

Historic Trails

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INTRODUCTION

Trails take us to places of nature and history. They lead us through rugged terrain, exceptional scenery, places of contemplation, and cultural sites. Many contemporary trails once served as utilitarian routes for hunting, migration, communication, and trade. Individuals, organizations, and government agencies have developed recreational and heritage-related trail systems to provide access to scenic areas, as links between communities, or as alternative paths for non-vehicular travel. The resulting trails vary in length, purpose, and physical characteristics. Many are built and maintained with simple tools and extensive hand labor, containing highly-crafted works of stone, iron, and wood. Though seemingly simple, a trail's route, construction methods and materials, and inherent landscape characteristics can embody a significant chapter of American history and make it eligible for listing in the National Register of Historic Places.

Effective treatment and management of these trails requires an understanding of their historic context, design principles, and construction methods. Trail managers are often faced with questions regarding the repair of trails, especially those constructed in the late 1800s or early 1900s. Heavy use, limited funds for maintenance and other treatments, and lack of treatment guidelines have caused trail managers to seek economical materials and methods to accomplish their work, often resulting in the loss of historic features or changes in character. Management practices that fail to consider the historic value of America's trails may diminish their historic character and significance.

This *Landscape Line* describes an approach to treatment and management of historic trails that balances historical considerations with contemporary concerns. Using the methodology of the Cultural Landscape Report (CLR), this *Landscape Line* describes the process of historical research, existing conditions documentation, and analysis and evaluation for historic trails with an emphasis on developing historically informed treatment recommendations.¹ It provides an overview of federal guidelines that relate to historic trails and is supplemented with case studies from a range of historic trail treatment projects. The document focuses on treatment of the trail prism, which incorporates the trail tread, associated features and the associated corridor leading through the landscape.

In this publication, the term “historic trail” refers to a route that is currently managed for interpretive or recreational purposes and is limited to pedestrian and non-vehicular traffic (See Sidebar 1). Heritage trails accessed by automobiles and multi-use recreational trails that allow bicycles, horses, and other means of transportation besides walking have special requirements that are not addressed in this document.

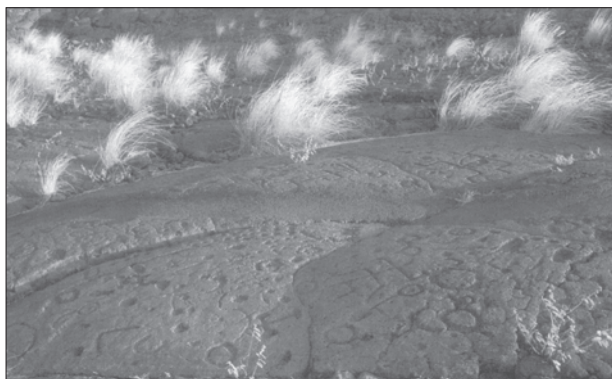


Figure 1. Trail worn into lava from centuries of foot traffic through the Waikola petroglyph field on the recently designated Ala Kahakai (Trail by the Sea) National Historic Trail. The ancient path, extending for approximately 175 miles along the coast of the island of Hawaii, has been altered in sections by natural changes such as lava flows, floods, and high surf, but also widened for horse and cart use, and later for paved roads and resort developments. (CRM, Steve Elkinton, 1997)

A BRIEF HISTORY OF AMERICA'S TRAILS

To fully understand the origin of a trail, one must trace the broad patterns, historical events, and individuals that shaped its development through time. The following brief history pertains to many trails in the United States that are now considered “historic trails.”

Native peoples, often following animal tracks, established the earliest network of overland and water trails for hunting, seasonal migration, trade, and ceremonial purposes. Footpaths often followed the most direct, flat route between waterways or through mountain passes. Routes were sometimes marked with debarked trees, rock cairns, petroglyphs, burial mounds, and objects left as spiritual offerings. A few of these trails are extant (Figure 1).

With the arrival of Europeans, some primitive trails became migration routes and were widened for carts and subsequently became roads. For example, when charting the Oregon Trail in 1812, trappers located the South Pass over the Continental Divide by following an existing Crow Indian trail. With easy grades and proximity to the upper reaches of the Platte River, the route was later followed by thousands of pioneers.

Recreational walking and mountain climbing trails, referred to as “paths,” became popular in the early nineteenth century.² American artists and writers, particularly those connected with the Hudson River School in New York, portrayed vast unspoiled landscapes as icons of a new flourishing country and often explored remote areas on foot. Public appreciation of paintings by artists such as Thomas Cole and Frederic Church prompted nature tourism as an escape from the growing industrial cities and engendered a sense of public ownership of these magnificent landscapes. Popular during the mid 1800s, the “American Grand Tour” encompassed a circuit of grand hotels, each with recreational paths, located along the Hudson River, the Catskills, Lake George, the Erie Canal, Niagara Falls, the White Mountains, and the Connecticut River Valley (Figure 2).³

This growing appreciation of landscape scenery led to a style of path development based on the “picturesque”

SIDEBAR 1: DEFINITIONS

Trail: A travel way established by construction or use for foot traffic, bicycles, wheelchairs and/or pack animals. Trails designed for motorized off-road vehicles are not emphasized in this document.

Historic trail: A trail built or in use during a significant event or historic period; associated with themes in our country's heritage (e.g., prehistory, history of commerce, communications, community planning and development, conservation, recreation, landscape architecture, engineering, military, religion, or transportation); and eligible or listed in the National Register of Historic Places.

National Historic Trail: Federally designated long-distance trails, preserved for public use and commemoration by an act of Congress. Most National Historic Trails (NHT) cross state boundaries and trace nationally significant routes such as Ala Kahakai NHT. The National Park Service administers many NHTs, while the Bureau of Land Management and Forest Service manage others. Designated trails need not be on federal land or be contiguous and can be sites and segments linked by adjacent auto tour routes.⁴ Some of these trails are associated with historic events and differ in character from the trails described in this document. The Selma to Montgomery National Historic Trail, which follows a road corridor traversed by Civil Rights advocates, is an example of this type.

National Scenic Trail: National Scenic Trails (NSTs) are long-distance trails designated for the nationally significant scenic, natural, and cultural qualities of the region through which they pass. Examples include the Appalachian National Scenic Trail and the Pacific Crest National Scenic Trail.

and “sublime.” Andrew Jackson Downing (1815-1852) suggested that garden walks lead through the landscape in an ever-changing manner, winding with easy, flowing curves to highlight picturesque landscape scenery or turning abruptly at an obstacle of dramatic interest, such as a sublime rock formation. He believed that constructed features, such as bridges, steps, seats, and shelters along a path could provide comfort, as well as enhance one's appreciation of the landscape.⁵ In the late nineteenth century, Frederick Law Olmsted, Sr. (1822-1903) laid out picturesque parks with carefully separated but intertwined pedestrian paths, bridle paths, and carriage roads with bridges and underpasses to accommodate traffic flow. Routes that encouraged contemplation were gracefully curved along the natural



*Figure 2. A short distance from New York City, the Catskills were laced with footpaths and hotels by the 1820s. Nearby lakes, waterfalls, and mountains were viewed from a network of paths, ornamented with rustic ladders and places to rest. (Engraving from *The Scenery of Catskill Mountains as Described* by Irving Cooper, 1876)*

terrain, whereas routes that encouraged social interaction were cut as broad, straight promenades.⁶ As large tracts of land were set aside for public enjoyment, the principles of Downing, Olmsted, and other influential landscape architects of the period, were often applied in the development of new road and trail circulation systems to wind through scenic landscapes, sometimes obliterating earlier more direct routes (Figure 3).

By the late 1800s, land protection and recreational hiking were firmly rooted in American politics and society. In the Northeast, hotel companies built footpaths as part of their facilities, while in the West similar hotel trails were designed for stock and pack trains into remote country. In California's Yosemite Valley, a network of tourist trails begun in the 1850s expanded as the area was protected as a state park in 1864 and later as a national park in 1890 (Figure 4).

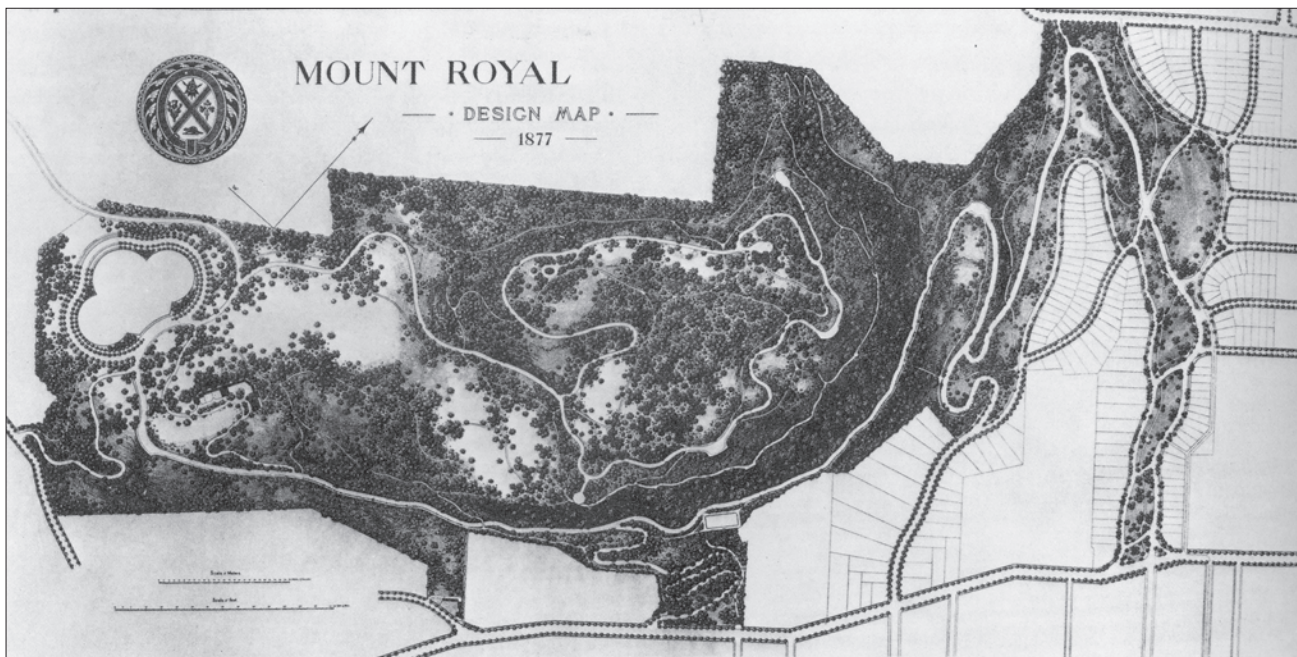


Figure 3. Plan by Frederick Law Olmsted, Sr. for Mount Royal, in Montreal, Canada, showing circulation system of carriage roads and foot paths, 1877. (Frederick Olmsted National Historic Site archives)

As railroads traversed the country, speculators and concessionaires built extensive "trail" systems as part of tourist hotel operations. Trails, such as the Grand Canyon's Bright Angel Trail in Arizona, built in 1890 by a private entrepreneur as a toll trail, received greater use after the arrival of the railroad in 1901.⁸ In Montana, the Glacier Park Hotel Company, a subsidiary of the Great Northern Railway, constructed an equestrian trail network in the 1910s to link tourist chalets and tent camps. The 163-mile trail system, consisting of three loops, earned Glacier the title of America's "Trail Park."

Economic ventures often spurred western trail development, while local village improvement societies and regional hiking clubs constructed many eastern trails. Village improvement societies, widespread throughout the Northeast after the Civil War, used membership dues and funds donated in remembrance of community members to hire local laborers for civic enhancement projects. Promoting picturesque landscape principles, attractive sidewalks, footpaths and drives became a hallmark of the village improvement movement.⁹ Walks were extended beyond villages to surrounding scenic points, symbolically linking civilization and nature (Figure 5).



Figure 4. The Nevada Falls Trail in Yosemite near Nevada Falls constructed in 1869 and 1870. Trails that ascended the valley walls were built for saddle tourism but never became roads. (NPS Historic Photo collection, Harpers Ferry Center, HFC-000532)

In more remote areas, hiking clubs formed in the 1870s and 1880s were responsible for a proliferation of new trails, guidebooks, and maps, such as those produced by the Appalachian Mountain Club. Formed in 1875, the club engaged in explorations and organized volunteers to construct trails and shelters for recre-



Figure 5. The Emery Path was built in the 1910s by the Bar Harbor Village Improvement Association on Mount Desert Island, Maine (now part of Acadia National Park), which included extensive stonework. (Acadia National Park archives, 1922)



Figure 6. Early hikers along the Long Trail in Vermont pictured in a 1927 promotional brochure published by the Central Vermont Railway. (Appalachian Trail Conference, Potomac Chapter archives)

ational use, primarily in the White Mountain Region of New Hampshire.¹⁰ Each improvement society and hiking club fostered philanthropy, volunteerism, and a land protection ethic. Their interests broadened in the early twentieth century as many organizations became effective advocacy groups for local, state, and federal land protection and recreational trail networks. In Vermont, the Green Mountain Club formed in 1910 to “make the Vermont mountains play a larger role in the life of the people.” The group established the Long Trail, a 270-mile footpath across the state (Figure 6).

While hiking clubs grew in popularity, village improvement societies waned in the early 1900s when their efforts were eclipsed by publicly funded land management agencies, professional planners, American involvement in the World Wars, and the Great Depression of the 1930s. Similarly, the railroad concessionaires and great hotels were supplanted by automobile touring and family camping.

Federal agencies such as the US Forest Service (USFS), established in 1905, and National Park Service (NPS), established in 1916, became increasingly involved in trail construction and maintenance. The USFS developed an extensive network of trails for timber harvesting and fire control, while the NPS added many trails to accommodate motorists by creating connections with



Figure 7. A rustic footbridge over Indian Creek in Yosemite Valley was designed by the NPS Landscape Division and built in 1928 with unpeeled logs, following the picturesque design principles put forth by A.J. Downing. (National Archives, Record Group 79)



Figure 8. Myron Avery (right), involved with the construction of the Appalachian Trail between 1927 and 1952, was one of several influential leaders who carried forth a grand regional vision of a foot path through “wilderness” from Maine to Georgia. Largely conceived, marked and built by volunteers, the trail required extensive coordination between regions and partnerships between public and private landowners. (Appalachian Trail Conference, Potomac Chapter archives)

parking areas, campgrounds, visitor centers, and other dispersed facilities located within designated park areas.

In the 1920s and 1930s, the NPS played an active role in the development of trail design standards and trail construction. An emphasis on master planning or development plans for parks ensured that there was an integrated network of foot trails, bridle trails, road systems, visitor facilities, and park buildings. Constructed features were to be “laid gently on the land,” so as to harmonize with the setting and native materials of the park. Wood, stone, and clay were fashioned with rustic building techniques for bridges, culverts, and retaining walls, with the avoidance of straight lines and right angles in all aspects of design.¹¹ NPS landscape architects, supervised through the NPS Landscape Division, perpetuated the nineteenth-century naturalistic design principles on a grand scale (Figure 7).

The NPS constructed two main types of trails. The first type consisted of narrow, rough trails, cut along the line of least resistance, which were to be used by park staff to monitor game animals and areas vulnerable to wildfires—similar to trails constructed on USFS lands. The second type consisted of tourist trails to lead park

visitors through attractive scenery. For these trails, the NPS aimed to construct trails four feet in width that did not exceed a fifteen percent grade.¹² By 1932, the NPS had built over 700 miles of tourist trails within 15 parks, including 216 miles in Glacier National Park and 150 miles in Sequoia National Park in California.¹³ Another type of trail, constructed in proximity to visitor facilities at the earliest national parks, were wildflower garden trails, which showcased the native flora, such as Castle Crest Wildflower Garden at Crater Lake National Park.

During the same period, private organizations coalesced to build new trails and lobby for the protection of trail corridors. The New England Trail Conference formed in 1916 to coordinate trail-making agencies and clubs; this led to the founding of similar organizations in other regions. Five years later, Benton MacKaye articulated his vision for the Appalachian Trail between Maine and Georgia, eventually leading to the formation of the Appalachian Trail Conference (ATC) in 1925. MacKaye asserted that, just as “The railway ‘opens up’ a country as a site for civilization; the trailway should ‘open up’ a country as an escape from civilization.” The ATC successfully organized land protection advocates and trail volunteers in the fourteen states along the 2,174-



Figure 9. The lookout platform at Massai Point, Chiricahua National Monument, completed by the CCC in 1935, is an example of highly crafted stone steps, stone walls, and ironwork constructed to harmonize with the natural scenery. (NPS Historic Photo Collection, Harpers Ferry Center)



Figure 10. Two views of Inspiration Point in Yellowstone National Park, showing rustic wooden overlook in 1925 and steel and concrete overlook built in 1956 as part of the Mission 66 program. The Mission 66 program, established to bring the National Parks into the modern age, funded the construction of modern roads, trails, utilities, camp and picnic grounds, and many kinds of structures needed for public use or administration to meet the requirements of an expected 80 million visitors by 1966. (NPS Historic Photo Collection, Harpers Ferry Center)

mile route, and enabled the connection of many trail networks along the Appalachian Mountain range. The trail is heralded as one of the first major acts of regional planning that promoted the concept of a linear protective zone or greenway (Figure 8).

In the West, a similar vision for a long distance hiking and equestrian trail was articulated by Clinton Clark in 1932 for a route along the ridgelines of the Sierra Nevada and Cascade regions from Canada to Mexico. Forming the Pacific Crest Trail Conference, the group eventually created the 2,658-mile trail, now designated the Pacific Crest National Scenic Trail. Ironically, the automobile contributed to the development of long-distance trails between mountain ranges by facilitating access to dispersed trailheads.

Trail development flourished during the 1930s as a means of combining conservation and economic relief. As a result of federal recovery programs such as the Civilian Conservation Corps (CCC) and Works Progress Administration (WPA), many trails were constructed on state and federal lands. Relief crews carried out projects all over the country in accordance with specifications for trails and related structures, which were issued in 1934, 1937, and 1938.¹⁴ With tight controls on design and construction techniques, most trails were highly crafted and durable (Figure 9). The large crews of young men developed a set of skills to be passed on to the next generation of trail builders and maintainers. With the onset of World War II, however, the crews disbanded and without subsequent maintenance, many trails fell into disrepair during the 1940s. Other trails were left incomplete or were poorly routed and soon abandoned.

The greatly expanded network of trails suffered from lack of maintenance during the 1940s and early 1950s. For NPS trails, relief came through the Mission 66 program, initiated in 1956 to upgrade park facilities, staff, and resource management before the fiftieth anniversary of the agency. With a different set of objectives, crews built short trails in association with park facilities and educational initiatives, such as self-guided nature trails and paved multi-use trails. Rather than rely solely on locally available rustic materials, Mission 66 standards employed modern materials such as pipe drains, concrete bridge forms, cut stone, and



Figure 11. In Idaho's rugged mountains, the Nez Perce National Historic Trail marks part of a 10,000 year-old route used by Columbia Basin Indians seeking buffalo in the Great Plains. In 1805, it became the path followed by Lewis and Clark. In 1877, the non-treaty Nez Perce Indians, attempting to escape the U.S. Army, fled east along this route. Segments of trails, totaling 1,170 miles, are now protected as the Nez Perce (Nee-Me-Poo) National Historic Trail and administered by USFS and NPS. (Nez Perce National Historic Trail)

asphalt surfaces. (Figure 10). A resurgence of NPS master plans documented the expansion, relocation, and in some cases reduction of park trails. Outside of parks, many communities and resort areas installed off-road multi-use trails to provide safe routes separated from increasing vehicular traffic.

Several federal laws established to protect cultural resources in the 1960s have affected trail management. The National Historic Preservation Act (NHPA) of 1966, with subsequent amendments, established the National Register of Historic Places, to protect districts, sites, buildings, structures, and objects of national, state, and local significance in American history. The National Trail System Act of 1968 established legislative authority for the federal establishment and protection of significant long-distance trails such as the 2,174-mile Appalachian Trail, which was designated a National Scenic Trail at that time. In 1978 the act was amended to include national historic trails to commemorate significant routes of exploration, migration, military action, civil rights, or commerce (See Sidebar 1 and Figure 11). On federal lands, a 1996 Executive Order to protect Indian Sacred Sites led to the closure and rerouting of trail sections in significant religious and ceremonial sites.¹⁵

Another group of laws enacted in the late 1960s and 1970s established protective measures for natural resources and influenced the management of many trail systems. The Wilderness Act of 1964 established millions of acres of federally protected wilderness lands "for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness." This act protected many of the country's primitive trails from alterations by mechanized equipment yet at the same time resulted in their abandonment due to lack of use. Additional acts affecting all trails include the National Environmental Policy Act (NEPA) of 1969, the Endangered Species Act of 1973 regarding the protection of critical habitat for endangered, threatened, or candidate species, and the Clean Water Act of 1977 with associated guidelines for protection of floodplains and wetlands.¹⁶ All require careful documentation, a systematic analysis of impacts, and a public review and regulatory process. Protection of natural resources resulted in the seasonal closure of trails for nesting and migration, the reroute of trails around wetland areas, increased use of boardwalks, and restricted use in wilderness areas. Similarly, protection of cultural resources such as sacred sites and archeological areas has resulted in reroutes of trails around sensitive areas or the development of parallel trails. Trail planning now requires full public involvement and consideration of feasible alternatives.

A growing interest in recreation in the 1970s paired with limited maintenance programs resulted in extensive erosion, disrepair and deterioration of structures along many trails as they were "loved to death." Managers struggled to develop trail maintenance programs and crews, and a new generation of volunteer programs emerged, including the Youth Conservation Corps formed in 1970, and state-run conservation corps. To fix trail problems, managers increasingly relied on non-native or imported materials using overland vehicles and helicopters to transport stone, gravel, cement, asphalt, steel, and planks, often replacing the rustic log and stone work from the CCC era. Similarly, high use and liability concerns resulted in the closure of many trails, reroutes of damaged or dangerous sections, and increased use of railings, often set in concrete walls and footings.

In the 1970s, a growing interest in recreation, urban open space, linear parks, and environmental protection led to a network of multi-use trails developed on abandoned railroad tracks, former canals, and other unused transportation routes. Many of these trails preserved industrial remnants including water towers, switching signals, stations, bridges and tunnels. Some of these corridors are listed in the National Register as significant symbols of American industry, engineering and labor. Their relatively recent conversions to trails may, in the future, be considered part of an important trend in American history (Figure 12).



Figure 12. View of Lock 37 on the Ohio & Erie Canal in the late nineteenth century, showing a dwelling and general store, paired with view nearly one century later, showing the Towpath Multi-use Trail within the Cuyahoga Valley National Park. The park was established in 1974 to protect historic resources and create a recreational corridor along the canal. (Cuyahoga Valley National Park)

In the 1980s and 1990s an increasing number of heritage routes and scenic trails were recognized either as significant national historic trails, national scenic trails, or listed in the National Register of Historic Places as historic districts, historic sites, or as part of a thematically-linked multiple property nominations (See Sidebar 6 for trails recently listed). In some cases, notable features along trails such as bridges, are listed as historic structures. With an increased awareness and understanding of preservation practices, many additional trails and trail features will likely be listed. Recognition of trails as historic resources raises issues related to their management such as reroutes, addition of new features, resource protection, and treatment guidelines as will be discussed further in this document.

HISTORIC TRAILS AND THE CLR

With the tremendous use of historic trails and concomitant maintenance concerns, a clearly defined approach for treatment and management is essential. A Cultural Landscape Report (CLR) provides a comprehensive approach to guide treatment and management decisions based on historical research, existing condition documentation, and analysis and evaluation. Other studies and planning methodologies may also guide management of a historic trail. A Comprehensive Management Plan (CMP) is mandated for all trails designated as National Scenic or National Historic Trails while a General Management Plan (GMP) is required for all National Park System units. Also, other cultural resource specific studies as described in Sidebar 2 may inform trail management decisions.

The historical research component of the CLR clarifies the general context and intent that influenced the trail's development, and supplies information about the original layout, design, workmanship, materials, setting, and construction process. The existing condition documentation provides a comprehensive account of the trail's current physical appearance, paying particular attention to aspects that have been identified as character-defining features from the period of primary significance. Comparing current conditions to historical precedents reveals the extent to which the trail's

SIDEBAR 2:

PLANS, REPORTS AND INVENTORIES WITH HISTORIC PARK TRAIL INFORMATION

Below is a list of plans, reports and inventories that may contain information about historic trails. Ideally, a historic trail would have been addressed in a General Management Plan, but in absence of this overarching document, or in conjunction with a master planning effort, a Cultural Landscape Report (CLR) is a valuable tool.

Documents Specific to National Scenic or Historic Trails:

Comprehensive Management Plan [CMP]. A plan required for all designated National Scenic and Historic Trails that typically provides a historical overview, identifies significant resources associated with the historic trail, and outlines objectives, practices, and responsibilities for the managing agencies associated with the trail. The plan defines a marking system with design guidelines to ensure consistency, identifies responsibilities for all cooperators, and provides a prioritized list of the tasks necessary for implementation. An example is the "Comprehensive Management and Use Plan, Trail of Tears National Historic Trail."¹⁷

Documents Specific to the National Park Service:

General Management Plan [GMP]. The overall plan for a National Park System unit that ensures that the park has a clearly defined direction for long-term resource preservation and visitor use. GMPs typically contain mission goals and management prescriptions that address the preservation of park resources, types and areas of development, visitor carrying capacities, and potential boundary modifications. It is critical that historic trails be identified within a park GMP.

Historic Resource Study [HRS]. A HRS for a trail system evaluates associated cultural resources within historic contexts. Through documentary research, typically led by a historian, and field investigations, this report describes the integrity, authenticity, associative values, and significance of the trail and related resources. This report includes National Register nominations for all qualifying resources and is used as a basic report for completing more detailed studies such as a CLR or interpretation plan. An example is the "Historic Resource Study, Pony Express National Historic Trail."¹⁸

Historic Structures Report [HSR]. A report that serves as the primary guide to treatment and use of a historic or prehistoric structure. The purpose, content and use of the report parallels that of a CLR. The treatment and use of an adjacent structure can directly affect the trail.

Cultural Landscape Inventory [CLI]. An evaluated inventory of all cultural landscapes in the National Park System having historical significance. The CLI provides baseline cultural landscape data for a park, including trails and trail-related resources. The information collected about a landscape includes location, description, historical development and significance, landscape characteristics, and management decisions.

List of Classified Structures [LCS]. An evaluated inventory of all historic or prehistoric structures in the National Park System having historical, architectural, or engineering significance. The LCS provides baseline structure data for a park, including the location of historic and prehistoric structures, description, historical development and significance, and management decisions.

Archeological Overview and Assessment. A report that describes and assesses known and potential archeological resources in a park area. The overview reviews and summarizes existing archeological data while the assessment evaluates the data. Further investigation requires an archeological identification and evaluation study to identify the location and characteristics of some or all sites in a geographical area. Data is then added to the Archeological Sites Management Information System (ASMIS).

Ethnographic Overview and Assessment. A report that reviews and summarizes existing information on park resources valued by associated traditional communities.

National Register of Historic Places. The National Register Information System (partially available on-line at www.nr.nps.gov) includes information on historic trails that have been listed in the National Register. The full text of nominations and copies of supporting documentation can be obtained by contacting the National Register of Historic Places.

purpose, users, or physical characteristics have changed. The analysis and evaluation component helps to identify treatment and management issues. The CLR may be based on or expand on existing studies such as Historic Resource Studies or National Register nominations, but in some cases the CLR can serve as an initial analysis and evaluation of the trail's significance and integrity.

The CLR is intended to address a range of concerns, from basic historical research and definitional criteria to broader managerial issues. The questions that the CLR should provide guidance in answering include: *What is the historic trail or trail system? Is it part of a larger circulation system or a single linear trail? Why is it significant? How should it be protected and enjoyed?*

HISTORICAL RESEARCH

Historical research for a CLR provides an in-depth understanding of the trail's evolution and lays the foundation for subsequent analysis and treatment. Historic trail research should begin by placing the development of the trail within the broader trends and events in American history. The political, social, economic, and environmental context can offer insights into the purpose of the historic alignment or method of construction. Research should then clarify the intent of the trail with respect to the origin, destination, and other trail or landscape characteristics (See Sidebar 3).¹⁹ For trails that are highly crafted, it is important to provide information on the development of specific trail characteristics and features such as layout, grade, tread width and composition, step construction techniques, other stabilization measures, drainage systems, bridges, and associated features. Tracing the appearance of trail characteristics and features through successive historic periods may reveal the influence of changing social patterns, land uses, construction practices, management philosophies, and funding situations. A trail may have been relocated in response to natural processes such as a flood or fire, changes in land ownership, the shift from trains to automobiles as the primary means of accessing trail heads, or evolving tastes in scenery or recreational activity. Legislation to limit the type of use or restrict access to traditional tribal properties might also alter trail

SIDEBAR 3: RESEARCHERS CHECKLIST

Historic Context

- Themes or associated events that influenced trail development or use
- Builders and users of route, owners, managers, and jurisdiction
- Adherence to local, regional, or national design standards, laws, and policies

Development History

- Evidence of prehistoric use or associated sites, especially springs and grave sites
- Evidence of segments capitalizing on natural routes, i.e., dry floodplains, natural sandhill benches, or mountain saddles
- Designers and builders of the trail, design intent, width, grade, origin, route or alignment, destination, views, natural features, cultural sites
- Materials used and sources, local or imported
- Tools and equipment used for construction and maintenance, professional skills of builders
- Types and extent of built features such as drainage systems, steps, retaining walls, ladders, railings, tread preparation, and bridges

Management History

- Maintenance and stewardship responsibilities for the trail, advocacy groups, volunteers and users
- Location and frequency of repairs for trail sections or rationale for trail closures and reroutes
- Descriptions of trails by users: recommendations and concerns
- Successes and failures of maintenance solutions, particularly in high use areas
- Changes in origin, destination, tread materials, width, or use
- Maps or other documents that locate features difficult to find in the field, such as closed trails, drainage systems above the trail, closed culverts, iron work, or retaining walls that may be obscured or in poor condition

location and appearance; a formerly unimproved trail may require stone steps, puncheon bridges, or scree wall curbing to withstand increasingly heavy use; changing safety standards and accessibility regulations may call for hand rails, grade changes, and surface alterations. The timing, nature, and reasons for such changes should be thoroughly documented and clearly articulated.

Sources for historical information on trails include old maps, trail guides, hiking club annual reports, travel journals, maintenance logs, paintings, sketches, photographs, aerial photographs, postcards, newspaper articles, oral histories, and interviews with maintenance staff and trail users. In some cases, trail archeology may be studied to either understand how the trail was built or determine if the trail is associated with a historic or prehistoric use. For trails on public lands, extensive records for the Civilian Conservation Corps (CCC) and other New Deal federal work programs are held by

the National Archives in College Park, Maryland, and their satellite repositories across the country (Figures 13 & 14). Specific types of trails, such as pioneer trails, may have associated repositories, like the National Frontier Trail Center in Independence, Missouri.

To ensure that data gathered is well organized and retrievable, it is helpful to create a database and assign a code to each trail or trail section. A database can generate a chronology of trail construction, sort trail segments by land ownership or region, and compile types of built features. Information can also be linked to maps produced through Geographic Information Systems (GIS) as described in the next section.



Figure 13. Historic photograph of rustic foot bridge constructed in 1934 by the CCC on the Eagle Rock Creek Trail in the Great Smoky Mountains in North Carolina. (National Archives; NARA MD, 79-42, NC, Box 21)



Figure 14. Historic photograph of horse trail, retaining walls, and guard rail built by the CCC in 1935 for a trail south of Sunset Rock in Chickamauga & Chattanooga National Military Park, Georgia. (National Archives; NARA MD, 79-42, GA, Box 14)

EXISTING CONDITIONS DOCUMENTATION

Documenting the trail's existing condition is an essential component of the CLR process. The existing condition documentation includes a geographical survey and field verification to locate and assess the current condition of general landscape characteristics and specific features associated with each trail. A US Geological Survey map at 1:24,000 scale may serve as the base for a survey. GIS and Global Positioning System (GPS) computer technology can be used to develop an electronic map with links to a GIS database with standardized terminology and attributes.²⁰ The database can contain historic, contextual, and trail-specific information. The graphic layers and data can then be manipulated to produce plans that illustrate past periods of development, rerouted sections, existing conditions, and proposed management actions (Figure 15).

Contemporary photographs are useful for documenting the current condition of trail features, particularly when paired with historic photographs taken from similar vantage points, as shown in Figure 12. A video of a trail is also useful. With visual documentation it is important to maintain a concise record of the trail name, number, and location within the trail. For highly crafted trail features, sketches, measured sections, and plans are useful for subsequent phases of analysis and treatment.

All features of a trail should be inventoried, if possible, at a cursory or comprehensive level (Sidebar 4). For a cursory inventory, a map and a scale bar are used to determine the length of trail segments. The types of features and conditions encountered on the trail are recorded but not their specific location. The width of the trail should also be measured at key points. For a comprehensive inventory, a measuring wheel or GPS unit should be used to document the trail route, length,

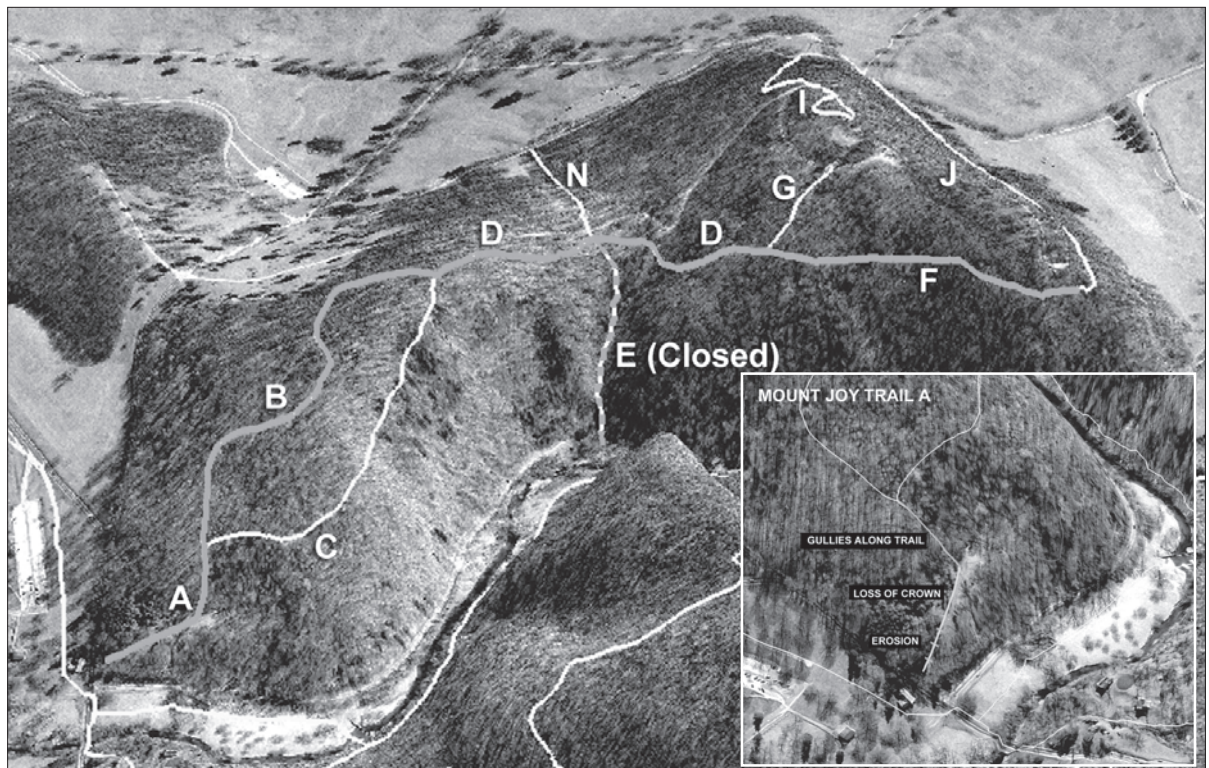


Figure 15. Geographic Information System map layers including an aerial photograph projected with three-dimensional topography, showing the configuration of open and closed historic trails on Mount Joy at Valley Forge National Historical Park, with close-up showing the condition assessment for Trail Section A. (NPS, Olmsted Center for Landscape Preservation, Mark Davison, 2003)

and features. Written notes should be supplemented with photographs keyed to the linear distance from the trailhead. The materials, dimensions, and construction style should be recorded.

The inventory can be combined with a log of corrective work needed, which can also be keyed to linear distance from the trailhead. A comprehensive inventory is useful to both augment archival research and inform subsequent steps in the CLR process. This record of existing conditions will serve as the benchmark for ongoing management of the trail.²¹ The Appalachian

SIDEBAR 4: SAMPLE LIST OF TRAIL-RELATED FEATURES

Design and Layout: origin, destination, relationship to significant natural features, width, grade/profile, curvature, switchbacks, junctions, views and vistas, cut/fill slopes, planted vegetation

Guides: fences, stiles, scree wall curbing (stone or log), railings, signs, blazes, cairns, plaques

Drainage Structures: culverts, side drains, water bars, water dips, ditches

Retaining Structures: coping stones, log or stone walls, checks, log or stone cribs, rip rap, iron pins

Crossings: stepping stones, bog bridges (split-log, topped-log; timber), stream bridges (note material, design & construction techniques: log, timber, or laminate; stringer, truss, suspension, etc.; style, materials, and dimensions of footings & pilings, railings, etc.)

Steps, Rungs, and Ladders: stone steps (rock-and-earth, set/tuck-behind, rock-on-rock or slab-laid, cut steps), log steps, foot and hand rungs, steel rung ladders, log ladders

Tread: edgings (log or stone), surface materials (soil, gravel, ledge, stone, concrete, bituminous asphalt, corduroy logs), turnpiking

Trail-related Structures: benches, shelters, tent sites, camp grounds, lookout towers, comfort stations and privies, trail heads, assembly areas, parking lots, constructed water features

Associated Cultural Features: archeological sites (including associated vegetation), traditional use sites, historic sites

Associated Natural Features: water (streams, water falls, lakes, ponds, springs), native vegetation (woodland, prairie, desert), wildlife, geologic formations

Trail Conference has developed an assessment process to identify key features and analyze trail maintenance and land management needs for trail sections within the long distance trail.²²

ANALYSIS AND EVALUATION

The analysis and evaluation component of the CLR compares existing conditions with historic conditions in order to assess the integrity of historic trails and associated features. To determine the historic character of a trail, one must understand its historic and existing conditions, as well as its associated contexts. A trail may be historically significant for its association with historic events or notable persons, its distinctive construction, or its association with prehistory or history. The National Register of Historic Places has articulated the general criteria for assessing the significance and integrity of historic districts, sites, buildings, structures, and objects. These criteria can be adapted to the evaluation of historic trails for CLR purposes as demonstrated in the accompanying sidebars (Sidebars 5 and 6).²³ This comparison is facilitated by the identification of landscape characteristics and features that contribute or do not contribute to the historic character of the trail. Landscape characteristics and features, including processes and physical forms, are the tangible evidence of the activities of people who shaped the landscape or trail.²⁴ The evaluation includes a brief description of historic and existing conditions, as well as a determination of whether a particular characteristic or feature of the trail contributes to its significance as a whole. Trail characteristics or features defined as “contributing” are those that were present during the period of significance and survive or are replacements in-kind of historic features. The analysis and evaluation section identifies features that should be preserved and those that should be removed or mitigated.

Many trails are listed in the National Register of Historic Places. Trails can be listed as historic sites, as parts of historic districts, or as part of a multiple property nomination. A major trail feature such as a bridge, cairn, earthwork, or tunnel may also be listed as a historic structure. A trail-related feature such as a



Figure 16. The West Rim - Angels Landing Trail in Zion National Park, which ascends 1,700 feet to the summit, is listed in the National Register under criterion C for its exceptional rustic style design and construction and contains extensive switchbacks, stonework, railings, and chiseled steps. (Zion National Park)

monument or marker may also be listed as a historic object. Typically trails are listed as part of a historic district or a thematically-linked multiple property nomination. Using the National Register criteria for evaluation, trails may be significant in many ways as previously highlighted in the brief history. For example, trails may be recognized for their association with events that have contributed to our country's history (Criterion A), such as the Oregon Trail; recognized for their association with significant individuals (Criterion B), such as explorers Meriwether Lewis and William Clark; possess high artistic or architectural values (Criterion C), such as the trails in Zion National Park built by the NPS between 1917 and the 1930s; or may yield information significant in the country's prehistory or history (Criterion D), such as the earliest trails in Yosemite National Park.²⁵

The National Register defines seven aspects of integrity that can be used to evaluate the degree to which a trail

retains its historic character (Sidebar 5). A trail that was partially rerouted, leaving a section closed or no longer maintained may still retain its historic integrity. However, if the origin, destination, or trail corridor has been substantially altered or if historically significant sections have been closed, changed or obliterated, integrity may be compromised and only a portion of the trail may be significant. For example, along designated National Historic Trails there are many sites and even trail segments that are listed in the National Register of Historic Places, such as the Barlow Road on the Oregon Trail. In other cases, an individual trail may not be noteworthy, but a network of trails may be significant as part of a larger circulation system such as the trail system at Acadia National Park. Studying the resource holistically is recommended, such as an integrated circulation system of roads, bridle paths, trails and associated developed areas within a park. Sidebar 6 provides several examples of National Historic Trails and National Park trails, the criteria for which they were listed, and the physical aspects that contribute to their integrity.

TREATMENT APPROACH

After documenting a trail's historical development, determining its significance, and evaluating its integrity, a long-term treatment and management approach should be chosen. The development of a CLR treatment section is typically a collaborative process, involving managers, field staff, representatives from associated communities and organizations, and multidisciplinary expertise such as a historian, archeologist, ethnographer, wildlife biologist, and historical landscape architect. Goals for treatment are defined and a range of alternatives may be developed. Based on the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*, four types of treatment are defined below with trail-specific examples of each.

Preservation allows for measures necessary to sustain the existing form, integrity, and materials of a trail. This treatment includes stabilization work, ongoing maintenance, and repair of historic materials and features, such

SIDEBAR 5: EVALUATION OF INTEGRITY FOR TRAILS

Aspect of Integrity	Trail Characteristics and Features	Retains Integrity	Does Not Retain Integrity
Location	<ul style="list-style-type: none"> Describe how the route is influenced by natural systems and features, including the surrounding landforms, geology, and hydrology Describe changes in microclimates and plant communities. Describe the three dimensional spatial organization of a trail, including the ground, vertical and overhead planes, which is often referred to as the trail corridor. Identify a boundary width for the trail corridor, which may be widened to protect adjacent resources and critical viewsheds. 	Continued use of the historic route or the presence of the historic route that is abandoned but not obliterated	Substantial reroutes and obliteration of the historic route
Design	<ul style="list-style-type: none"> Describe the evolution of the trail route and its lack or presence of constructed features, including associated roads, canals or other circulation systems. Determine whether the trail route was selected to orient the traveler to framed vistas of a peak, tower, or landscape features that are designed or natural. Determine if there are clusters of buildings, structures and associated spaces that relate to the trail and historic links to places obscured by subsequent development Determine whether the trail itself is a contributing resource to a larger designed circulation network. Describe the overall landform, as well as the trail's slope, solar aspect, elevation, and response to topography. Describe the trail character and whether it is straight, winding, connected to water bodies, or evenly graded between scenic knolls with extensive switchbacks. Consider whether the historic route is a contributing characteristic and should be preserved through an ecologically sensitive area. 	Evidence of the design style or design standards from the period of significance	Redesign, realignment, or obliteration of design from the period of significance
Setting	<ul style="list-style-type: none"> Describe how the surrounding land use may have changed through time and influenced trail development or use. Describe historical and contemporary land uses and determine what types are appropriate. Identify overlooks, summit destinations, and routes along ledges that may have been selected for broad, open views; or determine if migration or hunting trails may have been strategically located for protection and concealment. Describe the overall character of a trail, exposed or concealed, and specific views and vistas that may be contributing. 	The presence of the setting or views from the period of significance	Loss of the trail corridor setting, important sites, destinations and views due to subsequent development
Materials	<ul style="list-style-type: none"> Describe the materials used for structures that are associated with the route, such as culverts, trailheads, retaining walls, bridges and tunnels. 		

SIDEBAR 5: EVALUATION OF INTEGRITY FOR TRAILS

Aspect of Integrity	Trail Characteristics and Features	Retains Integrity	Does Not Retain Integrity
Materials (continued)	<ul style="list-style-type: none"> Describe materials used for buildings, such as hotels, cabins, shelters, monuments, towers, or developed areas that are key nodes or destinations within a trail system. Identify constructed elements that are contributing features and recent elements that are not. Document the materials used for constructed water features, such as dams, canals, springs, constructed waterfalls, or reservoirs, which may influence the route and purpose of the trail. Describe stone, wood, and iron small-scale features such as retaining walls, railings, and steps, that contribute to trail character. Document the types and dimensions of construction materials that are contributing characteristics. Identify native plant communities or cultivated landscapes that may be associated with the trail's alignment or historical use. Determine whether wooded or open areas, individual trees, groves, or wildflower meadows are contributing features. 	The repair of tread, crossings, drainage features or plant communities in the same style as the period of significance	Loss or replacement of materials from the period of significance
Workmanship	<p>See materials above.</p> <ul style="list-style-type: none"> Describe the construction methods used for structures that are associated with the route, such as culverts, trailheads, retaining walls, railings, steps, bridges and tunnels. Describe the construction methods for buildings, such as hotels, cabins, shelters, monuments, towers, or developed areas that are key nodes or destinations within a trail system. Document constructed water features, such as dams, canals, springs, constructed waterfalls, or reservoirs, which may influence the route and purpose of the trail. 	The presence of trail structures and features, such as bridges, walls, steps, planting design and associated buildings that date to the period of significance	Loss of workmanship from the period of significance
Feeling	<p>See setting, design, materials, workmanship.</p> <ul style="list-style-type: none"> Describe the overall feeling of the trail corridor with respect to its setting, topography, views, designed elements, presence or lack of built structures, and associated trail features. 	The presence of a trail corridor or setting, views, design elements, and materials from the period of significance	Dramatic change in use, setting, views, design elements, or destinations
Association	<ul style="list-style-type: none"> Identify cultural events and practices that may have influenced trail development and route, such as seasonal or ceremonial use. Determine whether traditional uses are so significant as to influence restrictions on the use of a trail for a particular day or season, or result in the development of parallel routes for non-traditional users. Determine whether prehistoric and early historic trails contain archeological sites that require protection. 	Physical evidence of associated sites, uses, or cultural traditions	Loss of associated sites, uses, or cultural traditions

SIDEBAR 6: EXAMPLES OF TRAILS LISTED IN THE NATIONAL REGISTER

Bold titles indicate the name on the National Register or National Historic Landmark forms.

The **Glacier National Park Multiple Property Listing** includes three distinct trail loops, North Circle, South Circle, and Inside Circle (made up of 13 individual trails), with a period of significance of 1890 to 1945 and key dates of 1911 and 1919. The trails were initially built by the Glacier Park Hotel Company to link scenic areas with tent camps and eight chalets. Beginning in 1929 the NPS reconstructed the trail system. The 163-mile district is listed under criteria A and C as an exceptional recreational system and for the physical development of rustic architecture and landscape design by the NPS. The trail boundary is ten feet to each side of the centerline, with broader areas to incorporate associated buildings and structures.

The **Bryce Canyon National Park Multiple Property Submission** identifies the Civilian Conservation Corps (CCC) as building the Under-the-Rim Trail, 32 miles long, and Riggs Spring Fire Trail, 8 miles long, between 1934 and 1944. The trails are listed under criteria A and C. The nomination relies on the context provided by the multiple property documentation form entitled “Historic Park Landscapes in National and State Parks (1993).”²⁶ The trail boundary is ten feet to each side of the centerline.

The **Mount Rainier National Park National Historic Landmark District** identifies the 93-mile Wonderland Trail as a contributing resource that encircles Mount Rainier. The nominated historic district includes most of the front-country developed areas within the park, as well as historic backcountry structures associated with the trail. The NHL district was designated under the themes of “Expressing Cultural Values” and “Transforming the Environment” for the period of 1904 to 1957 because of its many examples of rustic architecture, park village plans, and other aspects of 1920s and 30s national park planning and design. The trail passes through a federally designated Wilderness Area and maintenance must be accomplished within the guidelines for this area. For most sections of the trail, the boundary is five feet to each side of the centerline, with broader areas to incorporate associated buildings and structures.

In **Multiple Resources for Zion National Park** seven trails are listed in the National Register. The Angels Landing – West Rim Trail, East Rim Trail, Canyon Overlook Trail, Emerald Pools Trail, Grotto Trail, Hidden Canyon Trail, and Gateway to the Narrows Trail are all listed for their NPS and CCC construction and improvements between 1925 and 1949, some of which were built under the direct supervision of Chief Engineer Frank Kittredge. All have exceptional stonework including rubble stone walls, chiseled steps, handrails, switchbacks, and are intertwined with natural features. The trails are listed under criterion C as exceptional examples of NPS Rustic style design and construction. The East Rim Trail, is also listed under Criterion A for Native American origins and use by pioneers with an extended period of significance that includes 1875 to 1949. A boundary width is not defined.

The **Lolo Trail National Historic Landmark** is a 92-mile-long trail that extends from Lolo, Montana to Weippe Prairie, Idaho. The route is listed as a transportation corridor under Criterion A for its association with exploration and settlement and for Native American ethnic heritage, and Criterion B for its association with Meriwether Lewis, William Clark, Toby (Shoshoni guide), and Sacajewea (Shoshoni interpreter). The prehistoric route connects the Columbia River basin and the Missouri River basin through the Bitterroot Mountains. The route was used by the Nez Perce in their annual journeys to the buffalo plains in the east and was followed by Lewis & Clark and their Shoshoni guides in 1805, representing one of the most arduous stretches of their expedition. The route also contains significant ethnographic, archeological, and historic resources associated with Nez Perce and the Nez Perce War of 1877. The trail extends over private, local, state, and federal lands, with most owned by the U.S. Forest Service. The 92-mile corridor covers 86,000 acres and is at least a half mile wide and defined by a boundary line of 400 miles. Some sections are up to a mile wide where the trail diverges, wanders through difficult terrain, or is difficult to locate. The route has a high level of integrity with 32 contributing sites and 382 identified segments.²⁷ To preserve the sensitive cultural and natural resources associated with the trail, the U.S. Forest Service established a permit system for access to the area.

The **Hood River County Historic District** in Oregon includes a 30-mile section of the Barlow Road, a segment of the Oregon Trail listed in the National Register under Criterion A as an exploration, settlement and transportation route. The route was marked by Samuel Barlow in 1845 and operated as a toll road from 1846 to 1919, providing pioneers with an alternative route to the Willamette Valley. The route crosses over local and state owned land, but is predominantly on U.S. Forest Service lands within Mount Hood National Forest. Many sections of the original route and wagon ruts are still evident. The trail boundary is 600 feet to each side of the road trace, with some wider sections.

In **Historic Resources of Acadia National Park Multiple Property Listing**, the historic trail system of 250 individual trails covering 225 miles has been determined eligible for the National Register, with a period of significance from the 1860s to 1942. A network of unconstructed recreation trails grew in popularity beginning in the 1860s. In 1890, local village improvement associations began marking, mapping, and maintaining these trails and built many additional highly crafted trails. In the 1930s the Civilian Conservation Corps further expanded the system. The trails are eligible under criteria A and C for the unprecedented role of the local village improvement associations in land protection, community development, and exceptional trail construction and high quality stonework, and for the role of the CCC. Many of the trails are no longer marked or actively used but can still be found in the park. These have been documented using GPS and GIS technology. The trail boundary is fifteen feet to each side of the centerline, with broader areas to incorporate associated buildings and monuments.

In Yosemite National Park, as part of the **Yosemite Valley Historic District**, four trails built between 1858 and 1920 are listed. The trails include the Mist Trail to Vernal and Nevada Falls, the Four Mile Trail up to Glacier Point, the Yosemite Falls Trail, and the Valley Loop Trail. The district is listed for Criteria A, B, C, and D for its seminal role in the preservation of natural scenery, association with preeminent artists and conservationists, high quality stonework, significant trail design, and archeological sites. The trail boundary is ten feet to each side of the centerline.

as the repair of a wall that has collapsed or steps that have slipped. Because preservation prescribes maintenance of trail features as they currently exist, it is often the best treatment approach for a recently designated historic trail, where a detailed inventory of historic features has yet to be completed. For a trail that has suffered from severe erosion and subsequent loss of surface material, it may not be possible or desirable to preserve the existing condition. Preservation may require restrictions on the number of trail users by determining a carrying capacity for the route that prevents further erosion. Preservation may not be feasible if trail features were originally constructed with local natural resources that can no longer be used for repair work, such as large fir or redwood trees, or pond-side gravel.

Rehabilitation acknowledges the need to meet continuing or changing uses through alterations or new additions, while retaining the historic character. This treatment allows for compatible yet distinguishable materials, which may be brought in from non-local sources. For example, tread material can be imported to stabilize the pathway in sensitive natural and cultural resource areas. For trails with high use, rehabilitation allows for updating trail markings and sign systems, applying new surface materials and drainage features, rerouting sections of trail without obliterating historic features, or other measures necessary to sustain a durable and safe tread. All modifications require careful specifications to ensure that historic materials, features, and spatial relationships are protected.

Restoration is the process of accurately depicting the form, features, and character of a trail at a particular time in history, while removing evidence of other periods. This treatment requires a thorough understanding of the construction methods and materials for the period of significance. For trails with high design, ceremonial, or archeological significance, where limitations on use are feasible to protect restored features, this approach may be appropriate. For soft-surface trails that are heavily used, restoration may be difficult because of the need to modify the tread material, retaining walls, and/or drainage features.

Reconstruction allows for new construction that replicates the form, features, and detailing of a non-surviving

trail for the purpose of depicting its appearance at a specific period of time and in its historic location. Though this is an uncommon treatment, reconstruction of a trail or trail segment would be appropriate if it had been destroyed or if the pre-trail landscape was determined so significant that its re-creation was critical to the interpretive mission of the park and only if the documentation exists to reconstruct an accurate duplication of historic features. For National Park Services resources, this treatment requires the approval of the Director of the National Park Service.

For large trail networks, with multiple layers of significance and management needs, treatment alternatives may differ within management zones. Defining these management zones requires multidisciplinary input, as underscored by the National Environmental Policy Act (NEPA) and the National Historic Preservation Act (NHPA) compliance procedures. Management zones can be used to organize the CLR treatment section and recommendations.

Compliance

Selection of a treatment and management approach is done in accordance with the National Environmental Policy Act (NEPA) and Section 106 of the National Historic Preservation Act (NHPA) to ensure interdisciplinary involvement and systematic consideration of the human environment. For parks, following compliance procedures involves completing an environmental screening/project review form and determining the potential effects on cultural resources that are either listed in or eligible for the National Register of Historic Places. Management alternatives may need to be developed in accordance with NEPA to consider the impacts of major federal actions on the affected environment. Compliance ensures meaningful participation by the public and other stakeholders, development and evaluation of alternative courses of action, rigorous application of scientific and technical information in the decision making process, consultation with expertise through multidisciplinary teams, and attention to mitigation measures, pollution prevention measures, and sustainable management principles.²⁸ For historic trails, actions that require NEPA compliance include opening, major relocation, or closing a major trail;

extensive vista clearing; management of trails in fragile environments or rare habitats; and construction of associated features such as parking areas and facilities.

Compliance may be necessary for activities such as extensive regrading for accessibility, rerouting, restoration, or rehabilitation of a historically significant trail or a trail that passes through a significant cultural site.²⁹ For a long term or extensive trail rehabilitation project, a programmatic agreement with a list of programmatic categorical exclusions may be developed for repetitive procedures or a series of rehabilitation projects within a historic trail network.

Format of a CLR Treatment Section

Once a treatment approach is selected, a CLR treatment section should convey three levels of information:

- 1) An overall treatment philosophy and guiding principles (Sidebar 7);
- 2) Guidelines for types of features common to many trails or trail segments; and
- 3) Specific guidelines for individual trails or trail segments.

For primitive trails with few constructed features, a recap of the evolution of the trail and its historical functions, an overview of its general appearance and character-defining features, and a summary of contemporary issues, such as carrying capacity and types of appropriate use, provides the necessary background for treatment recommendations.

For trails with many constructed features, more extensive descriptions of the historic materials, construction methods, and contemporary management concerns are needed to develop treatment recommendations. Since many trail features are rustic and assembled with local wood and stone, guidelines can offer a range of parameters, e.g., bridge railings to consist of logs between 4 and 6 inches in diameter or stone steps must be between 16 and 24 inches wide.

SIDEBAR 7: EXAMPLE OF TREATMENT RECOMMENDATIONS

The following treatment recommendations were developed for the rehabilitation and maintenance of the historic hiking trail system in Acadia National Park.³⁰

- Preserve as much of the historic trail system as possible. Replace in-kind or rehabilitate historic features such as steps, bridges, walls, ladders, rungs, drainage, tread, markings, memorial plaques, and other historic trail features
- Maintain historic trail routes, with their winding or straight character, and names where possible
- Reroute trails only when necessary to preserve historic resources or stabilize the tread, try to retain the character and design intent of the trail
- Retain original trail width where possible and allow for rehabilitation work to guide and contain foot traffic on designated trails
- Protect associated scenic, natural, and cultural features that are part of the attractions and destinations of the trail system, including rock formations, vegetation, water bodies, views, buildings, structures, developed areas, plaques, and monuments
- Preserve the original choice of materials and methods used to construct the trails
- Prevent further dissection of natural areas by roads, reduce traffic, and disperse hikers to preserve the wilderness setting of the trail system
- Preserve and rehabilitate village connector trails to preserve the feeling of hiking from a village into wilderness
- Encourage public transportation to trailheads to reduce automobile use and enhance the island experience
- Use modern construction materials and methods that reduce material and labor costs and enhance durability where they are not visible or do not detract from the historic character
- Use historic or contemporary methods to produce the same style of historic workmanship
- Preserve association with the four surrounding villages and their local trail systems
- Preserve cultural traditions and protect archeological sites
- Preserve association with park recreation areas and facilities.

For both primitive and highly constructed trails, historic and contemporary photographs, diagrams, and text should convey the guidelines or parameters for trail work. Historic photographs can be used to show the construction of historic features, or be paired with contemporary photographs to illustrate compatible yet distinguishable differences in construction. Historic photographs also can be paired with diagrams to demonstrate underlying maintenance and construction techniques (Figure 17). Diagrams can be developed to show concealed features that aid in preserving historic character by improving durability. In all cases, graphic illustrations supported with concise text, aid in conveying the character, scale, and composition of the historic trail and its unique features. These guidelines are typically developed in collaboration with field staff to ensure their feasibility.

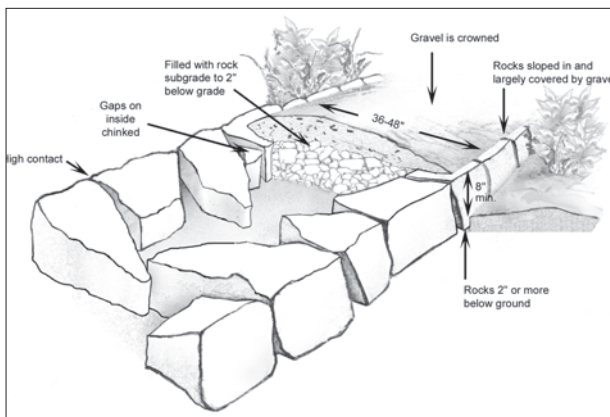


Figure 17. Historic photograph of Great Pond Trail constructed by the CCC in 1937 and contemporary detail showing walled causeway construction for a pond-side trail. (National Archives; NARA MA and Acadia National Park, Barter and Baldyga)

TRAIL TREATMENT CONSIDERATIONS

This section discusses concerns common to many trail systems, with examples from across the country. In order to determine the best treatment and management strategy for a trail, it is essential to understand the features that contribute to the trail's historic character and significance.

Primitive and Vernacular Trails

Many historic trails are significant for their primitive origins and association with Native American use such as the Lolo Trail from Montana to Idaho. Others are significant for their association with more recent broad social or historical patterns, such as American pioneer and settlement trails and long-distance recreation trails such as the Appalachian National Scenic Trail. For historic trails associated with broad social patterns, because of the scarcity of constructed features, the associated archeological sites, traces, or erosion caused by wagon ruts define their historic character. For recreational trails, distinctive design and construction features or key location decisions define their historic character. In both cases, the routes may be direct, have multiple branches, or lead through rugged terrain. Adding constructed features, making improvements for increased use or accessibility, or applying highly crafted trail design standards may be inappropriate. These decisions need to weigh the need for change versus the effects on the historic integrity and appearance. For trails to retain their primitive character, it may be necessary to determine a carrying capacity and limit use through a permit process or to restrict trail use during seasons when the trail is most vulnerable to erosion.

In some cases rerouted sections or a parallel route may be necessary to support contemporary use of a primitive trail. For example, steep and eroded sections of the Appalachian National Scenic Trail have been rerouted to follow side hill alignments with a more gradual slope and improved drainage. Trail sections and campsite locations near sensitive archeological sites or fragile environments have been relocated to prevent impacts to natural and cultural resources. Steep sections of trail on exposed ledges with erosion have also been relocated to follow safer routes.

Safety

Safety-related trail treatment measures include signs, railings, barriers, tread, and bridges. Historic barriers, such as dry-laid stone walls or iron, wood, or cable railings at precipitous overlooks, have often proved inadequate. The potential for loss of life or serious injury must be considered carefully on trails that attract high numbers of users with varying abilities. Handrails along ledges, over bridges, and at overlooks must be capable of withstanding exposed conditions and heavy use, such as extensive leaning, sitting, hanging, and vandalism. To meet the Secretary's of the Interior's standards, any added safety features should be compatible yet distinguishable from historic features. In many cases this may result in the substitution of steel for rustic wooden features or the addition of steel rails and pins to rustic stone retaining walls (see Figure 10).

In remote areas, warning signs that are difficult to remove or vandalize may be added to alert travelers that a particular route contains hazards such as exposed ledges, drops, loose footing, or potential flood conditions. Use of signs may be limited in designated wilderness areas where use of the area is acknowledged to be at the visitor's own risk. Warning signs may be more appropriately placed closer to the trail head, where information may be paired with accessibility information.

Accessibility, Topography, and Signs

The United States Access Board is currently developing Accessibility Guidelines for trails as described in the *Report of the Regulatory Negotiation Committee on Accessibility Guidelines for Outdoor Developed Areas*.³¹ These guidelines describe the ideal provisions for tread, width, openings, protruding objects, obstacles, passing space, running slope, cross slope, rest intervals, edge protection, and signs. The report describes exceptions that define allowable departures from these provisions. For historic trails, exceptions are allowed where compliance would cause substantial harm to cultural, historic, religious, or significant natural features or characteristics. Exceptions are also allowed where the provisions are not feasible due to terrain or prevailing construction practices. Despite these allowable

Lower Yosemite Fall Trail 0.9 mi.

Hikers **No Bikes**

Grade
Average 4%
0.14 mi. of the trail is greater than 8%

Cross Slope
Average 3%
0.18 mi. of the trail is greater than 5%

Trail Width
Minimum 20"
Average 53"

Surface Type
Paved & Packed Dirt
0.14 mi. is Soft

Sand **8" Roots**

10" Step

WARNING: Trail conditions may have changed since this trail was assessed. Temporary obstacles such as fallen trees and land slides were not mapped.

Trail Access Information Sign created by Beneficial Designs Inc. 5858 Empire Grade Santa Cruz, CA. 95060, using data collected by a certified trail assessment coordinator.

Figure 18. Proposed sign format provides more information on trail conditions for users with disabilities. (Beneficial Designs, Inc.)



Figure 19. National Historic Trail logo for the Oregon Trail.



Figure 20. Historic cairn at Acadia National Park. The length of the top stone indicates the direction of the trail. (NPS, Olmsted Center for Landscape Preservation, 1995)

exceptions, many historic trails are accessible to people with disabilities. In some cases, measures taken to improve accessibility may also enhance historic character and sustainability. For example, the CCC built many trails with an uninterrupted tread surface 42 inches wide, including closed culverts and bridges that were surfaced with compacted gravel. After years of neglect or low maintenance, the original closed culverts may have been replaced with open culverts and split-log bridges. If a higher level of maintenance can be re-established, restoration of historic features and improved accessibility may be achievable. In many places, the accessible trails with gentler grades may be the most sustainable as they are less susceptible to surface erosion. In addition, trails built with a substantial subgrade may drain better and retain a hard compacted surface that benefits all users and reduces long-term maintenance requirements. Materials may be added to increase the smoothness and durability of the tread.³²

A key component to accessibility is providing information to the public on trail characteristics. People tend to select trails based on their personal interests and abilities. Trail signs and maps can be improved to provide specific information about the trail conditions and difficulty levels. One example is the Universal Trail Assessment Process (UTAP) developed by Beneficial Designs, Inc. to create informative signs, guidebooks, and web sites. A recommended UTAP sign lists the trail length, destination, average and maximum grade, along with information about the cross slope, duration of steep grades, average and minimum trail width, surface hardness, and the presence of obstacles, hazards, and facilities (Figure 18). Such signs can also include drawing of the trail profile to show changes in grade and length.

Many historic trails have changed names or marking systems several times. This creates a dilemma as to which name and marking system to use. If subsequent trails are added, there are questions about whether to use the same marking system. For National Historic Trails, a uniform marking system helps users associate trail fragments and associated historic sites and features (Figure 19). At Acadia National Park, trails dating to different historic periods are all marked with similar blue blazes in order to minimize confusion in remote areas.

Trails built in Acadia in the 1800s and early 1900s continue to be marked with historic cairns, which are rebuilt when toppled (Figure 20). This style of cairn is not used on contemporary additions to the trail system.

An overabundance of trail blazes and signs can detract from the scenic purpose of a trail. Many trail maintenance guides contain explicit guidelines on the use of blazes, signs and markers to discourage overuse and ensure their proper location.³³

Many historic trails have multiple names that have been used during different historic periods. Management documents should promote the consistent use of names for trails with clearly identified endpoints to minimize confusion.³⁴

In some situations, historic trails may be deliberately left unmarked, or a historic marking may be removed in response to evolving cultural or environmental concerns. For example, trails to sacred sites may be left unmarked and a non-historic route constructed to direct trail users around these historic trails and sacred sites. Similar actions can help preserve natural areas that have been deemed too fragile to accommodate contemporary use. Interpretive waysides may be used to explain the significance of the area.

Historic trail signs are considered souvenirs to vandals. For trail users, a missing sign can result in confusion, or worse, becoming lost. Since there is little protection for historic signs in the field, they may need to be kept in a museum. Replacement signs should resemble historic signs but will be most likely manufactured using contemporary tools. Strategies for minimizing vandalism include: bolting rather than nailing signs to posts and using specialized bolts that are impossible to remove without specific tools, such as Tufnut,TM Vandlgard NutTM and Teenut.TM³⁵ Other strategies include inscribing information on posts that are sunk into the ground, installing posts with underground anchor bolts or crossbars, and piling large stones at the base of each post.

Another dangerous practice is the construction of false cairns that lead people off the marked route. Options for preventing this situation include using a unique construction style that is difficult to replicate, using iron

pins to anchor route cairns, educating hikers on how to distinguish a historic cairn from a contemporary fabrication, or increasing ranger patrols.

Natural Features, Systems, and Resource Management Issues

Many trails were built in association with a natural feature, such as a river, lake, rock formation, or mountain, or as a connection between two such features. These features, often referred to as “control points” in trail construction manuals, are key elements in the trail planning process. The trail serves as a safe and comfortable connector between these points. Identifying and protecting these control points is critical to preserving the intent and integrity of a historic trail.

Like natural features, natural systems such as waterways, geological formations, soil types, or plant communities, may have influenced the route of a historic trail. Identifying the relationship of the trail to these natural systems may result in the development of treatment guidelines for land management practices, such as the preservation of field patterns, along with opportunities for educational information on waysides or brochures.

Most historic trails predate natural resource protection policies for threatened and endangered species, invasive plants, clean water, wetlands, and resource extraction. Preserving the trail route or the materials used to construct a historic trail may conflict with these policies. Botanists, biologists, or wildlife specialists may survey areas to locate natural resources of concern.

In some areas, such as wetland and alpine zones, historic trails often become rutted, eroded, and braided.³⁶ Either the natural resources or the trail itself may benefit from closure during particular seasons. These trails may require rerouting or a higher level of construction than was historically present. In wet areas it may be necessary to stabilize the historic trail and protect the surrounding resources by using raised log or board-walks, or construct stone causeways with adequate cross-drainage systems. Alternatively, a reroute may be necessary. These improvements may be added using historic construction methods and materials found elsewhere on the trail or imported

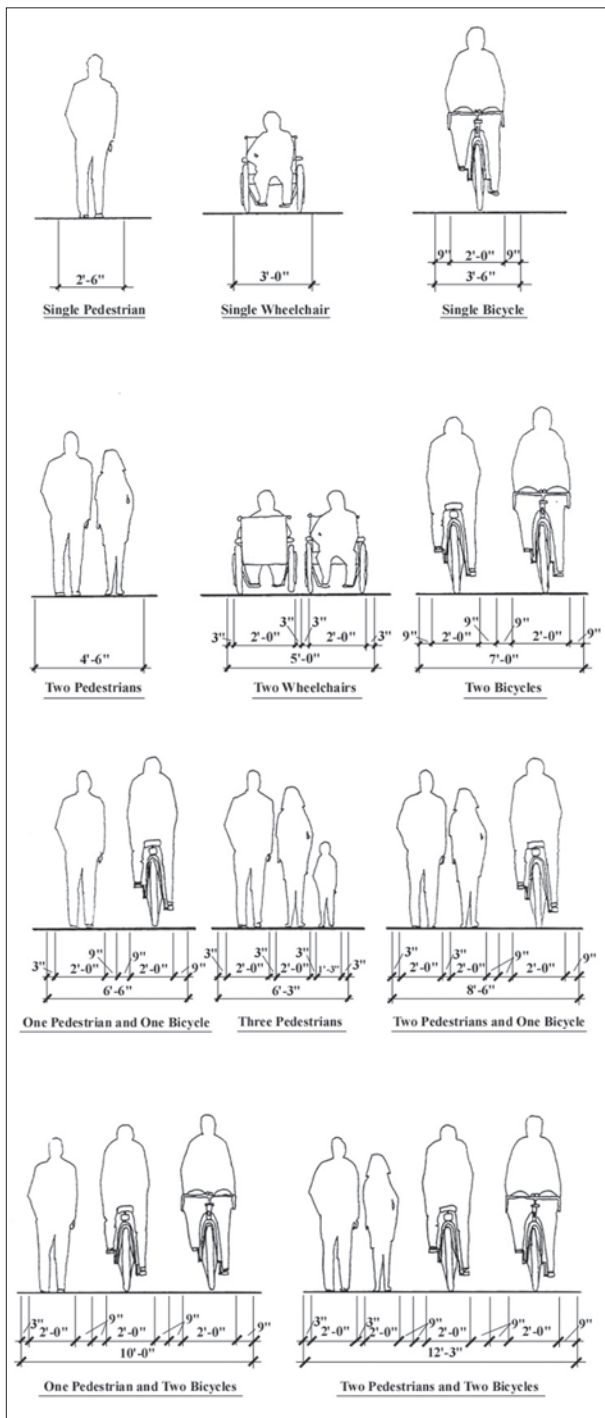


Figure 21. Width studies for different sections of a new interpretive trail to parallel the historic Battle Road within the Minute Man National Historical Park. (Carol R. Johnson Associates, Boston, MA)

from other locations. While the resultant built features themselves are not historical, the route and experience are preserved.

In alpine areas, scree or coping stones to define the trail edges, cairns placed at regular intervals, raised log or boardwalks, or causeways with adequate drainage may be added to direct hikers through fragile habitats. These built features should be unobtrusive but provide clear guidance along a comfortable and dry treadway. In addition, educational signs may be posted or increased ranger patrols may be desirable. Trails may be closed for nesting or migration season. Ideally, reroutes should not eliminate a control point along the trail that relates to the purpose of the trail, such as a significant view.

Trail Corridor Protection

Documentation of the history and significance of a trail may be part of a larger effort to protect a scenic corridor. Definition of the physical dimensions of the trail corridor, views, and its historic use and feeling may lead to zoning and development guidelines or land protection and acquisition priorities. For example, the Appalachian National Scenic Trail includes a buffer zone of up to one mile in order to protect the wilderness setting of the trail corridor.

Multiple Users, Traditional Use Patterns, and Archeological Resources

To meet multiple interests, segments of a historic trail may be rehabilitated for various users, including people with wheelchairs, horses, bicycles, or dogs. Alterations necessary to allow for multiple users should be evaluated for their impact on the historic route, grade, associated features, and feeling. Through an evaluation process that presents a series of alternatives, it may be determined that certain uses damage the integrity of the historic route and are not appropriate. For example, a towpath trail may be wide enough to accommodate multiple users, whereas a narrow hiking trail with historic stone steps may not. A comprehensive analysis of all circulation systems within an area will aid in developing opportunities for different types of use (Figure 21).

Trails that are considered sacred to certain peoples require careful treatment to protect spiritual sites or archeological resources. These routes may have been used for domestic purposes, work, trade, or led to ceremonial places that were used by multiple generations or for one significant event. The treatment approach should be developed in partnership with affiliated groups and specialists. The use of such trails for visitor enjoyment and education should be weighed against impacts to affiliated groups and threats to cultural resources.

Alternative routes may be necessary to direct people away from sensitive resources. For example at Tsankawi, a unit of Bandelier National Monument in New Mexico, park staff worked in consultation with the affiliated Pueblo tribe to reduce disturbances to religious and spiritual sites by eliminating several public trails. Eroded trails that remained open were hardened by adding rustic steps, which were cut from non-local, but similar tufa volcanic stone (Figure 22).

Trail-related Structures

Buildings, structures, and monuments can contribute to the character and significance of a trail system and require treatment guidelines to safeguard their integrity. A related building such as a hotel, cabin, shelter, or tower may be an integral part of the trail system. In some cases, the structure will have been determined historically significant, but its relationship to the trail system may not yet be defined and documented. Treatment recommendations may include the preservation of construction methods and materials for both the trail and related structure. Similarly, bridge and tunnel structures require careful attention in terms of safety, construction methods and materials. While historic trail bridges should be replaced in-kind if possible, a compatible yet distinguishable bridge may be necessary to accommodate greater loads, provide more safety features, or afford a higher level of accessibility. For example, to replace a historic wooden bridge of natural rough-cut logs, it may be necessary to use wider dimensioned logs and secure them with bolts rather than nails (Figures 23 & 24). Concealed steel stringers may be added for structural strength while key elements of the bridge design are preserved. Materials may be transported to the site

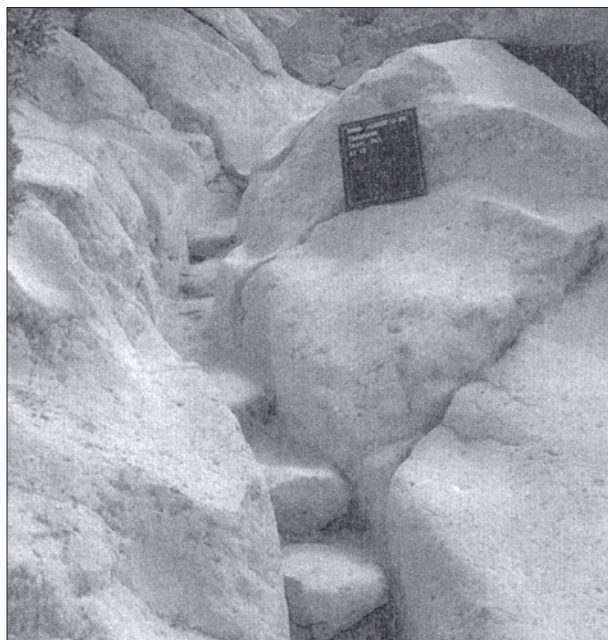


Figure 22. Steps of a similar stone type were added to a heavily eroded section of a Pueblo trail at the Tsankawi Unit of Bandelier National Monument. (Bandelier National Monument)



Figure 23. Historic photograph of corduroy bridge constructed by the CCC in Shenandoah National Park in Virginia. (National Archives; NARA MD, 79-42, VA, Box 32)

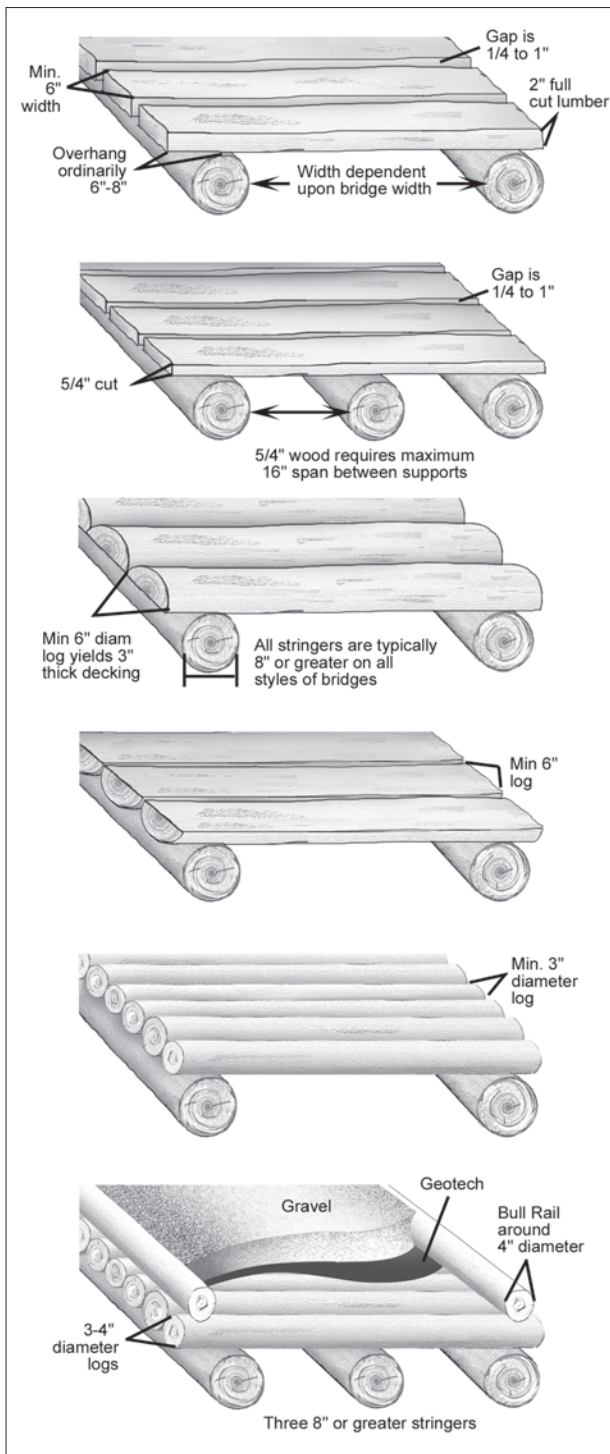


Figure 24. Examples of alternative bridge decking characteristics that reflect CCC era bridges. (Acadia National Park, Barter and Baldyga)

instead of following the historic practice of cutting down nearby live trees.³⁷ For trails with more than one period of significance, a historian or trail manager may be able to discern bridge characteristics from different periods and determine the appropriate treatment style (Figure 25).

Some trails include significant monuments, stone markers, tablets, and benches that are associated either with the trail's construction, dedication, or some other form of recognition. These features should be documented and inspected by a specialist, since markers and monuments are vulnerable to damage by vandals and natural processes. Significant trail-related features that can not be protected should be catalogued, removed to collection storage and an appropriate replacement should be installed along the trail.

Interface with Other Circulation Systems, Reroutes, and Parallel Routes

Many trails are either former transportation corridors or are linked to existing ones. Variations in width, surface materials, marking systems, and associated features may differentiate historical routes from other types of transportation corridors. If a rail line or canal towpath is converted to a trail, the signals, structures, tunnels, trestles, locks, or bridges should be retained. Features such as waysides, kiosks, benches, and associated visitor facilities may be added at intersections and other relevant points. These additions should be compatible in character yet clearly distinguishable from historic elements.

Maintaining the historic route of a trail can be a challenging goal that will not always be perfectly attained. Many historic trails were not designed to withstand the volume of use that they must now accommodate. Native American trails, early roads, and early recreational trails often traveled the most direct route without regard for drainage, sustainable grades or cross slopes. Even some trails that were carefully built, such as those constructed by the CCC, may not have adequately addressed water flow, rock slides, and unstable slopes, or anticipated that a beaver dam would flood the trail. If the trail cannot be stabilized, or if there are additional constraints such as sensitive archeological and ethnographic resources, a reroute may be necessary.

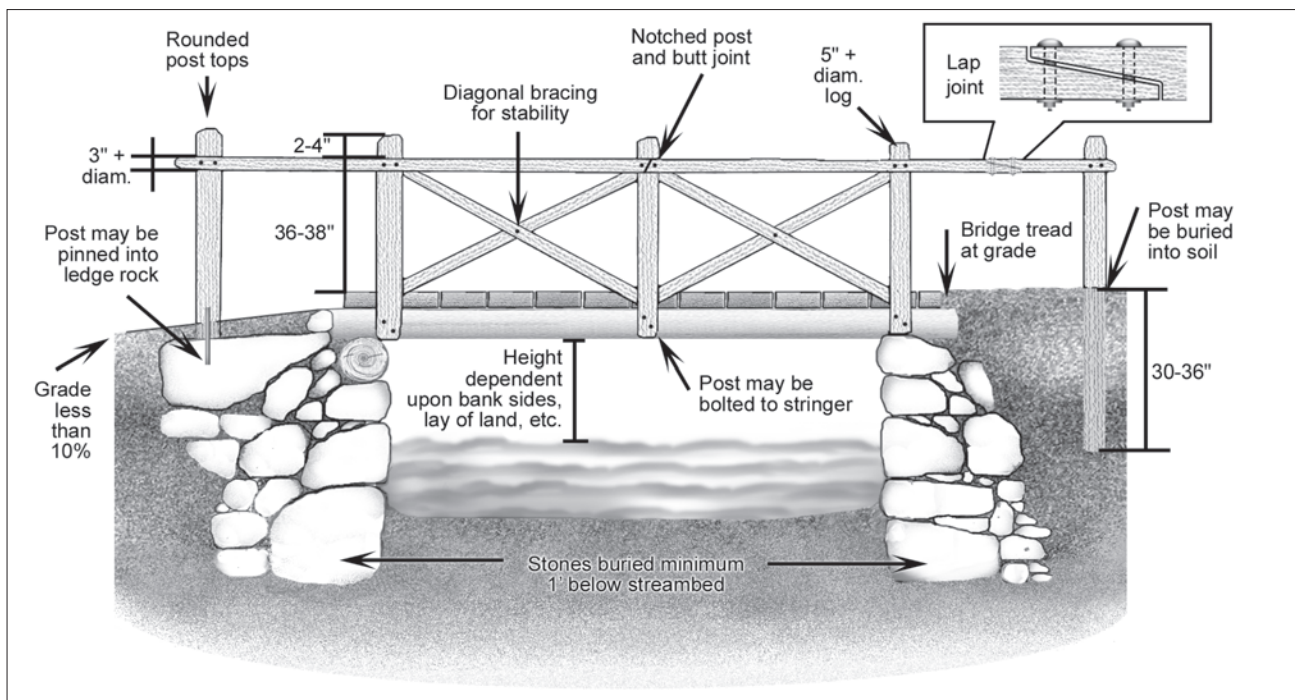


Figure 25. Example of bridge specifications for CCC era bridges. (Acadia National Park, Barter and Baldyga)

Before rerouting, control points or key attractions along the trail should be identified. Rerouted sections should provide new access to the same points. When the historic alignment is no longer tenable, another alternative is to design a parallel trail that enables users to experience the same landscape setting and feeling without adversely impacting the general location. At Minute Man National Historical Park in Massachusetts, an interpretive trail was added that parallels and intersects with the historic Battle Road to improve visitor circulation, safety, and enjoyment in the linear park. The width and surface treatment of the road and trail differ slightly, but both are compatible with the interpreted eighteenth-century landscape (Figure 26).



Figure 26. Section of the interpretive trail system in Minute Man National Historical Park that connects to and is similar in character to the historic Battle Road. (NPS, Olmsted Center for Landscape Preservation, Debbie Smith)

Opening or Closing Historic Trails

Historic routes may be abandoned, forgotten, and rediscovered. An abandoned trail or trace can serve as an outdoor archive of historic features that are often well-preserved from lack of use. Examination of built features on abandoned trails can provide information about historic construction methods that have been altered on heavily used trails either by natural processes

or detrimental treatment. Photographs and measurements of features such as culverts, steps, and retaining walls on abandoned trails can inform treatment for other trails. If an abandoned trail is to be reopened, it is useful to research its origin, purpose, and reasons for abandonment. It is also important to complete a comprehensive inventory as soon as possible to document its appearance prior to reuse.

Documentation may include photographs, video, maps, measurements, and descriptions. A survey of associated natural and cultural resources is very important, particularly if the route leads to significant cultural sites or bisects a large contiguous natural area. Reopening a trail creates future maintenance requirements which should also be considered.

A historic trail may also need to be closed or rerouted. For example, many historic trails follow logical routes through mountain saddles and cross streams where there are broad, gentle banks. Such areas become desirable camping and picnicking sites, but may also contain sensitive archeological or natural resource sites. When closing a trail section, it is better to cover and obscure access with leaf duff and branches rather than obliterate historic features, which should be documented and left in place for future reference. For example, at Valley Forge National Historical Park in Pennsylvania, a historic cart road that leads to a busy road was closed and covered with branches and leaves, but all subsurface features were left intact.

Views, Vistas and Vegetation Management

Managing views can be difficult in areas where land was previously cultivated for agriculture or cleared for timber. These areas historically had expansive views. In the East, changes in land use and increased land protection have caused many areas to revert to forest. Trails once described as scenic are now often woodland corridors to tree-covered summits. Many of the outlooks that late nineteenth-century concessionaires, early NPS designers, and the CCC built to provide sweeping views have become overgrown. Identification of control points is helpful and may lead to selective clearing for the most significant views. Depending on

the extent of clearing, these actions may require NEPA compliance.

Natural processes also affect historic trail character when trails that showcased certain types of vegetation have their surroundings changed through forest succession. This phenomenon can be particularly problematic when a name like the “Birch Grove Trail” refers to a species that is no longer prevalent. The CLR treatment section should address preservation of plant species, designed planting configurations, selective thinning and replacement-in-kind of certain species.

Trails through wooded areas typically require routine trimming to maintain an open trail corridor. Extensive removal of understory vegetation to improve views and remove dead and downed wood for “forest cleaning,” as was done by the CCC in the 1930s, may no longer be appropriate from an ecological perspective. A balanced approach to resource management objectives may limit the clearing of understory vegetation in some areas while recommending the thinning of canopy trees to promote understory growth in other locations.

Revegetation is often needed to rehabilitate disturbed sites after trail work. Once the characteristics of the historic vegetation is identified, appropriate plants may be propagated from local material (a process that may require up to two years) or purchased from a nursery. In sensitive habitats, imported tread material should be sterile and devoid of non-native seeds.

Drainage Structures

Improving drainage with historically compatible design techniques can improve durability and minimize maintenance for many decades. For most trails, drainage is a major issue requiring careful study of the surrounding topography, soil types, total water flow, seasonal flow, and direction of trail slope. Ideally, trails are designed to work with the natural drainage pattern and water runoff is controlled without eroding the trail surface.

All drainage measures, even simple side ditches that collect water and direct it along or away from the trail require annual maintenance to remove leaves, duff, and

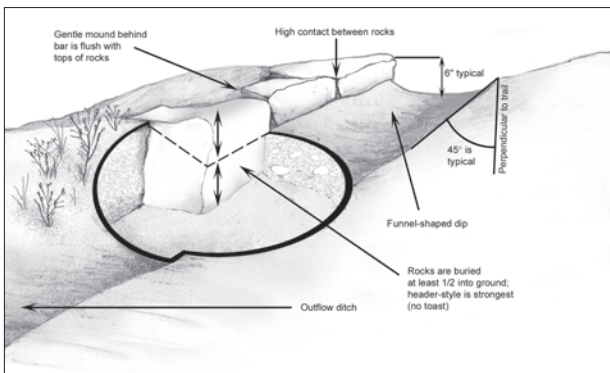


Figure 27. A water bar reinforced with stone. A water dip is similar without the use of stone to direct water off of the trail. (Acadia National Park, Barter and Baldyga)

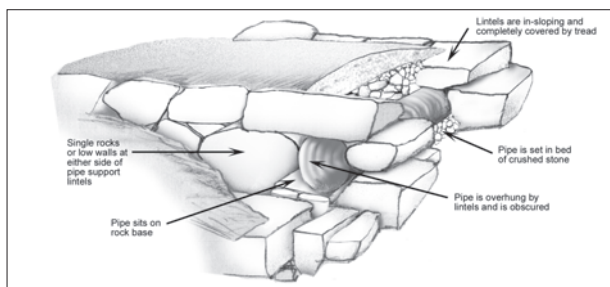


Figure 28. A pipe culvert is concealed with stone headwalls and covered with crushed stone and gravel to provide an uninterrupted tread. (Acadia National Park, Barter and Baldyga)

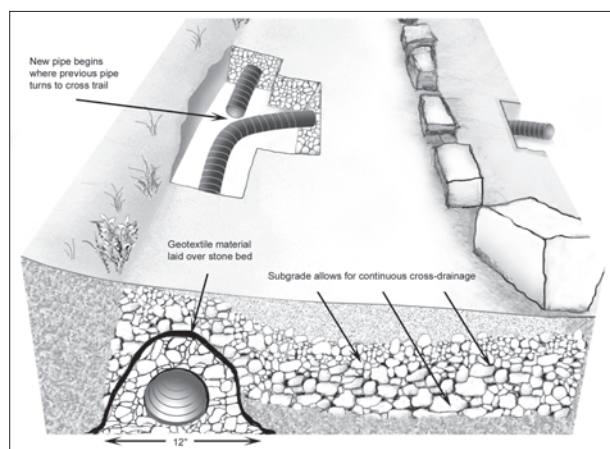


Figure 29. Perforated pipes are added below the treadway to improve drainage but not alter historic character of the treadway. (Acadia National Park, Barter and Baldyga)

debris. Where water crosses the trail, drainage features should suit the level of flow. For sections where light surface water crosses the trail, out-sloped tread, water bars, or water dips may be added (Figure 27). Water dips are desirable because they are less obtrusive and only minimally interrupt the trail surface, though they may lose their effectiveness with heavy trail use or with the heavy flow of storm water. Dips that flatten or are routinely washed out may need to be replaced with another form of drainage.

For trails with greater use or more serious drainage problems, side drains, culverts, and possibly bridges, should be constructed with the historically appropriate style and materials. For example, early cart trails and CCC trails were constructed with closed culverts for an uninterrupted tread. Some of these culverts are like small bridges and are remarkable examples of dry-laid field stone masonry. Other culverts are less evident, often overlooked and hence not maintained. A damaged section of trail may be the result of a clogged, closed culvert.

Where such precedents exist, preservation and accessibility may benefit from the restoration, rehabilitation, or addition of closed culverts. Rehabilitation is often the most viable strategy. In some cases, historic culverts may have been constructed entirely of stone, whereas contemporary replacements may consist of buried metal pipes with stone headwalls (Figure 28). Careful documentation of the location of drainage features should take into account the location of the trail with respect to topography, e.g. sidehill, direct or a switchback trail. The exact location of drainage features can be documented using a measuring wheel and/or GPS with field notes in order to expedite maintenance routines.

New materials and additional drainage may be necessary to preserve sections of historic trails. Underground drainage, such as concealed pipe culverts may be necessary. Similarly, subsurface drains using perforated pipe, gravel and geotextile fabric may aid in directing water under the trail without altering its appearance, though such a solution would not be appropriate in a sensitive archeological area or wilderness area (Figure 29).



Figure 30. Ascent of Half Dome at Yosemite National Park by steel pipe and cables installed by the CCC in 1939. (National Archives; NARA MD 79G-17C-4. May 1939)

Retaining Structures, Walls, and Steps

Most trails contain features that reflect their ceremonial, functional, industrial, or recreational history. These may include stone piles, railroad signals, iron rungs, or pins. Some of the most remarkable trails are constructed of simple materials, such as logs, iron pins, rungs and rails (Figure 30).

Recognizing and documenting these features can often guide future decisions on the appropriate use of materials, such as the use of stone instead of wood, or the use of iron for reinforcement of log or stone retaining walls. For example, at Mount Rainier National Park, the CCC used drift pins in bridge construction. A local blacksmith

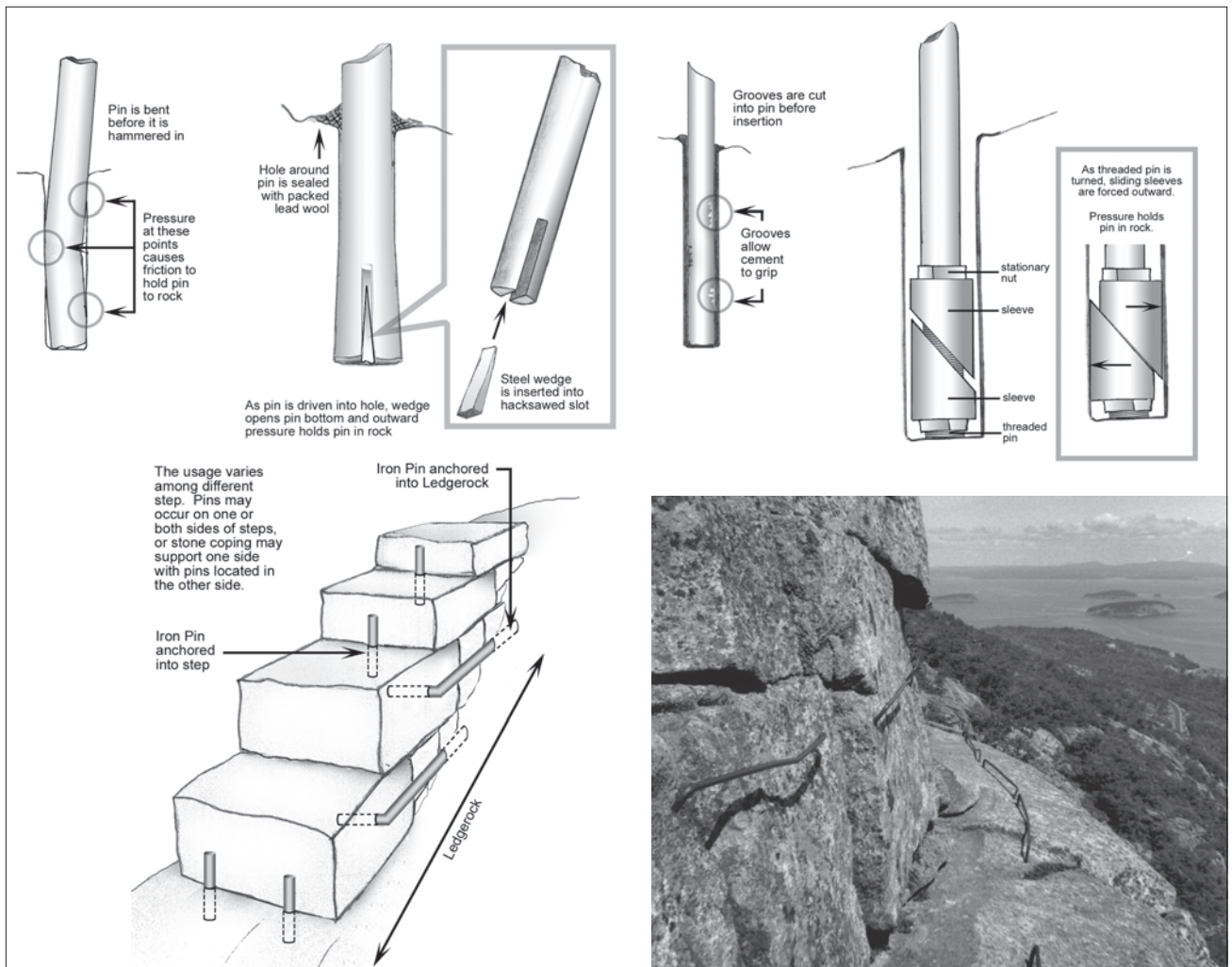


Figure 31. Photograph of the Precipice Trail in Acadia National Park and diagrams for installation of iron rungs. (Acadia National Park, Barter and Baldyga)



Figure 32. Nearly complete rebuilt wall at Big Bend National Park. To preserve the rough appearance, stones were placed with varied orientations. To improve stability, backfill was carefully laid. The wall was topped with large coping stones and the load was transferred down through the semi-laid backfill. (NPS, Steve Griswold)

is now making similar drift pins to use for replacement bridges. At Acadia National Park, trails ascend ledges by iron rungs installed in the 1910s. While some original rungs remain, many have been replaced using similar materials and installation methods (Figure 31).

Most trails have some component of dry laid, rubble, fitted, piled, or reinforced retaining wall, which aids in travel across slopes and ravines and is often part of a drainage system. Specifications for wall treatment should include the type of wall, associated drainage systems, foundation material, characteristics of the wall face, batter or relationship of rise to run in the face of the wall, backfill, and fill and tread surface materials. For example, at Big Bend National Park in Texas, plans were developed to rehabilitate a long rubble wall by preserving the rustic exterior stonework, constructing a more durable drainage system, foundation, and backfilling to improve the overall strength of the structure (Figure 32).

Trails designed primarily for foot traffic may contain extensive arrangements of rock or wooden steps, which often date to a historic period of intensive construction. Although each step and staircase was built in response to topography and typically used local materials, work can often be categorized by period of construction and characteristics. Treatment guidelines should address layout, materials, step size, rise, run, and

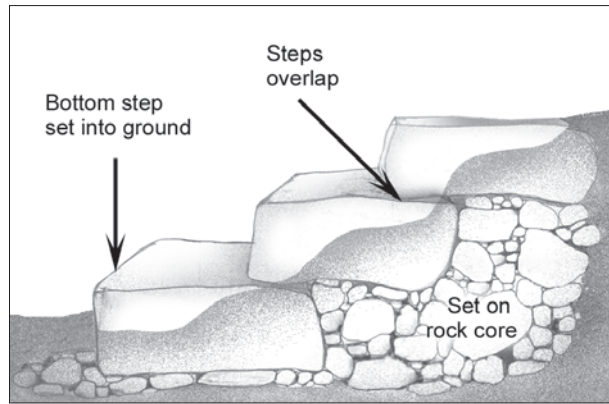


Figure 33. Diagram of slab-laid steps, a common construction used by the CCC in the 1930s. (Acadia National Park, Barter and Baldyga)

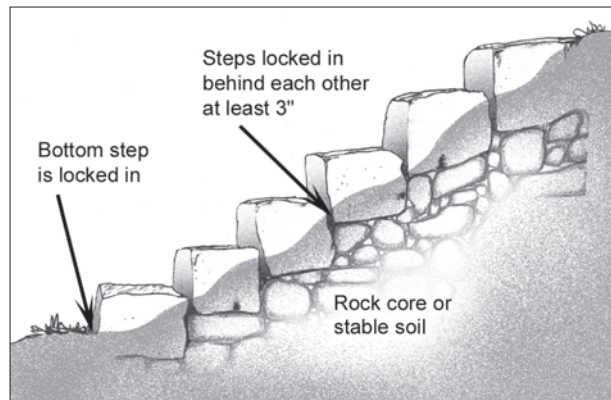


Figure 34. Diagram of set-behind steps, a contemporary method used to prevent stones from slipping downhill with heavy use. (Acadia National Park, Barter and Baldyga)

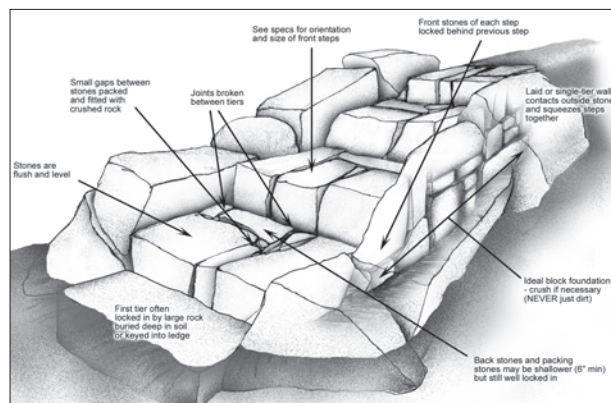
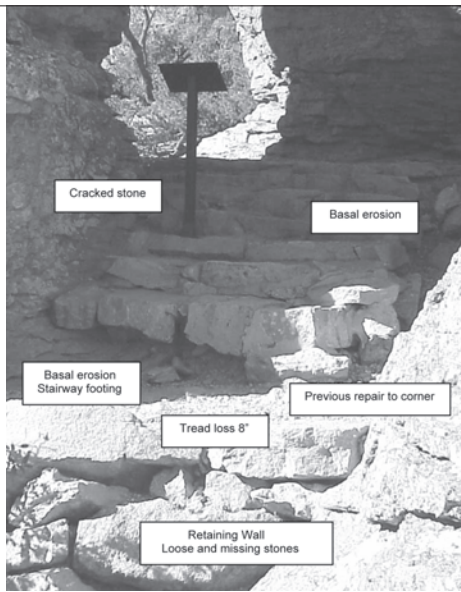


Figure 35. Diagram of rip-rap steps with random size stones used to blend into the surrounding landscape. (Acadia National Park, Barter and Baldyga)



Chiricahua National Monument Feature Form

Feature Form Trail: Massai Point Nature Trail

Date: October 15, 1999

Feature #: MNT 27

Location: South portion of trail overlooking upper end of Rhyolite Canyon – approximately 300 feet from trail head.

Context: Hilltop

Aspect: South

Feature Type: Stairway

Size: Small

Feature Description: Stairway constructed of flat tabular to blocky slabs of rhyolite set in cement mortar on a rubble foundation abutted to the base of rhyolite pinnacle. Each riser is composed of two to five individual stones of variable size and covers a vertical drop of approximately four feet. Voids are filled with small angular fragments of rhyolite or cement. Stairs lead from trail down to a platform, created by a stone retaining wall (MNT 28), that provides a scenic overlook into the dense woodland and rhyolite pinnacles of upper Rhyolite Canyon. In addition, a metal interpretive sign was installed on one of the stair steps. **Feature Condition:** Stairway risers all show signs of deterioration – cracked and missing stone, collapsed stones, basal erosion of footings and loss of foundation material – leading to uneven and potentially unstable step surfaces. While the abutted portion of the stairway appears stable, the basal footings of the outer side are actively eroding. The area adjacent to exposed footings is unstable and subject to channeled drainage from trail surface. Platform exhibits substantial loss of tread material, thereby contributing to loosening of retaining wall (MNT 28). The installation of a metal interpretive sign may have contributed to deterioration of step. Previous repairs are evident in numerous cement patches and placement of stones to provide support for deteriorating stairway foundations.

Figure 36. Treatment work including step repair identified on historic CCC trail in Chiricahua National Monument.

degree of uniformity. Stone steps may be slab-laid, with each step set on top of the one below, or set-behind, with each step set behind and above the step below it (Figures 33 & 34). Stones may be cut, uncut or a combination. The term “rip rap steps” refers to randomly laid, abutting stones, which provide a seemingly natural staircase (Figure 35). Shims, or small stones placed under steps to fill gaps or reduce wobble, may have been used. The absence of shims generally indicates a higher level of craftsmanship. Rock steps may also be accompanied by coping stones, sidewalls, iron pins, shims, railings, and associated drainage features.

At Chiricahua National Monument, where there is extensive CCC era step work, each step or stair type was classified and a series of stabilization and repair needs was identified. Guidelines included the repair of associated walls and footings, mortar replacement, repair of loose capstones and steps, and the reinforcement of steps using concealed iron retaining bars (Figure 36).

Wooden steps, which are generally less durable, were usually constructed with locally cut logs. Squared timbers were also used in more accessible locations. Log steps were staked in place or secured with rocks, anchor logs, pins, or trenching techniques. In some cases, wood steps were used in combination with log cribs or even more elaborate log ladders requiring a high degree of craftsmanship. Current regulations may prohibit replacement with native materials. When repairs or replacements are necessary, the use of compatible materials acquired from other locations should be considered. Dimensions, design techniques, and workmanship should follow historical precedents.

Tread

Most trails can be classified as either unconstructed, such as the wagon trails used by pioneers, or constructed, such as those built by the CCC. Treatment of an unconstructed wagon route, primitive trace, or “opportunistic trail” formed by repeated use, is particularly difficult since management activities or increased use can easily alter historic appearances. In some cases, however, low or moderate use is essential for keeping the trail open and defined. The carrying capacity of a

trail needs to be determined and the construction of a parallel or alternate route may be necessary. For example, along the Lolo Trail between Montana and Idaho, continued use is helping to preserve the trail. Increased use may prompt a permitting process to help protect the trail from deterioration.

For both unconstructed and constructed trails, increased use may lead to extensive degradation, particularly the loss of surface material. Without adequate maintenance, a smooth, graded trail can become a treacherous collection of gullies, rockslides, exposed roots, protruding stones, and puddles. Once conditions become this severe, relocation may be necessary or a major rehabilitation project must be initiated, requiring extensive labor to stabilize loose materials, control drainage, and replace surface materials. In such cases, treatment guidelines need to comprehensively address the improvement of drainage systems, the stabilization of tread, and the development of effective maintenance routines.

Trails that need substantial rebuilding or resurfacing may require large quantities of stone and gravel. Historically, these materials were extracted locally. If that is still a possibility, archeologists, botanists, biologists or wildlife specialists may need to determine if any local cultural sites or habitats would be damaged by borrow pits. A limit may be set on the amount of materials to be extracted from an area. When larger quantities are needed, the materials should be transported from outside protected areas, using the safest, most efficient, and most resource-sensitive methods available, which may include wheelbarrows, trucks, all-terrain vehicles, tractors, helicopters, or pack stock, some of which may not be feasible in wilderness areas. For trail construction within a designated Wilderness area at Rafferty Meadow in Yosemite National Park, mules were used to bring additional tread material to the alpine meadow (Figure 37). Such actions may require NEPA compliance.

To support a higher level of use, tread composition may be strengthened by adding subsurface rubble, checks, and/or surface material additives such as clay or a soil stabilizer. Subsurface rubble was commonly used in CCC trails, which typically contained a six to twenty-four-inch layer of stone rubble below the surface to improve drainage. Subsurface rubble can greatly



Figure 37. This stone-lined causeway with crowned tread material was constructed in 1985 through Rafferty Meadow in Yosemite NP to repair eroded alpine area. Because the trail is located in a designated Wilderness area, materials were imported by mule. (NPS, Steve Griswold)

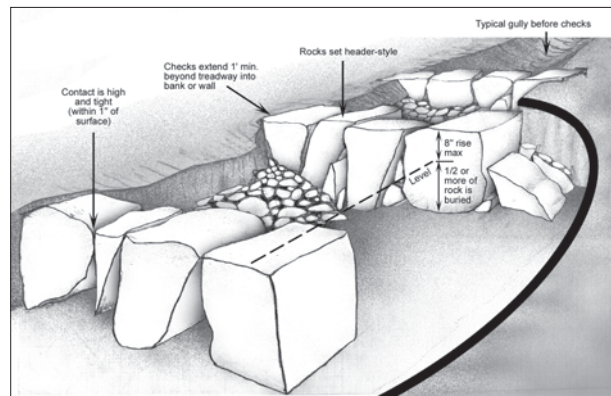


Figure 38. Diagram showing installation of stone checks before they are covered with surface gravel. (Acadia National Park, Barter and Baldyga)

improve drainage, but should be used in combination with other drainage features such as culverts, side ditches, and water dips. Some trail rehabilitation projects have included a layer of geotextile fabric between the rubble and surface material. This is not recommended, however, especially in backcountry or wilderness areas, as the fabric inevitably becomes exposed over time.

Checks may be used to stabilize trail sections that have gullied or have the potential to gully. Checks are effective when trail slope is less than twenty percent and it is not possible to shed water from the trail surface, such as when a trail travels down a natural gully. When

installed and maintained correctly, checks are not visible, acting as “hidden steps” underneath the evenly graded tread surface, holding back or “checking” the uphill infill material—a more subtle and durable solution than log cribbing. Checks are particularly useful on trails that travel directly up slopes, such as early migration and recreation trails that were not carefully laid out (Figures 38 & 39). Checks may not be effective in areas of poor, loose soils and/or where there is high precipitation. The source of water above a section of checks should be directed off the trail, if possible, using a waterbar, dip or other drainage structure.³⁸

For large resurfacing projects, a soil mix may be imported, allowing for the mechanical mixing of desired materials. The addition of clay can aid in forming a compacted tread with a crown, much like a road. Commercially available soil stabilizers may also be

added, such as EMC²TM or Road OylTM (a pine resin binder) both by Soil Stabilization Products or Stabilizer,TM by Stabilizer, Inc., which is an organic binder made from *Plantago*, a desert plant. Other methods include mixing in dry Portland cement or similar binding agents. The *Plantago* Soil Stabilizer was used effectively as a binder and stabilizer on the Minute Man National Historical Park interpretive trail (see Figure 26).

A series of test sections is recommended in order to develop a surface mix that can withstand local environmental conditions and trail use, as well as provide a compatible color and texture with native materials, since ultimately some of the material will wash from the trail surface. The material should also be checked for non-native plant material, especially invasive species.

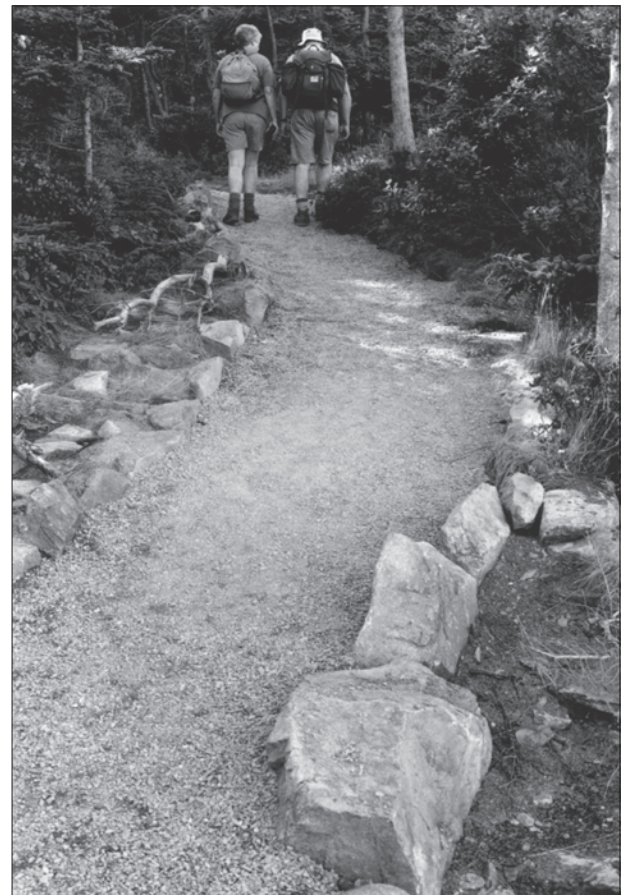


Figure 39. A section of checks installed to repair a gullied trail shown during and after completion on the Ocean Path at Acadia National Park. (NPS, Olmsted Center for Landscape Preservation)

CONCLUSION

Historic trails offer unique opportunities to retrace America's cultural heritage and experience a sense of place, history, and natural splendor. Understanding these resources and making thoughtful treatment and management decisions enables contemporary users and future generations to share these experiences.

Preserving a historic trail requires careful planning, a dedicated group of respectful trail users, and ongoing maintenance. This planning requires a substantial amount of time and the involvement of a multidisciplinary team, including affiliated groups and specialists. The project team should strive to develop clear goals and guidelines that are based on a thorough understanding and analysis of the physical history and existing conditions of the trail (Sidebar 8).

Trail users are often the best sources for information. Many can offer multigenerational knowledge and photographic documentation of historic conditions. Trail users frequently also serve as stewards, advocates, and volunteers for the trails. In fact, for the Appalachian National Scenic Trail, the Long Trail, and many other trails, volunteer-based organizations serve as full-fledged management partners that are involved in every aspect of trail management.

For many historic trails, use has increased dramatically but maintenance programs have not changed. Dedicated crews depend heavily on oral tradition to pass along techniques and rely on extensive hand labor and simple tools, including hand saws, loppers, mattocks, and pulaskis (Figure 40). Those responsible for the long term care of a historic trail need to employ an appropriate mix of historic and contemporary construction methods and materials to ensure the integrity of historic trails is preserved. Faced with the challenges of limited funding and the effects of increased use, maintenance is an increasingly complex task. The best way to meet this challenge is to develop an approach to trails stewardship that brings together a wide range of specialists and other stakeholders to collaborate in the development of comprehensive, historically informed, environmentally sensitive, and administratively sustainable treatment and management program.

SIDEBAR 8: CHECKLIST FOR IMPLEMENTING A SUCCESSFUL PROJECT

- Document cultural and natural resources using all tools available. Use the Cultural Landscape Report process, other plans, reports, and inventories, and associated compliance procedures for both historic (i.e., NHPA) and natural resources (i.e., NEPA) to develop and work through alternatives.
- Develop a treatment approach that incorporates the project goals and objectives, while addressing issues identified, including safety, structural stability, accessibility, and connections to other circulation systems and facilities.
- Define historic details to replicate and/or develop new details that will complement the historic trail. Select materials that are compatible with the historic trail system. Develop a consistent identity to link trail fragments and associated features through signs, guidance, and information systems.
- Evaluate and mitigate impacts to sensitive natural resources or other cultural resources by evaluating reroutes, seasonal closures, parallel routes, or restrictive use.
- Establish relationships with cooperating non-profit organizations to assist in identifying issues and alternatives, and locating volunteers to work on a project.
- Develop a work plan with all interested parties. Use experienced crew leaders to teach and serve as mentors to other crew members.
- Plan for sustained funding of maintenance work.



Figure 40. California Conservation Corps trails crew with pulaskis and mattocks at a scenic overlook along the trail, 2000. (Peter Lewis)

REFERENCES

Government Trail Programs

US Bureau of Land Management
National Landscape Conservation System
1849 C Street, NW, MIB 3123
Washington, DC 20240

US National Park Service
National Trails System Program
1849 C Street, NW (2235)
Washington, DC 20240
www.ncrc.nps.gov/rta

US Forest Service
Recreation, Heritage, and Wilderness Resources Division
P.O. Box 96090
Washington, DC 20090-6090

US Fish & Wildlife Service
National Trails Program
4401 North Fairfax Drive, Room 634
Arlington, VA 22203

Non-Profit Trail Organizations

American Hiking Society
1422 Fenwick Lane
Silver Spring, MD 20910

American Trails
P.O. Box 491797
Redding, CA 96049-1797
www.AmericanTrails.org

Appalachian Trail Conference
799 Washington Street
Harpers Ferry, WV 25425
www.atconf.org

Leave No Trace Center for Outdoor Ethics
P.O. Box 997
Boulder, CO 80306
www.lnt.org

Rails-to-Trails Conservancy
1100 17th Street, NW, 10th Floor
Washington, DC 20036
www.railtrails.org

Tread Lightly!, Inc.
298 24th Street, Suite 325
Ogden, UT 84401
www.treadlightly.org

Useful Websites

US Federal Highway Administration,
Forest Service Publications List
www.fhwa.dot.gov/environment/fspubs/index.htm

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ENDNOTES

- 1 A Cultural Landscape Report serves as the primary guide to treatment and use of a cultural landscape, and prescribes the treatment and management of the physical attributes and biotic systems of a landscape.
- 2 One of the earliest recreational trails was the Crawford Path up Mount Washington in New Hampshire, cut in 1819 and still in use today. Laura and Guy Waterman, *Forest and Crag: A History of Hiking, Trail Blazing, and Adventure in the Northeast Mountains* (Boston: Appalachian Mountain Club, 1989) 41-46.
- 3 John F. Sears, *Sacred Places: American Tourism Attractions in the Nineteenth Century* (New York: Oxford University Press, 1989) 3, 4, 61.
- 4 Associated resources, including historic structures, artifacts, and memorabilia that tell the story of those who used the route, are protected and managed through partnerships with state, local, non-profit, and private organizations and citizens. Examples include the 3,700-mile Lewis and Clark Trail and the 54-mile Selma to Montgomery Trail. Designation involves four steps: A Congressional amendment requesting a feasibility study; the study by a land-managing agency; an amendment establishing the trail; and a comprehensive management plan to guide the management partnership. Steven Elkinton 1997. CRM and the National Trails System. *CRM (Cultural Resource Management)*, 20: 1. (Washington, DC: US Department of the Interior, National Park Service, Cultural Resources, 1997).
- 5 Downing articulated the principles of American picturesque landscape design in his widely read "Treatise on the Theory and Practice of Landscape Gardening" (1841, eighth edition 1875), reprinted as *Landscape Gardening and Rural Architecture* (New York, Dover Publications, 1991) 294-5, 399-401.
- 6 Junctions and scenic points were marked with an object, such as a tower, bridge, monument, or rustic feature. Charles E. Beveridge and Paul Rocheleau, *Frederick Law Olmsted: Designing the American Landscape* (New York: Rizzoli International Publications, Inc., 1995) 49, 51, 88, 89.
- 7 Beveridge, Charles and Paul Rocheleau. *Frederick Law Olmsted: Designing the American Landscape* (New York, NY: Rizzoli International Publications, Inc., 1995) 88.
- 8 An entrepreneur constructed the Bright Angel Trail in 1890 as a toll trail from the south rim to the inner canyon and profited for many years, until the federal government acquired the land.
- 9 The country's first village improvement society, the Laurel Hill Association, was formed in 1853 in Stockbridge, Massachusetts, to raise funds from residents to beautify the community, and improve the public setting through landscaping. In 1895 a path was built on Stockbridge's Laurel Hill in memory of the Association's long-time president and natural areas were donated to the organization. Egleston writes in *Villages and Village Life*, "There are few things which could do more for the social life and true enjoyment of a village than the making of good footpaths." Richard Cloues, "Where Art is Combined with Nature: Village Improvement in Nineteenth Century New England." (Unpublished thesis, 1987) 27, 59, 65, 761-776, 859-872.
- 10 Waterman, 192.
- 11 Linda McClelland, *Building the National Parks: Historic Landscape Design and Construction* (Baltimore: Johns Hopkins University Press, 1998) 2, 3, 7.
- 12 Frank A. Kittredge, Chief Civil Engineer, NPS "Trails of the National Parks," printed in *American Civic Annual*, ca. 1931 (National Archives, RG79: 600-633, Central Files 1907-39, Roads, Trails & Bridges).
- 13 Correspondence from C. G. Parker to Bilkert, November 3, 1932 (National Archives, RG79: 600-633, Central Files 1907-39, Roads, Trails & Bridges).
- 14 Frank Kittredge, "Standards of Trail Construction" San Francisco, CA: Office of the Chief Engineer, National Park Service, October 1934. Guy B. Arthur, *Construction of Trails*. Civilian Conservation Corps, Project Training Series no. 7, (Washington, D.C.: 1937). Albert H. Good, ed. *Park and Recreation Structures*. 3 vols. (Washington, D.C.: National Park Service, 1938).
- 15 "Indian Sacred Sites," Executive Order 13007 of May 24, 1996.
- 16 "Floodplain Management," Executive Order 11988; "Protection of Wetlands," Executive Order 11990, Endangered Species Act of 1973, as amended; Federal Water Pollution Control Act (Clean Water Act) of 1977; and National Environmental Policy Act of 1969.

- 17 National Park Service, *Comprehensive Management and Use Plan: Trail of Tears National Historic Trail*, 2 volumes, (Denver: Denver Service Center, #NPS D-2A, 1992).
- 18 Anthony Godfrey, "Historic Resource Study, Pony Express National Historic Trail" (National Park Service, 1994).
- 19 See also *Landscape Line 3: Landscape Characteristics*.
- 20 For more detailed information, see *Landscape Line 10: Geographical Information Systems*, and *Landscape Line 11: Global Positioning Systems*. National trail data standards are being developed by a federal interagency group. For the most current information visit: <http://www.nps.gov/gis/trails/index.html>
- 21 For National Park trails, documentation should be coordinated with the Facility Management Software System (FMSS) to organize and streamline information.
- 22 Birchard, William Jr., and Robert Proudman. *Appalachian Trail Design, Construction, and Maintenance* (Harpers Ferry, WV: Appalachian Trail Conference, 2000) 19, 35; and Appalachian Trail Conference. "Trail Assessment Handbook," appendix in *Local Management Planning Guide* (Harpers Ferry: ATC, 1997). www.appalachiantrail.org/protect/policies/lmpg.html
- 23 *National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation* (www.cr.nps.gov/nr/publications/bulletins/nrb15/). The document also contains information on National Landmark criteria.
- 24 For further definitions, see to *Landscape Line 3: Landscape Characteristics*.
- 25 For criteria definitions, see National Register Bulletin 15.
- 26 McClelland, 502, 503, 511.
- 27 Wells, Merle. "Lolo Trail." National Register of Historic Places, Nomination Form, Idaho State Historical Society, Idaho. May 13, 1991.
- 28 NPS, "Director's Order 12: Conservation Planning, Environmental Impact Analysis, and Decision Making." (USDOT, NPS, Jan 2001).
- 29 NPS Intermountain Region. "Technical Assistance Manual, Compliance with Section 106 of the National Historic Preservation Act." Release No. 5, (USDOT, NPS, Feb 2003).30 Barter et al., 2004, 12.
- 31 Recreation Access Advisory Committee. "Recommendations for Accessibility Guidelines: Recreational Facilities and Outdoor Developed Areas (U.S. Architectural and Transportation Barriers Compliance Board, July 1994). (www.Access-board.gov).
- 32 Bergmann, Roger. Soil Stabilizers on Universally Accessible Trails (US Forest Service 0023-1202-SDTDC, 2000).
- 33 Birchard and Proudman, 145-147.
- 34 Changing the name of a trail to reflect an earlier historic name requires coordination with the US Geological Survey and all other map vendors.
- 35 Birchard and Proudman, 155-173.
- 36 Griswold, Stephen. "High Elevation Trailwork in United States National Parks, and Peru and Nepal" High Altitude Revegetation Workshop, Fort Collins, CO, 3/2000.
- 37 Many examples of CCC bridges are shown in Albert Good's 3 volumes of "Park and Recreation Structures."
- 38 Griswold, Stephen. *A Handbook on Trail Building and Maintenance*. CA: Sequoia Natural History Association, Fifth Edition, 1996. Retainer bars, 79-83, 109-110.

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