain after implementation.

***Method Used:*** Spawning surveys were conducted at all trail-crossings and proposed trail-crossings on Bay, Little Bay, Lusk and Little Lusk Creeks. These streams were monitored to determine 1) use by adult lamprey for spawning, 2) the approximate number of individuals present and 3) any sedimentation impacts in known spawning riffles. Surveys were also conducted throughout the Big Grand Pierre, Bay and Lusk Creek drainages to locate new spawning sites and determine lamprey distribution. Throughout these drainages, streams were visually inspected to detect aggregations of spawning lamprey. Each site was visited at least twice weekly beginning March 15 and ending April 15. The following protocol was used for the survey:

- Visually inspect all riffles beginning at the bottom and ending at the top.
- Visually inspect all proposed stream-crossings from 100 meters upstream of the crossing to 100 meters downstream of the crossing.
- Collect species for identification and measurement.
- If collection is not possible, record video or take photographs.
- Record GPS location of spawning site.
- Count and record the number of lamprey observed.
- Record the type of activity observed: spawning, nest-building, sedentary etc.

As a precautionary measure, data were also collected in the Lusk Creek Wilderness to determine potential sedimentation effects on the least brook lamprey. A Wohlman Pebble Count was taken in 2005, 2006, and 2007 to identify any increases in sedimentation.

***Results:*** Least brook lamprey spawning activity has been surveyed for three years on the Forest. In 2005, 181 lamprey were observed spawning at 38 sites; in 2006, 707 were observed at 86 sites; and in 2007, 1,684 were observed at 127 sites. Within the Little Lusk Creek drainage, several spawning sites were lost. These sites were lost, however, to beaver activity and were not

related to the trails designation implementation. Similar to 2006, there was also no spawning activity at Guest Farm Crossing in Lusk Creek Wilderness. At this site, in both 2006 and 2007, debris had accumulated on the spawning riffle and prevented spawning. Although these sites were lost, there was no net loss in the number of spawning sites within the four drainages.

There are five designated stream-crossings within Lusk Creek Wilderness. A Wohlman Pebble Count was taken at each crossing in 2005, 2006, and 2007 to assess the sedimentation from the trails. In 2006, there was a four-percent increase in silt at site number 102006, the Blanchard Church crossing. Both entrances to the crossing were reconstructed in the summer of 2006 to help prevent erosion of silt into the stream. During 2007, sedimentation fell back to 2005 levels at this site. Site number 112006, the Natural Bridge crossing, showed a six-percent decrease in silt in 2006 and then moderated back to three percent in 2007. This crossing was reconstructed during the summer of 2006. Sites 122006, the Saltpeter Cave crossing, and 132006, the Old Guest Farm crossing, showed a decrease in silt in the stream. At Site 142006, the Bowed Tree crossing, sedimentation increased by 13 percent. This site will be monitored closely in 2008 to ensure that sedimentation does not increase above the 20 percent threshold and to determine the cause for sediment buildup.

### **Effects of Sedimentation on Spike, Little Spectaclecase and Purple Lilliput Mussels in the Big Grand Pierre Creek Drainage**

**Objective:** Ensure that habitat for the spike, little spectaclecase and purple lilliput mussels is not reduced by implementation of the TDP.

**Method Used:** Surveys were conducted at trail-crossings within the Big Grand Pierre drainage. Twelve sites were to be surveyed at each of the following: 1) existing crossings, 2) new crossings and 3) closed crossings; however, because of the low number of crossings within this drainage, only eight sites were surveyed in 2006. Each site was surveyed prior to project initiation to gather baseline information. At each, a Wohlman Pebble Count and Residual Pool Depth Measurement were taken to identify any increases in sedimentation.

**Results:** In 2006, a Wohlman Pebble Count and Residual Pool Depth Measurement were taken at nine crossings on eight different streams within the Big Grand Pierre drainage. No trail work was conducted within the drainage in 2007; therefore, no monitoring occurred. Data from 2006 will serve as the baseline for future monitoring when implementation occurs.

### **Overall Results:**

- Trails implementation does not appear to be affecting least brook lamprey spawning and spawning habitat within the Lusk Creek drainage
- Baseline data gathered during 2006 monitoring in the Big Grand Pierre drainage revealed low levels of sedimentation. These data will be used to monitor the effects of trails designation implementation (expected in 2008 or 2009).
- Survey results showed an increase in the number of lamprey, as well as the number of spawning sites; however, these increases are likely the result of concentrated sampling in areas known to have lamprey. Prior surveys (i.e., 2005 and 2006) were more widely distributed, so that potential spawning sites could be located.
- As per the TDP, lamprey monitoring will continue into 2008. After 2008, standardized Forest Plan monitoring will be used to ensure no loss of habitat or populations.
- Based upon this monitoring, no new mitigation or changes in existing methodology are proposed.

## BOTANICAL RESOURCES (HSRD Botanist)

**Objective:** Ensure that federal and Regional Forester sensitive species (RFSS) individuals and populations and occupied habitat are maintained or enhanced throughout implementation of the TDP.

**Desired Result:** Mitigation measures would be effective at controlling damage or destruction of individuals/populations and occupied habitat along trails and trail facilities. If monitoring exposed continued unacceptable increase in trail-braiding and unauthorized spurs, mitigation measures would be implemented or the trail segment would be closed.

**Methods:** see Table 6, Rare Plant Resources Monitoring Schedule.

**Results:** Each response below corresponds to the “Description” with the same number in the above table.

1. Federally listed and RFSS plant locations monitored within the four watersheds from December 2, 2006 to December 1, 2007, include Mead’s milkweed (*Asclepias meadii*), Appalachian bugbane (*Cimicifuga rubifolia*), eastern hay-scented fern (*Dennstaedtia punctilobula*), Yadkin’s panicgrass (*Dichanthelium yadkinense*), French’s shooting star (*Dodecatheon frenchii*), turk’s-cap lily (*Lilium superbum*), and American ginseng (*Panax quinquefolius*). There are 28 federal and Regional Forester sensitive plant species known to occur or to have occurred historically within the four watersheds.

**Table 6. Plant resources monitoring schedule.**

Frequency	Location	Type	Description
Every other year for first five years.	Several locations throughout project area.	Ongoing Plan monitoring	1. RFSS locations to be visited to ensure populations are present and healthy
Annually for first five years.	Several trail locations throughout project area.	Implementation monitoring	2. Monitor implementation of mitigation measures at sampling of trail locations across project area. Visit different locations each year.
Every other year for first five years.	Recently re-routed or maintained trails.	Effectiveness monitoring	3. Resurvey trails to assure no RFSS present. If present, implement mitigation measures.

2. Monitoring of some of the Lusk Creek Wilderness trails conducted on May 9, 2007, determined that all of the listed species were successfully avoided in their natural habitat by the newly re-routed trail.

3. Several botanical surveys of existing trails and proposed re-routed trails were accomplished. The surveyed trails were adjusted or re-routed to protect RFSS habitat. In addition, when State-of-Illinois listed plant species were encountered, re-routes were adjusted to protect the plants and their habitat. Trail re-routes adjusted are as follows:

- Franks Tract trail
- Wishing Well trail
- Double Branch Hole boundary trail
- Jackson Hole boundary trail

## **NON-NATIVE INVASIVE SPECIES (NNIS) (HSRD Botanist)**

***Objective:*** Ensure any increase in NNIS is limited as a result of project implementation.

***Desired Result:*** If an increase from pre-implementation levels is detected, or if new NNIS are detected, develop eradication or control measures to be implemented.

***Methods:*** see Table 7, Non-native Invasive Species Monitoring Schedule below:

**Table 7. Non-native invasive species monitoring schedule.**

<b>Frequency</b>	<b>Location</b>	<b>Type</b>	<b>Description</b>
Prior to project implementation and several times a year during project implementation.	Several locations throughout project area.	Ongoing Plan monitoring	1. Train and conduct refreshers for all permanent and seasonal trails crews, trails management personnel, and volunteers to identify NNIS. Provide R-9 NNIS Field Guide as appropriate.
Prior to project implementation and several times a year during project implementation.	Several locations throughout project area.	Implementation monitoring	2. Those trained in NNIS identification conduct survey work and GPS NNIS locations and maintain in corporate database.
Prior to project implementation and several times a year during project implementation.	At trailheads, equestrian camps, feed stores; on special-use permits, website.	Ongoing Plan monitoring	3. Educational materials provided on identification and treatment of NNIS, feeding horses weed-free hay (feed one week prior to Forest visit), encouraging local sales of weed-free hay/feed.
Prior to project implementation and annually.	Several locations throughout project area.	Ongoing Plan monitoring	4. Survey sampling of trails to assess NNIS presence and increase/decrease.
Several times a year during project implementation.	Several locations throughout project area.	Implementation monitoring	5. Monitor implementation of mitigation measures. Ensure that measures to control spread of NNIS are implemented.
Annually for the first five years after decision.	All system trails in wilderness and natural areas.	Implementation monitoring	6. Survey all trails in wilderness and natural areas for NNIS annually.
Annually for the first five years after decision.	Recently rerouted and maintained trails.	Ongoing Plan monitoring	7. Set up survey plots in key locations prior to implementation and evaluate results over 5-year period.
Periodically for the first five years after decision.	Recently rerouted and maintained trails.	Ongoing Plan monitoring	8. Develop measures to control NNIS and propose for implementation.

### ***Results:***

1. Training was not provided to anyone this fiscal year due to unavailability of funds. The Trails Coordinator worked periodically with the botanist when questions arose regarding invasive plant species along trails.

2. The FACTS database was utilized by the HSRD Botanist to document NNIS that had been eradicated/controlled using hand-pulling or propane-torching methods during the fall of 2006:

- a) Lusk Creek watershed: Botany interns either propane torched or hand-pulled the garlic mustard. They also torched Chinese yam and Nepalese browntop. Repeat visits to all sites are necessary until the seed bank is depleted.
- b) Upper Bay Creek watershed: Chinese yam and Nepalese browntop were torched by the botany interns.
- c) Big Grand Pierre Creek watershed: Garlic mustard was hand-pulled and propane torched by the botany interns.

3. Educational materials containing photographs and narratives to assist in identifying some of the more aggressive NNIS are available at the District Office. They also provide suggestions on what forest visitors can do to assist in preventing the spread of NNIS on their forest lands. Boot-brush stations were checked to see if there was use by the public. The stations evidently are being used often. No NNIS were viewed at the stations. Soil compaction likely attributed to the NNIS seeds not establishing themselves.

4. The HSRD Botanist visited several trails within the Lusk Creek and Eagle Creek watersheds and searched for NNIS. The main exotic plant found sporadically along trails was Nepalese browntop; these areas will be closely monitored.

5. In order to monitor the implementation of mitigation measures, baseline data were collected in Summary Items 2 and 4 above. Future monitoring by the wilderness and botany crews, as well as others capable of identifying NNIS, will ensure that mitigation measures designed to control the spread of NNIS are implemented. Boot-brush stations listed in Summary Item 3 will be monitored for plant growth at the station area. NNIS germinating at the boot-brush stations will be removed from the site.

6. A few trails in Lusk Creek Wilderness were surveyed for select NNIS by the HSRD Botanist. Some trails in Garden of the Gods Wilderness were also surveyed for select NNIS. The main exotic plant found sporadically along trails was Nepalese browntop, with a couple of locations of garlic mustard. These plants were removed and disposed. These areas will also be closely monitored.

7. A survey plot was set up on a newly re-routed trail near Secret Canyon in Lusk Creek Wilderness prior to implementation and baseline data were obtained where no NNIS were present. Botanists designed the plot to be 20 feet wide from the center of the trail, for a distance of 115 feet along the newly re-routed and reconstructed trail. This plot will be monitored over a five-year period or longer to detect movement of NNIS on this portion of the trail. Heavy recreational use is anticipated since the trail leads to scenic attractions on the east side of the wilderness. The onset of monitoring will be during the 2008 growing season. Other plots will be established during the growing season as re-routes and construction of trails are completed.

8. Measures to control NNIS were developed in response to the detection of some of the more aggressive NNIS within the four watersheds. There are a vast number of NNIS and a decision was made to document, control and/or eradicate at least three of the most aggressive NNIS: garlic mustard, Chinese yam, and Nepalese browntop. Garlic mustard is found sporadically within the four watersheds and ranges from a few plants to coverage of 70-80 acres.

Results: NNIS inventories and eradication/control were completed by the botany crew during October and November of 2006. Data collected is stored in the FACTS database.

Three NNIS were the focus of searches in the four watersheds during the second year by the botany crew: Nepalese browntop, garlic mustard, and Chinese yam. Garlic mustard populations were hand-pulled, bagged and disposed. Repeat visits to the garlic mustard sites are necessary until the seed bank is depleted. The botany crew propane-torched and hand-pulled garlic mustard and torched Nepalese browntop and Chinese yam at various locations within the four watersheds.

## **WILDLIFE RESOURCES (HSRD Wildlife Biologist)**

*Objective:* Monitoring populations of wildlife species in the project area.

*Methods Used:* Monitor the development of any new trails and a random sample of closed trails annually for the first three years to insure compliance with their closure and to evaluate the rate of healing on the closed trails.

*Results:* Monitoring results for the development of any new trails and trails brushed in during this monitoring period are discussed in the Wilderness Resource section, Untrammelled Condition.

*Overall Results:* As disclosed in the FEIS, wildlife effects from project implementation have proven to be short-term and minor. At most, individuals are disturbed by trail use or construction activities, with only negligible effects on species distribution or population-trend. Field observations suggest that no population declines in wildlife species have occurred as a result of project implementation.

## **WILDERNESS RESOURCES**

### ***Untrammelled (HSRD Recreation Staff Officer)***

*Objective:* Allow natural ecological processes to proceed unhindered by human influence.

*Desired Result:* the untrammelled condition of project-area wildernesses would improve over time.



Figure 7. Old, non-designated section of River-to-River Trail closed and re-routed.



Figure 8. Highly eroded section of non-designated River-to-River Trail closed and re-routed.

*Method Used:* Monitor closed trails three to five years after work is accomplished to assure natural processes sufficiently reduce their impact. Closed trails will be selectively monitored based on historic use, current level of development and ease of access from private lands. A minimum of ten percent will be monitored annually for three years.

**Results:** Monitoring by the trail crew has been conducted largely on trail segments constructed and/or reconstructed in Lusk Creek Wilderness since implementation of the project. In FY2007, the trail crew constructed several miles of full-bench trail re-routes in Lusk Creek Wilderness. By constructing 3.7 miles of connections between designated trails with short re-routes, six miles of eroded, non-designated trail were brushed in with limbs and rock to allow natural vegetation re-establishment. The eroded, non-designated trail sections closed and re-routed represent the source of some of the worst resource impacts that were occurring in Lusk Creek Wilderness (Figures 7 and 8).

Non-designated trails brushed in by the trail crew in Lusk Creek Wilderness are monitored to assure natural processes sufficiently reduce their impact. Because the trail crew focused their efforts in the wilderness, nearly all sections of brushed-in trail were frequently monitored due to their proximity to existing work sites. Those sections are as follows:

- FT 492A (section off FR 1867 north of New Liberty Church and continuing southwest to Lusk Creek): In 2006, these sections of non-designated trail were brushed in and reported in the Monitoring Report. Continued monitoring in 2007 shows that natural processes have continued to sufficiently reduce the impacts on the brushed-in sections of trail. Users are staying on the designated trail and off the brushed-in, non-designated sections; brush has not been removed (Figures 9 and 10).



Figure 9. Fall 2006. Section of non-designated, user-developed FT 492A brushed in a year ago.



Figure 10. A different section of FT 492A. The old user-developed route, to left of existing path, was brushed-in and re-routed.

- Previous site of Blanchard Church stream-crossing on FT 457: In 2006, this old crossing-site was relocated and reported in the Monitoring Report. Continued monitoring in 2007 shows that natural processes continue to sufficiently reduce the impact on the deeply eroded site of the old crossing at the north embankment. Users are continuing to use the new stream-crossing and have not removed the brush or rock at the old crossing (Figures 11 and 12).



Figure 11. **Summer 2006.** North embankment of old crossing after being brushed in.



Figure 12. **Fall 2007.** North embankment of old crossing; users are not using it.

- **Ride-through-only trail (Saltpeter Cave to Natural Bridge):** In 2006, the stock-confinement area opposite Saltpeter Cave was relocated and the original location converted into a ride-through-only trail. Continued monitoring in 2007 shows natural processes continue to reduce the impact on the previous stock-confinement area. Users are primarily staying on the designated trail and are riding through the old confinement area to the Natural Bridge. Some users are meandering off the trail opposite the Saltpeter Cave as it is an open area. However, there is no evidence of equestrians stopping and tying stock to trees. In addition, they have not removed the brush, the signage directing users to ride through the area, or the stones used to delineate the ride-through trail (Figures 13 and 14). Monitoring shows that some equestrians are stopping at Natural Bridge and tying stock to trees, as was reported in 2006.



Figure 13. **Early fall 2006.** Old Saltpeter Cave stock-confinement area, highline removed and area converted to ride-through-only.



Figure 14. **Winter 2007.** Old Saltpeter Cave stock-confinement area.

- **Ride-through-Only Trail (Natural Bridge to relocated stock-confinement area in pine plantation):** As noted above, some equestrians are stopping at Natural Bridge and tying to trees. Monitoring shows that from the Natural Bridge to the pine plantation users are staying on the designated trail and are riding straight through. Users have not removed the brush or signage directing users to alternate trail sections (Figure 15). In early FY 2007, the trail crew completed the final phase of work at the stock-confinement area in

the pine plantation, now called the Natural Bridge tie-up. This work involved constructing an access trail for ingress and egress of the confinement area (Figure 16). Originally built to provide space for thirty stock animals, the new stock-confinement area currently offers tie-ups for fifteen stock animals. Additional brushing-in of the ride-through-only trail opposite Saltpeter Cave and trails no longer needed as a result of the completed re-routes between the old and new confinement areas was also accomplished. Users are staying on the designated trail and are staying off the non-designated sections of trail that were brushed in; brush has not been removed.



Figure 15. Users are staying on designated trail; sign and brush remain in place.



Figure 16. New access trail and sign to confinement area.

- FT 001 (River-to-River Trail/Goat Trail, sections above Little Bear Branch Creek): Non-designated trail sections were brushed in at this area shortly after implementation of the project in 2006. Monitoring in 2007 shows that natural processes continue to reduce impacts on the brushed-in sections of non-designated trail (Figures 17-20). Users are staying on the newly constructed re-route; however, some have short-cut the switchback. The short-cut was brushed-in and rock positioned to prevent this from continuing (Figures 21 and 22). This area will be closely monitored to determine if users continue to short-cut.



Figure 17. User-developed section of Goat Trail above Little Bear Branch Creek.



Figure 18. Early fall 2007. Same section as on left, one year later.



Figure 19. User-developed section of Goat Trail falling straight down canyon slope.



Figure 20. Same section as on left, one year after being brushed in.



Figure 21. Short-cut on switchback at Goat Trail.



Figure 22. Brush placed in short-cut to keep users on designated trail.



Figure 23. Sierra Club members brushed in this section of non-designated trail.



Figure 24. Sierra Club and trail crew brushing in non-designated trail sections.

- User-developed sections of trail in the Little Bear Branch Creek area: In April, 2007 members of the local Sierra Club volunteered to conduct trail maintenance. The volunteers worked with the trail crew to brush in approximately two miles of non-designated trail in the Little Bear Branch Creek Canyon between the Circle B Ranch and the confluence of Little Bear Branch Creek and Lusk Creek (Figures 23 and 24). Gully plugs made of rock and limbs were used in deeply eroded sections of trail. Users are staying off the non-designated sections of trail that were brushed in and brush has not been removed.
- FT 001 (old, non-designated R-T-R Trail to Guest Farm stream-crossing on Lusk Creek): Throughout 2007, the trail crew worked on a one mile re-route between the River-To-River (R-T-R) Trail and Goat Trail. The re-route replaced a section of R-T-R Trail near the western boundary of the wilderness between the turnpikes and the Guest Farm stream-crossing on Lusk Creek. The trail crew brushed in one hundred feet of the old, non-designated R-T-R Trail east of the turnpikes (Figure 25). Signs were put up to inform users to stay off the brushed in section and inform them of the existing re-route. Brush has not been removed; however, field observations have shown evidence of a single set of hoof prints from stock on the closed section of trail. Also, fallen trees, blown over due to recent storms, have begun to obscure the old trail (Figure 26). Additional gully plugs are needed in some of the worst area of rutting. This area will be monitored to ensure users are staying on the designated trail and off the non-designated sections of trail that were brushed in.



Figure 25. Brushed-in section of old, non-designated River-to-River Trail east of turnpikes.



Figure 26. Fallen trees blown over in recent storms have begun to obscure old trail.

- FT 457 (section beginning at the Guest Farm stream-crossing along the east bank of Lusk Creek and continuing north to Natural Bridge): In 2006, the entire section of non-designated trail beginning at the Guest Farm stream-crossing (River-to-River stream-crossing) along the east bank of Lusk Creek, and continuing north to Natural Bridge, was relocated upslope to a more suitable location along the contour. The old trail was brushed in and signage placed to inform users to use the new re-route. Brush was placed in the trail and gully plugs installed to prevent further erosion. Continued monitoring in 2007 shows that natural processes are continuing to reduce the impact on the brushed-in sections of non-designated trail. Users are staying on the newly constructed re-route and have not used the brushed section of trail or removed the brush (Figures 27 and 28).

Gully plugs installed in 2006 are functioning as intended; soil and debris are filling in the ruts (Figures 29 and 30).



Figure 27. Winter 2006. Section of trail brushed in shortly after building re-route.



Figure 28. Winter 2007. Same trail section as on left, one year later.



Figure 29. Summer 2006. Rutted, non-designated section of FT 457 before gully plugs installed.



Figure 30. Winter 2007. Gully plugs helping to arrest erosion on old, non-designated section of FT 457.

- FT 481 (section from Frank's Tract south to Lusk Creek Wilderness boundary): Three quarters of a mile of sections were re-routed. The original trail was deeply rutted due to falling straight down the steep slope. Once the re-route was complete, a mile of deeply rutted trail sections was brushed in. Users are staying on the re-route and have not used the brushed-in section of trail or removed the brush (Figures 31 and 32).

***Overall Results:*** By constructing 3.7 miles of connections between designated trails, six miles of eroded non-designated trail were brushed in with limbs and rock to allow the process of natural vegetation re-establishment. Non-designated trail sections brushed in were monitored after work was accomplished. The majority of users complies with staying off the non-designated, brushed-in, sections of trail and is not removing the brush from the trail. Since implementation of the project, 5.8 miles of connections between designated trails have been built with short re-routes, allowing for nearly nine miles of eroded non-designated trail to be brushed in with limbs and rock.



Figure 31. Brushed-in section of non-designated Trail 481.



Figure 32. Brushed-in section of non-designated Trail 481.

Project work related to stock-confinement areas has resulted in overall beneficial effects on the untrammled condition of Lusk Creek Wilderness. These effects are consistent with the disclosure in the FEIS (page 167). Fewer sensitive resources are affected at present as a result of project implantation. Field observation indicates that the short-term effects (on soil, water, visual quality) of the relocation of the stock-confinement area from Saltpeter Cave are continuing to fade. Equally importantly, users are staying off the brushed-in trails, allowing the healing of these trails to progress rapidly. Project implementation generally has had overall beneficial effects on the untrammled condition of Lusk Creek Wilderness.

***Natural Condition (Forest Recreation Program Manager)***

***Objective:*** Monitor the effects of human activity on the ecological processes within project area wildernesses.

***Desired Result:*** Human activities will not leave a dominant imprint on the landscape within project-area wildernesses.

***Methods Used:*** Examine the monitoring results from aquatics, botany, heritage, soil, NNIS, wildlife and visual resources to detect changes in natural condition within the project area wildernesses. Examination of the findings will allow a determination to be made, based on initial findings and subsequent monitoring, to ascertain the degree to which human influence is impacting the natural state or condition. Findings will be analyzed to determine departure from baseline. Reasons for departure will be corrected if adverse to the resource.

***Duration:*** Five years. Data will be compiled annually based on the results of the monitoring plan and results compared with previous years' data to start to establish trend data.

***Results:*** The monitoring results, with conclusions from aquatics, botany, heritage, soil, NNIS, wildlife, and visual resources, are included in this report. These will be used to establish trend data.

## **Undeveloped Character (HSRD Recreation Staff Officer)**

**Objective:** Maintain and enhance the undeveloped quality of wilderness character.

**Desired Result:** Improve the undeveloped character of project-area wildernesses over time.

**Method Used:** Field reconnaissance of the trail system to identify new confinement areas, new trails, unauthorized uses, inappropriate use of signs, or development of features. To identify increases in human influence in the wilderness, such as additional, unauthorized concentrated-use areas, equestrian or ATV trails, other improvements not authorized, or allowance or authorizations for mechanical transport or use of other mechanical equipment.

**Results:** Monitoring has been conducted largely on trail segments constructed and/or reconstructed in Lusk Creek Wilderness since TDP implementation.

- **Confinement Areas:** No new confinement areas have been developed in Lusk Creek Wilderness during this reporting period. As reported in the Wilderness Resources—Untrammelled section above and in the 2006 TDP Monitoring Report, monitoring shows that some equestrians are stopping at Natural Bridge and tying stock to trees. In November, 2006 the trail crew installed signs informing users that the Saltpeter Cave area and Natural Bridge are part of a ride-through-only trail; this signage still remains (Figures 33 and 34). As part of the Trails Sign Plan in early 2007, additional signage was posted at Natural Bridge informing users of its ride-through-only trail status. This area will require close monitoring to prevent further resource damage.



**Figure 33. Signage informing users that Saltpeter Cave area is part of ride-through-only trail.**



**Figure 34. Signage informing users that Natural Bridge area is part of ride-through-only trail.**

- **New, user-developed trails:** Monitoring of new trails has been conducted largely in Lusk Creek Wilderness. One short section of new was observed and two sections of old, brushed-in trail were observed to have been used:
  - The original FT 481A from County Road 1628, east of Frank's Tract, was brushed in upon the completion of the re-route. The trail crew has observed equestrians riding this section.
  - A short, but potentially damaging, segment of trail continues to be ridden adjacent to Natural Bridge as a shortcut from the top of the ridge commonly referred to as

- “Devil’s Backbone.” This section descends steeply down a ravine in the rock. It was brushed in by hikers in 2006 and again by the trail crew in 2007. This section was reported in the 2006 TDP Monitoring Report.
- In 2006, a segment of user-developed trail between FT 457 and FT 492D, north of Secret Canyon, was brushed in. Evidence of equestrian use suggests the trail continues to be used. In 2007, additional brush was placed at both ends of the trail to deter use and conceal the old entrance.
  - As additional trail work has been completed to reconstruct damaged sections of trail, or to relocate routes around private land, the corresponding proliferation of new trails has abated.
  - In addition to the 381 new directional signs installed in the project area, an *Interim Trails Map* was published in 2006. It depicts all the designated trails in the project area. The map has been updated with locations of new re-routes and will continue to be updated as trail work continues. While the intent of these actions was to eliminate some of the confusion surrounding the trail system in wilderness, it has also affected a component of development in wilderness. It was hoped that this attempt to mitigate some of the conflicting jumble of trails would encourage users to stay on designated routes and help to cease the proliferation of trails. Additionally, the map contains a variety of interpretive information about wilderness values, NNIS detection and wilderness trail regulations intended to increase awareness of the wilderness resource as well as compliance with regulations. Numerous comments have been received from trail users in praise of the signing effort. The lack of new user-developed trails observed in Lusk Creek Wilderness during this monitoring period is evidence that the attempt to mitigate some of the conflicting jumble of trails is working.
  - Unauthorized Uses: As reported in the 2006 TDP Monitoring Report, unauthorized uses were observed in Lusk Creek Wilderness prior to the implementation of the TDP, mostly tracks believed to have been caused by all-terrain vehicles (ATVs). When observed, Forest Protection Officers have issued violation notices to those operating ATVs in the wilderness. In addition, unauthorized uses have been observed in Lusk Creek Wilderness and other parts of the project area.
    - In October 2006, ATV tracks were observed on the River-to-River Trail east of Rudy Junction (Figure 35).
    - In the fall of 2007, tracks believed to have been caused by ATVs were observed at Blanchard Church stream-crossing, on FT 457D (Figure 36). During the same period, the trail crew observed a group of four ATV operators on County Road 1628 east of Frank’s Tract. The ATVs turned off the road to the north and rode into the wilderness on FT 457D, towards Blanchard Church stream-crossing. The crew followed the ATV tracks to where they exited the wilderness at the northern boundary on FT 484E. Also, a report was made to Forest Service Law Enforcement from a group of equestrians who stated they observed an off-road vehicle in the Lusk Creek Wilderness, near the area of Saltpeter Cave. The trail crew looked for evidence of ORV tracks and resource damage in the area, but found nothing. While conducting monitoring activities on the River-to-River Trail in the east area of Lusk Creek Wilderness, ATV tracks were observed near the junctions of FTs 001 and 480. These areas will require further monitoring.

- While installing trail signage, the District's Recreation Technicians observed evidence of heavy ATV use in the project area located at T12S, R7E, Section 6, southeast corner, between One Horse Gap and One Horse Gap Lake, east of Benham Ridge (Figures 37 and 38). A voice mail message was also left at the HSRD, stating 15 to 20 ORV's were observed on the R-T-R Trail above One Horse Gap on Benham Ridge. The caller did not leave his contact information, or the license plate numbers of the reported ORV's. In addition, the Bay Creek Horse Camp reported heavy ATV and ORV use on the R-T-R Trail, in the area between the railroad tracks and west of Bay Creek Number 5 Lake, T12S, R5E, Section 8. Also, ORV tracks were observed on FT 487C. These areas will require further monitoring.
- No one was observed operating a mountain bike in the wilderness.



Figure 35. Evidence of heavy ATV traffic on River-to-River Trail east of Rudy Junction.



Figure 36. ATV tracks near Blanchard Church stream-crossing in Lusk Creek Wilderness.



Figure 37. Heavy ATV use between One-Horse Gap and One-Horse Gap Lake, east of Benham Ridge.



Figure 38. Heavy ATV use between One-Horse Gap and One-Horse Gap Lake, east of Benham Ridge.

- Inappropriate use of signs: The inappropriate use of Forest Service signs has been observed in Lusk Creek Wilderness during this reporting period. A small percentage of signs installed on brushed-in sections of trail in Lusk Creek Wilderness were damaged. The signs informed users that a section of trail was closed and to stay on designated trails. Evidence suggests these signs were deliberately torn; some were ripped from the sign post (Figures 39 and 40).



Figure 39. Summer 2007. Torn FS sign in Lusk Creek Wilderness.



Figure 40. Winter 2007. Torn FS sign in Lusk Creek Wilderness.

- Monitoring shows that red spray paint continues to be used as unauthorized reassurance markers on trees along some of the trails in Lusk Creek Wilderness (Figure 41). In the past, the trail crew has removed spray paint on trees when observed. Commercial horse camps around Lusk Creek Wilderness have been informed that the use of spray paint in the wilderness is unauthorized. Observation of red spray paint was also recorded in the 2006 TDP Monitoring Report.



Figure 41. Red spray paint used for unauthorized reassurance markers on trees.



Figure 42. Unauthorized sign in Garden of the Gods Wilderness.

- Recreation Technicians removed an unauthorized sign hung from a tree on the River-to-River Trail in Garden of the Gods Wilderness. The sign, consisting of a painted horse skull and routed wood, was originally reported by a local hiker (Figure 42).
- Another unauthorized sign was reported at the Lusk Creek Trailhead opposite Circle B Ranch. This notice consisted of a toilet seat with signs above it reading, "Forest Service Documents," with an arrow pointing to the toilet seat.

No other unauthorized uses of signs were observed during this monitoring period.

- **Development of Structures:** Indications of past development in Lusk Creek Wilderness include cisterns, fence lines and foundation remnants. Permanent tree-stands were observed and dismantled in this area prior to TDP implementation; however, few tree-stands have been observed in this area during this monitoring period. A few fire rings in Lusk Creek and Garden of the Gods Wildernesses were also found and dismantled, but evidence of overnight use was scarce.
- **Mechanical Transport or Equipment:** No allowance or authorizations for mechanical transport or use of other mechanical equipment occurred during this monitoring period.

***Overall Results:*** Continued close monitoring of the Natural Bridge area is required to prevent further resource damage where equestrians are tying stock to trees. In addition, monitoring of the trails noted above for continued unauthorized use, ATVs, and other wheeled transport is necessary to prevent violations of wilderness regulations. The use of primitive tools and traditional methods of trail construction will continue in accordance with the Wilderness Act. Field reconnaissance of the trail system to identify new confinement areas, new trails, unauthorized uses, inappropriate use of signs, or development of structures will continue as outlined in the monitoring plan.

The brushing-in of user-developed trails, elimination of braided trails, and the reduction of excessive muddiness and erosion on trail segments, along with relocation of stock-confinement areas, is improving the undeveloped condition of Lusk Creek Wilderness.

### ***Solitude or Primitive and Unconfined Recreation (Forest Wilderness Staff)***

***Objective:*** To provide the opportunity for visitors to experience solitude or primitive and unconfined recreation, including the values of inspiration and physical and mental challenge, and to determine how or if these values are changing through time.

***Desired Result:*** To have places within project-area wildernesses that provide the opportunity for solitude or primitive and unconfined recreation.

***Methods Used:*** Establish and maintain a method to determine the numbers of individual and groups using wilderness. Determine the number of interactions between groups and establish trend-information over time. Visitor surveys will be used to monitor users to determine if the experience provided meets their expectations.

***Results:*** During CY2007, five infrared traffic counters were placed along trails within Garden of the Gods and Lusk Creek Wildernesses. Compared to last year, it was more difficult to maintain the infrared traffic count method due to the lack of seasonal wilderness rangers. However, some data was obtained and is summarized in Table 8, 2007 Trail Traffic Count Summary.

The patterns of use demonstrated in the traffic count reports are consistent with past field observations made by Forest Service personnel and seasonal staff. Since the traffic counters are designed to register counts whenever the infrared beam is broken, this method of monitoring visitor use is limited to only providing numbers of visitors and not more specific information, such as the types of use, length of stay, visitor satisfaction as it pertains to wilderness experience or the measure of solitude/unconfined recreation.

Beginning October 1, 2007, the Forest began conducting on-site surveys of its visitors, including wilderness visitors, as part of the National Visitor Use Monitoring program. These surveys will yield specific wilderness-use and satisfaction reports for Lusk Creek and Garden of the Gods Wildernesses. The Forest will not have the results of these surveys until after the closure of the program on September 30, 2008.

**Table 8. 2007 trail traffic count summary.**

	Garden of the Gods	Garden of the Gods	Lusk Creek	Lusk Creek	Lusk Creek
	TC 1	TC 12	TC 2	TC 9	TC 11
<b>JAN</b>	6.4	No data	0.9	No data	No data
<b>FEB</b>	Insufficient data	No data	No data	No data	No data
<b>MAR</b>	No data	No data	No data	No data	No data
<b>APR</b>	No data	No data	No data	No data	No data
<b>MAY</b>	No data	No data	No data	No data	No data
<b>JUN</b>	No data	No data	No data	7.8 (half month or less)	No data
<b>JUL</b>	7.3 (half month or less)	17.4 (half month or less)	15.4 (half month or less)	No data	7 (half month or less)
<b>AUG</b>	6.5	No data	No data	No data	6.8 (half month)
<b>SEP</b>	17.1	No data	No data	No data	No data
<b>OCT</b>	No data	No data	No data	No data	No data
<b>NOV</b>	No data	No data	No data	No data	No data
<b>DEC</b>	No data	No data	No data	No data	No data
Note: Averages based on total days in which valid data was collected.					

TC 1 – Indian Point Trail

TC 12 – River-to-River Trail (at FT 108l)

TC 2 – River-to-River Trail

TC 9 – Blanchard's Crossing Trail

TC 11 – Natural Bridge (Interim Trail)

**Table 9. Trail crew visitor encounters in Lusk Creek Wilderness.**

Month and Date	Number of People	General Location
<b>January 2007</b>		
1/3/07	Crew noted there were "obvious horse tracks as they walked in, but they stopped at the first deep crossing."	Goat Trail
1/4/07	2 hikers	Goat Trail
<b>February</b>		
No encounters recorded		
<b>March</b>		
3/29/07	2 equestrians	Goat Trail
<b>April</b>		
<i>NOTE: Little Bear Branch trail was closed on April 24th</i>		
4/4/07	6 equestrians in a group	Goat Trail
4/4/07	4 equestrians in a group	Lower portion of old Goat/ River-to-River Trail
4/4/07	3 hikers	River-to-River Trail
4/5/07	40-plus equestrians, ranging from 2 to 11 in each group.	Goat Trail
4/6/07	8 equestrians in a group	Goat Trail
4/6/07	4 equestrians in a group	Goat Trail
4/6/07	6 equestrians in a group	Goat Trail
4/6/07	8 equestrians in a group	Goat Trail
4/6/07	4 equestrians in a group	Goat Trail
4/6/07	1 hiker heading towards Indian Kitchen	
4/6/07	17 equestrians in one group	Below on old Goat Trail
4/6/07	3 equestrians in a group	
4/7/07	5 equestrian groups of 4 to 10 people each	Goat Trail
4/12/07	12 equestrians in a group	Goat Trail
4/13/07	2 equestrians in a group	Goat Trail
4/13/07	2 groups of horse riders, 3 in a group <i>Avoided crew; turned and went on decommissioned trail</i>	
4/18/07	2 equestrians in a group	Goat Trail

Month and Date	Number of People	General Location
4/19/07	9 equestrians in a group	Goat Trail
4/19/07	8 equestrians in a group	Goat Trail
4/19/07	6 equestrians in a group	Goat Trail
4/19/07	4 equestrians in a group	Goat Trail
4/19/07	6 equestrians in a group	Goat Trail
4/19/07	6 equestrians in a group	Goat Trail
4/20/07	1 equestrian	Goat Trail
4/20/07	2 equestrians in a group	Goat Trail
4/20/07	7 equestrians in a group	Goat Trail
4/20/07	5 equestrians in a group	Goat Trail
4/20/07	1 equestrian	Goat Trail
4/20/07	2 equestrians	Goat Trail
4/20/07	7 equestrians in a group	Goat Trail
4/20/07	5 equestrians in a group	Goat Trail
4/20/07	<i>Multiple equestrian groups seen on old Goat Trail</i>	
4/26/07	4 equestrians in a group	Upper Goat Trail
4/26/07	6 equestrians	Goat Trail
4/26/07	2 equestrians	Goat Trail
4/27/07	10 equestrians in a group	River-to-River Trail
4/27/07	<i>13 equestrians in a group</i>	River-to-River Trail
<b>May</b>	No encounters recorded.	
<b>June</b>		
6/27/07	4 equestrians in a group	not noted
	4 equestrians in a group	not noted
<b>July</b>		
7/2/07	<i>8 to 9 equestrians bushwhacking through forest onto new trail toward Natural Bridge.</i>	
<b>August</b>	No encounters recorded.	
<b>September</b>	No encounters recorded.	
<b>October 2006</b>	Includes some of previous year's seasonal wilderness crew observations.	
10/6/06	6 equestrians in a group	Lusk Creek trailhead
10/7/06	3 cars in parking lot	Indian Kitchen trailhead
10/7/06	2 equestrians in a group	Lusk Creek trailhead
10/7/06	4 hikers	River-to-River Trail
10/7/06	2 equestrians in a group	Indian Kitchen trail
10/7/06	2 hikers	Indian Kitchen trail
10/7/06	10 equestrians at the highline	Indian Kitchen highline
10/7/06	2 equestrians in a group	Indian Kitchen trail
10/7/06	2 equestrians in a group	Indian Kitchen trail
10/7/06	5 equestrians in a group	Indian Kitchen trail
10/7/06	3 hikers	Indian Kitchen trail
10/7/06	4 equestrians in a group	Indian Kitchen trail
10/7/06	5 equestrians in a group	Indian Kitchen trail
10/7/06	7 equestrians in a group	New Liberty Church Rd.
10/13/06	4 cars in parking lot	Indian Kitchen trailhead
10/13/06	2 equestrians in a group (neon green tags)	Indian Kitchen trail
10/13/06	2 cars and 1 truck & trailer in parking lot	Lusk Creek trailhead
10/13/06	6 equestrians in a group	River-to-River Trail
10/18/06	9 equestrians in a group	Little Bear Branch trail & River-to-River Trail
10/18/06	5 equestrians in a group	River-to-River Trail
10/25/06	Trailhead parking lot empty	Indian Kitchen trailhead
10/25/06	10 equestrians in a group	Indian Kitchen Highline
10/25/06	5 equestrians in a group	Indian Kitchen trail
10/27/06	No one – Rained	
10/28/06	No one – Rained	
<b>November and December 2006</b>	No encounters recorded.	

**Table 10. Trail crew visitor-encounters in Garden of the Gods Wilderness.**

October 2006	October'06 Includes some of previous year's seasonal wilderness crew observations.	
10/6/06	1 car in parking lot	Indian Point trailhead
10/7/06	10 cars in parking lot	Indian Point trailhead
10/18/06	2 equestrians in a group	Indian Point trailhead
10/18/06	1 hiker	Indian Point trailhead
10/27/06	Trailhead empty - Rained	Indian Point trailhead
10/28/06	5 cars in parking lot	Indian Point trailhead
Remainder of FY	No encounters recorded	

***Burden Falls Wilderness (Forest Wilderness Staff)***

***Objective:*** Ensure that increased equestrian use of Burden Falls Wilderness does not result in resource damage that adversely impacts the wilderness character.

***Desired Result:*** To maintain the wilderness character of Burden Falls Wilderness.

***Methods Used:*** The main travel routes in Burden Falls Wilderness will be identified and annually surveyed for erosion, new trails, and maintenance requirements until trails designation has been completed in this watershed.

***Duration:*** Annually survey to ensure that increased use does not impact wilderness character.

***Results:*** Lack of funding prevented monitoring this fiscal year.

***Trail Design Standards (HSRD Recreation Staff Officer)***

***Objective:*** Ensure that trail-design standards and maintenance specifications and scheduling are appropriate for the type and frequency of use that each trail receives.

***Desired Result:*** Trail facilities are constructed and/or maintained to appropriate standards and are sustainable over time.

***Methods Used:*** A general walk-through utilizing the Trail Assessment and Condition Survey method was conducted on trails worked on. Conditions that trigger trail-maintenance are: Unauthorized trail development, rutting in trail-tread, trail-braiding, trail muddiness, excessive trail width, sloughing of embankments at stream-crossing approaches, general ineffectiveness.

***Results:***

**Unauthorized trail creation:** (Close unauthorized trail with natural barriers. Sign trail as closed, if necessary. Report incident to Forest Service Law Enforcement.)

During this monitoring period, a closure order was issued restricting horse and pack stock animal use within wilderness areas. The closure order prohibits entering or using Lusk Creek, Garden of the Gods, or Bay Creek Wildernesses while in possession of a horse or other saddle or pack animal from December 1 thru March 31, and entering or using Lusk Creek Wilderness while in possession of a horse or other saddle or pack animal when the area has received more than one inch of rainfall within 24 hours. This prohibition applies during the months of April, May, September, October, and November. The area will be closed for a minimum of 24 hours. Non-designated trail sections brushed in after re-routed were discussed previously in section Wilderness Resources, Untrammled.

**Evidence of rutting in trail-tread:** Indication that water is not draining from the trail surface. (Decrease spacing of water-control features. Gravel trail-tread as necessary.)

Rutting of trails, condition of erosion-control features and the need to gravel the trail-tread of trails constructed in FY2007 are discussed in sections Soil and Water Resources and Recreation and Trail Resources, Wet-Weather Ridability. In the 2006 TDP Monitoring Report, FTs were identified as needing additional maintenance to mitigate damage such as wet, muddy sections, and those that required additional drainage features. Other sections required further evaluation for re-routing. During the FY2007 trail season, the trail crew provided maintenance and reconstruction on some of those trails as follows:



Figure 43. Stone steps at base of Barger Branch Creek.



Figure 44. Same steps as on left after reconstruction.

- FT 481 (from Barger Branch Creek upslope to the junction with FT 483—Cactus Trail over Saltpeter Cave): In FY2006, a trail crew was detailed to the district to assist with project implementation. Not as experienced in trail work as the HSRD crew, some of their work needed improvements. The detailed crew built a re-route from Barger Branch Creek upslope to the junction with an existing section of FT 483, allowing users the option of crossing Lusk Creek at the authorized Natural Bridge stream-crossing from the north. Monitoring in FY2006 showed that, at the junction with Barger Branch Creek, the steps constructed on the west side of the creek embankment leading upslope needed some improvement. These steps did not provide adequate spacing for equestrian users (Figure 43), and were reconstructed to provide a more suitable crossing (Figure 44).

In addition, the remainder of the re-route required hardening with gravel (gravel and clay mixture). Due to terrain restrictions, this short section of re-route is relatively steep, above the standard 8-to 10-percent slope. The trail crew dug a new back slope (Figures 45 and 46), installed sandstone to serve as cribbing for the tread (Figure 47), and installed over 30 waterbars and check dams. In addition, over 25 tons of gravel was hauled in by mule to harden the trail-tread (Figure 48).



Figure 45. Before. FT 481 before reconstruction.



Figure 46. After. FT 481 after reconstruction with new backslope, tread, and drainage features.



Figure 47. Sandstone used to crib trail-tread.



Figure 48. Reconstructed cribbed tread backfilled with gravel.

- FT 483 (from Cactus Trail south over Saltpeter Cave to Guest Farm crossing on Lusk Creek): In FY2006, this FT over Saltpeter Cave was open for users shortly after the re-route was constructed to Barger Branch Creek. (These sections have not been worked on since TDP implementation). Monitoring in 2006 showed several sections holding surface water and needing maintenance (Figures 49 and 50). In FY2008, this trail may be re-routed or left in place and graveled. This will also be determined for the remainder of the trail, proceeding south towards the junction of the River-to-River Trail, ending just west of the Guest Farm stream-crossing.



Figure 49. Wet and muddy section of FT 483 (Cactus Trail) over Saltpeter Cave.



Figure 50. Wide, wet muddy section of FT 483 near junction with River-to-River Trail.

- FT 457 (from Blanchard Church stream-crossing proceeding south along the east bank of Lusk Creek to the junction with FT 492A). In the 2006 TDP Monitoring Report, this section of trail, located on flat terrain alongside Lusk Creek, had difficulty draining surface water (Figure 51). Several sections were reported as wet and muddy due to rainwater accumulation (Figure 52).



Figure 51. FT 457 was located in flat terrain.



Figure 52. FT 457 needed re-routing.

During the 2007 trail season, the trail crew and the Hoosier National Forest mule team plowed and graded the re-route for FT 457 upslope along the natural contour of the terrain (Figures 53 and 54). The re-route will require graveling to ensure wet-weather ridability and is planned for the 2008 trail season.



Figure 53. Hoosier National Forest mule team plowing FT 457 re-route above Lusk Creek.



Figure 54. Trail crew using Hoosier National Forest mules to grade FT 457 re-route.

**Trail Braiding:** More than one trail-tread along a given alignment. (Harden tread with gravel as necessary. Use brush, rocks, or other natural-appearing barriers. Plan trail junctions to eliminate alternate trail development.)

Hardening trail-treads with gravel and the use of natural barriers on trail braids are discussed in sections Soil and Water Resources and Recreation and Trail Resources.

The *Interim Trails Map* depicting all designated trails in the four-watershed area was updated and published. Additionally, in accordance with the Trails Sign Plan, during this monitoring period 26 new wilderness directional trail signs were installed throughout Lusk Creek, Bay Creek and Garden of the Gods Wildernesses. The signs were installed on designated trails at trail junctions, entrances to wildernesses, and authorized equestrian crossings of Lusk Creek. Also, 133 new directional trail signs were installed on designated trails outside the wildernesses in the watersheds. The map and newly installed signs will aid users in locating designated trails and their junctions.

**Trail Muddiness:** Users sink over four inches in trail-tread. (Trails will be hardened with gravel or by installing turnpikes using natural-appearing materials.)

Turnpikes installed on FTs 481A, 481, and 001 were surveyed using the Trail Assessment and Condition Survey method. Native building materials such as redcedars were used in the construction of these turnpikes and others filled with gravel and clay mixture in order to raise the trail-tread above wet areas, such as perched water tables. The turnpike on FT 492A, constructed in 2006, has some cupping of the tread. Drainage was installed at the entrance to the trail to allow runoff. In 2006, a turnpike was installed on FT 472C (non-wilderness trail) to raise the trail-tread above a wet area (Figure 55). Culverts were also installed to allow for drainage and continue to function as planned (Figure 56). Currently it appears to be a sufficient feature for the use the trail is receiving.



Figure 55. Turnpike on FT 472C continues to provide tread above wet areas.



Figure 56. Culvert on FT 472C continues to provide drainage above a ditch.

**Trail Width Exceeds Standards:** (Encourage users to stay on trail in all trail-related informational maps and brochures. Harden trail surface if necessary to prevent muddiness. Use natural barriers to keep users in single file.)

The *Interim Trails Map* was published depicting all of the open interim designated trails in the project area. The map includes information regarding special provisions for wilderness use to control the impacts of recreational use. The hardening of trail surfaces to prevent muddiness and using natural barriers to keep users in single file are discussed in detail in sections Soil and Water Resources and Recreation and Trail Resources.

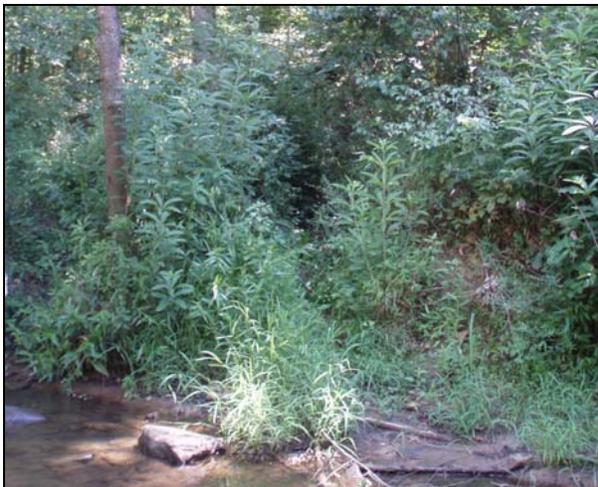


Figure 57. Site of old, user-developed Bowed Tree stream-crossing on Lusk Creek.



Figure 58. Crew members using shovels to excavate steps needed for new stream-crossing.



**Figure 59. Sandstone retaining walls on east embankment.**



**Figure 60. View of east embankment with retaining walls on either side of stairway where old crossing was located.**

Sloughing of trail-side embankments at stream-crossing approaches: (Stabilize trail surface with gravel; hold in place with steps; stabilize sides with log or stone cribbing.)

The Bowed Tree and Little Bear Branch stream-crossings were relocated and constructed to mitigate resource damage and provide improved recreation opportunities. The old Bowed Tree stream-crossing was deeply eroded, dangerous to use, and added sedimentation to Lusk Creek (Figure 57). As the new crossing was built, the trail crew filled in the old crossing with excavated soil and reinforced the area with cribbed sandstone retaining walls (Figures 58 - 60).

Upon completion of the Bowed Tree stream-crossing, the trail crew installed an erosion-control feature designed to divert rainwater runoff from flowing down the east embankment via an old roadbed located upslope from the crossing (Figure 61). Sandstone and redcedar logs were used to form a diversion wall to redirect and slow surface water, thereby creating sheet flow, as opposed to direct flow (Figure 62). This method is intended to prevent erosion of the embankment and reduce sedimentation into Lusk Creek. Continued monitoring indicates this diversion feature is functioning as planned.



**Figure 61. Sandstone wall used to divert rainwater along old roadbed.**



**Figure 62. Diversion feature along embankment.**

Since construction of the Bowed Tree and Little Bear Branch stream-crossings, heavy rainstorms have resulted in the waters of Lusk Creek and Little Bear Branch Creek raising several feet. Because the gravel used to form the steps of the crossings contain a compacted clay base and sound building materials were used—large sandstone and cedar logs—the crossings easily withstood the rising creek waters (Figures 63 and 64).



Figure 63. Bowed Tree stream-crossing after a winter storm.



Figure 64. Little Bear Branch stream-crossing after a winter storm.

In addition, Forest users informed the District of increased equestrian and hiker traffic on a section of interim trail connecting with Bowed Tree stream-crossing to the east. The trail is located up a steep slope and has been used for years. It existed at the time of the old crossing. However, the majority of users choose to cross Lusk Creek upstream at the Guest Farm stream-crossing. There was limited use of this trail until the reconstruction of the Bowed Tree stream-crossing. The majority of users now cross at Bowed Tree. Once users cross to the east embankment, there is currently only one way to continue, upslope. Monitoring shows that there is rutting and erosion of the trail; however, these are preexisting conditions more revealed as a result of increased traffic (Figure 65). The section of trail in question has been scheduled for re-routing in the spring/summer of 2008.



Figure 65. Preexisting ruts on trail section east of Bowed Tree.

In 2006, the Blanchard Church stream-crossing on Lusk Creek was relocated and reconstructed. In 2007, monitoring shows that the crossing is functioning as intended (Figure 65); however, maintenance is required for the lower step along the water's edge on the east embankment (Figure 66). An additional step is required to prevent the eddying of water from washing out soil. The trail crew will conduct the needed maintenance in 2008, once the water level drops. Several other stream-crossings in Lusk Creek Wilderness could be reconstructed depending on scheduling priorities.



Figure 66. West embankment of Blanchard Church stream-crossing, working as intended.



Figure 67. East embankment, where maintenance is required for lower step.

**Effectiveness monitoring:** In the event that the above mitigations are unsuccessful, trails may need to be moved to a more maintainable alignment. Temporary closures may be necessary while work ensues. The results of this report will aid the trail crew in focusing their trail maintenance on noted sections of trail. Temporary closures of trails where work has been done were not necessary this reporting period.

### **VISUAL RESOURCES (HSRD Recreation Staff Officer)**

**Objective:** Ensure that changes made in the visual character of a viewshed are minimized to protect the visual quality.

**Desired Result:** Landscape character meets visual quality objectives.

**Results:** A total of 350 tons of gravel was used in the wilderness to harden miles of trail-tread and provide for the construction of trail features. The gravel used as backfilled in the trail features and placed in the tread was chosen for its rustic brown coloration, which creates a natural appearance. As has been the practice of the trail crew, special attention was taken to naturalize any new re-routes by collecting leaf litter and scattering it along the back slope of new trails. Because of the techniques and natural materials used in building, and the trail crew's attention to detail, over a short period of time the new re-routes and trail features blend well with their natural surroundings (Figures 63 – 70).



Figure 68. Cribbed retaining wall under construction on Goat Trail, March 2007.



Figure 69. Same section of Goat Trail as on left, eight months later, November 2007.



Figure 70. Goat Trail re-route, summer 2006.



Figure 71. Goat Trail, over one year later, fall 2007.



Figure 72. FT 481, summer 2007.



Figure 73. FT 481, winter 2007.



Figure 74. Coyote Club re-route, spring 2007.



Figure 75. Coyote Club re-route, fall 2007.



Figure 76. Blanchard Church stream-crossing under construction two years ago, summer 2006.



Figure 77. Blanchard Church stream-crossing, winter 2007.

The brushing-in of old non-designated trails employed native, available-on-site material to blend with the existing landscape and to allow the process of natural vegetation re-establishment (Figures 73 and 74).



Figure 78. Section of brushed-in trail with vegetation beginning to grow into tread.



Figure 79. Section of brushed-in trail with sandstone used as gully plugs.

Re-routed trails were laid out and designed with the intent of providing access to popular destinations, such as Saltpeter Cave and Natural Bridge. In these areas where stock was once confined, there exists a ride-through-only trail. This ride-through-only status helps to reduce the groups of people who once stopped in these areas, thereby enhancing the visual quality of the viewshed.

In addition, the *Trails Sign Plan* used unobtrusive signs in the wilderness, built from redcedar posts and oak to blend into the natural environment.

The above activities meet visual-quality objectives.