

D-487

Trails Rehabilitation Guide for 1999 • Environmental Assessment



GREAT SMOKY MOUNTAINS
National Park

Tennessee • North Carolina

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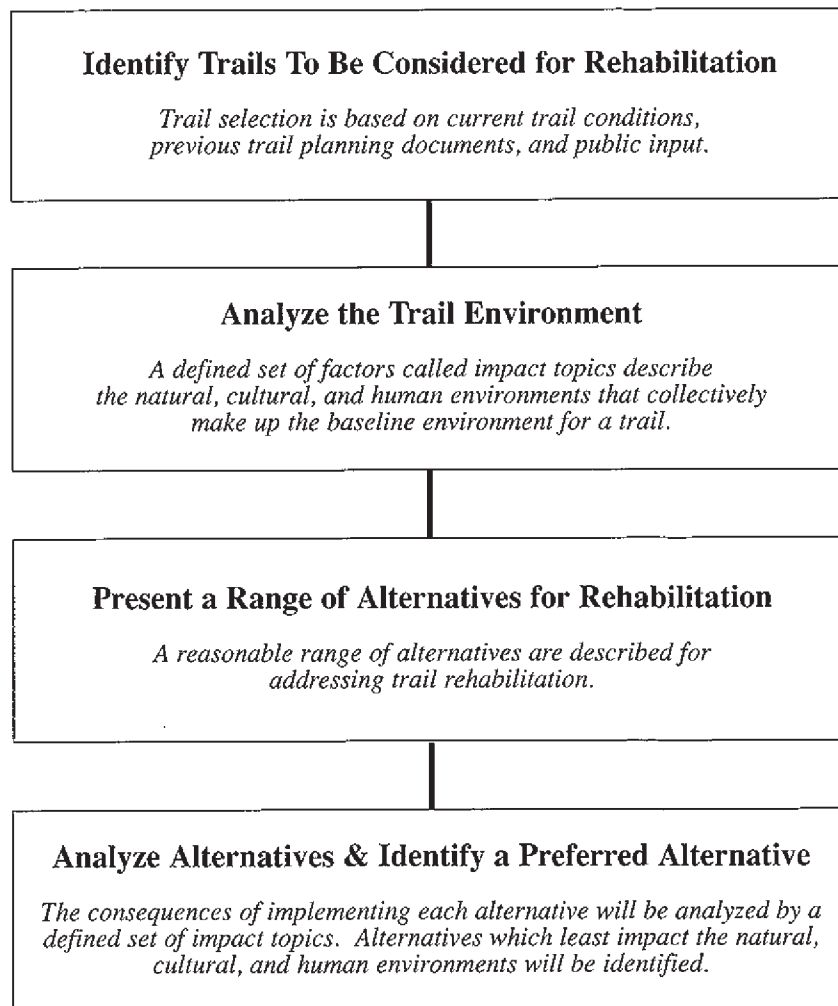
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Introduction

Purpose and Need

The purpose of the *Trail Rehabilitation Guide* is to create a framework for decision-making that will determine the appropriate actions required for rehabilitating trails identified in the 1999 trail program. The document has been prepared in accordance with the National Environmental Policy Act (NEPA) and regulations of the

Council on Environmental Quality (40 CFR 1508.9). The following flowchart summarizes the decision-making process:



Scope of Project

Great Smoky Mountains National Park will receive approximately \$746,000 for trail rehabilitation in 1999. This *Guide* will provide Park management with the needed direction to ensure the congressional appropriation is spent effectively. A total of 20 trails have been identified for rehabilitation.

To determine trail selections, previous trail studies and planning documents were reviewed to identify trails in most need of repair. In addition, trails with significant damage from recent catastrophic weather events were considered in the selection process. The guiding principle for final selections focused on trail conditions with the highest potential for adversely affecting visitor safety and Park resources. Public comments collected from two public scoping meeting held in June of 1998, provided support for the selection process and the selected trails.

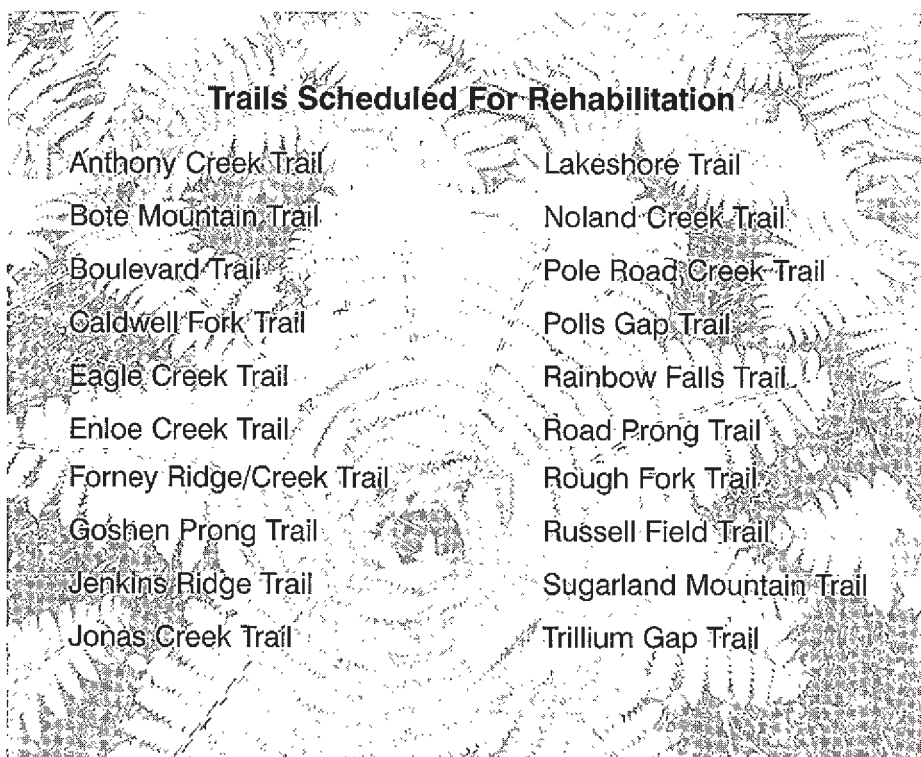
The Park's goal is to complete work on all 20 trails during the spring, summer, and fall of 1999. The Park is committed to completing the rehabilitation work utilizing the actions described in the alternatives in an efficient means. An expeditious rehabilitation effort is fundamental to ensure exposure to safety risks are minimized for both visitors and employees, and to effectively manage the visitor experience. Some

rehabilitation efforts, however, may be hampered by inclement weather and changing trail conditions which may ultimately effect the total amount of work accomplished.

Environmental Compliance

The National Environmental Policy Act of 1969 (NEPA) requires consideration of the environmental effects of proposed Federal actions. This *Guide* and Appendix provides the required environmental analysis for the identified trail rehabilitation work and serves as an Environmental Assessment.

The types of damage and the techniques used in repairing damage are common to many trails within the Park's trail system. This *Guide* focuses on the affected environment and environmental impacts that are common to all 20 identified trails. To address occasions when additional environmental circumstances exist for a specific trail, the Appendix, under separate cover, describes "trail specific" affected environment and environmental impacts. The Appendix to the *Trail Rehabilitation Guide* for 1999 is available by writing to the Superintendent, Great Smoky Mountains National Park, 107 Park Headquarters Road, Gatlinburg, TN 37738.



Previous Planning & Current Policies

Purpose and Mission of the Park

The genesis and purpose of the Great Smoky Mountains National Park was described in the 1924 report by the Southern Appalachian National Park Commission to the Secretary of the Interior. Great Smoky Mountains National Park was established "for the benefit and enjoyment of the people." This purpose was again stated by Congress in the act of May 22, 1926, that provided for the establishment of the Park. That act further defined the purpose by reference to the National Park Service Organic Act of August 35, 1916, which stated that the fundamental purpose of national parks is "to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

The commission defined its vision of the lands it was seeking for national park designation as follows:

- Mountain scenery with inspiring perspectives and delightful details.
- Areas sufficiently extensive and adaptable so that annually millions of visitors might enjoy the benefits of outdoor life and communion with nature without the confusion of overcrowding.
- A substantial part to contain forests, shrubs, and flowers, and mountain streams, with picturesque cascades and waterfall overhung with foliage, all untouched by the hand of man.

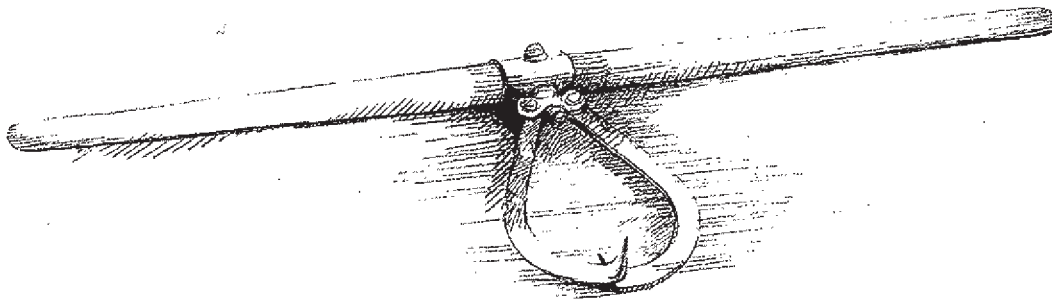
- Abundant springs and streams available for camps and fishing.
- Opportunities for protecting and developing the wildlife of the area, and the whole to be a natural museum, preserving outstanding features of the southern Appalachians as they appeared in the early pioneer days.
- Accessibility by rail and road.

The 1982 General Management Plan for the Park reflects a management direction for the trail system that supports the Commission's vision. As stated, the goal of the Park's visitor use program is to provide opportunities for resource-related activities to further visitor's appreciation of the Park's natural, cultural, and aesthetic values. The Park's trail system serves as a major facility that fosters this mission. With over 850 miles of trails in the Park, and almost 10 million visitors each year, trail usage provides a Park experience for a significant number of visitors.

Previous Planning

Several trail studies have been completed that provide guidance, document, and recommend management strategies for trails in the Smokies. The 1993 Backcountry Management Plan for the Park serves as an action plan for daily backcountry management and includes guidelines on trail construction and maintenance. The plan also suggests that a well documented process is needed for selecting actions for





maintaining, reconstructing, redesignating, or closing trails.

In 1994, the National Park Service released a final research report "An Assessment of Trail Conditions in Great Smoky Mountains National Park" (Marion 1994). This assessment covers 72 backcountry trails, characterizes the number, severity, and lineal amount of soil erosion, wet areas, and ineffective maintenance features. Results of the assessment were used as research for "A Strategic Plan for Managing Backcountry Recreation" (1995). This plan offers guidance in implementing backcountry strategies for protecting resources. Most of the plan focuses on strategies to improve the Park's trail system. Specifically, the plan addresses: 1) some of the trails/trail sections that need to be rehabilitated or relocated, 2) the nature of the work required, and 3) specific actions for modifying the existing trail system to reduce maintenance demand and improve opportunities for visitor enjoyment.

Managing for Wilderness

To a large extent, the Wilderness Act of 1966 guides the administrative decisions for the Park's backcountry and its trail network given that approximately 93% of the Park has been recommended for wilderness designation. Although formal designation has not been achieved, those areas recommended for wilderness are to be managed to protect their values as directed by National Park Service policy. Consequently, the intent of management is to preserve those lands

"in such a manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as wilderness"

The act goes further to suggest

"except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act, there shall be no temporary road, no use of motorized vehicles, motorized equipment or motorized boats, no landing or aircraft, no other form of mechanical transport, and no structure or installation within any such area"

The act makes clear that use of motorized or mechanized equipment is inappropriate for certain purposes such as recreation, but such equipment is appropriate for administrative purposes in certain circumstances. In those circumstances, a standard of applying the minimum tool to preserve the character and content of the wilderness area is the guiding principle. Selecting the minimum tool requires judgement. If a particular tool is the minimum necessary to rehabilitate or protect wilderness values and any effects can be offset that might alter the area's character, then that tool is appropriate even if it is mechanized or motorized. In a national park, administrative discretion for such decisions resides with the superintendent.

Administrative Actions

Historically, certain administrative actions have been exercised under the discretionary authority of the superintendent as granted under 46 CFR part 1.5. For a six week period in the spring of each year, a variance is granted whereby Park staff is able to utilize hand-held motorized tools such as chainsaws. This short window allows the Park to effectively perform routine maintenance to make trails passable to the public. Much of the routine maintenance that the Park performs is presented in the Great Smoky Mountains Trail Handbook (NPS 1997) and the Backcountry Management Plan. Routine maintenance includes windfall removal, water bar cleaning, minor bridge repair, sign replacement, rock work, minor drainage corrections, brushing and mowing.

The Trail System

Description

The Park contains about 850 miles of backcountry trails that are subject to increasing use by day hikers, backpackers, and equestrians. There are approximately 515 miles of trails maintained for equestrians and hikers, and about 335 additional miles used exclusively by hikers.

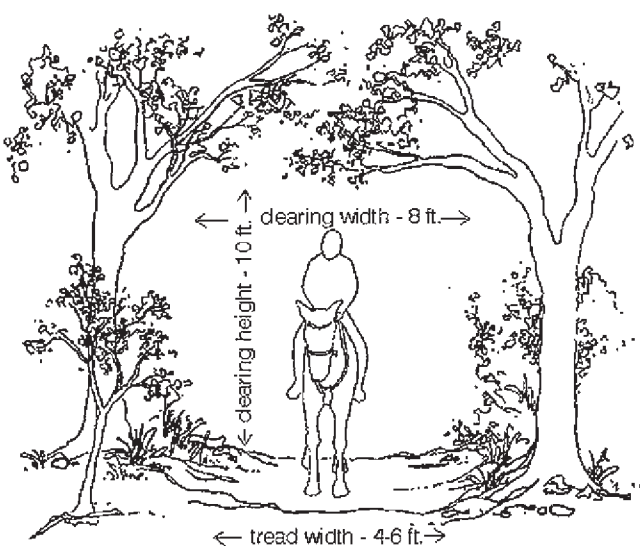
Many of the trails originated before the Park was formed and consist of old manways or historic routes that lacked proper planning and design. Many lie on excessive grades with unsuitable soils and have tread widths that are too narrow. These trails do not meet the Park's established trail standards.

Over time, visitor use has also adversely affected many trails and Park resources. As much as 400 miles of trails

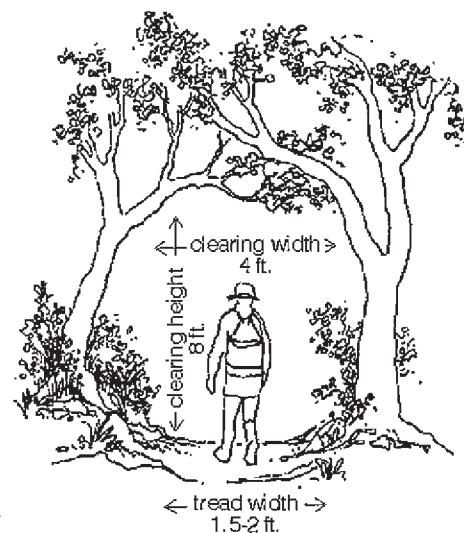
are in poor condition with several trail sections having extensive soil erosion problems, deep gullies, extensive rock and root exposure, and muddy bogs.

Weather conditions have compounded the amount of trail damage that has occurred. Since 1990 there have been numerous blizzards, a 100-year flood, and Hurricane Opal, which left debris on trails and caused trail washouts from fallen trees and landslides. As a result, Park visitors are encountering unsafe conditions, and their experience is being negatively affected as they use these trails. Concurrent with increasing trail damage, the number of Park visitors has increased while funds and resources to maintain and repair trails have decreased. Many trails or sections of trails need to be brought to established trails standards.

Trail Prism Established Trail Standards



Horse Trail



Hiking Trail

Common Types of Trail Damage

Marion (1994) assessed 72 backcountry trails, 35% of the Park's total trail mileage. That assessment identifies the most common types of trail damage as soil erosion, compaction, and wet soils. Much of the damage incurred on the Park's trail system is a result of poor drainage, inadequate trail structures, poor design or extreme weather. Specific types of trail damage are described below:

Gullies

Marion defines gullies as significant soil erosion greater than 1 foot below post-construction depth. Gullies are typically caused by improper drainage and excessive trail grades. Gullying can be caused by nonfunctioning, deteriorating, or missing water bars, trail sections without proper drainage slope, or the lack of check dams. Many gullies on steeper or poorly designed trails present a safety problem on these trails and may contribute to resource damage by removing soil around vegetation or by depositing sediment into nearby streams. Gullies may also force users out of the trail prism, where they trample vegetation and contribute to trail widening and further soil loss.

Rock and Root Exposure

Rock and root exposure is a common type of trail damage caused by erosion and compaction of soil by hikers and horses. Extensive stretches of exposed roots and rocks can create an uneven trail tread that can be unsafe for users.

Substandard Width

Many designated horse trails were never developed to horse trail standards and remain at a substandard width and clearing height. Many safety issues arise when riders are using narrow trails. The risk of accidents rises significantly when riders use a trail that traverses steep side slopes. The safety risk can be compounded by narrow stretches filled with protruding rocks and roots where horses can lose footing and fall. Passing hikers and riders on narrow trails is also problematic.

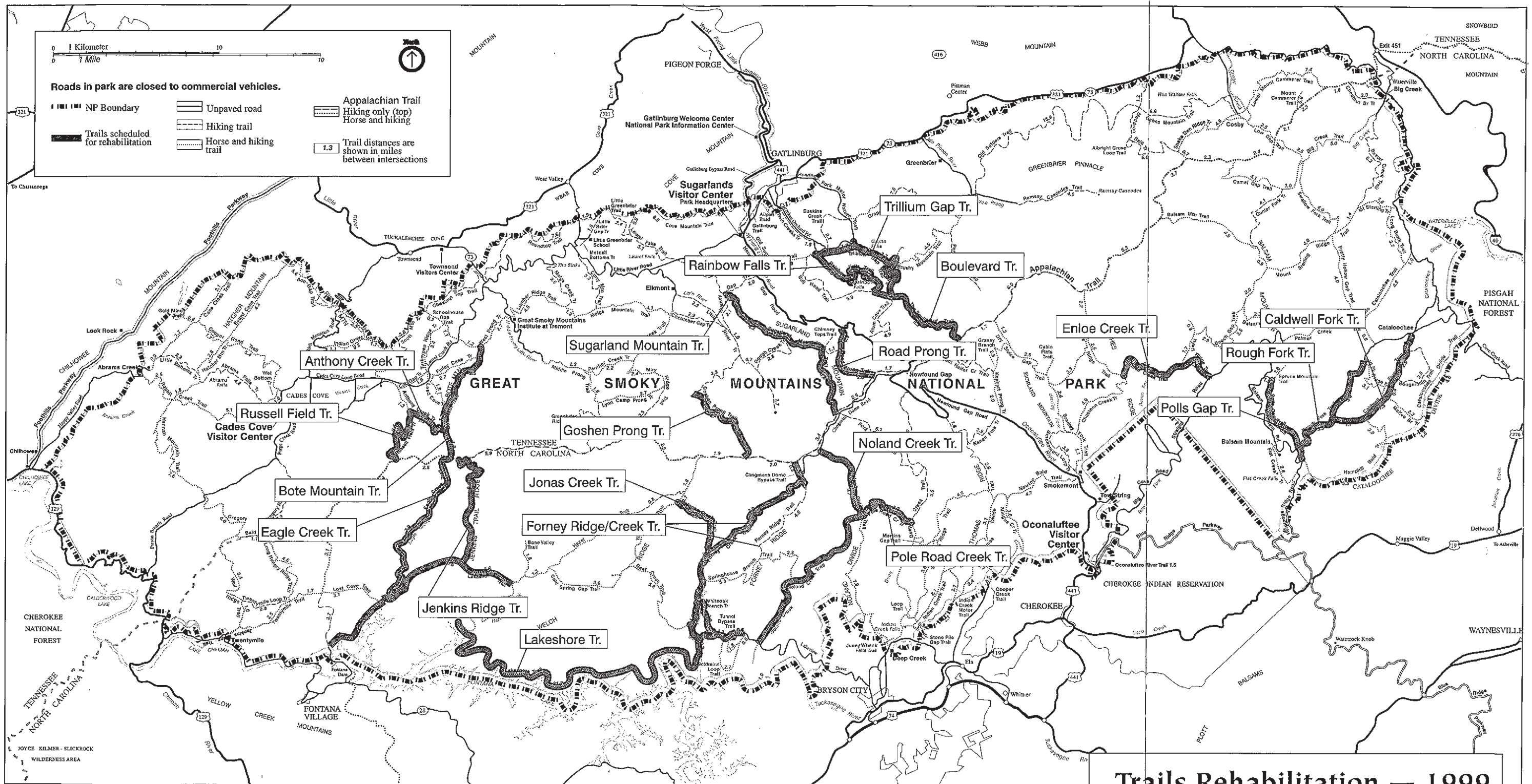
Slough and Berm

Some trails on side slopes have accumulated slough and berm. Slough is dirt, rocks, and organic material that wash downhill into the tread of the trail. Berm is the ridge of material that accumulates on the outside of the trail tread and prevents proper drainage. Water will eventually begin to run down the trail, causing erosion. Slough and berm result in the trail becoming narrower.

Bogs

Bogs, or muddy areas, are common where little direct sunlight reaches the trail or where there are flat areas that are difficult to drain. Bogs become a problem when users travel around the Bog's perimeter, trampling vegetation and creating multiple treads or trail widening.





Trails Rehabilitation — 1999
 Great Smoky Mountains National Park
 United States Department of the Interior • National Park Service
 DSC • 133 • 20174 • Jan 1999

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Describing the Environment



Understanding the trail environment is an important component of the planning process and provides an opportunity to build baseline information for natural, cultural, and human resources. This baseline environment, sometimes referred to as the affected environment, serves as the measuring stick by which rehabilitation alternatives are evaluated. The baseline environment is presented and arranged by subject topics. The topics are listed below and are selected based upon federal law, National Park Service management policies, and issues identified by the public.

- water resources
 - soils/erosion
 - vegetation
 - wildlife
 - threatened and endangered species and species of special concern
 - cultural resources (archeological and historical resources)
 - visitor use and experience
 - visitor and worker safety
-
- *wetlands*
 - *air quality*
 - *floodplains*
 - *topography*
 - *socioeconomic*
-
- *geology*
- Topics considered and determined to be categorically non-applicable to this project and/or the resource does not exist.*
- Trail specific issues relative to geology are addressed in the appendix to this guide.*

Great Smoky Mountains National Park is distinguished by its' extraordinary diversity and abundance of resources. The trails identified for this project are located throughout the Park and their collective environments also reflect this diversity. A broad description of each subject topic is presented below and intended to mirror the aggregated environments of the subject trails.

Water Resources

Many of the identified trails either run adjacent to or traverse streams in the Park. The central ridgeline of the Great Smoky Mountains is a local drainage divide. Streams in the eastern end of the Park drain into the Pigeon River. Streams in the south and west parts of the Park are tributaries of the Little Tennessee River. The north side of the Park is drained by tributaries of the Little River and the Little Pigeon River.

All of the streams in the Park are relatively small, with none draining an area of more than 200 square miles. There are 333 streams (735 miles) large enough to be classified as fishable. Springs are also common in lower elevations throughout the Park, and occasionally occur on the upper slopes and in the gaps of the mountains. Stream flow usually is lowest during late summer and early fall.

Water quality in Park streams is generally good. In most streams the water is cold, fast-flowing, slightly acidic, and low in dissolved solids. During normal and low flows the water is clear, although streams become turbid following storms. Most of the eroded material from trails end up scattered along the trails are not believed to be affecting stream water quality. It is likely, however, that small amounts of sediment from these trails end up in Park streams.

Soils

The soils in the Great Smoky Mountains vary according to their elevation and location. They are generally thin and rocky and are predominantly inceptisols that exhibit minimal horizon development. The parent materials of the primary soils are the noncalcareous shales, quartzites, and sandstones of the Ocoee series. In general, the valley bottoms of the Park have well-drained, deep soils, while the higher mountain soils are thin and rocky. The parent materials of the primary soils are the noncalcareous shales, quartzites, and sandstones of the Ocoee series. Soils in the Park have been grouped into six associations (NPS 1982).

Most of the Great Smoky Mountains is made up of the Jeffrey-Brookshire-Ditney association, which is found above 3,500 feet along the main northeast-southwest ridgeline and is underlain mainly by

coarse-grained rocks. In general the soils are loam or stony loam from the surface to bedrock. They have dark surface layers and brownish subsoils. Depth to bedrock ranges from a few inches on sharp crests to 6 or 7 feet near the bases of long slopes.

The Sylco-Ranger-Cataska association covers the second largest amount of Park soils. This association is generally found at elevations between 1,500 feet and 3,500 feet along the Park perimeter from Twenty Mile Creek in the southwest to Little Cataloochee in the northeast. These soils are mostly slaty silt loam. Depth to bedrock ranges from 5 to 6 feet at the bases of long, steep slopes to less than one foot at higher elevations. The four other soil associations (Allen-Jefferson, Sylco-Telladega, Evard-Saluda, and Porters-Edneyville-Ashe) are located around the edge of the Park and cover smaller areas.

The soils in the Park have not been adequately categorized or mapped, consequently, detailed soil information is unavailable. Soils are thought to basically follow major geology types in their characteristics. Some areas are known to have very sandy soils that are easily eroded, while others are clayey or high in organic matter, all of which will affect rehabilitation and maintenance of trails.



Vegetation

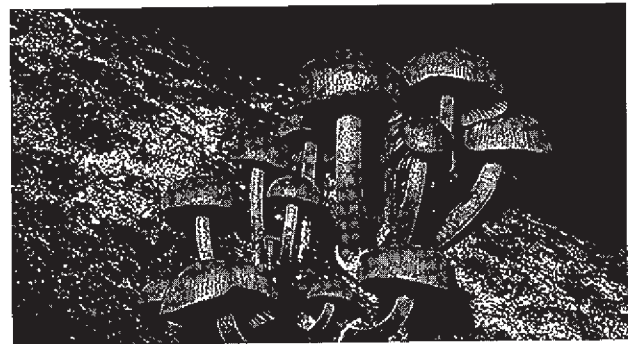
Vegetation is one of the Park's primary natural resources. Due to its topographical relief and position in the continent, Great Smoky Mountains National Park supports an enormous diversity of vegetation. Almost 95% of the Park is forested. These forests have been described as among the most diverse and complex in North America (NPS 1982). The Park has more vascular plant species than any other unit in the national park system, and the number of its nonvascular plant species rank among the highest of any area in North America north of Mexico (NPFLORA 1988 as cited in Rock and Langdon 1991). More than 1,500 species of vascular plants have been identified in the Park (including 100 native tree species), 10% of which are considered rare. Of the 1,500 species of vascular plants, over 350 are nonnative. More than 4,000 nonflowering plant species are present, including 430 species of mosses and liverworts, 2,250 species of fungi, and 302 species of lichens (NPS 1982, 1991). About 10 plant taxa, new to the Park, are discovered each year.

The Park's flora is highly representative of the Eastern Forest Biotic Province, existing in both disturbed and undisturbed ecosystems and over a wide range of elevation and aspect. The Great Smoky Mountains also contain one of the largest blocks of virgin temperate deciduous forest in North America. About 100,000 acres of virgin forest are believed to be in the Park (NPS 1991). Other forested areas in the Park are in varying successional stages, having been cut over at various times in the past. Dominant tree species in the Park's forests include red maple (*Acer rubrum*), sugar maple (*Acer saccharum*), yellow buckeye (*Aesculus octandra*), yellow birch (*Betula lutea*), hickories (*Carya* sp.), beech (*Fagus grandifolia*), red spruce (*Picea rubens*), silverbell (*Halesia carolina*), tuliptree (*Liriodendron tulipifera*), pines (*Pinus* sp.), oaks (*Quercus* sp.), white basswood (*Tilia heterophylla*), and eastern hemlock (*Tsuga canadensis*).

Eight main plant communities occur in Great Smoky Mountain National Park, of which five forest types dominate: spruce/fir forest (above 4,500 feet), northern hardwood forest (from 3,500 to 5,000 feet), cove hardwood forest (below 4,500 feet), hemlock forest (from 3,500 to 4,000 feet), and

pine-oak forest (found along dry ridges). The subject trails traverse through all of these communities.

Some of the trails are also found on heath and grassy balds. Heath balds occur on steep and exposed ridges, peaks, and points over 4,000 feet. Dense shrubs dominate these areas, including rhododendron, mountain laurel (*Kalmia latifolia*), blueberry (*Vaccinium* sp.), and sandmyrtle (*Leiophyllum buxifolium*). Grassy balds are open, largely treeless areas on rounded summits or on southwest slopes surrounded by forest. Grasses, sedges, and various other herbs dominate these meadowlands.



Wildlife

Great Smoky Mountains National Park contains a diverse number of wildlife species due to the Park's size, topography, vegetation, and human land uses. More than 60 native mammal species are known to occur in the Park, half of which are rodents. More than 230 species of birds use the Park. Thirty-nine reptilian species have been identified including six turtle species, nine lizard species, and 24 snake species.

The Park's heavy precipitation and numerous streams support a very diverse amphibian population. Forty-one amphibian species occur here, including 29 salamander species (the most diverse salamander population anywhere in the world). Three toad species and nine frog species have also been identified. Approximately 60 species of freshwater fish inhabit the streams of the region, although several of these species are nonnatives. The most important species for management and sport fishing are brook trout (*Salvelinus fontinalis*), rainbow trout (*Salmo gairdneri*), brown trout (*S. trutta*), and smallmouth bass (*Micropterus dolomieu*). Numerous species of land snails, insects, and spiders are also found in the Park.

Threatened & Endangered Species & Species of Special Concern

Common Name	Scientific Name
Spruce-fir moss spider	<i>Microhexura montivaga</i>
Rock gnome lichen	<i>Gymnoderma lineare</i>
Carolina northern flying squirrel	<i>Galucomys sabrinus coloratus</i>
Long-stalked holly	<i>Ilex collina</i>
Smoky mountain mana grass	<i>Glyceria nubigena</i>
Rugel's ragwort	<i>Rugelia nudicaulis</i>
Fraser fir	<i>Abies fraseri</i>
Mountain fetter-bush	<i>Pieris floribunda</i>
Liverwort	<i>Gymnomitrium laceratum</i>
Moss	<i>Leptohyemenium sharpii</i>

Threatened & Endangered Species & Species of Special Concern

Ten federal and state threatened and endangered species and species of special concern are found along or near 7 of 20 subject trails. The Endangered Species Act of 1973 requires examination of impacts of federal actions on federally listed threatened or endangered species. National Park Service policy also requires examination of the impacts on state-listed threatened, endangered, rare, declining, and sensitive species.

Archeological Resources

A systematic survey of archeological resources along the subject trails has been completed. No archeological resources were found during the initial site investigation. The National Park Service will consult with appropriate state historic preservation offices and the Advisory Council on Historic Preservation in advance of any undertaking that may affect archeological resources.

Historical Resources

In general, the trail system at Great Smoky Mountains National Park has had a long and varied history. The strong presence of the Cherokee and other American Indian groups in the region are well

documented. A treaty signed with the Cherokees and other tribes in 1791 opened the area for settlement, and pioneers took advantage of the heavily used Cherokee trails to disperse over the land.

Until the late 19th century, settlers engaged primarily in self-subsistence agricultural practices. They raised corn and cattle and established many of the orchards typical of the Smokies, the remains of which can still be seen today. Evidence of the extensive cattle raising is evident along some of the trails. During the last decades of the 19th century through the years after World War I, the lumber industry began to actively harvest the magnificent trees of the region. They built roads and railroads to facilitate the extraction of hundreds of thousands of board feet of timber. The remains of these roads and railroads can still be seen and provide an important component of the Park's trail system today. Another cultural legacy still evident along the trails today is the work of the Civilian Conservation Corps (CCC). Starting in 1934, for almost a decade, they built and improved many of the Park's trails. Their excellent craftsmanship is apparent in the stone work that characterizes many of the trails.

Visitor Use and Experience

Providing for visitor enjoyment is a fundamental purpose of the Park. Great Smoky Mountains

National Park is the most visited national park in the United States totaling approximately 10 million visitors annually. The Park's backcountry receives between 500,000 and 700,000 visits each year and contains approximately 850 miles of trail with 102 camping sites and 18 shelters. Backcountry-use statistical information indicated there were approximately 106,000 camper nights (one person staying one night) in 1997. Additionally, data collected during the mid 1990s suggests there are approximately 80,000 private horse rides and 421,000 day hikes annually.

There is great variation in the number of people using different trails throughout the year. Generally, the highest number of visits to the Park is during July, August, and October. The spring wildflower season, which generally occurs from March through May, is another popular time to visit the Park. In general, horseback riders tend to avoid riding during August when yellow-jackets are common and the heat is hardest on animals. Riding tends to be more popular during the spring wildflower season and the fall color season.

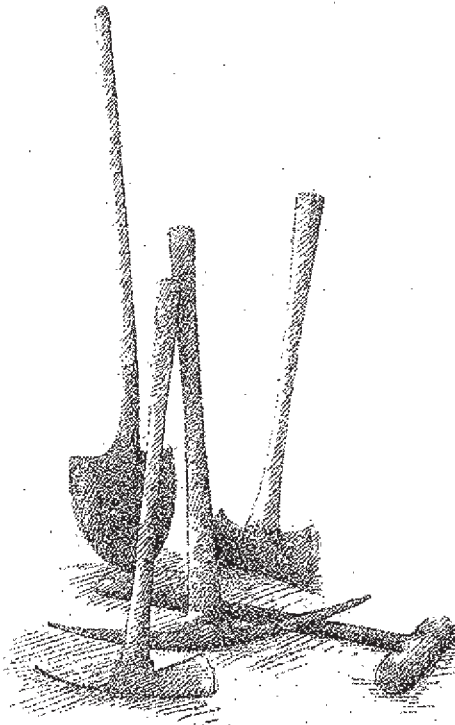
High visitor use levels in the Park's backcountry indicates the trail system is intensely utilized. The subject trails for this project include hiker only

trails and trails designated for both hikers and horse riders.

Visitor and Worker Safety

National Park Service policy requires the agency to seek to provide a safe and healthful environment for visitors and employees by removing or reducing known hazards where practicable and not detrimental to National Park Service mandates to preserve Park resources. Additionally, Park visitors must also assume a certain amount of risk and responsibility for their own safety when visiting natural areas. Current conditions on the subject trails pose varying safety hazards for Park visitors. Deeply eroded gullies, substandard trail width, steep sideslopes, and debris along trails could potentially result in accidents. The management of Great Smoky Mountains National Park is committed to addressing safety threats to visitors by applying acceptable design standards and principles for trail rehabilitation.

Employee safety regarding trail rehabilitation activities is equally important to Park management. All reasonable efforts will be taken to ensure that staff can perform maintenance activities in a safe environment.



The Alternatives

Five alternatives are presented as reasonable actions to address trail rehabilitation. The alternatives only apply to rehabilitation efforts for the trails identified in this *Guide* and are not applicable to routine trail maintenance activities on other Park trails.

Alternative I

*Continue Existing Management Practices
(No Action)*

Alternative II

*Perform Trail Repairs With Hand-Held
Nonmotorized Tools
And Hand-Held Motorized Tools*

Alternative III

*Perform Trail Repairs With Hand-Held
Nonmotorized Tools, Hand-Held Motorized Tools,
And On Selected Trail Sections
Utilizing Motorized Equipment*

Alternative IV

Redesignate Trail Use And Perform Trail Repairs

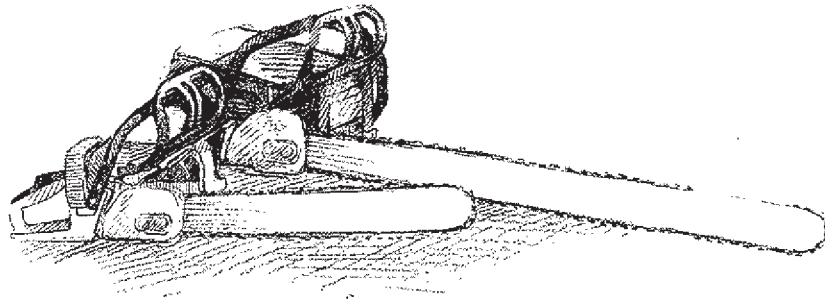
Alternative V

Close Trail And Stabilize

In general, the techniques used in repairing trail damage apply to **all** alternatives. The substantive contrast between most alternatives focuses on the various tools utilized for implementation. The techniques described below are common practices in trail rehabilitation.

Repair Techniques for Trail Damage

Technique	Description
Water Bars	Usually constructed from rock or logs and placed across a trail to divert water.
Check Dams	Logs or rocks placed across the trail to allow for resurfacing eroded trail tread.
Retaining Walls	Wood or stone structure designed to stabilize a trail bench on a cut or fill slope.
Outsloping	Trail tread graded to include a cross slope that provides for positive drainage.
Turnpiking	Elevating a trail section above a wet area by using retaining walls and placing fill.
Relocation	Utilized when a trail section becomes unusable or the resource is being significantly damaged.



Describing the Alternatives

Each alternative is described below and includes a catalog of potential tools to be used in rehabilitation efforts. The description of alternatives is followed by a discussion of *general actions* that will serve as an integral part of the work program. These actions include protection strategies for both natural and cultural resources, public notification procedures for temporary trail closures, and efforts to minimize inconveniences to trail users.

Alternative I

Continue Existing Management Practices (No Action)

Trail maintenance work will continue at current levels. No major backcountry trail repair/rehabilitation projects will be initiated. Trail work will continue primarily with hand-held nonmotorized tools such as axes, explosives, picks, pulaskis, rakes, and shovels. Hand-held motorized tools, such as chain saws, chain saw winches, and drills, can be used if necessary to clear windfalls and make trails passable during the six-week spring variance period or as approved by the Superintendent. As currently practiced, no wheeled mechanized equipment will be used to repair trails. There will be no change in type of trail use.

Alternative II

Perform Trail Repairs With Hand-Held Nonmotorized Tools And Hand-Held Motorized Tools

This alternative utilizes both nonmotorized and motorized hand-held tools throughout the year on identified trails without seasonal restrictions on the use of hand-held motorized equipment. No changes in the type of trail use will occur. Minimal trail relocations might occur. Nonmotorized hand tools include, but are not limited to the following:

Axe	Boulder Buster	Box Saw
Brush Saw	Brush Hook	Cable Jack
Draw Knife	Explosives	Files
Pick	Pole Pruner	Posthole Digger
Grub Hoe	Hammer	Mattock
Pry Bar	Pulaski	Rake
Ratchet Winch	Rope and Cable	Shears & Clipper
Shovel	Sledge Hammer	Scythe
Tamping Bar	Triangular Frame	Wedges
	Weeder	

Hand-held motorized tools will be used when it is determined the minimum tool to complete the job with the least amount of impact on resources and visitors.

Hand-held motorized tools include:

- Chain Saw
- Jackhammer (Rockhammer)
- Chain Saw Winch
- Weedeater

Alternative III

Perform Trail Repairs With Hand-Held Nonmotorized Tools, Hand-Held Motorized Tools, And On Selected Trail Sections Utilizing Motorized Equipment

Under Alternative III, hand-held nonmotorized and hand-held motorized tools (as described in Alternative II) will be used throughout the construction season to repair trails. Additionally, wheeled or tracked mechanized equipment will be used on specific trail sections when trail damage is so severe that hand-held nonmotorized and hand-held motorized tools are insufficient to make repairs. This alternative only applies to trails designated for hikers and horse use, and is not applicable to trails used solely by hikers. As required under NPS policy for proposed wilderness areas, only the minimum necessary mechanized equipment will be used to repair trails. No changes in the type of trail use will occur.

Motorized equipment includes mechanized vehicles that are propelled by a motor and not hand-held. Motorized equipment includes the following:

- All-Terrain Vehicles (Gator)
- Crew Cab & Other Vehicles (administrative roads only)
- Rock Crusher
- Bobcat Size Loader/Backhoe
- Helicopter
- Small Trail Dozer

Alternative IV

Redesignate Trail Use and Perform Trail Repairs

Some damaged horse trails do not meet the Park's horse trail standards. In many cases, these trails were never constructed to a designated standard and the rehabilitate effort required to meet approved standards is considered unreasonable due to site constraints, safety concerns, and/or obvious environmental impacts. These trails will be redesignated as hiker trails and rehabilitated to meet hiker trail standards. Repair efforts will be significantly less than required to meet horse trail standards.

Nonmotorized and motorized hand-held tools, and wheeled or tracked motorized equipment (if necessary) will be utilized to make repairs. The subject tools and equipment are listed in Alternatives II and III.

Alternative V

Close Trail And Stabilize

On rare occasions, a trail will be closed when 1) the severity of damage is such that rehabilitation is not cost-effective, or 2) major safety concerns exist due to excessive grades or unsuitable soils, or 3) sensitive resources are at risk. Required administrative procedures are set forth in 36 CFR Part 1.5 to permanently close a trail. In some cases requiring trail closure, stabilization efforts will be needed to prevent further resource damage. Nonmotorized hand-held tools, motorized hand-held tools, and wheeled equipment (if necessary) will be utilized to stabilize trails. The subject tools and equipment are listed in Alternatives II and III.

General Actions

A proposed schedule of trail work will be developed and weekly updates provided to Park staff allowing for any work or other concern to be discussed and addressed before work begins. The trail foreman and other applicable staff will monitor the work in progress to ensure appropriate measures are implemented and impacts are minimized.

Construction activities will be limited, as much as possible, to previously disturbed areas. Impact areas, not previously disturbed, will be restored at the completion of the project. Trail rehabilitation areas will be flagged by appropriate Park staff when the following conditions exist:

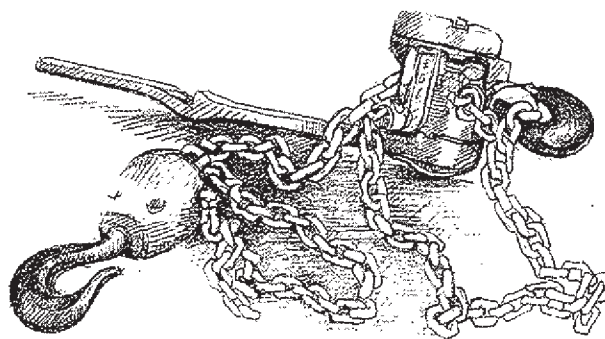
1. *Listed federal and state threatened and endangered species and species of special concern are present or are known to exist in the immediate area of the proposed work.*
2. *Cultural resources identified as being on or adjacent to the trail in areas of proposed work.*
3. *New trail construction is proposed (trail reroute).*

Wherever possible, materials generated from trail repairs (e.g., soil and rock) will be reused onsite, minimizing the need to transport materials to and remove materials from the work site. No construction materials will be left at the work site after rehabilitation is complete.

Existing campsites along trails will be used, where feasible, as staging areas for equipment, materials, and trail crew camping. This may temporary close to the public the subject camp sites for the duration of the work effort. In situations where utilization of camp sites are inappropriate, staging will occur in areas clear of surface cultural resources. If determined to be necessary, resource surveys will be conducted before locating a proposed staging area. All staging areas will be restored.

In general, work will be accomplished by completing rehabilitation efforts on a single trail prior to beginning work on other trails. This practice will reduce noise impacts, avoid repeated trail closures, minimize inconveniences to trail users, and maximize the efficiency of work. If adjoining trails within a singular drainage are scheduled for rehabilitation, work may occur concurrently, or in sequence, to lessen the impacts of repair efforts and mitigate transporting supplies, materials, equipment, and crews over long distances.

All proposed trail reroutes will be staked, marked, and mapped utilizing a global positioning system (GPS). GPS locator points (waypoints) will be used to overlay Park resource maps in an effort to identify any known natural and cultural resource concerns. It may be determined necessary by the Park resources staff to field check the area prior to construction.



Natural Resources

If motorized wheeled or tracked equipment is determined to be the minimum tool needed to rehabilitate a trail, matting will be used near areas of boulders and rocks to minimize the impacts of marks made on the rocks while transporting the equipment. Any evidence of tracks and other signs of motorized equipment will be obliterated by

such practices as raking equipment tracks and filling areas where soil has been borrowed.

Motorized wheeled or tracked equipment will not be used in areas with grades greater than 35% - 40%, in bogs, streams (although the equipment may cross streams), or in areas with a significant potential of soil erosion. Equipment may be used to address wet or boggy areas within the trail prism. Spill-proof storage containers will be kept onsite and used to prevent spills of lubricants and fuels.

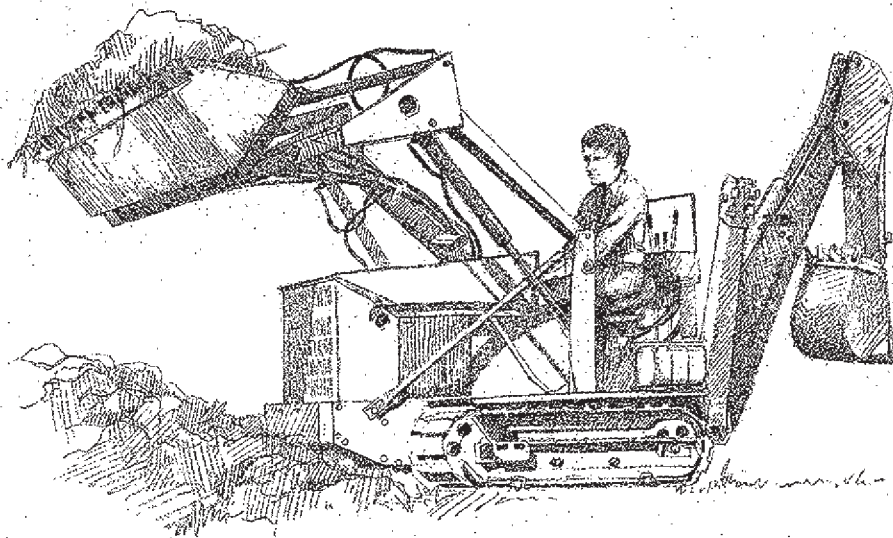
Borrow material from outside the Park may be used in some instances as sand and gravel sources. Outside sources of borrow material will be analyzed by the Park's resource staff to ensure the material is free of exotic species. Contaminated material will not be used. In some cases, borrow material may need to be extracted from inside the Park at locations adjacent to the trail work or from other areas and transported to the work site. Before any onsite borrow material is used, the location of the borrow site will be discussed with appropriate cultural and natural resource staff to determine if any significant natural or cultural resources are present. All borrow areas used within the Park will be located in areas that are not visually intrusive. All borrow areas will be restored and revegetated.

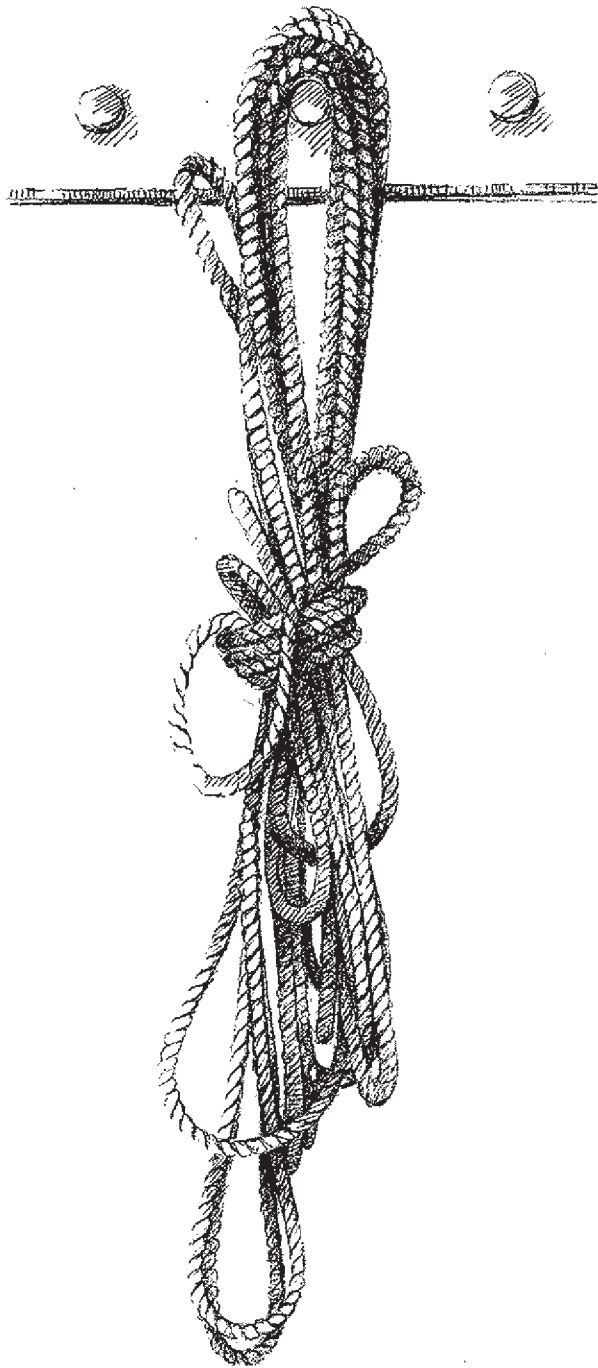
To reduce the potential for soil erosion and sedimentation during construction, sediment control measures (e.g., silt fences) will be used where applicable. Special attention will be directed to areas near or above drainages, streams, and riparian zones during and post construction.

Where applicable, sediment control will include revegetative efforts. For some trails, horses may be temporarily prohibited until sufficient time has elapsed for new soil to settle and stabilize.

Locust or other rot-resistant wood will be used for water bars and footlogs. When trail rehabilitation requires substantial amounts of wood for water bars or footlogs near documented old growth forests, the Park's resources staff will assist in identifying areas appropriate for harvesting.

In areas where motorized wheeled or tracked equipment is determined to be the minimum tool needed to rehabilitate a trail, temporary barricades, flagging, or fencing will be put in place to protect adjacent trees from damage due to equipment operations. Areas outside the trail prism or construction area will not be used for storage or stockpiling if the underlying root system will be impacted. Equipment will be parked and secured in the construction area when not in use. All tree protection materials will be removed after repair work is complete. Proper treatment, as defined by the U.S. Forest Service guidelines for tree wound repair, will be applied in the event of tree damage (buttress root is debarked or trunk wounds measure 20% or more of the total circumference of the tree). Most of the rehabilitated areas along trails will revegetate naturally, however, some areas may require additional plantings or seeding. Revegetative efforts will be monitored to ensure adequate survival rates.





In areas with known nests or dens, trail work will occur at times identified by Park biologists. Trails identified for rehabilitation will be field checked, prior to work beginning, to ensure that no federally threatened or state listed threatened or endangered or species of special concern are present. Such resources, if identified, will be flagged and mitigation measures implemented. The Park will consult with the U.S. Fish and Wildlife Service regarding the proposed construction work and possible mitigative actions (including rerouting trails if necessary) in areas where federally listed species have been identified on or immediately adjacent to the trail. The

Park will also consult with the North Carolina Wildlife Resources Commission, North Carolina Heritage Program, Tennessee Department of Environment and Conservation (Division of Natural Heritage) regarding proposed construction work and possible mitigative actions in areas where state-listed species have been identified on or immediately near trails. Park employees and work crews will be educated about the microhabitats used by federal and state listed species before working in these areas.

Cultural Resources

Known cultural resources adjacent to trails identified for rehabilitation will be flagged. An archeological survey will be required in areas scheduled for trail widening or reroutes, and when disturbance will occur on previously undisturbed ground.

Cultural landscapes are recognized by National Park Service Management Policies as one of five categories of cultural resources (together with archeological resources, structures, museum objects, and ethnographic resources) (NPS-28, Release No. 5, 1997).

NPS-28 defines cultural landscapes as settings we have created in the natural world. They reveal fundamental ties between people and the land—ties based on our need to grow food, give form to our settlements, meet requirements for recreation, and find suitable places to bury our dead. Landscapes are intertwined patterns of things both natural and constructed: plants and fences, watercourses and buildings. They range from formal gardens to cattle ranches, from cemeteries and pilgrimage routes to village squares. They are special places: expressions of human manipulation and adaptation of the land.

There will be no effect on cultural landscapes when trail repairs are performed within an existing trail prism. Work performed outside existing trail prisms in areas with known cultural resources will be evaluated on a trail-by-trail basis to determine the effects on cultural landscapes. Trail work planned outside an existing trail prism in areas with no known cultural resources will have no effect on cultural landscapes.

Visitor Experience

Noise reduction technology will be used on construction equipment (including hand-held equipment) to the maximum extent practicable. Work schedules will also be consolidated to minimize noise impacts.

Trail closures and trails that are open and under repair will be posted at trailheads. Wherever possible, alternate routes will be identified to direct visitors around work

areas. Backcountry permit offices, visitor centers, ranger stations, and the communications center will be apprised of all closures and work in progress. Up-to-date information concerning trail work will be placed on the Park's web site outlining those areas visitors may wish to avoid or get more information about. The Park's public affairs office will prepare press releases for media, local governments and user groups concerning the proposed trail work, trail closures, and campsite closures. Follow-up press releases will continue throughout the trail work season.

Work will be restricted to daylight hours when public campsites are open and within 0.25 mile of work sites. In some cases, campsites might be closed to accommodate necessary work. If closures are needed, backcountry campers requesting permits to these sites will be notified at the time permits are requested.

All possible safety measures will be employed to protect visitors when trails remain open and construction work is in progress. Measures will include using barricades, signs and short delays during blasting operations. Adequate clearances will be maintained for visitors to move around work sites safely. At the end of the workday, trails will be in a safe condition so that visitors hiking or riding along these areas will not be at risk.

Proposed Actions

The following chart illustrates the preferred action for each trail. The Appendix to this *Guide*, under separate cover, includes additional analyses and information regarding selected alternatives.

Preferred Action for Each Trail

	Alternative I	Alternative II	Alternative III	Alternative IV	Alternative V
Anthony Creek Trail			XXXXXX		
Bote Mountain Trail			XXXXXX		
Boulevard Trail		XXXXXX			
Caldwell Fork Trail			XXXXXX		
Eagle Creek Trail		XXXXXX			
Enloe Creek Trail			XXXXXX		
Forney Ridge/Creek Trail			XXXXXX		
Goshen Prong Trail		XXXXXX			
Jenkins Ridge Trail				XXXXXX	
Jonas Creek Trail			XXXXXX		
Lakeshore Trail			XXXXXX		
Noland Creek Trail			XXXXXX		
Pole Road Creek Trail			XXXXXX		
Polls Gap Trail					XXXXXX
Rainbow Falls Trail		XXXXXX			
Road Prong Trail		XXXXXX			
Rough Fork Trail			XXXXXX		
Russell Field Trail			XXXXXX		
Sugarland Mountain Trail		XXXXXX			
Trillium Gap Trail				XXXXXX	

Environmental Consequences

The following terms are used to discuss environmental consequences:

negligible impact

An impact with a low level of detection.

minor impact

A slight, but detectable impact.

moderate impact

An impact which is readily apparent.

major impact

A severe adverse impact or exceptionally beneficial impact.

short term impacts

Impacts directly associated with construction (less than one year).

long term impacts

Impacts beyond the construction period (greater than one year).

cumulative impacts

Impacts from non-project related actions affecting the same resource.

Other than routine maintenance work, no National Park Service or other federal agency actions have occurred, or are expected to occur in the foreseeable future, in or near the trails being repaired. No activities or developments outside the Park are known to be affecting trail resources, and no such actions are expected to occur in the future.

The aggregated environmental impacts for each alternative are described below. Additional information regarding trail-specific environmental analysis can be found in the Appendix to this *Guide*.

Impacts of Alternative I

Continue Existing Management Practices (No Action)

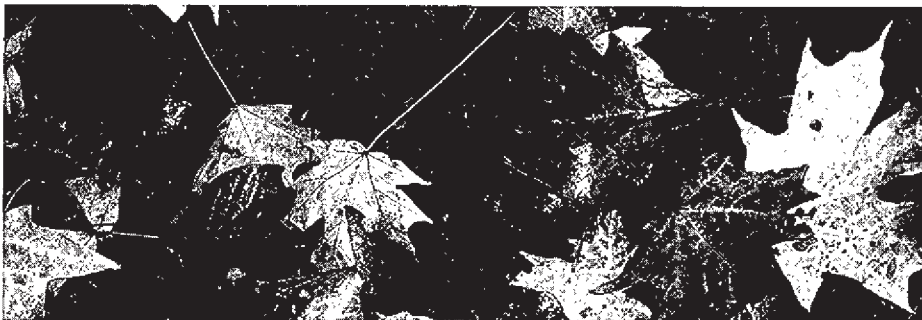
Impacts On Natural Resources

Analysis. Under this alternative, erosion problems on many trails will continue or accelerate. Most sediments will end up scattered along the trails, although some soil will continue to be carried into streams, increasing sediment loads. During major storm events, large quantities of soil could be transported from these trails into streams, temporarily increasing turbidity levels and degrading water quality.

Vegetation will continue to be trampled as visitors walk off trails to avoid rocks, fallen trees, roots, and bog areas. Similarly, on horse trails that have substandard widths, adjacent vegetation will continue to be trampled when users go off trails to avoid rocks and wet areas. Eventually multiple social trails will form wider trails and contribute to the further loss of vegetation.

Most wildlife in the vicinity of these trails are habituated to the presence of people and will be expected to stay in the area. There will be no change in the habitats, number of species, population distributions, or animal behaviors as a result of implementing this alternative.

Conclusion. Erosion will continue at current rates or accelerate with short-term negligible to moderate impacts on water quality, depending on the trail. Vegetation will continue to be lost in localized areas. The no-action alternative will have a negligible effect on wildlife along the trails. Federally or state listed species do not occur in the vicinity of most of the trails. For those trails that are known to have listed species in the area, no actions



would occur under the no-action alternative that would likely affect these species. Routine maintenance has periodically been done on the trails with no known long term impacts on federally or state listed species.

Impacts On Cultural Resources

Analysis. Identified historic resources within the trail corridors will not be disturbed by routine maintenance actions taken over time. Some loss of archeological resources might occur as a result of continued erosion if routine maintenance were not undertaken in time to correct problems.

Conclusion. Impacts to cultural resources will be negligible.

Impacts On The Human Environment

Analysis. Currently, all of the subject trails are open to visitor use. Hikers will continue to encounter exposed roots, downed trees, rocks, gullies, steep trail segments and other hazards. Equestrian experiences will be equally affected and hazardous due to erosion problems and steep grades. Substandard trail widths and clearances make passing difficult and dangerous.

Conclusion. The visitors' experience and safety will continue to be negatively affected by the existing trail conditions and impacts will be exacerbated over time.

Impacts of Alternative II Perform Trail Repairs with Hand-held Nonmotorized Tools and Hand-held Motorized Tools

Impacts On Natural Resources

Analysis. With the application of resource protection actions described under this alternative, the trail repair work will result in no impacts on water resources in the short term. In the long term, performing the proposed trail repairs should substantially reduce erosion on the trails and decrease the potential for sediments being carried down the trails into drainages. This will have a positive effect on the drainages' water quality relative to existing conditions.

Trail repair work will negatively affect soils in localized areas. The degree to which soils will be affected depends on the location on the trail. In general, repair crews will be able to use soil that has been deposited in slough and berm areas to level trails and fill in gullies, resulting in minimal soil disturbance. On high-elevation trails, where there is little soil, trail crews will crush existing rocks in the area and use as fill, which should have a negligible

effect on soils. For a few trails, where trail rerouting or widening will occur, additional soils will be displaced that will have a long term but localized impact.

Additional long term localized impacts will occur along some remote trails where work crews will need to dig small pits to obtain borrow material. In situations resulting in borrow material being brought in from sources outside the Park, the appropriate protection measures will ensure negligible impacts.

In the long term, the repair work will level trails, improve drainage, stabilize soils, and obliterate shortcuts, which will reduce soil erosion and the resulting loss of soils on the trails. Soil loss will be substantially reduced in areas of trail reroutes.

The trail construction work will result in the short term loss of some vegetation. A minor amount of vegetation will be lost in the removal of slough and berms along the trails. Borrow pits near the trails will remove minor amounts of vegetation, but plants should quickly regrow on these areas after they have been leveled and reseeded. Some trees will be cut down for turnpiking, check dams, water bars, and cribbing steep slopes along the trails.





Although the loss of individual trees would be a long-term impact, other trees should quickly regrow in the area, and with the proper selection of trees, the impact on the overall forest community will be negligible.

The trail construction work also will result in some long term, localized, negative impacts on vegetation. Rerouting a few short stretches of trails and widening trails will remove moderate amounts of vegetation. In the long term, many of the factors that contribute to vegetation loss, including visitors walking and riding off trails and soil erosion, will be eliminated or greatly reduced. As a result of stabilizing soils, leveling the trails, and correcting water runoff problems, it is expected that much less vegetation will be lost or damaged in the future compared to the no-action alternative.

No actions will be taken under this alternative that will appreciably adversely affect wildlife populations along the trails, with the exception of invertebrates that likely will be lost during soil disturbing activities. The habitats and burrows of small mammals such as mice would be permanently lost due to trail rerouting and temporarily lost due to the borrow pits. However, no actions are being proposed in areas that are known to be of special importance for nesting, breeding, or foraging, nor are there any known important migration corridors that cross the trails. With the proposed resource protection measures, including consultation with the U.S. Fish and Wildlife Service and state agencies if appropriate, the trail repair work will not likely adversely affect federal or state listed species or federal species of concern that occur along the trails being repaired.

Conclusion. This alternative will have a minor to moderate, positive, long-term impact on the water quality of drainages near the trails being repaired. The trail construction work will result in negligible negative short term impacts on soils in localized areas. In the long term, the repair work should have a positive moderate impact on most soils.

With the implementation of the proposed resource protection measures, most of the impacts from the trail repair work on vegetation would be expected to be minor and short term. In the long term, there will be both minor negative effects and moderate, localized, positive effects on vegetation along the trails.

This alternative is expected to have a negligible, short term, adverse effect on wildlife along the trails. No long term impacts on wildlife populations or habitats would be anticipated. With the proposed resource protection measures, the trail repair work proposed will not likely adversely affect federal or state listed species or federal species of concern that occur along the trails being repaired.

Impacts On Cultural Resources

Analysis. Known archeological and historic resources will be flagged prior to rehabilitation to avoid disturbance. For trail sections that will be relocated, realigned, or widened, an archeological survey will be undertaken before any construction activity. In the long term, the problems associated with the Park's trail network will be corrected sooner than in the no-action alternative, thus the potential for loss of cultural resources due to accelerated erosion, will be lessened.

Conclusion. The impacts on cultural resources associated with implementing this alternative will be negligible.

Impacts On The Human Environment

Analysis. Visitors could potentially be inconvenienced due to temporary trail closures when work is ongoing. Trail closures will only occur when work poses a significant safety risk to visitors. On trails under rehabilitation and open to the public, the visitor experience may be compromised in the short term as visitors traverse through work zones. Completion of the work as described in this alternative will significantly improve the safety of subject trails.

Conclusion. Short-term impacts on the visitor experience include noise resulting from trail rehabilitation work and temporary closures of some trail segments. Both impacts are expected to be localized and short term. In the longer term, improved trail conditions will result in a higher quality and safer experience for hikers and equestrians.

Impacts of Alternative III Perform Trail Repairs with Hand-Held Nonmotorized Tools, Hand-Held Motorized Tools, and on Selected Trail Sections Utilizing Motorized Equipment

Impacts On Natural Resources

Analysis. The impacts on natural resources for this alternative mirror those described in Alternative II and also include the consequences of utilizing motorized equipment as described below.

Transporting motorized equipment across streams will affect water quality (turbidity) for a short time. There is also a potential for negative impacts due to mishandling of fuels and lubricants, although resource protection measures described should minimize this potential. The potential positive water quality impacts from the reduction of soil erosion will be realized more quickly in this alternative, given the use of motorized equipment will result in faster completion of trail work.

There is potential for vegetation being disturbed on sideslopes in areas difficult to maneuver motorized or tracked equipment. Additionally, some vegetation is likely to be damaged or lost along narrow trails when motorized equipment is being transported to the construction sites. These actions will not result in long-term impacts.

Conclusion. This alternative will have a minor to moderate, positive, long-term impact on the water quality of drainages near the trails being repaired. The trail construction work will result in negligible negative short term impacts on soils in localized areas. In the long term, the repair work should have a positive moderate impact on most soils.

With the implementation of the proposed resource protection measures, most of the impacts from the trail repair work on vegetation would be expected to be minor and short term. In the long term, there will be both minor negative effects and moderate, localized, positive effects on vegetation along the trails.

This alternative is expected to have a negligible, short term, adverse effect on wildlife along the trails. No long term impacts on wildlife populations or habitats would

be anticipated. With the proposed resource protection measures, the trail repair work proposed will not likely adversely affect federal or state listed species or federal species of concern that occur along the trails being repaired.

Impacts On Cultural Resources

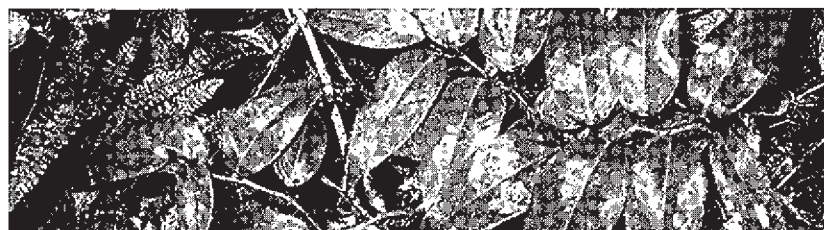
Analysis. Known archeological and historic resources will be flagged prior to rehabilitation to avoid disturbance. For trail sections that will be relocated, realigned, or widened, an archeological survey will be undertaken before any construction activity.

Conclusion. As with previous alternatives, the impacts on cultural resources will be negligible. In the long term, the problems associated with the Park's trail network will be corrected sooner than in the two previous alternatives; thus the potential for loss of cultural resources due to accelerated erosion, will be lessened.

Impacts On The Human Environment

Analysis. Visitors could potentially be inconvenienced due to temporary trail closures when work is ongoing. Trail closures will only occur when work poses a significant safety risk to visitors. The use of motorized or track equipment may increase safety concerns around work zones that results in more frequent trail closures in comparison to Alternative I or Alternative II. In general, the length of trail closures will be shorter than those described in previous alternatives. On trails under rehabilitation and open to the public, the visitor experience may be compromised in the short term as visitors traverse through work zones. Noise pollution generated from this alternative would be short term, although there is greater potential for impacts than in previous alternatives. Measures described for noise abatement should significantly reduce negative impacts. Completion of the work as described in this alternative will improve the safety of subject trails.

Conclusion. Short term impacts on the visitor experience will include noise resulting from trail rehabilitation work and closure of some trail segments for the duration of the project. Both impacts are expected to be localized and short term. In the longer term, improved trail conditions would result in a higher quality and safer experience for hikers and equestrians.



Impacts of Alternative IV

Redesignate Trail Use and Perform Trail Repairs

Impacts On Natural Resources

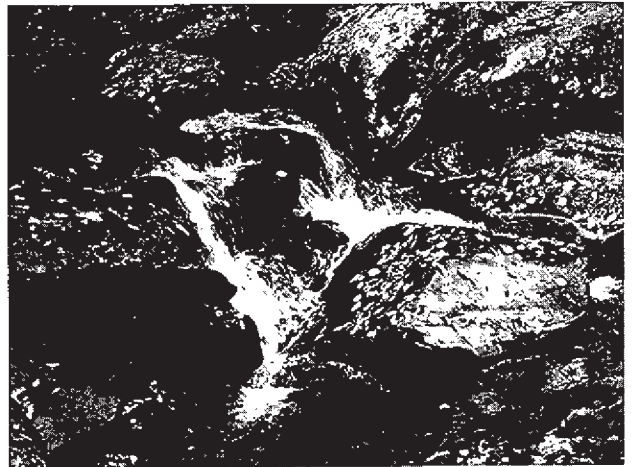
Analysis. The impacts on natural resources for this alternative are described in Alternative III, and also include the consequences resulting from changes in trail use as determined below. On trails redesignated for *hiker only*, the erosion due to horse use will be eliminated, which will considerably reduce erosion on those trails and decreasing the potential for sediments being carried down the trails into drainages. This will have a positive effect on the drainages' water quality. There will be less soil disturbance if trails are redesignated to *hiker only*, since trails will not be widened to meet horse trail standards (provided a trail did not already meet horse trail standards).

The short term impacts of trail repair work on vegetation will be the same as described in Alternatives II and Alternative III. Redesignation of trails to *hiker only* will have moderate beneficial effect by generally decreasing both the volume and intensity of use, and thus reducing erosion and the potential for vegetation being washed away.

No actions will be taken under this alternative that will appreciably adversely affect wildlife populations along the trails, with the exception of invertebrates that likely would be lost during soil disturbing activities. The habitats and burrows of small mammals such as mice would be permanently lost due to trail rerouting and temporarily lost due to the borrow pits. However, no actions are being proposed in areas that are known to be of special importance for nesting, breeding, or foraging, nor are there any known important migration corridors that cross the trails. With the proposed resource protection measures, including consultation with the U.S. Fish and Wildlife Service and state agencies if appropriate, the trail repair work will not likely adversely affect federal or state listed species or federal species of concern that occur along the trails being repaired.

Conclusion. Some localized minor to moderate negative impacts on water resources will occur if motorized equipment is used for trail repairs. From a parkwide perspective, these impacts would be minor and short term. In the long term, redesignation of trails from *hiker/horse* to *hiker only* will have a localized minor to moderate beneficial effect on water quality.

In the short term, there will likely be minor to moderate negative impacts to soils in localized areas. In the long term, redesignating *hiker/horse* trails to *hiker only* trails will have a moderate beneficial effect on the soils of individual trails.



There will be some short term, minor to moderate impacts on vegetation in localized areas due to trail repair work. In the long term, redesignations of *hiker/horse* trails to *hiker only* will have localized, moderate, positive effects on trailside vegetation.

This alternative is expected to have a negligible, short term, adverse effect on wildlife along the trails. No long-term impacts on wildlife populations or habitats would be anticipated. With the proposed resource protection measures, the trail repair work proposed will not likely adversely affect federal or state listed species or federal species of concern that occur along the trails being repaired.

Impacts On Cultural Resources

Analysis. The impacts on cultural resources (historical and archeological) will be negligible as a consequence of implementing this alternative. Known archeological and historic resources will be flagged prior to rehabilitation to avoid disturbance. As with the previous alternatives, widening, relocating, or realigning trails will require an archeological survey.

Conclusion. As with previous alternatives, the impacts on cultural resources will be negligible.

Impacts To The Human Environment

Visitors could potentially be inconvenienced due to temporary trail closures when work is ongoing. Trail closures will only occur when work poses a significant safety risk to visitors. The use of motorized or track equipment may increase safety concerns around work zones that results in more frequent trail closures in comparison to utilizing hand-held nonmotorized and hand-held motorized tools. On trails under rehabilitation and open to the public, the visitor experience may be compromised in the short term as visitors traverse through work zones. Noise pollution will be short-term, although there is greater potential for impacts when using

mechanized equipment. Measures described for noise abatement should significantly reduce negative impacts. Completion of the work will improve the safety of subject trails.

Redesignation of trails from horse/hiker to hiker only will be a moderate long term impact on equestrian users. At the same time, the experience of hikers will be enhanced due to fewer user conflicts.

Conclusion. Short term impacts on the visitor experience will include noise resulting from trail rehabilitation work and closure of some trail segments for the duration of the project. Both impacts are expected to be localized and short term. In the longer term, improved trail conditions will result in a higher quality and safer experience for hikers and equestrians. Long term minor to moderate negative impacts on equestrian users will result from redesignating trail use to hiker only.

Impacts of Alternative V

Close Trail and Stabilize

Impacts To Natural Resources

Analysis. The use of hand-held nonmotorized tools and hand-held motorized tools to stabilize soils will not affect the Park's water resources. If motorized equipment is needed to stabilize soils, some localized and minor sedimentation could occur when equipment is transported across streams. There will also be the potential for spills of fuel and lubricants (although the proposed resource protection measures will make this unlikely). In the long term, trail closures will result in substantially reduced erosion and fewer sediments being carried down the trails into drainages. This will have a positive effect on the water quality of the Park's drainages. In the long term, closing the trails will result in moderate positive effects on soils in localized areas.

Some minor short term impacts on plants will result from removing slough and berms from the sides of trails, and a negligible amount of vegetation will be lost from borrow

areas. In the long term, closing a trail will have a beneficial effect as native vegetation will likely become reestablished on the trails.

No actions will be taken under this alternative that will appreciably adversely affect wildlife populations along the trails. In the long term, closing a trail could potentially eliminate habitat fragmentation and reduce conflicts between people and wildlife.

Conclusion. Some short term, localized, minor impacts on water resources could occur if motorized equipment is used to stabilize soils. In the long term, trail closures will have a minor to moderate beneficial effect on the Park's water quality (from the reduction of erosion), depending on the miles of trail closed. This alternative will likely result in some minor, short term, localized, impacts on soils due to stabilization work. In the long term, closing trails will result in moderate positive effects on soils in localized areas.

In the long term, trail closures will have a moderate beneficial effect on vegetation in localized areas. Soil stabilization work will likely have a short term, minor adverse effect on vegetation in localized areas.

No actions would be taken under this alternative that will appreciably adversely affect wildlife populations along the trails, with the exception of invertebrates that likely will be lost during soil disturbing activities. With the proposed resource protection measures, including consultation with the U.S. Fish and Wildlife Service and state agencies if appropriate, the trail repair work will not likely adversely affect federal or state listed species or federal species of concern that occur along the trails being repaired.



Impacts On Cultural Resources

Analysis. The impacts on cultural resources (historical and archeological) will be negligible as a consequence of implementing this alternative. Known archeological and historic resources will be flagged prior to trail stabilization to avoid disturbance. There will be a long term, minor, positive impact in areas of known surface cultural resources given that the potential for vandalism will be reduced. **Conclusion.** As with previous alternatives, the impacts on cultural resources will be negligible.

Impacts To The Human Environment

Analysis. Under this alternative, visitors will no longer have access to previously opened trails. The visitor experience may be permanently lost, although, other trails within the trail system may be able to provide a similar visitor experience. Access to particular destinations or loop routes may no longer be available depending on the trail. Visitors will be less impacted by closing trails which have low visitor use and are disconnected from the trail network

Conclusion. To the extent that the trail experience cannot be replicated on other trails, the impacts of closing some trails will be major and long term for both hikers and equestrian users. The impact of construction will be less than previous alternatives considering the amount of trail work will be reduced.

Compliance with Federal & State Laws

In implementing any of the alternatives proposed in this *Guide*, the National Park Service will comply with applicable laws and executive orders, including the National Environmental Policy Act (40 CFR 1500 et seq.) and in part 516 of the U.S. Department of Interior's *Departmental Manual* (516 DM).

Potential impacts on cultural resources will be addressed under the provisions for assessing effects outlined in 36 CFR, part 800 regulations issued by the Advisory Council on Historic Preservation implementing section 106 of the National Historic Preservation Act of 1966, as amended (NHPA; 16 USC 470 et. seq.). Under the "Criteria of Effect" (36 CFR Part 800 800.9[a]), federal undertakings are considered to have an effect when they alter the character, integrity, or use of a cultural resource, or the qualities that qualify a property for listing on the National Register of Historic Places.

The Park will consult with the U.S. Fish and Wildlife Service regarding the proposed construction work and possible mitigative actions in areas where federally listed species have been identified on or immediately adjacent



to the trail. The Park will also consult with the North Carolina Wildlife Resources Commission, North Carolina Heritage Program, Tennessee Department of Environment and Conservation (Division of Natural Heritage) regarding proposed construction work and possible mitigative actions in areas where state-listed species have been identified on or immediately near trail.



Consultation and Coordination

Public Involvement

Initial scoping with the public and other interested agencies, organizations and individuals began in May of 1998. Three public meetings were conducted in the summer of 1998, as follows:

Meeting Location	Date
<i>May 30, 1998</i>	<i>Park Headquarters Gatlinburg, Tennessee</i>
<i>June 1, 1998</i>	<i>Smoky Mountain Institute at Tremont Townsend, Tennessee</i>
<i>June 2, 1998</i>	<i>Tuscola High School Waynesville, NC</i>

Approximately 100-125 stakeholders and trail users participated in these public meetings. Participants were presented with a history of trail use in Great Smoky Mountains National Park. The planning team also discussed current trail conditions, the extent of trail damage, potential methods/tools to be used in repairing trails, and the types of impacts associated with trail

rehabilitation. The Park staff presented for discussion a list of 20 trails under consideration for rehabilitation. Participants were asked to fill out a questionnaire identifying the type of tools and techniques appropriate to accomplish repair work. Additionally, comments were collected that identified protective actions needed to lessen the impacts of trail rehabilitation.

The results of the questionnaires and comments indicate that the majority of public meeting participants support rehabilitation of the identified trails by utilizing the minimum tools necessary, including wheeled or tracked motorized equipment, to complete the work. Public comments on the range of techniques/tools and the suggested protective actions are incorporated into the range of alternatives presented in this *Guide*.

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As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

Publication services were provided by the graphics staff, Resource Planning, Denver Service Center.
NPS D-487 / January 1999

