

Jake and Bull Mountain Trail Assessment and Management Plan

Promoting Recreation & Environmental Protection through
Assessment, Collaboration and Education



USDA Forest Service
R8, Southern Region
Chattahoochee-Oconee National Forest
Blue Ridge Ranger District

Prepared and submitted by

Liz LaPorta
Recreational Trails Planner
USDA Forest Service
TEAMS Enterprise Unit

Woody Keen
Trail Dynamics, LLC.

Contributors:

Alison Koopman
Recreation Supervisor
Blue Ridge Ranger District
Chattahoochee National Forest

Southern-Off Road Bicycle Association (SORBA)

Chattahoochee Trail Horse Association (CTHA)

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Background and Introduction

The mission of the USDA Forest Service is to sustain the health, diversity, and productivity of the Nation's forests and grasslands to meet the needs of present and future generations. The phrase, "Caring for the Land and Serving People," captures the Forest Service mission. As set forth in law, the mission is to achieve quality land management under the sustainable multiple-use management concept to meet the diverse needs of people.

The Forest Service Strategic Plan, a multi-year guiding strategy, is tied to the Mission Statement which aims to protect and enhance the Nation's natural resource base and environment. It is one of many tools which ultimately prioritize project-level work. Contained within the current USDA Forest Service Strategic Plan for Fiscal Years 2004-08 are 6 broad Agency goals. One of these six goals is to; **provide high-quality outdoor recreational opportunities on forests and grasslands, while sustaining natural resources, to meet the Nation's recreational demands.** As stated in the Strategic Plan, by mid-century, the Nation's population is projected to increase by nearly 50 percent. If public lands are to continue to provide additional recreational benefits without experiencing unacceptable impacts to resources, emphasis must be placed on effective management solutions. As part of this broad goal, the U.S. Forest Service has identified that maintaining trail networks is a critical component to meeting this objective.

In line with this national directive, the 2004 Chattahoochee-Oconee National Forest Plan states that a goal of the Forest is to "provide a spectrum of high quality, nature-based recreation settings and opportunities," including horse and bike trails. More specifically, during the FS Southern Region "Recreation Realignment" process, which began in 2004, the Jake and Bull Mountain Trail System complex was identified for future improvements after the completion of a design narrative, or comprehensive plan. Such direction has carried over through the current operating season. Having a Trail Assessment and Management Plan will serve as the basis for this study to prioritize and determine future action items. Rather than reacting to crisis situations, it is the Forest's goal to clearly articulate a plan for maintenance and improvements projects within the Jake and Bull Mountain Trail System complex.

The Jake and Bull Mountain Trail System currently provides approximately 36 miles of recreational trails for equestrians, bicyclists and hikers. (Refer to Table 1 for a list of the trail names and mileages within the current Jake and Bull Trail System and Appendix A - Map 1 for a map depicting the current trail system.) The Jake Mountain Trail System and the Bull Mountain Trail System connect to form a complex system of scenic trails within a four (4) square mile area of the Chattahoochee National Forest's Blue Ridge Ranger District. This area is located in

western Lumpkin County, less than ten (10) miles from downtown Dahlonega. The system is made up of interconnecting dirt trails and gravel roads through the Chattahoochee National Forest, including a portion of the Blue Ridge Wildlife Management Area and the Ed Jenkins National Recreation Area. The trail system attracts recreationists from local Georgia communities, the metropolitan Atlanta area and surrounding states. Trail use has increased significantly in recent years, both in terms of the number of different users visiting the trail system but also the frequency of return visits. Increased traffic on trails that were not properly designed to handle high levels of recreational use has led to many problems and trail tread degradation.

Table 1: Trail Miles for the current Jake and Bull Mountain Trail System

Trail Number	Trail Name	Miles
223	Bull Mountain Trail	4.13
223A	West Jones Creek Trail	2.63
223B	Bear Hare / Saddle Back Trail	3.96
223C	Whoop-De-Dos Trail	0.77
223D	Bull Mountain Cutoff Trail	1.54
223C	Whoop-De-Dos Trail – Jones Creek In-holding	0.28
223D	Bull Mountain Cutoff Trail – Jones Creek In-holding	0.63
223E	Jones Creek Dam Trail	3.21
223F	Bull Mountain Connector Trail	3.76
223G	Bull Mountain Spur	0.56
223H	Jake Mountain Trail	3.28
223J	Moss Creek Trail	1.79
223K	Nimblewill Branch Trail	1.18
223L	Nimblewill Branch -C Trail	1.81
223M	Nimblewill Branch - C Spur Trail	0.54
223N	Black Branch Trail	3.89
223O	Black Branch Connector Trail	0.12
223P	No-Tell-Trail	2.18
Total Trail Miles		36.26

The Jake and Bull Mountain Trail System is a product of years of collaborative planning and financial support through the U.S. Forest Service, its volunteers and the Georgia Recreational Trails Program. The construction of this 36 mile trail system began in the mid-90's and occurred in multiple phases. The system was built, primarily, on old road beds and existing user-created horse and bicycle trails with very few miles of new trail construction. In addition to the trail system, day-use parking lots and long-term parking/camping facilities were also constructed to accommodate horse trailers and automobiles at the Jake Mountain and Bull Mountain trailheads.

From its conception, the purpose and need for this trail system was to enhance outdoor recreational opportunities for horseback riders, mountain bike riders and hikers in a relatively safe and amenable environment. The intention was to actively engage volunteer groups in the development and maintenance of this system so as to ensure its longevity for the future. Today, the Jake and Bull Mountain Trail System is enjoyed by more people than ever before. The Chattahoochee Trail Horse Association (CTHA) and Southern Off-Road Bicycle Association (SORBA) continue to play an active role in the management and maintenance of this large trail system network. In recent years, CTHA and SORBA members have contributed over 1,000 hours of volunteer labor to improving forest trail systems, with many of those hours directly contributing to the conservation of the Jake and Bull Mountain Trail System. Both groups have invested a substantial amount of time, money and talent to help the Forest Service construct and maintain the trail system.

The importance of the Jake and Bull Mountain Trails can not be overstated. For equestrians, the Jake Mountain Horse Camp and adjoining trails represents one of a very few places in North Georgia where

equestrians can camp with horses and have several days of riding right out of their camp. Unfortunately, the addition of the camping area directly contributed to increased equestrian traffic and therefore accelerated impacts on a trail system that lacked design elements to withstand the impacts of high horse traffic. According to CTHA, the Jake and Bull Trail System contains the highest inventory of trails for horse use in the entire state of Georgia. This area also provides trails at higher elevations and therefore cooler temperatures as compared with other in-state equestrian opportunities. CTHA uses the Jake Horse Camp and Trail System for club camp outs to strengthen the equestrian community, raise funds, conduct trail work and builds bonds.



Left: A typical equestrian trailer with attached camping unit at the Jake Mountain Horse Camp.



Above: An equestrian camping arrangement where horses are tied to a high-line at the Jake Mountain Horse Camp.

SORBA has been very successful in recent years in developing many trail systems for mountain bikes in the surrounding Atlanta metro area. While many of these trails are closer in proximity to Atlanta, few of them, if any, offer the distance and feel of the Jake and Bull Trail System. For mountain bikers, these trails offer an opportunity for much longer rides than other more urban trail systems. The large size of the National Forest lands provides for a highly desirable mountain



Above: Mountain bikers experiencing the trails at Bull Mountain.

biking trail experience with a much greater “out there” feeling. The Bull Mountain Trails were designated as an “IMBA Epic Ride”. This designation represents the opportunity for mountain bikers to “go big” in a single trail system. One of the long time used IMBA slogans was “Long Live Long Rides”, and this trail system in the North Georgia Mountains provides such an opportunity.

While volunteer groups have worked diligently to maintain this system, there is clear evidence that many sections are not

sustainable; therefore ongoing efforts and maintenance work are short-lived band-aid fixes instead of long-term solutions. That is, these trails have a large impact on the natural surroundings, they have significant evidence of soil loss or movement, and they require extensive re-routing and maintenance work. In addition, it is also clear that more energy must be focused on providing the “right” type of maintenance for those trails capable of being sustained over time.

Local USFS recreation staff applied for a Georgia Recreational Trails Program (RTP) Grant to fund a “Trail System Assessment, Management Plan, and Trails Education Workshop”. The focus of the project was to promote environmental protection through the creation and maintenance of sustainable trails using a 3 step process focused on **1) Assessment, 2) Collaboration and 3) Education**. To facilitate this 3-step process, the Chattahoochee National Forest acquired the services of a team of trail professionals from the USDA Forest Service TEAMS Enterprise Unit and Trail Dynamics, LLC. These trail professionals provided the Forest an un-biased opinion which focused on education, trail planning, management, design, maintenance and construction needs.

This “Trail System Assessment, Management Plan, and Trails Education Workshop” project provided Forest staff and volunteers with a 1-day indoor-oriented education workshop, and utilized the broad-stroke trail assessment portion of the project as a 7 day outdoor-oriented education workshop. Participants learned how to assess problem areas and the technical

concepts related to repairing, maintaining and managing sustainable trail systems. A collaborative public field day and open house meeting provided an opportunity for volunteers and the public to provide feedback regarding the trail system and offer their requests for how to manage/maintain the trail system. The end-result of the project is the development of this Trail Assessment and Management Plan document.

Trail Management Plans are developed to assist land managers in making good trail management decisions. They examine current conditions of trails in the system inventory, identify risk and resource management concerns, and set priorities for improvements and additions/deletions (closures) to the trail system. Protecting natural resources while providing for quality recreational experiences can be a juggling act for land managers, but a good trail plan makes the job easier by providing recommendations for managing sustainable trail systems. This Assessment and Management Plan document will be used by Forest staff and volunteers to plan out yearly maintenance and management needs.

In summary, this Plan provides:

- Project Summary Overview
- Discussion on Trail User Impacts
- Summary of the current trail conditions and management prescriptions for the Jake and Bull Mountain Trail System.
- Trail Assessment -- For each trail segment within the Jake and Bull Mountain Trail System, a narrative summary with photos is provided to describe the conditions, problem areas and management recommendations.
- General Management Recommendations provides a discussion on the following topics:
 - Fundamentals for trail planning and management
 - Discussion on trails versus roads
 - Recommendations for improving the trail system (Trail Names, Trail Signage, and Trail Maps)
 - Recommendations related to improving and managing the parking, trailheads, and camping facilities
 - Recommendations for equestrian user impacts
 - Weather related trail closures
 - Best Management Practices for streams and water crossings
 - Trail Closures and New Trail Construction
 - Predicting trail construction costs
- Setting priorities to plan future maintenance projects
- GIS maps provide a depiction of the current trail system, conditions and recommended management prescriptions, and the proposed ideal new trail alignment.

Project Overview

The project started with Trail Dynamics, LLC conducting a one-day indoor-oriented trail education workshop on "Sustainable Trail Design and Construction". The workshop was held on April 12th 2008 at the Forest Supervisor's Office (SO) in Gainesville, GA. This education workshop covered the philosophy and process of planning, designing, building and maintaining sustainable, high quality trails that fit with the landscape for non-motorized users: hikers, mountain-bikers, and equestrians. This full day education workshop focused on the many different aspects to consider when planning and designing a trail. Participants learned the importance of starting with a planning process, followed by a design process that reflects on the plan, and finally implementing the plan and design with good construction. The presentation was an abbreviated version of "The Art and Science of Trails" workshop that is a thorough and comprehensive trail education workshop presented to many land managers and trail advocates alike.

Highlights of the workshop included:

- Trail planning (understanding trail user motivations, determining the desired trail experiences, etc.)
- Designing for sustainability
- Enhancing the user experience
- Trail construction (hand build vs. machine build)
- Trail structures (steps, bridges, switchbacks, etc.)
- Trail maintenance

A full description of the 2 day workshop format can be found at:

http://www.trailbuilders.org/conference/2006/art_science06.html



Left and Above: Woody Keen (Trail Dynamics, LLC) teaches the "Art and Science of Sustainable Trail Design and Construction" during a one-day education workshop.

Participants included USFS personnel and representatives of the two primary user groups. The mountain bike community was represented by the Southern Off-Road Bicycling Association (SORBA), and the equestrian community was represented by the Chattahoochee Trail Horse Association (CTHA). For more info about these organizations, please see their websites:

<http://www.ride-ctha.org> and <http://www.sorba.org>

Both CTHA and SORBA have contributed greatly to the management of the Jake and Bull trails and have cooperated together on many projects. The sense of cooperation and fellowship between the two user groups is strong and user conflict seems very low in the area. The two groups have worked together on many trail projects, doing maintenance work and new trail construction adding to the system inventory. CTHA uses club funds to pay for a portable toilet at the Jake Campground. This is the only toilet facility within the entire Jake and Bull Mountain area. SORBA has provided club owned machines and a trained operator for use during larger projects and this has added greatly to the productivity of work projects. The USFS has strong partners in both CTHA and SORBA and these relationships will prove vital moving forward with implementing a trail plan and improving the trail system for all users.



Above and Right: USFS staff and members from SORBA and CTHA discuss the needs and desires for the Jake and Bull Mountain Trail System.



The collaboration portion of this project kicked-off on April 13th 2008 with an “Experience the Trails Day”. This day included introductions of the participants, and an opportunity to experience a small section of the trail system by each participant’s preferred means of travel (hiking, horses, or bikes). Collaborative group discussions took place to share local

knowledge of the existing problems and future visions/ideas concerning the Jake and Bull Mountain Trails. Both user groups (CTHA and SORBA) were asked to develop a formal “Vision Statement”. (Refer to Appendix B and C)

The Forest Service hosted a collaborative public open house which took place on the evening of April 17th 2008. The open house was open to all users, volunteer organizations, local landowners, surrounding community members, etc. The open house provided an opportunity to share information regarding the trail system, assess opportunities, constraints, and concerns regarding the area and its activities, discuss the need for volunteerism, and collaborate among various focus groups. Participants were asked to fill-out a questionnaire, of which the results were used in the formulation of this Trail Management Plan. (Refer to Appendix D for the 2008 User Survey Summary.)



Above: Woody Keen (Trail Dynamics, LLC) discusses the Jake and Bull Trails with members from SORBA at the Public Open House Meeting.

An assessment of the content, character and condition of the 36-mile Jake and Bull Mountain Trail System was the meat of this project. The assessment was combined to be an outdoor-oriented “Trail Assessment and Education Workshop” which took place over a period of 7 days from April 14th – April 20th 2008. This was a combined effort between the Chattahoochee National Forest Service staff, the contracted team of trail professionals from the USFS TEAMS Enterprise Unit and Trail Dynamics, LLC, and a variety of volunteers from SORBA and CTHA. This combined assessment and education workshop provided USFS staff and volunteers with a sense of ownership in the trail system. Participants learned how to assess problem areas for sustainability and the technical concepts related to repairing, maintaining and managing sustainable trails. The information collected during the assessment process was used to develop this Trail Assessment and Management Plan.

The week continued with an assessment of current conditions for different segments of the trail system each day. USFS staff and members of SORBA and CTHA joined in this process as well. A total of 7 days were spent in the field during this assessment process with an average of 4-7 miles per day traveled. Digital photos, video clips and GPS data were collected to assist in the documentation of the trail conditions. Please refer to Appendix A for a series of GIS maps which depict 1) the current trail system, 2) trail conditions and management prescriptions, 3) trail closures and proposed new trail alignments for relocations 4) the ideal trail system with proposed new trail alignments, 5) recommended closures and the proposed ideal trail system with new trail alignments, and 6) a map which depicts all GPS data points, and Appendix J for the GPS Data Point Field Notes.

Each day of the assessment provided for additional educational opportunities as problem areas were discovered. This stimulated discussions on solutions for each area and why the problems are occurring. This “walk and talk” educational process proved to be very valuable to all who participated each day. Indoor classroom learning is a great beginning to understanding trails, but being outdoors and participating with an on-the-ground assessment with a trail professional provided educational opportunities that are not readily available.



Above and Left: Each day of the assessment process had plenty of teaching opportunities.

The site visit concluded on April 21st 2008 with a focused workshop which took place at the Forest Supervisor’s office in Gainesville, GA. This workshop was tailored to provide a summary amongst internal US Forest Service staff. Both a video and a PowerPoint slideshow were used to communicate the findings of the assessment and the recommendations for future maintenance activities.



Above: Participants examined trails and problem areas within the Jake & Bull Trail System.

Trail User Impacts

It is important to understand the relative impacts of the different user groups in developing a good management plan. In general, research has found that mountain bike travel impacts are relative and similar to those of hiking impacts. Both of these user groups are considered low impact users, though their impacts increase when trails are poorly designed (bad alignments/location). All studies to date have found that horses have significantly higher levels of impacts when compared with hiking and mountain bike traffic. This suggests the need for more conservative trail gradients and a somewhat different management strategy when designing and managing sustainable equestrian trails.

A 2001 study performed by botanist Richard Reader of the University of Guelph (Canada) noted that "We've found that hikers have the same effect as bikers do, regardless of the number of trips along the path. In reality, both are equally damaging to the environment, but there is increased trail wear because twice the numbers of people are now using the trails." (*Impacts of Experimentally Applied Mountain Biking and Hiking on Vegetation and Soil of a Deciduous Forest* - Eden Thurston and Richard Reader).

A trail impact study from the Aldo Leopold Wilderness Research Institute comparing hiking impacts to horses and llamas noted: "Horse traffic resulted in statistically significant higher sediment yields (the primary indicator of trail deterioration) than either hiker or llama traffic. The low level (250 passes) horse treatment caused more impact than the high level (1000 passes) llama treatments, suggesting that horses can cause at least four times as much impact to trails under the conditions simulated in this experiment. In addition, under dry trail conditions horse traffic caused significant reductions in soil bulk density (a measure of how compacted the soil is) compared to llama and hiker traffic. Horse traffic also caused significant increases in soil roughness compared with the other 2 users. This suggests that the greater impacts of horses on trails are a result of soil loosening of trail surfaces that are otherwise compacted, thereby increasing the detachability of soil particles and increasing sediment yield and erosion." (*Llamas*,



Above: Attendees at the April 12, 2008 Trails Workshop learn some of the factors related to trail user impacts.

Horses, and Hikers: Do They Cause Different Amounts of Impact? - Thomas Deluca (University of Montana) and David Cole (USFS - Wilderness Research Institute) 1998 study)

Don Weir addresses the differences in compaction of soils by some users and displacement of soils by others in his book *A Guide to the Impacts of Non-Motorized Trail Use* (Don Weir and Associates- Edmonton Alberta Canada). Weir noted: "Repeated passes by bicycles (and most other users) tend to compact the soils of a trail tread. Vertical compaction tends to push particles closer together, thereby increasing shear strength. An increase in shear strength of the soil will have greater ability to resist erosive forces." Weir also notes that: "Research to date has indicated that the degree of impacts from mountain bikes, relative to those of walkers who have their own unique forms of impacts, appear to be similar." The Weir book is a wonderful resource and a great review of the literature and research available on the subject of trail impacts. It cites many studies from around the world on the subject matter. A few of these notable sources include:

- Cessford (1995) asserts that: "Mountain bikers will exert a downward force through their tyres (translated to tires - Cessford is from New Zealand) which comprises the wheel load divided by the contact area, is likely to be less than that of heavier motorized vehicles, horses, and heavily laden hikers." (*Off Road Impacts of Mountain Bikes: A Review and Discussion, Science and Research* - G.R. Cessford, Department of Conservation Wellington New Zealand).
- Weaver and Dale (1978) found that: "During down slope travel, downhill stepping (by foot and horse) was more erosive than downhill motor biking." It should be noted that the modern mountain bike did not exist at the time of this study, but later studies show that mountain bikes have far less impacts (equal to hiking) as compared with motor bikes. (*Trampling Effects of Hikers, Motorcycles, and Horses in Meadows and Forests*) - T. Weaver and D. Dale - Journal of Applied Ecology 1978).

In the Executive Summary of Weir's book, he notes that: "Common belief holds that wheeled vehicles cause new trails to form more readily than the actions of feet or hooves, thus justifying the allowance of off trail travel by hikers and equestrians. Yet, erosion studies cited above, practically Weaver and Dale (1978), Quinn et al (1981), Soanne et al (1981) and Cole (1987), suggest that in many places, "feet and hooves will trample more than bicycle tires. The instantaneous sheer forces exerted on a plant by a foot or hoof will have much more of a tearing effect than the rolling over and crushing force of a bicycle wheel."

Don Weir's book explores the effects/impacts of what he refers to as biological loading". He notes: "The amount of excreta produced by user groups is a function of user type and the residence time the user is in the area. We can hypothesize that equestrians produce the most

amount by mass; then hikers, who have a longer residence time; and lastly the mountain bikers who have the shortest residence time and therefore are less likely to need to void".

Perhaps the most widely accepted research on trail impacts of different users is the Seney/Wilson Study as it compared all the user groups together in one study (hikers, motorcycles, mountain bikes, and horses). Some of the findings from the Seney/Wilson Study include:

"The sediment yields for horse plots produced significantly more sediment yield than the bicycle, control, or hiker plots." "Hiker and bicycle plots were not significantly different from each other or the control plots."

"Indeed, hikers produced the second largest increase in sediment yield following the horse treatments, and overall the horse and hiker plots suggest that hooves and feet make more



Above: Of all the non motorized users, the shod horse has the highest impact. Horseshoes are made of metal, are harder than any trail surface, and concentrate a horse's weight into a small surface area. When combined with the weight of a 1,000 pound animal, the strength of a horse's powerful legs and the action required to move that horse in a forward fashion (physics of propulsion), the raised and curved shape of a metal horseshoe provides the perfect digging tool.

sediment available for removal than wheels on pre-wetted soils. The results indicate horse traffic produced significantly more sediment than other users on dry plots as well". (Erosional Impact of Hikers, Horses, Motorcycles, and Off Road Bicycles on Mountain Trails in Montana- John Wilson and Joseph Seney - Mountain Research and Development 1994)

The most recent study to look at and compare user impacts is the work of Dr. Jeff Marion with Virginia Tech University. His study from Big South Fork National Recreational Area (BSFNRA) entitled *Assessing and Understanding Trail Degradation: Results from Big South Fork*

National River and Recreational Area from 2006 again found that hiking and mountain biking traffic have considerable less impact to trails as compared with horses and motorized use (OHV). This study perhaps carries the most weight as it pertains to the Jake and Bull Trail System as the BSFNRA is located in the southern Appalachians and likely has many similarities to the Chattahoochee National Forest of the North Georgia Mountains.

Some of the factors that determine trail user impacts are as follows:

- Average combined weight of trail user (horse with rider, mountain bike with rider, hiker with loaded backpack) Amount of surface area of user in contact with the trail tread (PSI).
- Relative hardness of the contact area of trail user in relation with trail tread surface (shod hoof, hiking boots, running shoes, mountain bike tires)
- Alternating contact or consistent contact between user and trail surface
- Relative speed of travel modality and consistency of speeds traveled
- Acceleration/Deceleration, speed carried into turns, momentum forces
- Distances traveled
- Relative amount of users in any given user group
- Duration of stay
- Physics of propulsion (how do the different users propel themselves forward on flats and uphill and how do they resist gravity on downhill)

Current Trail Conditions

Although the inventory in the Jake and Bull Mountain Trail System includes approximately 36 miles of trails, very little of that inventory consists of purpose designed and built recreational trail. Instead, much of the trail system has adopted old corridors that were used for purposes other than recreation. These routes or corridors include timber extraction routes, old forest management roads, fire breaks, access routes to wildlife clearings (also known as food plots) and some trails that were just “worn in” by users but later adopted as official trails. Adopting many corridors that lacked good planning and design for recreational traffic as trails has led to many problems within the trail system and thus the current need for a formal trail management plan to help chart the future course for managing a sustainable trail system.

The combination of poorly designed trail alignments, significant rainfall events, increasing use, and lack of proper ongoing maintenance certainly has taken its toll on many of the trails located in the Jake and Bull Trail System. Water based erosion and significant user caused impacts are visible in many places. Many trails have seriously degraded conditions that have had a large impact on the natural resources (such as water quality).

Water based erosion and user impacts (soil displacement) are significantly increased at an accelerated rate on trails that have poor alignment. Trail alignment is defined as the relationship of a trail to its surrounding landscape, sometimes also referred to as trail location. There are many factors that determine how fast a trail will erode over time, but a trails relationship (alignment) with the landscape it is running through is the most important factor. Other factors include: soil composition, frequency of positive drainage features such as rolling dips or grade reversals, amount of annual precipitation and how it is received, canopy over the trail, other trail tread watershed issues, steepness of tread, amount of use and types of users, seasonality of the trail (if any) and many more.



Above: This section of the Jake Mountain Trail shows signs of extreme erosion, a combination of user created impacts (soil displacement) and water based erosion.

The trail system can be easily divided into two sections: east (Jake Mountain side) and west (Bull Mountain side) with the dividing line being the north/south corridor of Forest Development Road

(FDR) 28-1 and Forest Development Road (FDR) 77. It is often important to segment major trail systems due to their complexity and structure. In the case of the Jake and Bull Trails, this north/south corridor also conveniently divides the system into prevailing use types. The eastern portion of the trail system sees more equestrian use as compared with the western side of the system seeing more mountain bike traffic. This difference in concentrations of user types and trail conditions on trails in the two regions reflects the findings of all available trail user impact studies.

Trails located within the eastern section of the trail system are located at a lower elevation and are closer to water than the trails within the western section. These eastern trails have a greater concentration of equestrian use and therefore exhibit much higher levels of trail degradation and resource concerns. Trails located within the western section of the trail system are higher in elevation and are farther from water sources. The western section of trails have higher numbers of mountain bike passes, and exhibit greater signs of water based erosion and less signs of user caused impacts. Of particular concern is the fact that trails which exhibit the highest levels of erosion in the eastern section are also the trails located closest to water and thus having a larger resource management concern. Eroding trails that are higher on ridge-tops and farther away from water sources are still problematic, but have less of a direct negative impact on water quality resources due to the presence of buffer zones where sediment is able settle before reaching live water ways.

Many of the existing trail alignments are too steep to be considered sustainable. Steeper trails cause problems in several different ways. Due to the change in the physics of propulsion, as a trail gradient increases so do user caused impacts. On flat to moderate trail grades, most users (those on foot or bicycle) have a greater compactive force. As trail grades steepen, trail travel generates displacement forces either as propulsion forces going uphill or braking forces in the downhill direction. As soils on steeper treads are displaced, they become readily available to be taken away in rain events which happen often in the North Georgia Mountains. Additionally, water on steeper trails travels at a faster rate and increased velocity increases the erosional force of water. As discussed in the "Trail User Impacts" section of this Plan, horses have a heavier compactive force than hikers or bikers. This compactive force is followed by a displacement force as the horse's hooves dig into the dirt to propel the horse forward. As the trail tread steepens this displacement force of the horse traveling uphill or downhill become extreme.

Many trails also lacked good drainage features such as grade reversals and rolling dips. These positive trail tread drainage features are more permanent than outslope which can be lost very quickly due to soil compaction and displacement forces. Though there are some examples of good rolling contour trail within the Jake and Bull system, they are the exception instead of the rule.



Above: A good example of rolling contour trail on the northern half of the Jones Creek Dam Trail 223E. The pictured grade reversal is a permanent drainage feature that sheds water well, but also adds interest to the trail alignment.

will be a build up of mud which can lead to trails widening as users attempt to avoid the mud. Horse trails are a particular problem in that the action of a horse traveling on the landscape can leave “pot-holes / tea-cups” that hold water.

Often, trail maintainers without enough training try to drain these areas without looking in either direction to find the source of the problem. It is important to understand that the problem starts from the point where the soil is leaving the trail tread, and this must be addressed in addition to the mud

hole itself. Adding positive drainage features such as rolling dips above the settling area will help, and the mud area itself will also need better drainage. If the trail is excessively steep, it becomes very difficult to provide effective drainage structures. These are the trails which will need relocation.

When trails are too steep and lack good positive drainage features, there is soil loss which can lead to a range of other trail and resource protection problems. Soil loss and the resulting sedimentation into streams and creeks from trails located close to or leading into water is certainly the largest problem observed within the Jake and Bull Trail System. Clay based soils contain very small particles which stay suspended in water for long periods of time and this can have a negative effect on aquatic wildlife. When soil leaves a trail tread and settles in another section of trail that is not drained well, there



Above: Poorly drained roads can become very problematic as horse trails. The indents from a hoof create pot-holes that hold water and contribute to the build up of mud.

Flat areas on trails can also pose problems as it pertains to muddiness and trail widening. With a lack of side-slope to drain water and clay based soils which do not drain well, build up of mud can become a large problem. There are many examples of these problems in the Jake and Bull trails.



Above: Steep trails (and roads) exhibit high levels of soil loss. When this soil settles out due to a slowing down of water carrying the soil, mud areas can become extreme.

As high levels of user impacts occur, the trail tread will develop into a trench that is “below grade”. These impacted sections hold water and provide little opportunity to drain. For trails in flat areas that can not be effectively drained or moved to higher ground, the best solutions are turnpikes or causeways to elevate the trail users above the wet areas. Another option is a wooden puncheon; however these structures will not work well when horses are in the mix of trail users.

Trailhead parking areas are adequate for current use levels, though predicted

increased levels would suggest possible future enlargements and improvements. It should, however, be noted that trailhead improvements will have an effect to increase trail traffic. The current trail system can not support any increased traffic without significant improvements to the trails themselves. The ease of access to the Jake Mountain trailhead from available camping is one of the determining factors of higher concentrations of equestrian use on the eastern side of the trail system.

Many water crossings found in the system have failed to meet the management objectives of providing relative safety and easy access across water corridors while protecting the natural resources. Most major crossings came in the form of hardened crossings also known as fords. These crossings used plastic geo-cell webbing with gravel fill construction. This technique has fallen out of favor in trails management due to durability



Above: This mud hole was caused by flat conditions along the northern end of the Jake Mountain Trail. This segment is known by some of the local riders as the Beaver Pond Trail. Trails in flat areas lack good drainage and can become very problematic for trail maintainers.

problems and safety issues for equestrians. Plastic geo-cell failures are well exhibited in the Moss Creek, Jake Mountain and Black Branch Trails.



Above: An example of a failed water crossing located on the Moss Creek Trail. This crossing was poorly designed and this coupled with high levels of horse use led to structure failure and increased impacts on water quality.

Signage is present within the trail system at most major intersections. Signage consists of brown Carsonite wands with location number markers and directional arrows, as well as indications on approved user groups for each trail (horse and bike). The current signage program is very confusing and most users have a hard time interpreting the information contained on the posts. An improved signage program would help users better understand the entire system and find the desired trail experience.



Above: Current signage program is somewhat confusing for many trail users of the Jake and Bull trails.



Above: Liz LaPorta, US Forest Service TEAMS Enterprise, stands adjacent to a typical trail sign within the Jake and Bull Trail System.

Management Prescriptions

In summary, approximately 19% of the trails in the Jake and Bull Mountain Trail System can be described as having very bad conditions and are in need of trail closure and relocation, 24% are trails which have poor conditions and are in-need of trail reconstruction, 40% are trails that are co-located with a road, and the remaining 17% are trails that are in fair condition that require minor to moderate trail maintenance. Conditions that contribute to these overall condition ratings are as follows. Please refer to Table 2 (Summary of Existing Trail Conditions and Management Prescriptions), Table 3 (Detailed Summary of Existing Trail Conditions and Management Prescriptions), and Appendix A Map 2 for a depiction of trail segment conditions and management prescriptions.

Fair Condition -- Minor to Moderate Trail Maintenance (6.31 miles -- 17%)

This prescription recognizes that the trail alignment is in a good location and is able to shed water for most of its alignment. Trail maintenance on these trail segments requires attention to small areas where water is not able to properly drain. Better water management is the most important aspect of this and will come in the form of knicks, drain dips and rolling grade dips. Location of drainage features is as important as how well they are built and developing an eye for locating these will be acquired over time. One of the keys is looking for (or creating) slight meanders in the trail tread and building drainage structures at these locations. Because flowing water likes to go in straight lines, a good drainage structure within a tread meander is likely to last for a very long time as the act of accelerating water off-trail makes it somewhat self cleaning.

In addition to better water management, some steep areas will need armoring to sustain short grades. Good rock work is an art and should be learned as it serves as a good solution to some of the problems in the Jake and Bull Trail System. Rock armoring works for a number of different reasons and these combine to provide for sustainability on steep treads where it did not previously exist. Rock is a hard material and is not subject to trail users loosening it as they do most native soils. Rock is also impervious to water, and as such, water is not reaching the more fragile native soils below. Lastly, rock armoring adds texture to a trail tread which has a slowing effect towards water running down the trail tread. There does not seem to be a lot of available rock in the general area for rock armoring projects, and thus materials may need to be imported. Buying rock from a stone yard can be expensive. An alternative is to use broken concrete in the form of old sidewalks. This technique has been used in many trail systems around the US when the area lacks a good supply of natural stone.

For good info on rock armoring for trails, please see the following websites:

http://www.imba.com/resources/trail_building/rock_armoring.html

<http://www.dupontforest.com/trailproject.asp>

Poor Condition – Trail Re-construction (8.44 miles -- 24%)

Trail re-construction is prescribed on trails that have significant signs of water based erosion, are well below grade, but with significant work and re-grading these alignments can be made sustainable. This is a much more intensive work prescription as compared to minor to moderate work, noting that much, if not all of the trail alignment will need some level of machine work. Work includes: re-grading and re-establishing outslope where possible, heavy grading, adding frequent rolling dips, re-aligning the trail in the best location within the road matrix, pulling the trail outside of, but parallel to the current trailbed if needed to improve drainage, and good landscaping to re-enforce the flow and meander of the trail for better drainage. Formal “road-to-trail” conversions are often a good measure to adopt when the trail is really an old roadbed. This prescription locates the trailbed in the ideal location on the roadbed for sustainability. It can also help improve visitor satisfaction and reduce user conflict issues by calming speeds of different users.

Bad Condition – Trail Closure (7.00 miles -- 19%)

This prescription is reserved for those trails that have such a poor alignment that they can not and should not be reconstructed. These trail corridors exhibit extreme erosion and therefore most of them are having serious impacts on natural resources including water quality. Re-constructing such bad alignments would only provide a very temporary “fix” and the tread on these trails would exhibit much of the same level of degradation as current conditions shortly after a re-construction. The best management prescription in these extreme cases is trail closure including stabilization and restoration work to prevent further damage to the surrounding resources. If at all possible, consideration should be given to relocations to replace old trail segments. New trail segments as relocations will always be longer in length, as compared with old segments, due to the need for additional run to gain the same or lesser amount of rise. These additions to length of any given segment of trail will add up to significantly increase overall mileage of trail system, a condition desired by most trail users.

Trail Co-Located with Road (14.52 miles -- 40%)

The Chattahoochee National Forest Travel Management Plan and Land and Resource Management Plan allows for recreational travel by horses and bikes on inventoried roads. For this reason, there is little need to inventory both existing roads with an additional trail number. The current system of “co-location” with both a road and a trail inventory number is quite confusing. With only a road inventory number, the existing roads corridor will certainly stay open for all recreational traffic to use, but will clearly note that the roads corridor is in fact a road and

not a trail. Such a distinction will also help users find the recreational opportunity they are seeking. Some users will enjoy these inventoried roads as part of a trail loop experience, while others will prefer to stay only on inventoried “trails”. There seems to be no disadvantage to pulling such roads corridors from the trails inventory (INFRA trails), and in doing so, confusion would decrease on the part of trail users, and management decisions can be made to utilize trails budgets towards the trails corridors and not road corridors.

Table 2: Summary of Existing Trail Conditions and Management Prescriptions

Condition	Management Prescription	Miles	% of Trail System
Fair Condition	Minor to Moderate Work	6.31	17%
Poor Condition (Break-down listed below)	Trail Reconstruction	8.44	24%
Inventoried Trail	Trail Reconstruction – Needs Moderate Work	3.87	11%
Inventoried Trail and Uninventoried Road	Trail Reconstruction – Road to Trail Conversion	4.57	13%
BAD Condition	Trail Closure	7.00	19%
Trail co-located with Road (Break-down listed below)		14.52	40%
Inventoried Trail and Inventoried Road (not actively used)	Road to Trail Conversion	2.95	8%
Inventoried Trail and Inventoried Road (not actively used)	Trail & Road Closure	0.61	2%
Inventoried Trail and Inventoried Road (actively used)	Remove from Trails Inventory Leave coded as a road	7.50	21%
Inventoried Trail and Uninventoried Road (actively used)	Remove from Trails Inventory and Add to Roads Inventory	3.46	9%
TOTAL TRAIL MILES		36.26	100%

Table 3: Detailed Summary of Existing Trail Conditions and Management Prescriptions

Trail #	Trail Name	Miles	% of Trail System
Fair Condition — Inventoried Trail — Minor to Moderate Work			
223E	Jones Creek Dam Trail	0.14	
223F	Bull Mountain Connector Trail	2.66	
223G	Bull Mountain Spur	0.30	
223H	Jake Mountain Trail	0.76	
223J	Moss Creek Trail	0.21	
223K	Nimblewill Branch Trail	0.05	
223L	Nimblewill Branch -C Trail	0.88	
223M	Nimblewill Branch -C Spur	0.54	
223N	Black Branch Trail	0.17	
223O	Black Branch Connector Trail	0.12	
223P	No-Tell-Trail	0.48	
Totals		6.31	
Poor Condition – Inventoried Trail –Trail Reconstruction			
223	Bull Mountain Trail	0.77	
223B	Bear Hare / Saddle Back Trail	2.57	
223G	Bull Mountain Spur	0.26	
223N	Black Branch Trail	0.27	
Totals		3.87	
Poor Condition – Inventoried Trail / Uninventoried Road – Road to Trail Conversion			
223	Bull Mountain Trail	3.14	
223A	West Jones Creek Trail	0.26	
223C	Whoop-De-Dos Trail	0.77	
223L	Nimblewill Branch -C Trail	0.40	
Totals		4.57	
BAD Condition - Inventoried Trail - Trail Closure			
223	Bull Mountain Trail	0.23	
223E	Jones Creek Dam Trail	2.01	
223H	Jake Mountain Trail	2.45	
223J	Moss Creek Trail	1.59	
223K	Nimblewill Branch Trail	0.15	
223N	Black Branch Trail	0.40	
223P	No-Tell-Trail	0.17	
Totals		7.00	

Table 3 (continued): Detailed Summary of Existing Trail Conditions and Management Prescriptions

Trail #	Trail Name	Road #	Miles	% of Trail System
Trail Co-located with Road Inventoried Trail and Inventoried Road (Road not actively used) Road to Trail Conversion				
223N	Black Branch Trail	28F	1.64	8%
223N	Black Branch Trail	28G	0.78	
223L	Nimblewill Branch -C Trail	28C	0.53	
Totals			2.95	
Trail Co-located with Road Inventoried Trail and Inventoried Road (Road not actively used) Trail & Road Closure				
223N	Black Branch Trail	28F	0.61	2%
Trail Co-located with Road Inventoried Trail and Inventoried Road (Road actively used) Remove from Trails Inventory – Leave coded as a road				
223A	West Jones Creek Trail	77A	2.37	21%
223D,F	Bull Mtn Cutoff & Connector	83	2.31	
223E	Jones Creek Dam Trail	872	0.67	
223F,H	Bull Connector & Jake Mtn Trail	299	0.39	
223K	Nimblewill Branch Trail	28A	0.97	
223P	No-Tell-Trail	28A	0.78	
Totals			7.50	
Trail Co-located with Road Inventoried Trail and Uninventoried Road (Road actively used) Remove from Trails Inventory and Add to Roads Inventory				
223B	Saddle Back Trail	Uninventoried Road	2.37	9%
223C	Whoop-De-Dos Trail – Jones Creek Inholding		2.31	
223D	Bull Mountain Cutoff – Jones Creek Inholding		0.93	
223E	Jones Creek Dam Trail		0.40	
223P	No-Tell-Trail		0.39	
Totals			3.46	

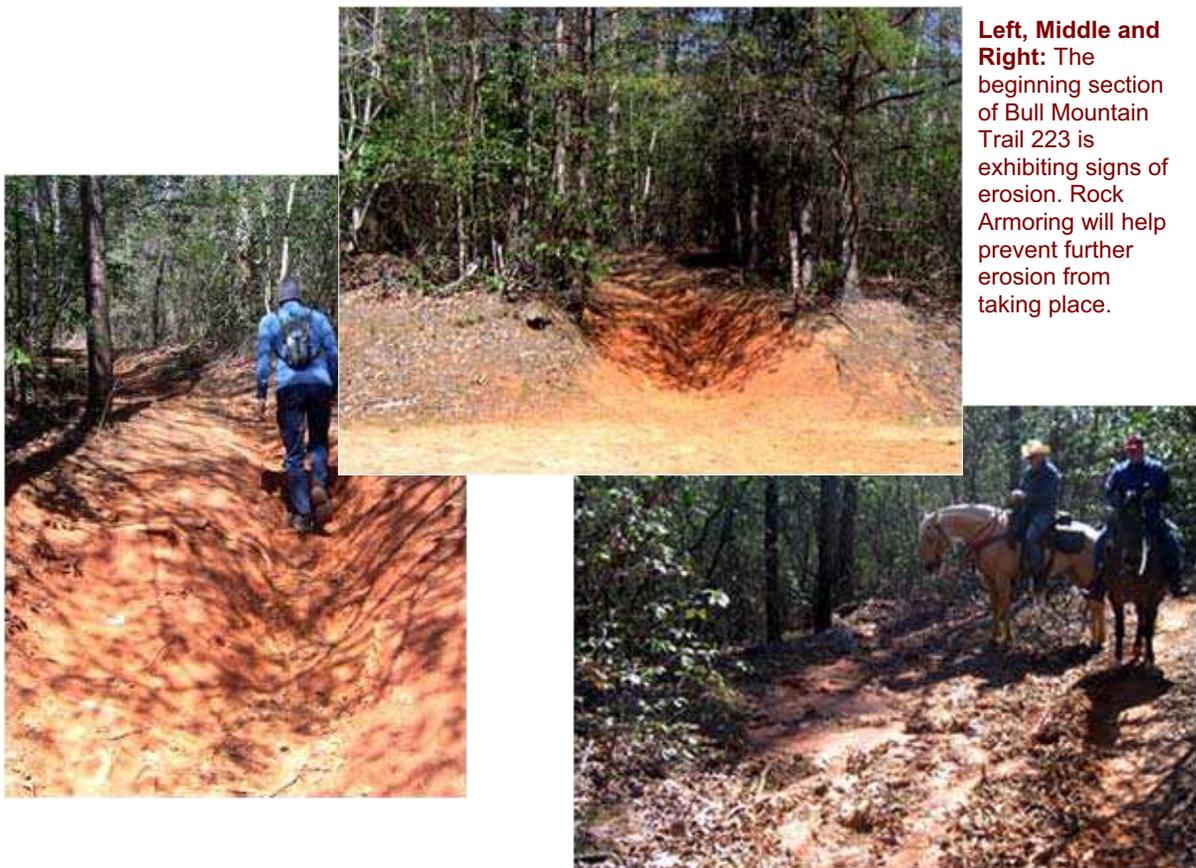
Specific Trail Assessments

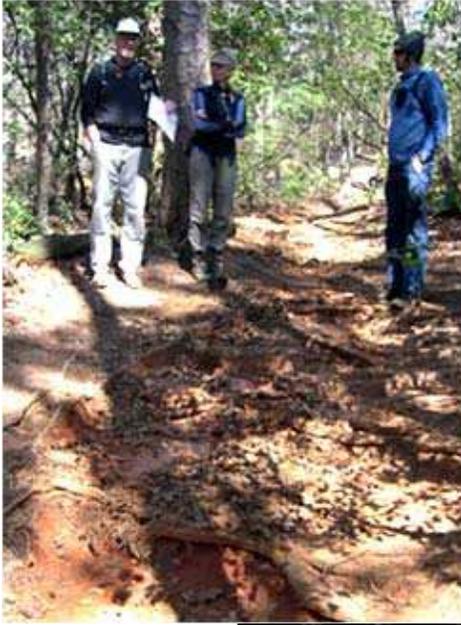
Trail 223 – Bull Mountain Trail (4.13 miles) and

Trail 223G – Bull Mountain Spur Trail (0.56 miles)

The Bull Mountain Trail 223 leaves Bull Mountain Rd (FDR 83) directly across from Jones Creek Dam Rd (FDR 872). It follows an old jeep road which was used as a timber extraction corridor many years ago. The Bull Mountain area has been logged heavily throughout the years and old roads and skidder trails litter the landscape. There are sections of the Bull Mountain Trail which gently contour the landscape and are therefore in great shape with little signs of erosion. Other sections, however, contain a more aggressive trail grade, do not fit within the landscape and therefore are showing moderate to severe signs of water based erosion that have carved the tread to be well below-grade.

The beginning section of this trail from its start off the Bull Mountain Rd is well below grade and signs of user impact and water based erosion are problematic. It is recommended to utilize rock armoring and/or surface hardening for this short entrance.





Left, Middle and Right: A continuing look at Bull Mountain Trail.

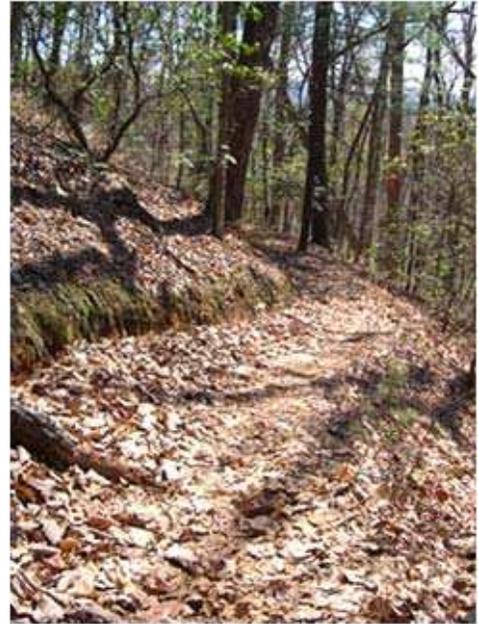


The first 0.5 mile of the Bull Mountain Trail is located on a steep “fall-line” which historically was used as an old extraction route. This section is experiencing moderate to severe erosion that has risk management concerns, enough to justify building a short section of trail (Bull Mountain Spur Trail 223G) to by-pass 0.2 miles of the most severely eroded section of this segment. The Bull Mountain Spur Trail 223G is marked for mountain bikes only and was designed and purpose built by SORBA. It is sustainably hand-built on the contour for most of its alignment and is expected to hold-up over the years. The 0.2 mile section of trail which Trail 223G by-passes is marked for horses (not bikes) and is currently used to gain the main ridge. As would be expected, this steep fall line old extraction route has failed and lost significant amounts of soil. It is recommended to immediately close this section of trail and pursue the re-location option for a new horse-only section that would connect further north with the Whoop-De-Dos-Trail.



The "Horse-Only" section of the Bull Mountain Trail 223 has severe erosion and risk management concerns.





Above and Right: The first half of the Bull Mountain Spur Trail 223G (Bikes Only) is a purpose-built trail that is sustainably hand-built on the contour.



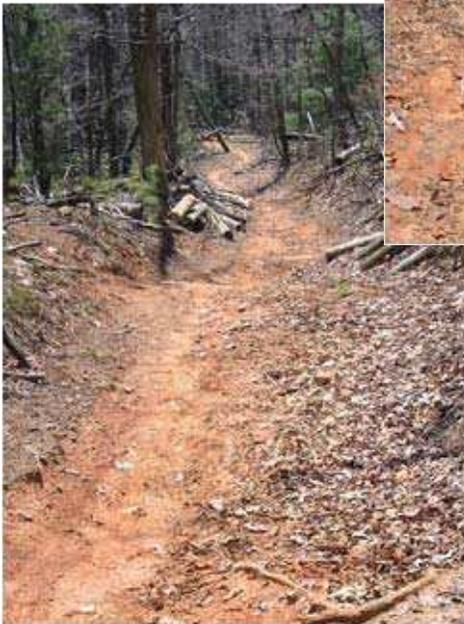
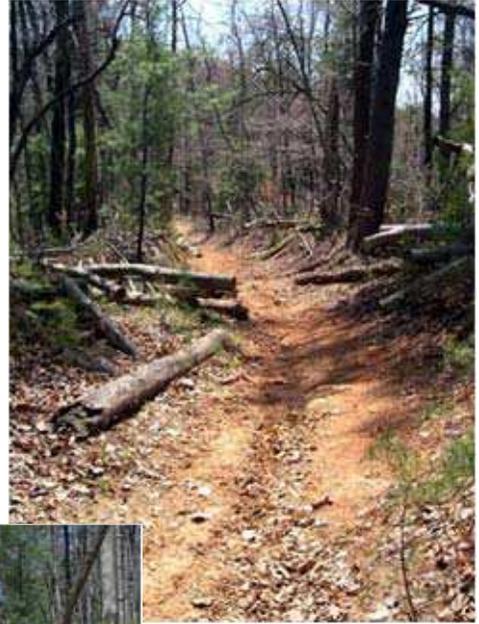
Left, Middle and Right: The second half of the Bull Mountain Spur Trail 223G (Bikes Only) was built on a fall-line in order to connect back to the existing Bull Mountain Trail 223. Moderate work is recommended to manage for sustainability with the additions of undulations and meanders.



Continuation of the Bull Mountain Spur Trail 223G

The section of Bull Mountain Trail 223 between its intersection with Spur 223G and Marker 1D at the Whoop De-Dos Trail 223C is also constructed on a fall-line and is showing signs of moderate erosion. This section is in Poor Condition and requires a “Trail Re-Construction Miracle” to be made sustainable. This section is a good candidate for an educational workshop where a Trail Professional would conduct the work and at the same time provide an educational workshop for USFS staff and volunteers on how to do the work. There are very few trail professionals whom can do this work, and therefore it is recommended to carefully consider who is hired so mistakes are not made in the reconstruction of this segment.

From the Bull Mountain Trail’s intersection with Marker 1D at the Whoop-De-Do’s Trail 223C and Marker 1E, it heads in a northwesterly direction for 3 miles along an old road bed. This section of trail is in fairly good condition due to the contouring nature of the old roadbed. A formal road-to-trail conversion is recommended for this 3 mile segment. This management prescription would take the trail out of the current roadbed where it would have the ideal placement for water management through increased meanders and undulations. A road-to-trail conversion will also provide the trail experience with a feeling of a purpose built trail rather than a trail that was built in the middle of an old road. Such a re-alignment would need to be designed by a trail professional with experience in road to trail conversions. During the assessment of this trail, a flagging exercise was performed as a demonstration. This section is another great opportunity for an educational workshop on “road-to-trail” conversions. Overall, better water management and re-alignment work would benefit long term sustainability of this section but could be considered low priority when compared with many other more significant issues found within the system.



A Trail Re-construction Miracle is recommended for the Bull Mountain Trail between its intersection with Spur 223G and Marker 1D at the Whoop-De-Do's Trail 223C. Woody Keen (Trail Dynamics, LLC) explains how erosion is occurring and how to properly re-construct this trail section.



Much of the Bull Mountain Trail is in good shape due to the contouring nature of the old roadbed.



Left and Below: Woody Keen (Trail Dynamics, LLC) provides an education session on the concepts for a “road-to-trail” conversion.



Trail 223A – West Jones Creek Trail (2.63 miles)

The West Jones Creek Trail begins at the intersection of Bull Mountain Trail 223 and Saddle Back (Bear Hare) Trail 223B. The sign at this intersection is not consistent with the USFS GIS data and reads “Bull Mountain Loop” for the direction of the West Jones Creek Trail and “Bear Hare Trail” for the direction of the Saddle Back Trail.

The West Jones Creek Trail begins by dropping-off the ridge for 0.26 miles to reach its crossing with Lance Creek. This short section is located on an old road bed. It shows signs of erosion, but is mostly naturally “armored” with rock and cobble. A formal “road-to-trail” conversion and armoring project that utilizes available rock in the area would benefit long-term sustainability and the trail experience by narrowing the active tread on the roadbed.

Once the trail reaches the bottom of the steep and cobbled old road bed, it crosses Lance Creek in two locations. These stream crossings are naturally armored with river rock and are working great!!



The Intersection of the West Jones Creek Trail is signed as the Bull Mountain Loop.



The first 0.26 mile section of the West Jones Creek Trail is naturally armored with the presence of much rock and cobble.



Above and Right: The West Jones Creek Trail crosses Lance Creek twice.

The remaining 2.37 miles of the West Jones Creek Trail is co-located with the West Jones Creek Rd (FDR 77A). It is interesting to note that the body of water this road follows is named Lance Creek on topo maps, and many trail users know this section as the “Lance Creek Road / Trail” more than the current USFS designated name “West Jones Creek Road / Trail”. For most of its length, the existing road corridor is in good shape with frequent broad based dips and water turn outs that are still effective. This should be monitored and some work may need to be scheduled as road conditions deteriorate due to increased traffic and on-going weather events. Despite the wider width associated with the forest road, paralleling the creek provides for an interesting and desirable trail experience.

Forest Development Road (FDR) 77A is seasonally open during hunting season. There are several dispersed campsites throughout the river corridor. It is therefore recommended to remove the 2.37 mile section which is co-located with FDR 77A from the trails inventory and leave it coded as a road only. In order to provide a consistent naming convention it is also recommended to change the name of this Road to be consistent with the body of water it follows, “Lance Creek”.



The West Jones Creek Trail is co-located with the West Jones Creek Rd (FDR 77A) for 2.37 miles.

Trail 223B – Saddle Back/Bear Hare Trail (3.96 miles)

The Saddle Back Trail begins at its intersection with the turn-off from West Jones Creek Rd 77A. The trail is historically known to local users as the “Bear Hare” Trail. The signs along the trail depict this as the trail’s name. It travels northwest to the highest point in the trail system and also the most remote portion of the forest currently contained within the system. Though not apparently inventoried as such, the first 1.4 miles of trail are located on an improved road bed which shows signs of crushed stone surfacing in places and broad-based dips. Some of these dips have failed or are failing and need re-shaping. This road is actively used to access wildlife clearings.



Above, Left and Below: The first 1.4 miles of the Saddle Back Trail is located on an improved road-bed that is used to access wildlife clearings.

It is therefore recommended to remove the 1.4 mile section which is co-located with an un-inventoried road from the trails inventory and inventory it as a road only.



At mile 1.4, the improved road-bed ends and the trail enters the forest and becomes single track in nature. The next 2.57 miles of trail is of fair to good design and rolls along contours and ridge-tops, however, this section of trail needs moderate maintenance including: rolling dips, minor re-alignment work, and short sections would benefit from some rock armoring. There are several drainage crossings at the higher elevations with waters flowing off of Springer Mountain, however they are naturally armored and pose no resource concerns.



At mile 1.4, the improved road enters the forest and provides the feeling of a single-track trail.



The Saddle Back Trail crosses this small creek draining off of Springer Mountain. This crossing is naturally hardened with native rock and the trail crossing in this location poses no great threat to water quality.



An example of a section of the Saddle Back Trail that rolls with the contour.



Woody Keen (Trail Dynamics, LLC) provides an education session on how to include rolling dips and re-alignment work to this section of trail.



Above: The Saddle Back Trail has a sign that reads "Bear Hare" Trail.



Above: Sections of the Saddle Back Trail provide a feeling of single track.



Above: Intersection of the Saddle Back Trail with Bull Mountain Trail and West Jones Creek Trail.

Trail 223C – Whoop-De-Dos Trail (0.77 miles)

The Whoop-De-Dos Trail is located on an un-inventoried old road bed. From its intersection with Bull Mountain Trail 223, it heads in a northeast direction for 0.77 miles along the flanks of the southeastern side of Bull Mountain before its T- junction with the Jones Creek In-holding and the un-inventoried jeep road which is also inventoried as the Whoop-De-Dos Trail (west side) and the Bull Mountain Cut-off Trail 223D (east side).

The roadbed shows significant signs of soil loss and water based erosion and is somewhat aggressive in grade. There is, however, no water courses anywhere close to the trail and therefore direct resource impacts are limited. Because this trail is not part of a current road inventory, it could be made sustainable using “road-to-trail” conversion techniques. This management prescription would take the trail out of the current roadbed where it would have the ideal placement for water management through increased meanders and undulations. A road-to-trail conversion will also provide the trail experience with a feeling of a purpose built trail rather than a trail that was built in the middle of an old road. A trail professional should be consulted to design the best location in and out of the current corridor for long term sustainability.



Intersection of the Bull Mountain Trail 223 and Whoop-De-Dos Trail 223C.

Below and Right: The Whoop-De-Dos Trail is located on an old road-bed.



Above: Woody Keen (Trail Dynamics, LLC) teaches a volunteer about road-to-trail conversions.

Trail 223C – Whoop-De-Dos – Jones Creek In-holding (0.28 miles) and Trail 223D – Bull Mountain Cutoff – Jones Creek In-holding (0.63 miles)

The Whoop-De-Dos Trail meets a T- junction within privately held land that is locally known as “Booger Holler” or the “Jones Creek in-holding”. From this T-junction, the trail in both directions is located on an un-inventoried jeep road that is actively being used to access private land. The west-side of this jeep road is inventoried as the Whoop-De-Dos Trail and the east-side of this jeep road is inventoried as the Bull Mountain Cut-off Trail 223D.

There are drainage problems on this jeep road that will be difficult to remedy, but applying forest road BMPs would certainly help. Some road solutions include: broad based dips with lead-off ditches, and surface hardening with successive layers of surge stone (2-4”) and a top dressing of ABC crusher run. The public open house meeting received comments from locals who own property in this private in-



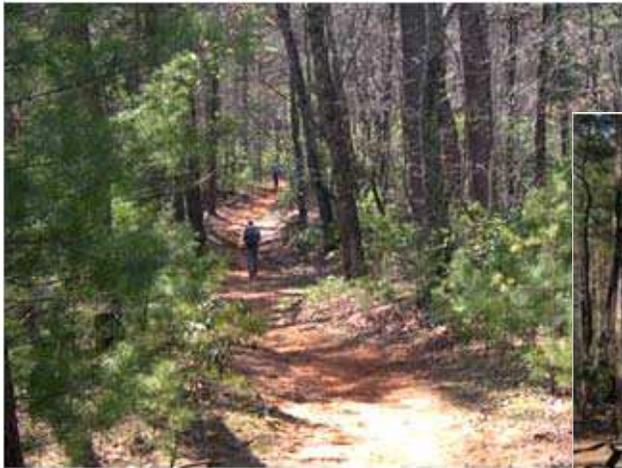
Intersection of the Whoop-De-Dos Trail with the Bull Mountain Cutoff Trail is located on private land.

holding describing a large amount of silting that takes place within a creek this road crosses over. The creek meanders through and carries with it a large amount of sediment into the private lands.

The jeep road is not inventoried in the roads GIS layer, but it is presumed that it needs to become part of a road inventory as it provides access to private land within USFS managed lands. It is recommended to change the inventory from a trails designation to a roads designation. Trail relocation is not recommended. If a new trail were to be constructed, the sediment problem will still take place within the private lands from the jeep traffic on this road. Changing the inventory to reflect an actively used road will still guarantee that recreational traffic can use this road.



The Whoop-De-Dos Trail is located on a jeep road and private lands.



Left, Right and Below: The Bull Mountain Cutoff Trail is located on a jeep road and private lands.



Below: The jeep road crosses a creek that is causing silting problems within private lands.



Left: The Whoop-De-Dos Trail crosses Lance Creek before its intersection with the West Jones Creek Trail/Road and the Saddle Back Trail. This stream crossing is naturally armored with river rock and is completely functional with no resource concerns.

Trail 223D – Bull Mountain Cutoff Trail (1.54 miles)

The Bull Mountain Cutoff Trail begins at the intersection of Bull Mountain Trail 223, Bull Mountain Connector Trail 223F (which is co-located with the Bull Mountain Rd - FDR 83), and the Jones Creek Dam Trail 223E (which is co-located with the Jones Creek Dam Rd - FDR 872).

The first 1.54 miles of the Bull Mountain Cut-off Trail 223D is co-located on FDR 83. The inventory should not have dual designations as both a road and a trail. FDR 83 is coded in the GIS roads layer as a “County Rd”. This is a main road used to access many places within the Forest. It is recommended to double-check that this road is correctly designated as a County Road and remove the trail designation from the trails inventory and leave it coded as a road within the roads inventory.



Trail 223E – Jones Creek Dam Trail (3.21 miles)

The first 0.93 miles of this trail is co-located along with Jones Creek Dam Rd - FDR 872, and provides access to the dam and wildlife clearings in the area. It appears the inventoried road length should be evaluated for accuracy. The GIS roads layer depicts this road ending prior to the Dam and one of the wildlife clearings. The inventory should not have dual designations as both a road and a trail. It is recommended to remove the section which is co-located with FDR 872 from the trails inventory and leave it coded as a road within the roads inventory. This road has an

aggressive gradient and needs re-shaping with better broad based dips with lead-off ditches and surface hardening to prevent further loss of soil.

Left and Below: The Jones Creek Dam Trail is co-located with the Jones Creek Dam Rd (FDR 872) and provides access to wildlife clearings.



The first 1.8 miles of the Jones Creek Dam Trail is a part of a popular equestrian loop ride. The dam site is a destination for equestrians and currently is one of the only view spots within the entire Jake and Bull Mountain Trail System. It is recommended to design a day-use picnic area with trail side amenities to include tables and horse tie outs.



Jones Creek Dam is an equestrian destination.

After leaving the dam, the remaining 2 miles of the Jones Creek Dam Trail

climbs steeply through a wildlife clearing to gain a ridgeline and steeply descends down a fall-line only to again climb steeply to go through another wildlife clearing. This series of “Pointless-Ups-and-Downs” (PUDs) is not sustainable trail construction. The trail at the edge of the clearing continues to move locations due to its fall-line alignment. Once the current active tread erodes to a certain point, users move over several feet and begin wearing in a new tread and duplicating the problem. At the bottom of these PUDs are mud holes that will never properly drain. It is recommended to re-locate this section of trail to avoid the PUDs and steep terrain traveling



through the edge of the wildlife openings. This will not only create sustainable trails, but it will also help to better manage the user to stay on a designated trail tread. The many trails running through the wildlife clearings will heal fairly quickly if disked and seeded. The new proposed relocation would use more run to gain the same amount of rise and therefore provide for more conservative grades and sustainable trail maintenance.

Above and Right and Below: Participants during the assessment process examine the many “trails” running through the wildlife clearings north of the dam.



Left: It only takes several passes of a heavy trail user such as a horse for this to begin to look like a trail. It is hard to manage the user on trails through open pastures and these should be avoided when at all possible.

The last 0.14 miles of the Jones Creek Dam Trail functions as a connector trail between FDR 77 (marker 2A) to Nimblewill Branch C Trail 223L (marker 2B). This small section of trail is somewhat steep and difficult to sustain. Improved drainage with the addition of rolling dips and some surface hardening will help if traffic patterns remain low. This small section should be reclassified as part of the Nimblewill Branch C Trail 223L.



Right: Mud holes that are difficult to properly drain develop at the bottom of sections that are Pointless-Ups-And-Downs (PUDs). These mud holes are the combination of poorly drained flat areas with steep areas above where soil is being displaced.



Above: Steep trail construction that results from a PUD is not sustainable and invites erosion.



Intersection of FDR 77 and Jones Creek Dam Trail 223E. This section of Trail 223E connects between Marker 2A (**above**) and Marker 2B (**right**) to Nimblewill Branch C Trail 223L (below)



Trail 223F – Bull Mountain Connector Trail (3.76 miles)

This is one of the newer alignments in the Jake and Bull system and is a purpose designed and built trail which connects the Jake Mountain Horse Camp, Trailhead and Parking Area with the Bull Mountain Trailhead and Parking Area. The entire segment is an important component of the most popular equestrian riding loop.

The Bull Mountain Connector Trail 223F begins at the Jake Horse Camp and shares 0.34 miles of Jake Mountain Rd - FDR 299 before leaving the Jake Trailhead. It travels northwest on sustainable grades for 0.90 miles before its crosses over FDR 28-1 and shares a short section with and crosses Bull Mountain Rd - FDR 83. This segment needs minor work in the form of adding additional rolling dips to better manage water. The short sections which drop to cross these roads will need rock armoring to sustain steep fall-line grades.



The Jake Parking Area and Trailhead for Bull Mountain Connector Trail 223F.



After sharing and crossing the Bull Mountain Road - FDR 83, it heads northwest and begins a steep climb into the woods, following some old skid trails in places, but in other places it is a new purpose designed/built alignment. The entrance off the road will need rock armoring or surface hardening with crushed stone and some better water management in areas prescribed. Some mud holes have developed and these are often the result of soils leaving steeper sections of trail and settling where the water slows down and drops out sediment.

At its second intersection with FDR 83, the user groups are split with the mountain bikes being co-located with FDR 83 and the horses/hikers on a trail that sits in the bottom of a drainage. The horse/hiker segment sits directly below the FDR 83 and therefore has an extensive amount of surface run-off coming from the road above. There are a number of wet and muddy spots on this section of trail; these are the result of flat areas on the tread and poorly draining soils (clay based). The recommendation to create sustainability is to surface harden with crushed stone, add more meanders to help shed water, and/or re-align the trail onto the eastern slope with meanders and undulations.

The horses/hiker section passes through the Bull Mountain Parking Lot and onto FDR 83 to connect back with the biker only section. There is severe erosion within the short connector trail between the parking lot and the road. Rock armoring will help this section from eroding any further.

After the biker and horses/hiker section joins back together, it continues north and is co-located with FDR 83 for 0.30 miles until its intersection with Bull Mountain Trail 223, Bull Mountain Cut-Off Trail 223D (which is also co-located on FDR 83), and the Jones Creek Dam Trail 223E (which is also co-located on FDR 872). Jake Mountain Rd – FDR 299 and FDR 83 are main roads within the roads inventory. The inventory should not have dual designations as both a road and a trail. The recommendation is to remove the trail designation for the sections that are co-located with the inventoried Jake Mountain Rd 299 and FDR 83 and leave them coded only as roads. The biker only section that is co-located on the FDR 83 should be allowed to share the use with the horse/hiker only section that connects from FDR 83 to the Bull Mountain Parking area. Trail relocations are identified to remove the shared-use sections from being co-located with the roads.



A mountain biker avoids a mud hole on the Trail 223F. Trail maintainers must look at the causes of mud holes before a suitable solution can be designed. Adding additional drainage up trail can help by eliminating soil loss. Some areas may need armoring with rock to prevent additional soil loss.



Above: The Bull Mountain Connector Trail shares a short section to cross Bull Mountain Rd – FDR 83. The sections of trail which drop to cross roads like this will need rock armoring to sustain steep fall-line grades.



Left: This Horse Only segment of the Bull Mountain Connector Trail lies in the bottom of drainage and is difficult to dry out. Options include surface hardening with crushed stone, adding more meanders to help shed water, or slight re-alignment up slope to shed water.



Left: The end of the horse/hiker section which connects to the Bull Mountain Kiosk and Trailhead needs rock armoring to prevent further erosion.



Above: The Bull Mountain parking area.



Above: After the biker and horses/hiker section joins back together, it continues north and is co-located with Bull Mountain Road - FDR 83 for 0.30 miles until its intersection with Bull Mountain Trail 223, Bull Mountain Cut-Off Trail 223D, and the Jones Creek Dam Trail 223E.

Trail 223H – Jake Mountain Trail (3.28 miles)

The Jake Mountain Trail runs south to north and connects the Jake Mountain Horse Camp to Forest Development Road (FDR) 28-1. This trail experiences extremely high levels of equestrian use as it leads directly out of the Jake Horse Camp. Overall, the Jake Mountain Trail consists mostly of an old road alignment that served as a timber extraction route and as an on-going fire break. It consists of a series of “pointless-ups-and-downs” (PUDs) as it steeply climbs and descends from one ridge top to the next, crossing Jones Creek in-between ridges. The most significant signs of user caused impacts can be found on some of these “PUD” sections with gullies that exceed 4 feet in height.

The beginning of the trail is co-located with Jake Mountain Rd – FDR 299 for a short 0.06 miles before departing the Jake Horse Camp. The inventory should not have dual designations as both a road and a trail, and it is recommended to remove the trail designation for this short section that is co-located with the inventoried Jake Mountain Rd – FDR 299 and leave the road coded only as a road.

After departing the Jake Horse Camp, this trail steeply climbs (grades exceeding 35+%) to gain a ridge only to steeply drop elevation to cross Jones Creek. This is the largest water corridor the trail system crosses and the hardened ford has failed. The Jones Creek crossing will need improvements in the form of a better hardened crossing using a triple layer stone approach: rip-rap for base layer, railroad ballast (2-4” stone) in the middle, and a top layer of ABC or crusher run stone. Large rocks can be placed in the creek for stepping stones allowing hikers and bikers to cross without getting their feet wet. This upgraded crossing structure will likely need to be permitted by the US Army Corps of Engineers. A second option includes using timber framing to contain the crushed stone and a riser step pattern to gain the needed creek exit elevation. A final option would involve building a major bridge structure at this crossing. This is less preferred due to the level of engineering involved with building a bridge of that length. Jones Creek is an important watering hole for horses, and a bridge would create additional equestrian impacts to the stream area adjacent to the bridge.



Jake Mountain Trail 223H crossing at Jones Creek. Note the geo-textile webbing hardened ford has failed.



Above: Jake Mountain Trail crossing Jones Creek. The hardened ford has failed at the crossing with Jones Creek.



Left: Example of a bridge that can be designed and built strong enough to accommodate equestrian traffic, but such a crossing eliminates an opportunity to water a horse.



Above: The Jake Mountain Trail steeply descends to cross a small branch of Jones Creek.



Above and Left: Significant erosion is seen on the Jake Mountain Trail as it climbs a steep ascent to gain a ridge above Jones Creek.

After its crossing with Jones Creek, the trail steeply climbs yet another ridgeline to its intersection with the Moss Creek Trail 223J (Marker 3D). From this intersection, the Jake Mountain Trail continues northbound as the segment locally known as the “Beaver Pond Trail”. This segment is experiencing extreme erosion with gullies reaching up to four-feet deep. This is clearly a risk management concern and does not meet US Forest Service specifications.



Above and Left: The Beaver Pond segment of the Jake Mountain Trail is severely eroded and poses risk management concerns.

Once the trail reaches the bottom, it gently follows along-side Moss Creek for 0.75 miles to its intersection with Nimblewill Branch Trail 223K. The alignment is in fair condition, and minor trail work to include additional meanders and undulations would create a more sustainable condition.



In summary, the Jake Mountain Trail contains some of the worst conditions within the Jake and Bull system. It poses extreme resource concerns and risk management problems in the form of trail erosion-related hazards and failed water crossings. Very few sections of the Jake Mountain Trail can be considered sustainable for heavy horse traffic. Management prescriptions include immediate trail closures, stabilization for much of the alignment, removing the failed geo-webbing used at all stream crossings and replacing with rock armoring, and planning/designing the recommended relocations for the closed sections. This plan proposes a new location for a sustainable alignment that eliminates the “PUD” by keeping the trail at a consistent gentle grade which contours the landscape. Unfortunately, project coordinators did not understand the impacts of horses and how to design sustainable trail locations and stream crossings to manage heavy equestrian use.

Trail 223J – Moss Creek Trail (1.79 miles)

The Moss Creek Trail runs west-east and connects the Jones Creek Dam Trail 223E with the Jake Mountain Trail 223H. As the trail leaves Jones Creek Dam Trail heading to the east, the first section has some problems in aggressive grades that are not sustainable for heavy equestrian traffic. East of the Dept of Natural Resources maintenance shed, the trail begins having significant problems where the trail drops at a 35+% grade, showing significant signs of erosion and a very rocky trail tread posing technical challenges for horses. As the trail bottoms out in a wide drainage area, there are numerous sink holes beside the trail which pose a risk management concern in the form of hidden hazards that are difficult for the trail user to identify.



Above: Woody Keen (Trail Dynamics, LLC) uses a clinometer to measure the grade of this trail.



Above and Right: Sinkholes along-side the upper section of Moss Creek Trail pose a hazardous situation for equestrians and other trail users.



The trail climbs out and crosses FDR 77 and FDR 28-1 and descends to cross Moss Creek with grades exceeding 35+%. This section of trail has very aggressive grades and lacks positive drainage features such as grade reversals or rolling dips. It is impossible to tell at this stage of trail degradation if drainage features were built in during a construction process and have failed, or if they did not get planned and designed into the initial construction. The final stretch runs 1,000+ linear feet without any drainage and is a knee deep below-grade gully.



Above: The trail climbs out and crosses FDR 77 and FDR 28-1 and descends to cross Moss Creek with grades exceeding 35+%.

The Moss Creek crossing consists of black plastic geo-cell webbing filled with gravel. This structure has failed and lacks the durability required to withstand extremely high levels of equestrian use and the resulting impacts caused by horses. When this structure failed, the geo-cell webbing had floated freely within the creek, resulting in an equestrian hazard where horses could get their hooves caught within the geo-cells. Apparently the failed and freely floating webbing had been cut-out and removed from the creek to illuminate the greatest

hazard; however, this hazard still exists on the approaches to/from the creek where geo-cell webbing is exposed from erosion.

After the Moss Creek crossing, the trail aggressively climbs with grades exceeding 35+% on an old timber extraction route to join the Jake Mountain Trail. As can be expected, severe erosion is taking place with no drainage turn-outs or control measures.

Generally speaking, the Moss Creek Trail is the number one “worst” segment of trail which exhibits “BAD” trail conditions within the Jake and Bull Trail System. The Moss Creek Trail is dumping an enormous amount of sediment into Moss Creek resulting in significant impacts to water quality and aquatic life. It poses extreme resource concerns and risk management problems in the form of trail side hazards and extremely bad trail-tread conditions. Unfortunately, project coordinators did not understand the concepts of sustainable trail design and construction and the impacts that result from extremely high levels of equestrian use. This section of trail is a perfect example of a “Pointless-Up-and-Down” or “PUD” where steep trail grades and poor design alignment contribute greatly to the failure of not only the trail tread, but also to the creek crossing.

This trail segment is recommended for **immediate trail closure and stabilization** to prevent further impacts to the creek and hazards to trail users. The impacts this section of trail has upon the landscape are detrimental and will be very difficult to rehabilitate. Eliminating the large scar within the landscape and halting the current level of soil loss that is settling within Moss Creek requires good planning and execution. **Consultation with a trail professional is suggested on many of the proposed trail closures, and this trail is of top priority for outside professional help.**



All: The Moss Creek Trail descends with grades exceeding 35+% towards its crossing with Moss Creek, and runs 1,000+ linear feet without any drainage features. This section of trail is having a serious negative impact on water quality and needs to be closed and stabilized.



All: The geo-webbing structure within Moss Creek has failed, resulting in impacts to water quality and hazards to equestrian users. Moss Creek is experiencing a tremendous amount of sediment loading with serious negative impacts on water quality.



A temporary solution to this serious resource concern would be to immediately close the trail to all users and place straw bales every

50-100 feet as check dams. Pine straw or hay straw could be used for this application where the key is to have good surface contact between the bale and the eroding trail tread. This will help to reduce the velocity of water by frequently breaking up its force and speed. It does not, however, significantly reduce the volume of water running down the 1000+ linear feet of trail straight into Moss Creek. This stabilization should only be considered a short term solution until a more thorough closure and stabilization can be performed.

Closure and stabilization techniques include: re-grading and the creation of rolling dips with lead off ditches to shed water, large earthen check dams to slow water velocity down this corridor, scarifying all soils to promote re-vegetation, seeding all barren surfaces with an approved seed (likely to match nearby food plots), and covering all barren surfaces with straw or other organic

forest duff material. Additionally, trees will need to be dropped frequently into the corridor to discourage on-going use of the trail.

The western portion (west of FDR 77) of the trail could possibly be re-located on more moderate grades and included into a future trail system. There appears to be enough landscape to allow such a re-location and a proposed alternate route is included in the maps of this planning document. The proposed new trail alignments will still provide a complete loop trail that can be used from the Jake and Bull Trailheads.



Left, Middle and Right: The Moss Creek Trail climbs aggressively to its intersection with the Jake Mountain Trail.



Trail 223K – Nimblewill Branch Trail (1.18 miles)

The Nimblewill Branch Trail 223K generally runs north-south and begins at Moss Hill Rd – FDR 28B, intersects with the terminus of the Jake Mountain Trail 223H, crosses over Moss Creek and FDR 28-1, and is co-located with Nimblewill Branch Rd – FDR 28A.



Above and Right: Nimblewill Branch Trail begins at Moss Hill Rd 28B, and then descends an aggressive 35+% grade to its intersection with the terminus of Jake Mountain Trail 223H.

The short segment of Trail 223K that begins at Moss Hill Rd – FDR 28B descends an aggressive 35+% grade to its intersection with the terminus of Jake Mountain Trail



223H. This segment appears to be user created and is mostly fall-line in its alignment. Due to steep fall-line grades, this short 0.15 mile section needs to be closed, stabilized, and removed from the trail system inventory. It is suggested that the

Jake Mountain Trail 223H terminate at the junction with FDR 28-1.

Prior to intersecting with FDR 28-1, Trail 223K crosses over Moss Creek, and again, the geo-webbing is failing. This small stream crossing needs to be hardened with a shallow stream ford to both replace the failing geo-webbing and reduce future user impacts.



Above: The geo-webbing installed at this small crossing of Moss Creek is failing and needs to be replaced with rock armoring.

Trail 223K crosses over FDR 28-1 and is co-located with Nimblewill Branch Rd – FDR 28A for approximately one-mile and ends at the intersection with No-Tell-Trail 223P. FDR 28A is generally a good alignment for horses and bikes and needs little work. There are some signs of crushed stone surfacing on the upper reaches and there may be other areas that would benefit from the same treatment. Broad based dips were generally in fair condition but need to be monitored for needed future maintenance work (re-shaping). Any work on this alignment needs to come out of a roads budget and not a trails budget. FDR 28A provides access to wildlife plots / clearings. The roads and trail inventory should not have dual designations as both a road and a trail, and it is recommended to remove the trail designation for the section that is co-located with the inventoried Nimblewill Branch Rd – FDR 28A and leave the road coded only as a road.



Above and Right: FDR 28A provides access to wildlife plots / clearings

Trail 223L – Nimblewill Branch C Trail (1.81 miles) and Trail 223M – Nimblewill Branch C Spur Trail (0.54 miles)

The Nimblewill Branch C Trail 223L and C Spur Trail 223M generally runs north-south and connects the FDR 77 with the FDR 28-1. The first mile of trail 223L (between FDR 77 and its intersection with Jones Creek Dam Trail 223E) and Spur C Trail 223M represent two of the best trail segments within the Jake and Bull Trail System. They have mellow grades, provide the trail experience with a really nice setting, and are mostly newer purpose built sustainable trail construction which was designed to pull the recreation corridor off a low lying road that is always wet. This newer construction was performed by SORBA with a machine doing the initial work and volunteers doing finish work behind. These two sections of trail are well anchored with interesting trees near the tread and incorporate rolling contour design with frequent undulations to shed water.



These particular segments of Trail 223L and 223M represents textbook sustainable trail design and construction. The trail is well anchored with interesting trees, is out-sloped, has undulations to effectively shed water, and has conservative grades to withstand user impacts.

The first 100 yards of where Trail 223L takes-off from its intersection with FDR 77 contains a steep gradient that needs to be rock armored and more aggressively drained to be made sustainable.

(See Photo to Right)



Beginning at its intersection with the Jones Creek Dam Trail 223E, the Nimblewill Branch C Trail 223L heads in a southerly direction on an old road-bed for approximately one-mile. After the first half-mile, the use splits with bikers only on the Nimblewill Branch C Spur Trail 223M and horses/hikers only on the remaining half-mile of Trail 223L. As described earlier, C Spur Trail 223M consists of textbook sustainable trail design and construction. The last half-mile of Trail 223L, however, is co-located with FDR 28C. The inventoried road terminates at the Nimblewill FDR 28-1. The inventoried road does not appear to be accessing anything such as wildlife clearings. It is recommended to remove the road designation and do a formal “roads-to-trail” conversion for the one-mile section between the intersection with the Jones Creek Dam Trail 223E and FDR 28-1.

There are 2 bridges on the 223L and 223M trail segments. The first bridge is located on the shared-use half of Trail 223L. Upon inspection, the bridge is in need of being removed. The boards are sagging from the heavy weight of equestrian use. It is obvious that this bridge is not being used to cross the small stream as there is a user-created trail which goes around the bridge. Equestrians typically water their horses at stream crossings, and by doing so, create an area of impact adjacent to bridges. The recommendation is to remove this bridge and construct a shallow stream ford to protect the stream from additional user impacts.



Left and Above: Nimblewill Branch C Spur Trail 223M is designated as bikers only.



Above: The last half-mile of Nimblewill Branch C Trail 223L is co-located with FDR 28C between its intersection with Trail 223M and FDR 28-1.



Above: The first bridge is located on the shared-use half of Trail 223L.

Right: The second bridge is located on the bike only section of the C Spur Trail 223M.

The second bridge is located on the bike only section of the Nimblewill Branch C Spur Trail 223M. Inspection of this bridge deemed it to be in great condition.



**Trail 223N – Black Branch Trail (3.89 miles) and
Trail 223O – Black Branch Connector (0.12 miles)
Also inventoried as Black Branch Rd - FDR 28-G and Upper Nimblewill Rd - FDR 28-F**

The eastern half of this loop is co-inventoried as Black Branch Rd - FDR 28G (open rd) and the western half of the loop is co-inventoried as Upper Nimblewill Rd - FDR 28F (closed rd). The signage in the field, however, is flip-flopped, with the eastern half signed as FDR 28F (closed with a permanent barricade) and the western half signed as FDR 28G (open rd). This data error needs to be updated within the roads inventory, and is correctly depicted both within the text and maps for this Trail Plan. Both of these roads (FDR 28F & FDR 28G) would make a perfect candidate for



The signage in the field is flip-flopped, with the western half signed as FDR 28G (open road).

a formal “roads-to-trail” conversion. The inventory should not have dual designations as both a road and a trail. The recommendation is to remove the road designation and leave them coded only as trails.



Flip-flopped signage on the eastern half signed as FDR 28F (closed with a permanent barricade).



The Black Branch Connector Trail 223O (Photo to Left) is a small 0.12 mile segment which connects from FDR 28-1 to Black Branch Trail 223N. In addition to the 223O connector trail, the Black Branch Trail 223N also takes off from the intersection of FDR 28F and FDR 28-1. This trail is a popular loop when riding within the Jake Mountain area.

The eastern half of the loop (Upper Nimblewill Rd - FDR 28F) is located on a sustainable contouring old road bed for much of its distance. There is a small creek crossing that needs armoring and a section that crosses private property.



Woody Keen (Trail Dynamics, LLC) provides an education session to USFS staff and volunteers on road-to-trail conversions.



With rock armoring, this small stream crossing will become sustainable from the impacts of equestrian traffic.



A portion of the Black Branch Trail traverses private property.



Left: There are several hazard trees located at the higher elevations of the Black Branch Trail.

The trail connects with the western half of the loop (FDR 28G) by following an old extraction route which drops elevation aggressively (at a grade greater than 35%) to cross Black Branch Creek, and then climbs aggressively to connect with FDR 28G. As was the case at Moss Creek and Jones Creek, this section of trail is referred to as a “pointless-up-and-down” (PUD) that has steep aggressive grades which descends / ascends to cross two sections of Black Branch Creek with little if any positive drainage. These steep PUD sections are experiencing erosion which is loading heavy amounts of sediment into the stream crossings. As can be expected, the stream crossings have geo-cell webbing that has failed due to not being designed to handle impacts resulting from equestrian use.

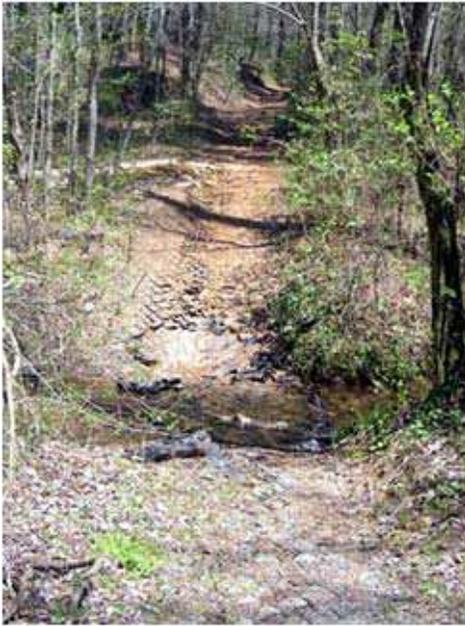
All: The Black Branch Trail contains a “pointless-up-and-down” (PUD) aggressive grade which descends / ascends to cross Black Branch in two locations. The geo-cell webbing has failed at both crossings.



The western portion (Black Branch Rd - FDR 28G) is a decent alignment for a trail and few problems currently exist. There are signs of vehicle traffic and mud bogging. The road does not appear to access anything such as wildlife clearings, and is a good candidate for a formal “roads-to-trail” conversion. The recommendation is to close approximately one-mile of trail between the private lands and the connection to FDR 28G. The geo-webbing will need to be removed from the streams, with restoration and stabilization to take place at the same time. Trail closure prescriptions are the same as previously described for the Moss Creek and Jake Mountain Trails. The resulting scar damage to the landscape at Black Branch will not be as severe as that on the Moss Creek Trail. Proposals for re-locations are illustrated on the attached maps and offer several loop options peeling off of the two inventoried roadbeds and looping back to the beginning. A direct connection between the ends of these two old roadbeds is not sustainable due to a high level of elevation loss and gain without enough landscape to achieve such. The goal is to not re-create the same problem that currently exists with a “pointless-up-and-down” (PUD) section of trail that ascends/descends to cross a stream with no positive drainage and severe sediment loading to the stream. There simply is not enough real estate or landscape available to provide mellow, sustainable grades for a trail that would withstand the impacts of heavy horse traffic. The proposed alignments will provide two loops with a net gain of trail mileage if built as proposed.



Above and Right: Signs of vehicle traffic and mud bogging in the western portion of Black Branch Rd - FDR 28G.



Above, Top Right, Middle Right and Below: Woody Keen provides an education session on the pros and cons of the different options for stream crossings. Rock armoring would provide the best material to stand-up to the heavy impacts resulting from equestrian use.



Left and Right: After crossing Black Branch Creek, the trail climbs a steep ascent to its connection with FDR 28G.



Trail 223P – No Tell Trail (2.18 miles)

The No-Tell-Trail travels in a northwest direction connecting the FDR 28-1 with FDR 77. The first mile of its alignment follows a road that historically was used for timber extraction purposes and is currently being used to access wildlife clearings. This road does not appear to be within the current GIS inventory. If it is actively being used as a road, its designation should be updated to reflect it as a road.

The grade of this road to gain the ridge is not overly steep, however, where the trail turns off and becomes a trail heading southwest; it plunges for 0.2 miles down a steep fall-line and is not sustainable. It is recommended to close this short section of trail and design/build a re-location that will provide for sustainability by contouring with the landscape rather than the current location that gains the high ridge on its way to Little Sal Mountain. The old roadbed can still be used as an access route to wildlife food plots, but this road will need to be closed to recreational traffic. Disking and seeding the 0.2 miles trail which is located on a fall-line and proposed for trail closure with an appropriate wildlife mix will reduce continued soil loss off the road due to excessive un-surfaced soil and steep gradients.



Above and Right: The first mile of No-Tell-Trail is co-located on an un-inventoried road. This road is actively used to access wildlife clearings and should be added to the roads inventory and removed from the trails inventory. The trail departs the road bed and enters forest as pictured to the right.





The southwest trail is steep fall-line and is not sustainable.

The next 0.5 miles of trail is in fair condition and contours with the landscape. It could benefit from minor trail maintenance to include additional undulations and meanders. The trail tread ends at the intersection with Nimblewill Branch Rd – FDR 28A. This intersection also marks the end of the Nimblewill Branch Trail 223K. No-Tell-Trail 223P continues for 0.75 miles in a northwest direction where it is co-located with Rd 28A. As described for the section of Trail 223K which is co-located on the first half of Rd 28A, any work on this alignment needs to come out of a roads budget and not a trails budget. Road 28A provides access to wildlife food plots and therefore it would be difficult to do a “roads-to-trail” conversion. The roads and trail inventory should not have dual designations as both a road and a trail, and it is recommended to remove the trail designation for the section that is co-located with the inventoried Nimblewill Branch Rd 28A and leave the road coded only as a road.



Section of trail in fair condition, but could benefit from minor trail maintenance to include additional undulations and meanders.



Trail tread ends at the intersection with FDR 28A.

General Management Recommendations

There is a tremendous amount of work needed to transform the Jake and Bull Mountain Trail System into a sustainable and functional trail system which meets the needs of user groups while simultaneously providing for protection of natural resources. This section provides general recommendations for managing the Jake and Bull Mountain Trail System. While this document provides a wide variety of topics and recommendations, it should be noted that there are several books and publications available which can also help trail managers with their job. Please refer to Appendix E for a list of “Trail Planning, Designing, Construction and Maintenance Reference Books and Publications.”

Trail Planning and Management Fundamentals

The US Forest Service has established five fundamental concepts for trail planning and management: **Trail Type, Trail Class, Managed Use, Designed Use, and Design Parameters**. These concepts are presented in depth and detail within Appendix F – “USFS Trail Planning and Management Fundamentals (updated 1/2004)”. Establishing Trail Management Objectives (TMOs) is a process that will guide USFS trail managers in the development of these five trail fundamentals. A trail can not be effectively managed or determinations made of what’s needed to meet standards until basic questions like these have been answered: What is the purpose of the trail? What type of use is the trail being managed for? What is the intended level of development of the trail? In the past, some trails have been managed based largely on the type or amount of use they were currently getting, without sufficient consideration of the intended use or future trends and needs. This sometimes resulted in managing a trail for a type or level of use that was not compatible with the trail management direction, design, or location. Establishing and communicating the intended TMOs for each system trail is a proactive step that prevents this from occurring.

- TMOs are fundamental building blocks for trail management.
- TMOs tier from and reflect forest plan, travel management and/or trail-specific management direction.
- TMOs synthesize and document, in one convenient place, the management intention for the trail, and provide basic reference information for subsequent trail planning, management, condition surveys, and reporting.

TMOs should be established for every trail, or trail segment when TMO variables change along the trail. Instructions and reference material for developing TMOs are provided in Appendix G.

Though most of the trails contained within the Jake and Bull Trail System are shared use, there is some level of self separation among the users. This likely has to do with available parking close

to pavement and the lack of safe roads for equestrians to drive a loaded horse trailer on a winding and narrow gravel mountain Forest Service Development Road. This natural self separation of the system helps to reduce user conflict and should continue to be encouraged in the future. Relocations and new trails should be open to both user groups, but each and every segment should have a designed and managed use that helps drive the specifications for construction.

Trails generally within the Jake Mountain side (east of FDR 77 and FDR 28-1) should be designed and managed for horses, while most new trail segments (relocations or new alignments) within the Bull Mountain side (west of FDR 77 and FDR 28-1) should be designed and managed for mountain bikes. This management strategy mirrors the USFS Trail Planning and Management Fundamentals (Appendix F) noting that such considerations should be part of the trail planning process.

Trails designed and managed for horses would have a wider trail tread, wider clearing limits and taller vertical clearing limits to better accommodate horse traffic, and should have more conservative grades recognizing the higher possible impacts of heavy horse traffic. Trails designed and managed for mountain bikes would have a tighter and more intimate feel to them, something highly desired by this user group. Suggestions for trail development specifications can be found in Appendix H "USFS Trail Design Parameters", and National Trail Management Classes can be found in Appendix I.

Trails designed and managed for equestrian use-

- Trail tread- 4-6' wide to allow safe passing of another trail user
- New construction should require running a plate compactor on all new tread
- Clearing limits- 6-8' with more clearing on uphill side of trail
- Vertical clearing limits 10' to accommodate easy head clearance of the rider
- Average trail gradient- 6-8%
- Max grade- 12% for 50 linear feet, 10% for 100 linear feet

Trails designed and managed for mountain bikes-

- Trail tread 3-4' wide but frequent choke points with rocks are suggested if possible
- Clearing limits- 6' but frequent choke points with major trees of 4' to help control speed
- Vertical clearing limits – 8' maximum
- Average trail gradient- 10-12%
- Max grade- 20% for 50 linear feet, 15% for 100 linear feet

Trails designed and managed for horses should be open to bikes but will have a more open feel.

Efforts should be made to concentrate on long and open sight lines when designing such a trail. Trails designed and managed for mountain bikes should be open to horses, though there would be a much tighter feel with some “knee knockers” and “head ducks”.

Equestrians will need a higher level of skill and comfort with their horse to be able to ride these trails. Trail design should include technical optional challenges to interest mountain bike riders of higher skill level (Technical Trail Features).



Trails designed and managed for mountain bikes can have a tighter more intimate feel, and overhead clearance is not as high as on a horse trail.

Trails versus Roads

One additional recommendation would be to call wider roads what they are, roads. Reserve the word “trail” for those travel ways that are narrower and more intimate, what most users would refer to as “single track”. A corridor may have a trail inventory number to it instead of a road inventory in the travel management plan, but could have the word Road as part of the name of the alignment. An example of this is “Old Haul Road” but this corridor could be inventoried as a trail.

Some trail users may prefer the wider road corridor width while others are seeking the narrow and intimate feel of single track trails. Providing better information to users through naming and a better signage program will help users choose better routes. A specific example of this would be an equestrian with a fairly “green” trail horse; this user may prefer the wider feel of a road until the horse gains more experience being in the woods and sharing trails with many other users.



An example of good road-to-trail conversion. The trail is forced to the outside edge making it easier to drain water off the tread. The meander of the trail also helps manage water and makes for a more interesting trail experience. One of the keys of a good road-to-trail conversion is landscaping.

The Travel Management Plan for the Chattahoochee National Forest allows for recreational travel by horses and mountain bikes on closed and gated forest roads. Because of this, there seems to be little, if any, advantage to having a dual inventory number for both a road and a trail in the same alignment (known as co-location). In some ways, this co-location inventory causes some level of confusion among trail users. This plan suggests removing the trail inventory number when overlapping with a road inventory. Any roads that are no longer needed in the Travel Management Plan as roads should be considered for de-classification and a formal “road-to-trail” conversion. “Road-to-trail” conversions place the trail-bed in the ideal location of the old road matrix and attempt to disguise much of the evidence of the old road bed. This conversion provides for better sustainability, management of water/drainage, and makes the trail more interesting for many users.

Roads to remain in the Travel Management Plan as roads will need improvements including re-grading and better shaping of roadway drainage features, and many will require surface hardening with some form of crushed stone.

Trail Names

It is suggested that the Chattahoochee National Forest re-visit the naming of the trails and work with the various stake holders to find a naming system that better reflects names that users are familiar with long before the dedication of the trail system. This would be a good opportunity for the USFS to also simplify the naming system and clean up confusion where it exists. Corridors that are to remain in the roads inventory only need a road inventory number and name.

Longer trails that form a loop should be considered to be one and the same trail instead of two trail names and inventory numbers. An example of that would be the loop formed by the Bull Mountain Trail #223 and the Saddle Back (Bear Hare) Trail #223B. A short segment dropping off of the Bull Mountain Trail to connect with West Jones Creek Rd could have a separate name and number to indicate it as a short connector trail.

Signage and Maps

Better signage combined with better maps will help users navigate the trail system and find the trail experiences and distances desired. Carsonite signs that are currently in place are a widely accepted trail marking method; however with different and better information, the signage could be much more useful to forest visitors. Suggested information to include on signs is as follows: USFS logo, blaze marking color for that section of trail, difficulty rating based on technical aspects of the trail, name of trail and USFS inventory number, and approved use types allowed on trail.

Kiosks found at trail heads and other locations within the system could be more useful with better information. It is very important to provide an upgraded map of the trail system located on the kiosk as well as some route descriptions to help users plan a trail outing. Contact information for CTHA and SORBA should also be prominently displayed on any and all kiosks.

There have been requests for color coded way-marked routes of varying length (such as a 2 hour equestrian ride). This can be difficult due to speed differentials based on a certain pace. A better suggestion is to provide better maps and route descriptions on kiosks and maps available for purchase. It is suggested that the supporting organizations work with the USFS to produce a waterproof map that could be sold at many locations where the funds raised would support on-going efforts and improvements to the trail system. A good design would include the topo map and other GIS information on the front, while the back of the map would contain descriptions of favorite routes written up by users that frequent the trail system often and know it well.

An example of such a product can be seen in the map produced by Friends of DuPont Forest in Western North Carolina. GIS information for the map would be provided by the USFS, and SORBA and CTHA could produce the map and sell it. In the case of the DuPont State Forest map, this project yields over \$10,000 per year and that amount is put directly back into the trail system. For more info, please see: <http://www.dupontforest.com/maps.asp> Annual updates with changes to the trail system provide for some planned obsolescence and regular users of the trail system will want to continue to buy the updated versions of the map to stay current.



Left: This trail marker sign contains good and important information to convey to trail users, and will help them make better trail use decisions based on provided information.

Below: A trail kiosk is the best tool for land managers to convey needed information to users about the trail system. A current map with marking indicating kiosk location is a critical aspect of any good kiosk.



Parking, Trailheads and Camping Facilities

A “Recreation Facility Analysis” would be an appropriate project for the Blue Ridge Ranger District to complete for the parking, trailheads, and campground facilities. A “Recreation Facility Analysis” is a US Forest Service analysis process, used nationally, to assist Forests in creating a sustainable program that aligns recreation sites with visitors' desires, expectations, and use. A “Recreation Facility Analysis” helps ensure that recreation sites and facilities provide the appropriate mix of opportunities within the special characteristics of each Forest, and gives recreation resource managers good information that can be used to develop a Forest level program of work.

Some of the broad observations made during the analysis of the Jake and Bull Mountain Trail System, regarding facilities, include the following:

- The Jake Mountain parking area is barely adequate to accommodate the amount of equestrian traffic the trail system is receiving. There is confusion as to whether the parking is for horse trailers only or also intended for other vehicles. Information about the intents of the parking area should be shared with forest visitors through appropriate signage. One suggested option would be to provide signage indicating what kind of parking is allowed in a certain area. For example, horse trailer parking vs. passenger car parking.
- Improved and additional parking areas should also be considered to help disperse the impacts of highly used areas, help reduce the impacts of any given trail, and help to mitigate user conflicts. Please refer to Appendix A Map 4 for proposed trailhead and day-use parking area locations. Additional parking in the form of enlarged parking or adding new areas should, however, be considered a low priority until the bulk of the needed trail work to make the system more sustainable has been completed.
- The Jake Horse Camp needs improved equestrian facilities to accommodate both the current level of use, but more important, the higher levels of use it is expected to receive. Improvements that cater to equestrians need to be planned and designed to accommodate equestrians and their horse trailers. The US Forest Service publication #0723-2816-MTDC (December 2007) “Equestrian Design Guidebook for Trails, Trailheads, and Campgrounds” should be used in the planning process. One of the authors of this guidebook, Jan Hancock, is a nationally known consultant in planning and designing equestrian facilities. The Forest should consider hiring a consultant to help with this particular project.

The Forest should plan for the future and consider that one-day the Jake Horse Camp will become a destination for equestrians from all over the country. As improvements are made to

the Jake Horse Camp, the popularity of this facility will increase, and equestrian camping will require a reservation be made for a campsite. It is very important, however, that this level of improvement only be made AFTER the current trail system is re-vamped for sustainability. If the Forest were to design an improved equestrian campground before fixing the current situation, the problems that are currently being experienced will triple within a short period of time.

- The public comments described Jones Creek Rd 877 and 877A as an area that receives a tremendous amount of use in the form of camping. This area should be included with any future recreation facility analysis for campground facilities.
- Parking areas and the horse camp area need vault toilets and better manure management to prevent biological loading of these areas. "Sweet Smelling Toilets" (SST) are fairly common at USFS trailheads and likely would cost less in the long run than the rented portable toilet which is currently present in the Jake Horse Camp area. There are numerous suppliers of vault toilets with different models available and certain styles would certainly fit the surroundings.

In addition to human waste, there needs to be better management of horse manure droppings both within the parking area and campground. With the amount of horse use this trail system is currently experiencing, and the projected increase in numbers, manure needs to be managed somewhere besides being tossed into the woods. Equestrians should be encouraged to clean up after their horses through better signage; recommendations could entail hauling off any droppings or providing manure storage areas.

Below: Better signage is needed at the Jake Mountain trailhead and Horse Camp to encourage equestrians to clean up after their horses.



Above: In addition to human waste, horse droppings can become a problem at high use equestrian trailheads and camping areas.



Above: A sample of a collection area for horse droppings as seen in DuPont State Forest.

Equestrian Impacts

To help reduce the impacts of horses, the USFS and CTHA should encourage the equestrian community to transition their horses to a barefoot lifestyle. Barefoot is not only beneficial for a horse's health, but it is also beneficial for reducing equestrian-user impacts to a trail tread. Part of this process is to host natural hoof-care clinics to educate equestrians on the benefits of going barefoot. With the Chattahoochee's location in North Georgia, there is a wealth of knowledge within close proximity. Pete Ramey, a nationally recognized leader in the barefoot community, lives in North Georgia. Pete Ramey conducts barefoot workshops all over the country. What a wonderful neighbor to have in the local equestrian community.

(Visit Pete's website at www.hoofrehab.com)

Part of the transition process is the use of hoof boots. Hoof boots greatly reduce the impacts of horse use on trails in several ways. They increase the surface area of the hoof in contact with the trail tread, this in turn decreases the PSI factor, the rubber boot is much softer than the metal



shoe, and the boot eliminates the lip of the raised shoe which has more of a digging effect when traveling.

Above: A beautiful example of a barefoot horse with a “natural trim”. This hoof will certainly have less impact as compared with a shod horse.



Above: The trend of rubber hoof boots for horses is encouraging as this greatly reduces the impacts of horse travel on trails. The displacement forces are reduced by an increased surface area (lower PSI) and because of the softer durometer of the rubber boot as compared with a shod hoof.

Weather Related Trail Closures

User groups should be encouraged to avoid the trails after periods of significant rainfall events and during the freeze/thaw cycles of winter months. Soils are more fragile when they are wet and therefore more acceptable to user impacts. However, it should be noted that well designed and constructed trails dry out much faster after a rain event as compared with wider roads. Some consideration should be given to developing an all weather loop of short distance close to the camping area. This would allow for trail use shortly after a rain event while other trails are still drying. Such a trail facility would need surfacing of crushed stone and extremely conservative grades.

Streams and Water Crossings

As new trails are developed (re-locations or altogether new alignments), protection of water ways needs to be a high priority and crossings will require good planning, design and execution. Hardened fords or armoring are preferred, though some crossings may require bridges. Protecting water as a trail crosses water corridors should be a high priority for trail managers. Trails leading to water can, however, in reality have a higher impact than the water crossing itself. A few good examples of this are the Moss Creek, Jake Mountain and Black Branch Trails.

Emphasis should be placed on good positive drainage and mellow grades when trails are leading toward water courses.

Bridges offer the greatest level of protection to water quality. When horses are in the trail user mix, however, bridges may not be appropriate. Trail horses need frequent watering and bridges do not allow for such. Often when bridges are present on trails, there is also a horse ford that allows for safe passage and watering opportunities. Proper horse fords are made of hardened materials such as layers of crushed stone or turf-stone blocks. Stepping stones can be added to fords to allow for hikers and bikers to cross without getting their feet wet. Refer to **Figure 1** and **Figure 2** for USFS Trail Drawings and Specifications of two popular styles of shallow stream ford and gully crossings – rock & log structures.

Hardening the exits and entrances into crossings can be achieved with a layering effect of different sizes of aggregates. Rip-Rap forms the first course layer and provides a very strong and stable base. If extremely wet conditions exist, consider using a layer of geo-textile to help prevent stone loss. The next layer is railroad ballast also sometimes known as surge stone. This 2-4 inch stone is applied directly on top of the rip-rap with no separating layer such as a geo-textile. This course should be 2-4 inches thick preparing for the top dressing of crusher run (ABC stone). This top layer should be 4+ inches thick and wetted and then compacted. Durable flag-stone can be used to provide a tapered effect along the outside edges of the stream channel.

Locating a good crossing, such as a ford, is important and should include shallow trail grades approaching. If the trail alignment does not allow for shallow grades entering or exiting a stream crossing, rock armoring will need to be applied in much the same way it would be prescribed for any steep section of trail tread.

Right: An example of a hybrid stream crossing project utilizing compacted stone for the approach side and more durable flag-stone armoring for a steeper exit.

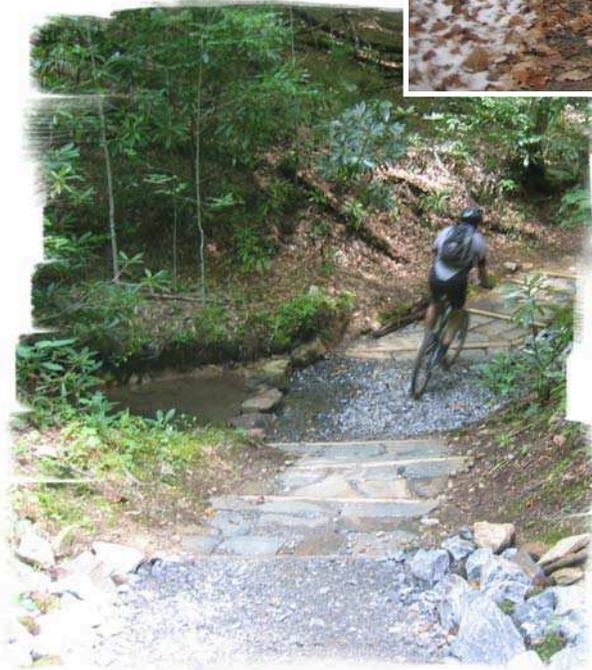




Left and Below: The same example of a hybrid stream crossing project viewed from a different angle.

Left: Flag-stone armoring is used to provide a tapered effect along the outside edges of the stream channel.

Below: View of this same armoring project after completion in the winter. Water naturally flows across the armoring.



Left: Another example of a hybrid stream crossing.

**Figure 1: USFS Trail Drawings and Specifications document
Shallow Stream Ford and Gully Crossing – Rock Structure**

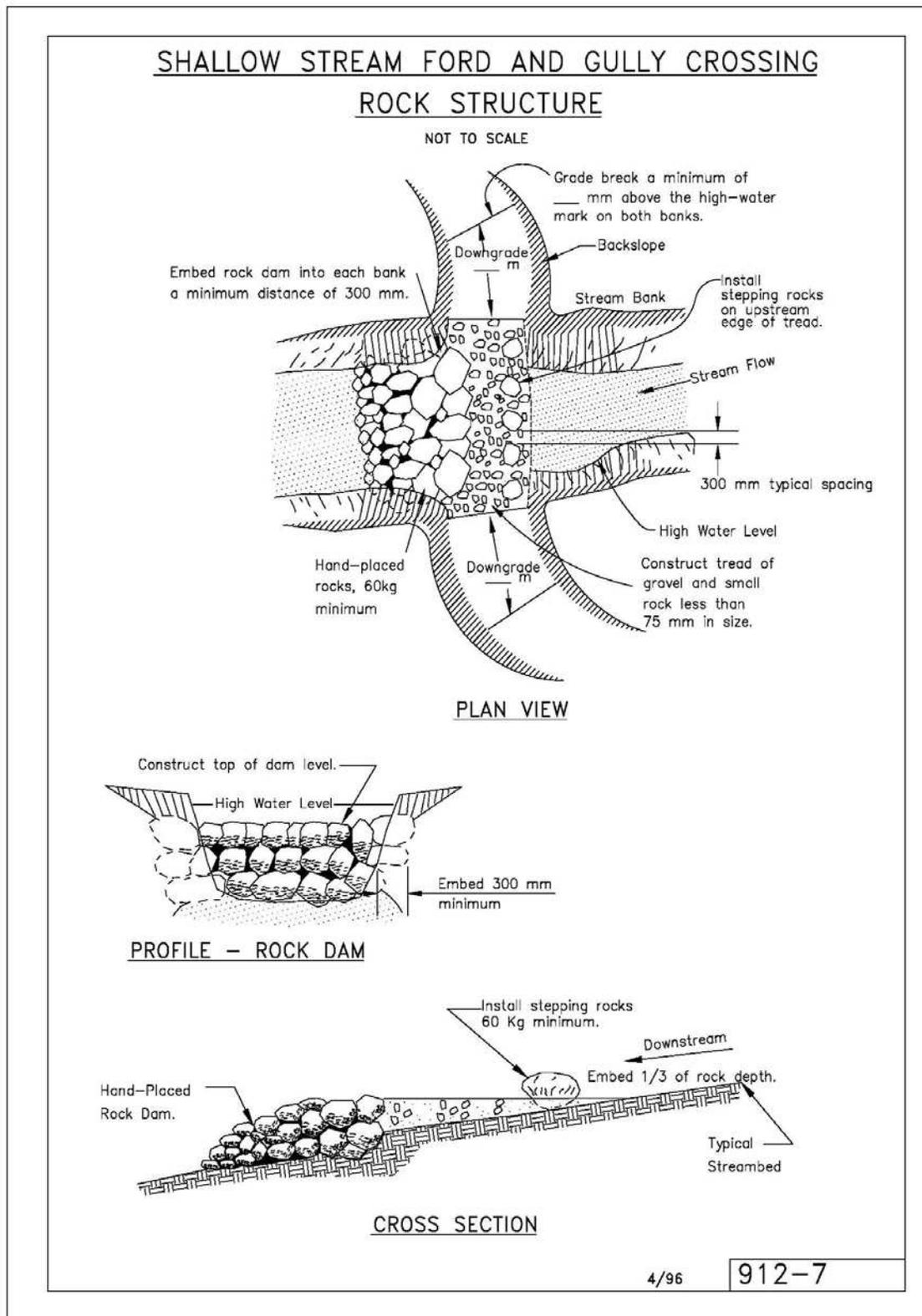
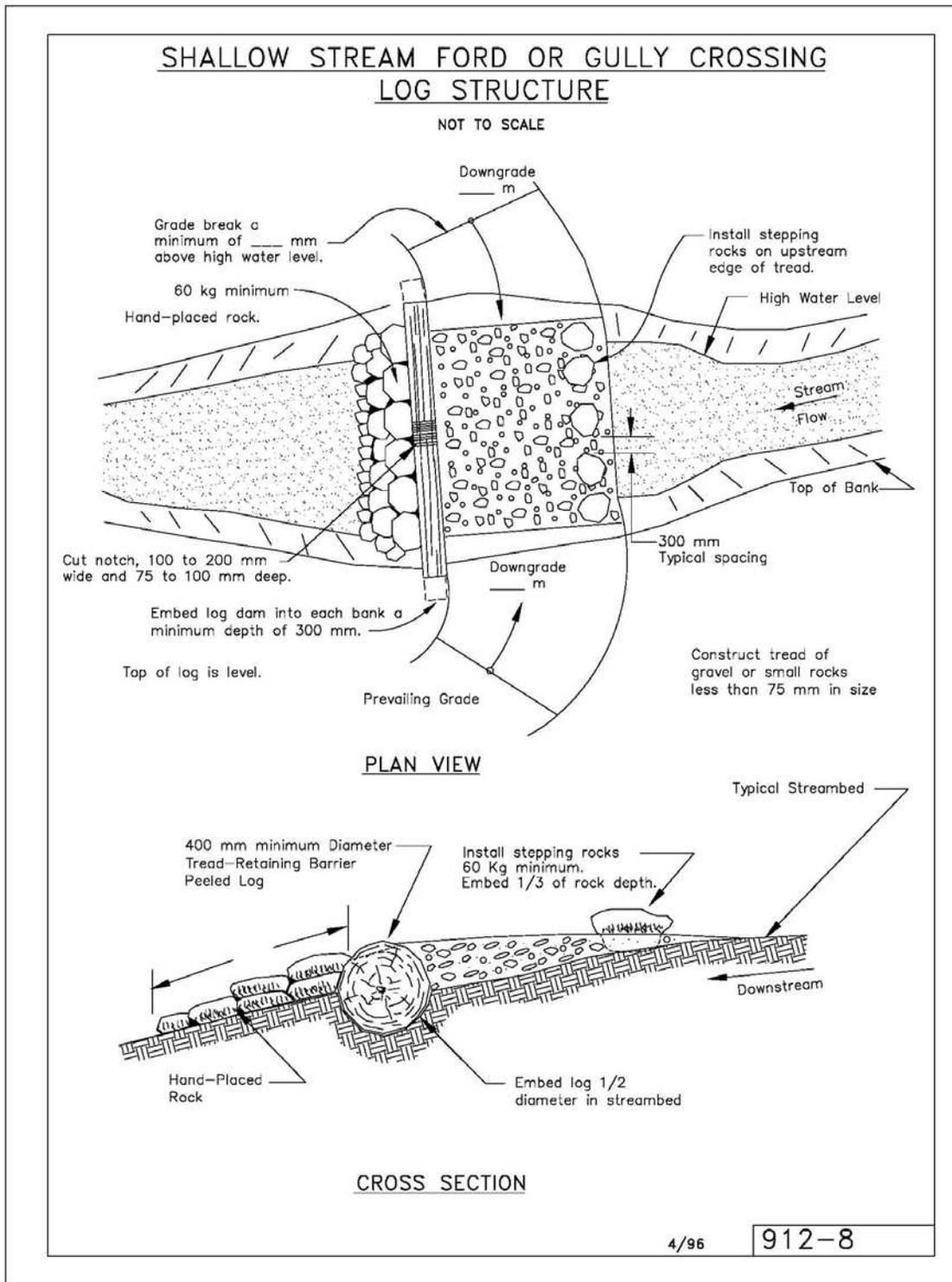


Figure 2: USFS Trail Drawings and Specifications document
Shallow Stream Ford and Gully Crossing – Log Structure



Trail Closures and New Construction

As discussed in the section on “Trail Conditions and Management Prescriptions” and “Trail Assessments”, there are many miles of trails which need re-construction and re-alignment. It is important that trail closure and re-location is conducted in a timely fashion to prevent further water quality impairment. For example, this work includes re-grading and shaping of the trail tread, establishing outslope, establishing undulations and meanders to better manage water, moving the trail to the ideal location on roadbeds, moving the trail outside of its current matrix (to the left or right of the current trail tread) to provide better drainage, etc. Table 4 provides a summary of the miles of recommended trail closures and miles of trails recommended to be removed from the current trails inventory at Jake and Bull Mountain. Table 5 provides a summary of trail closure and relocation miles. Table 6 provides a summary of trail miles which makes up the proposed ideal trail system.

Please also refer to Appendix A:

- Map 2: Trail Conditions and Management Prescriptions.
- Map 3: Trail Closures and Proposed New Trail Alignments for Relocations
- Map 4: Ideal Trail System and Proposed New Trail Alignments, including recommended locations for new trailheads and day-use parking areas.
- Map 5 depicts a combination of map 3 and map 4: Recommended Closures and the Ideal Trail System with Proposed New Trail Alignments, including recommended locations for new trailheads and day-use parking areas.
- Map 6: Current Trail System and GPS data points

Both primary user groups expressed an interest in adding additional trail mileage in the Jake and Bull system to add ride options. Such additions would help to disperse user loads, reduce use conflict, and reduce the impacts of any single trail segment. Maps provided as part of this project indicate a number of possible new trail alignments in addition to needed relocations. The new proposed trail alignments include approximately 30 miles of new trail designed and managed for mountain bikes and approximately 42 miles of new trail designed and managed for horses. As discussed in the section on “General Management Recommendations – Trail Planning and Management Fundamentals”, trails designed and managed for horses should be open to bikes but will have a more open feel, while trails designed and managed for mountain bikes should be open to horses but will have a tighter corridor with “knee-knockers”.

Proposed additional parking areas and trailheads have also been indicated on Appendix A – Map 4. Such new trail and trailhead proposals should be considered a low priority until needed relocations to problematic trails are completed and general maintenance work to salvageable alignments are made.

Table 4: Summary of Recommended Trail Closures & Trails Removed from Trails Inventory

Trail Condition	Management Prescription	Miles	% of Trail System
BAD Condition	Trail Closure	7.00	19%
BAD Condition	Trail and Road Closure	0.61	2%
Inventoried Trail and Inventoried Road (actively used)	Remove from Trails Inventory Leave coded as a road	7.50	21%
Inventoried Trail and Uninventoried Road (actively used)	Remove from Trails Inventory and Add to Roads Inventory	3.46	9%
Trail Miles to REMOVE from current Trail System		18.57	51%
Trail Miles to REMAIN in current Trail System		17.69	49%
Total Trail Miles		36.26	100%

Table 5: Summary of Trail Closure and Relocation Miles

Trail Number	Trail Name	Trail Closure Miles	New Trail Alignment / Relocation Miles
223	Bull Mountain Trail (Horse Only Segment north of 223G Spur)	0.23	0.69
223E	Jones Creek Dam Trail	2.01	1.82
223H	Jake Mountain Trail	2.45	6.40
223J	Moss Creek Trail	1.59	2.51
223K	Nimblewill Branch Trail (Marker 3K to 3F)	0.15	No Replacement
223N	Black Branch Trail	0.40	1.59
223P	No-Tell-Trail	0.17	1.5
Total Trail Miles		7.00	14.51

Table 6: Summary of Trail Miles within the Proposed Ideal Trail System

Condition	Designed & Managed Use	Miles	% of Trail System	
Existing Trail to Remain in System	Horses	7.3	8%	50 total miles 55%
New Trail Alignment to Replace Sections from Trail Closures	Horses	14.51	16%	
New Trail	Horses	27.79	31%	
Existing Trail to Remain in System	Bikes	10.4	12%	40 total miles 45%
New Trail	Bikes	30	33%	
Total Trail Miles		90	100%	

Predicting Trail Construction Costs

Predicting construction costs for trail related projects is a difficult task as there are many factors that influence construction productivity. Some of the factors include: mobilization costs for a contractor, thickness of vegetation in the trail corridor, length of the trail to be constructed or re-constructed, remoteness of the trail project, distance of the construction site to be traveled each day by the work crew, average lodging and food cost (per diem) in the area where the project is located, type of soils that have to be graded, amount of rock in soils, steepness of landscape, number of needed trail structures such as bridges and/or shallow stream fords, and more.

Another recent factor that is having a great effect on trail construction costs is the increasing cost of fuels for machines (gas and diesel).

Sustainably designed and built trails are not inexpensive. They are of course much cheaper than the cost of restoration coupled with new trail construction on a trail that was not designed and built properly. Administrative costs are another consideration in developing good contract language and managing trail construction contracts.

With a complex trail system such as the Jake and Bull Trails and proposed needed work, the financial aspects of re-building the system can be daunting. There are many needed relocation projects and most of the trail system needs some level of work in the form of general maintenance or more intensive re-construction. In the mountains of North Georgia, new trail construction is estimated to range from \$4 to \$7 per linear foot. Trail stabilization and obligation is estimated to cost as much as \$2 to \$3 per linear foot for the trails that are well below grade and will need significant grading work to shed the water off of them and prevent further erosion.

Trail re-construction and road-to-trail conversions can cost as much as new trail construction on trails (roads) that have significant design problems. Some re-construction projects move a fair bit of soil to make them sustainable. The cost range for such projects is guessed to come in between \$2 to \$5 per linear foot, noting that closed sections of a trail alignment will receive trail closure methods even if the new tread is parallel. Other trails that need less intensive work will range from \$1 to \$3 per linear foot if less work is needed. For trails that only need light to moderate maintenance, factoring in a cost per drainage feature is often the estimating tool of choice. Rolling dips often cost a range of \$50 to \$65 each when contracting with a trail professional for that work.

Trail structures are an additional expense and factored in separately when estimating the cost of any trail project. Bridges can cost as high as \$10,000 for a 20 foot span depending on the design and specifications of that bridge (abutments, width, over all bridge strength, and railing detail). Shallow steam fords are much more affordable but have a cost range that varies on available and needed rock to design and build one. The location and trail distance to be traveled with needed

materials such as rock will have a great effect on the final cost of a good hardened stream crossing ford. Costs are estimated to range from \$3,000 to \$5,000 for each crossing.

It is suggested that the basic maintenance work could likely be performed by local USFS staff and trained volunteers. The Blue Ridge District has recently purchased a Ditch Witch SK-650 which is a very capable machine for the basic maintenance work and some of the easier new trail construction. The USFS should however develop a budget for training staff and volunteers to safely run this machine and perform good dirt work. Such a workshop will need to be 2-4 days and a budget to hire a trail professional with good experience in this type of training will range in cost from \$3,000 to \$5,000.

Many aspects of needed new trail construction (relocations and brand new alignments) will however go far beyond the capabilities of the SK-650 and trail volunteers or local USFS staff. Trail contractors with larger more powerful machines and a great wealth of experience will be needed on a regular basis to implement the trail plan for the Jake and Bull Trails.

There are however several ways to stretch any budget regardless of the funding source (grants, donations or internal budget). One of the often used strategies is what the industry refers to as "hybrid contracting". A "turnkey" contract is when a trail contractor does all of the needed work to complete a trail project. Because of the passion and willingness of trail users to volunteer their time, taking full advantage of that energy often involves some sort of hybrid contract. This means that professional trail contractors are hired to perform certain aspects of any given trail project, and volunteers work with the contractor to perform tasks that are needed but less technical. Examples of work that can be performed by volunteers include: corridor clearing, swamping behind a sawyer, and finish work behind trail machines. Managing the volunteers can become a large task in of itself and this can become the responsibility of the local land managing agency, a very well trained person within the volunteer group, or part of the scope of work for the trail contractor.

Hybrid trail contracts can greatly reduce the over all cost of trail contracting, but such hybrid contracts can be difficult to set up and manage. Developing good contract language is vital as is working with a trail contractor with great experience in this type of arrangement.

Setting Priorities

The Jake and Bull trails form a complex system of trails, and as noted in this document, many current problems (some small and some large) exist. Setting priorities in embarking on a new trail management direction can be a daunting task for land managers responsible for implementing a trail management plan. Answering the question “Where do we start?” is perhaps the most important aspect of any trail plan. Developing trail system priorities can often be a difficult task in that there are limited resources (staff time and money for professional contracted work) but no shortage of possible trail improvement projects that are needed in a timely fashion. Additionally, there are a number of factors to be considered when performing trail project triage. Some of the important factors include (but are not limited to): natural resource impact concerns, trail user safety issues (risk management), comparing trail use information and planning projects to impact the highest number of trail users, enhancing the trail user experience thus improving visitor satisfaction, reducing use conflict issues (if they exist), increasing trail system carrying capacity through better management and development of new trail opportunities to meet increased demand, etc.

A holistic approach is recommended and when one trail project can effectively address two or more of the above listed considerations it should be ranked high in the priority matrix. Refer to **Table 7** for the **Trail Management Prescriptions Action Items Priority Matrix** tables. This prioritization was created based upon the assessment field work which took place during the week of April 13th – 20th 2008. The table was designed as a guide for USFS staff to use in collaboration with volunteers in planning the trail management prescriptions needed for the Jake and Bull Mountain trail system. As trail conditions change over-time, priorities within the matrix will shift. To compliment the priority matrix tables, a sample suggested timeline for trail improvement projects is included below. US Forest Service staff will need to review this timeline and adjust it according to available resources. The US Forest Service may be able to complete some of these projects working with or without volunteers. Some of the more difficult reconstruction and/or new trail construction projects will likely require professional help to complete. Some management prescriptions may be a lower priority, but easier to implement due to decreased levels of needed NEPA or other environmental approval processes. Authors of trail management plans can only make recommendations based on available needs at the time of trail assessments, recognizing there are many factors in deciding what project to do in what order.

Immediate:

- Develop Trail Management Objectives (TMOs) -- (Refer to Appendix F)
- Begin the process to close the Moss Creek, Jake Mountain and Black Branch Trails. Perform temporary stabilization techniques as described in this document. Develop a plan for more permanent stabilization and restoration work.
- Begin the process of designing relocations for the Moss Creek, Jake Mountain and Black Branch Trail closures. Refer to Map 3 for recommended trail closures and proposed new trail alignments for relocations. On the ground design will need to reflect the conceptual trail designs mapped in this document. New alignments need to be field verified.
- Begin needed NEPA compliance on these major trail relocations.

Fall 2008:

- Continue working on permanent trail closures and stabilization to needed corridors as identified in this plan. Consult with a trail professional with extensive experience in this type of closure and restoration work.
- Develop a training course for USFS employees and volunteers to use the newly purchased Ditch Witch SK650. Course should include: basics of machine, care and feeding, good drainage structures built with machines, safety, what to do when things go wrong, track re-installation, machine extraction from off trail and more.
- Finish trail relocation designs, field verification and required NEPA compliance
- Begin some trail work to segments needing minor/moderate maintenance work. Involve different user groups to continue to build on relationships.
- Develop a plan for funding trail construction projects. Components could include the following: RTP grants, private donations, fund raisers, local business contributions and more.
- Develop specifications for new trail construction.
- Begin process for removing sections of trail / road from the trails inventory which are co-located with actively used roads (inventoried and un-inventoried).

Winter 2008/2009:

- Begin relocation projects of Moss Creek, Jake Mountain and Black Branch Trails. These are important corridors for the equestrian community and timely completion of projects will be important.
- Work on best locations for trails on roads and begin flagging possible road to trail conversions and gaining need levels of approvals.

Spring 2009:

- Continue on relocation projects of closed trail important to equestrian loops. (Jones Creek Dam Trail 223E and Bull Mountain Trail 223 - horse only segment)
- Develop a workshop on road-to-trail conversions. Partner with SORBA, CTHA, and local land managers for workshop attendees. Contract with a trail professional who has extensive experience in this area of trail work to provide the training.
- Develop a workshop on rock armoring and train volunteers.

Short Term (1-2 years):

- Continue needed maintenance work on all trails as needed.
- Continue to work on trail relocations and road to trail conversions.

Mid term (3-5 years):

- Complete needed and prescribed work to the current trail system.
- Add new proposed trails to system adding mileage for all users.

Long Term (5-8 years):

- Continue adding new trails to complete the system.
- Plan and design additional new parking areas to increase parking and carrying capacity of system. (Refer to Appendix A - Map 4 for suggested locations)
- Plan and design improvements to the Jake Horse Camp.
- Work with volunteers to develop trail names, signage and maps for the newly designed trail system.

Table 7: Trail Management Prescriptions Action Items Priority Matrix

Priority	Trail Number	Trail Name	Trail Condition and Management Prescription	Trail Miles	
1	223J	Moss Creek Trail	BAD Condition – Trail Closure	1.59	
			New Trail Construction for Trail Relocation	2.51	
			Fair Condition – Minor to Moderate Work	0.21	
	223H	Jake Mountain Trail	BAD Condition – Trail Closure	2.45	
			New Trail Construction for Trail Relocation	6.40	
			Fair Condition – Minor to Moderate Work	0.76	
	223N	Black Branch Trail	BAD Condition – Trail Closure	0.40	
			BAD Condition – Trail and Road Closure	.61	
			New Trail Construction for Trail Relocation	1.60	
			Poor Condition – Trail Reconstruction	0.27	
			Trail co-located with Inventoried Road Road is not actively used Recommend a Roads to Trail Conversion	FDR 28F FDR 28G	1.64 0.78
			Fair Condition – Minor to Moderate Work	0.17	
	223O	Black Branch Connector Trail	Fair Condition – Minor to Moderate Work	0.12	
	223K	Nimblewill Branch Trail (Marker 3K to 3F)	BAD Condition – Trail Closure	0.15	
Fair Condition – Minor to Moderate Work			0.05		
<ul style="list-style-type: none"> • Due to resource and risk management concerns, it is the number one priority to work on trail closure and planning/design of relocations for the Moss Creek, Jake Mountain, and Black Branch Trails. • Suggested sample project timeline is described within the “Setting Priorities” section of this plan. • Nimblewill Branch Trail between Marker 3K and 3F→Closure of the 0.15 mile section to happen with other closures due to close proximity of the Jake Mountain Trail. The 0.05 mile section coded as minor/moderate work crosses a small stream – remove geotextile webbing and add rock armoring – re-classify this small section as part of the Jake Mountain Trail. • Minor/Moderate maintenance, trail reconstruction, and road-to-trail conversion work to the sections that will not be closed would take place during new trail construction for trail relocations. 					

Table 7 (cont.): Trail Management Prescriptions Action Items Priority Matrix

Priority	Trail Number	Trail Name	Trail Condition and Management Prescription	Trail Miles
2	223E	Jones Creek Dam Trail	BAD Condition – Trail Closure	2.01
			New Trail Construction for Trail Relocation	1.82
	<ul style="list-style-type: none"> • Due to resource concerns and the connection of the most popular equestrian loop trail, it is the number two priority to work on the trail closure and planning/design of relocation for the Jones Creek Dam Trail. • Addition of Day-Use area with equestrian tie-outs to take place after trail relocation. This could be included in the NEPA for the relocation of this trail section. 			
3	223	Bull Mountain Trail – Horse Only Segment north of Bull Mountain Spur Trail 223G	BAD Condition – Trail Closure	0.23
			New Trail Construction for Trail Relocation	0.69
	Bull Mountain Trail – Marker 1C to Marker 1 (east)	Poor Condition – Trail Reconstruction	0.24	
<ul style="list-style-type: none"> • Due to resource and risk management concerns, it is the number three priority to work on trail closure and planning/design of relocation for the “Horse Only” segment of the Bull Mountain Trail. • Reconstruction of Bull Mtn Trail between Marker 1C and Marker 1 at the east end of Horse Only segment to be done at same time. This work includes rock armoring to stabilize the trail tread from further erosion. • Recommend building new horse only section first - then close the horse only segment. DO Not temporarily divert horse traffic onto the 223G spur bike only section. 				
4	223C	Whoop-De-Dos Trail	Poor Condition– Trail Reconstruction in the form of a “roads-to-trail” conversion	0.77
	223	Bull Mountain Trail Ridge line from Marker 1 (west) to 1D	Poor Condition – Trail Reconstruction	0.53
	223G	Bull Mountain Spur Trail (West Half of Bikes Only Segment)	Poor Condition– Trail Reconstruction	0.26
	<ul style="list-style-type: none"> • Trail reconstruction and “roads-to-trail” conversion to create grade reversals, undulations and meanders. • Recommend a workshop with a trails professional to facilitate how to do correctly accomplish this type of work • Trail reconstruction work along west half of 223G is needed to create additional grade reversals, undulations and meanders. 			

Table 7 (cont.): Trail Management Prescriptions Action Items Priority Matrix

Priority	Trail Number	Trail Name	Trail Condition and Management Prescription	Trail Miles
5	223F	Bull Mountain Connector Trail (Marker 1B to 3B)	Fair Condition – Minor to Moderate Work	2.66
	<ul style="list-style-type: none"> This section rates higher in the priority list due to its projected higher use levels associated with its connection between Jake and Bull Mountain Parking. Recommended minor work includes adding additional rolling dips to better manage water. The short sections which drop to cross roads will need rock armoring to sustain steep fall-line grades. The recommendation for the section that is currently split between horses and bikers south of the Bull Mtn Parking area is to surface harden the trail with crushed stone, add more meanders to help shed water, and/or re-align the trail onto the eastern slope with meanders and undulations. The small horses/hiker section which passes through the Bull Mountain Parking Lot and onto FDR 83 to connect back with the biker only section needs rock armoring to help prevent further erosion. 			
6	223B	Saddle Back / Bear Hare Trail	Poor Condition – Trail Reconstruction	2.57
	223	Bull Mountain Trail (Marker 1D to 1E)	Poor Condition– Trail Reconstruction in the form of a “roads-to-trail” conversion	3.14
	223A	West Jones Creek Trail (Marker 1E to crossing of Lance Creek)		0.26
	<ul style="list-style-type: none"> Trail reconstruction and “roads-to-trail” conversion to create grade reversals, undulations and meanders. Stream crossings need rock armoring. 			
7	223P	No-Tell-Trail	BAD Condition – Trail Closure	0.17
			New Trail Construction for Trail Relocation	1.5
			Fair Condition – Minor to Moderate Work	0.48
	<ul style="list-style-type: none"> Due to resource concerns, trail closure and planning/design of relocation is recommended for a small section which contains steep fall-line grades at the No-Tell-Trail. Minor/Moderate work to create grade reversals, undulations and meanders to the sections that will not be closed and that are no co-located with a road would take place during new trail construction for trail relocation. 			

Table 7 (cont.): Trail Management Prescriptions Action Items Priority Matrix

Priority	Trail Number	Trail Name	Trail Condition and Management Prescription	Trail Miles	
8	223L	Nimblewill Branch C Trail	Poor Condition– Trail Reconstruction in the form of a “roads-to-trail” conversion	Uninventoried road	0.40
				Inventoried Road FDR28C	0.53
			Fair Condition – Minor to Moderate Work		0.88
	223M	Nimblewill Branch C Spur Trail Bikes Only Section	Fair Condition – Minor to Moderate Work	0.54	
	223E	Jones Creek Dam Trail Marker 2A to 2B		0.14	
<ul style="list-style-type: none"> • Small section of Jones Creek Dam Trail between Marker 2A to 2B functions as a connector trail between FDR 77 (marker 2A) to Nimblewill Branch C Trail 223L (marker 2B). This small section of trail is somewhat steep and difficult to sustain. Improved drainage with the addition of rolling dips and some surface hardening will help if traffic patterns remain low. This small section should be reclassified as part of the Nimblewill Branch C Trail. • The first 100 yards of where Trail 223L takes-off from its intersection with FDR 77 contains a steep gradient that needs to be rock armored and more aggressively drained to be made sustainable. • The bridge located on the shared-use half of Trail 223L needs to be removed and replaced with rock armoring. The boards are sagging from the heavy weight of equestrian use. It is obvious that this bridge is not being used to cross the small stream as there is a user-created trail which goes around the bridge. • Recommended minor work includes adding additional grade reversals to better manage water. 					
9	223G	Bull Mountain Spur Trail (East Half of Bikes Only Segment)	Fair Condition – Minor to Moderate Work	0.30	
	<ul style="list-style-type: none"> • Minor/Moderate work along the east half of Spur 223G to include maintenance of existing grade reversals, and at small stream crossing rock armoring work needs to replace the small culvert. 				

Table 7 (cont.): Trail Management Prescriptions Action Items Priority Matrix

Priority	Trail Number	Trail Name	Trail Condition and Management Prescription		Trail Miles	
10	223C	Whoop-De-Dos Trail (Jones Creek In-holding)	Trail Co-Located with Un-inventoried Road (Road actively used)		2.31	
	223D	Bull Mountain Cutoff Trail (Jones Creek In-holding)			0.93	
	223E	Jones Creek Dam Trail			0.40	
	223B	Saddle Back / Bear Hare Trail			2.37	
	223P	No-Tell-Trail			0.39	
	223D, F	Bull Mountain Cutoff & Connector Trail	Trail Co-Located with Inventoried Road (Road actively used)	FDR 83	2.31	
	223F, H	Bull Mountain Connector & Jake Mtn Trail		FDR 299	0.39	
	223E	Jones Creek Dam Trail		FDR 872	0.67	
	223P	No-Tell-Trail		FDR 28A	0.78	
	223K	Nimblewill Branch Trail		FDR 28A	0.97	
	223A	West Jones Creek Trail		FDR 77A	2.37	
	<ul style="list-style-type: none"> Trails which are co-located with roads (inventoried and un-inventoried) that are actively used to access other parts of the Forest are recommended to be removed from the trails inventory. The process needs to take place to include all road segments which fit into this category at the same time. 					

Conclusion

The Jake and Bull Mountain Trail System is an extremely important system to both the equestrian and mountain bike communities. Unfortunately, many mistakes and management decisions have been made that have contributed to the seriously degraded trail conditions that currently exist. Some of these mistakes include: adopting roads as trails that did not have sustainable grades for recreational traffic, adopting old skid trails which are too steep and often running on the fall line, adopting other user created trails that lacked good planning and design, and a lack of proper on-going maintenance.

Previous management mistakes have been greatly amplified by a significant increase in use of the area. On poorly designed trails, users have an effect of loosening the soils that make up the trail tread, and these displaced soils are available to be taken away in the next rain storm. Once a trail has become below grade in a cupped fashion, the process of erosion has begun and it becomes very difficult to drain water off a trail.

A better understanding of user impacts, trail design, and good management decisions will be needed to move this trail system from its current state to one of a sustainable trail system that balances the needs of trail users by providing positive and desirable recreation experiences while simultaneously protecting the natural resources such as water quality and wildlife habitat. A good sustainable trail system that is planned, designed, constructed and maintained to current best management practices could have four times the current mileage of trail while having ½ or less of the current impacts.

The USFS will need to work closely with the user groups to make suggested improvements and additions to the trail system. Of particular interest is strengthening bonds with great organizations such as CTHA and SORBA. These groups have good basic knowledge of sustainable trail designs and additional education will only enhance this current level of knowledge and experience.

Volunteer groups and individuals, nor the USFS staff alone, can solve the many problems and challenges facing this trail system. Beyond the great partnerships, professional help will be needed in many capacities including: additional educational work, design of re-alignments and trail re-locations, and consulting on effective trail closure and stabilization.

There will be a need for significant funding from various sources to make the Jake and Bull Trail System a sustainable trail system. The current trend in USFS Trails and Recreation budgets is downward and this will make it difficult for the USFS to handle these costs. In addition to the cost

of trail construction itself, there are the additional costs of compliance with NEPA. It is unlikely that outside funding sources will fund NEPA planning, and The Blue Ridge Ranger District will subsequently need to budget for administration costs of these trail projects.

Additional funding sources will need to be secured for the construction phase of the many needed projects within the system, and one major source for such funding is the Recreational Trails Program. It is suggested the user groups will also need to be involved and engaged, getting creative with various fund raising events and programs can also help raise needed monies. There are many examples of non profit groups providing significant financial support to land managing agencies to improve and enlarge trail systems.

One creative way to stretch any funding for projects would be to use a hybrid contracting style with a professional trail contractor providing some services and volunteers working beside and behind to stretch dollars. Putting on a week long education seminar that is also geared toward a demonstration project could help to transfer knowledge and needed skills to volunteers and accomplish a valuable project such as a road-to-trail conversion.

There is a lot of work ahead for the Chattahoochee National Forest's Blue Ridge Ranger District and its partners. Having a good management plan helps sets priorities and offer insights on how and where to go with a new direction in trails management. Great trails are the combination of having a good plan, and the will and enthusiasm to implement the plan.