

Chapter 9

MAINTENANCE

The objectives of trail maintenance are to: provide for user safety, access, and convenience, protect adjacent resources, and preserve trail investment. Maintenance begins immediately following trail construction and is a continuous process.

Sometimes questions arise whether seldom used stretches of trail are worth the time and effort required to maintain them. However, if the trail is not maintained, why should anyone hike it? All trail should be maintained in the best condition possible—a well-maintained trail is self-perpetuating.

TRAIL ASSESSMENT AND INVENTORY

Trail assessment

For routine maintenance, a detailed trail condition assessment may not be necessary. However, there may be sections of the trail where it is not possible to complete all maintenance immediately or where more help in terms of labor and/or money is needed. For example, during a routine walk through, a severely-eroded, rather lengthy trail section may be noted. Since the best solution for a severely eroded trail section may be to relocate it, the work is not within the capabilities of an individual maintainer to correct immediately. In that case an assessment is needed so that the major needs can be made known to the local managing authority and the NPS. With this information at hand, funding or labor may be found to assist in correcting the problem. A maintenance assessment can also serve as a basis for applying for Challenge Cost Share funds. One way to accomplish an annual trail assessment and document heavy maintenance needs, or to just provide information on the condition of the trail, is through the use of a trail assessment or inventory form. An example is shown in Appendix 2. (Agencies or clubs may use their own, if available.)

Inventory

A more detailed inventory of trail features and required maintenance is desirable as the trail moves closer to completion, as trail managers become more knowledgeable, and as the NPS or the North Country Trail Association (NCTA) and its affiliates increase management oversight capability. An electronic database is capable of generating various reports including maintenance needs. An inventory similar to either the Appalachian Trail Conference's TREAD database, or the proposed Ice Age NST Trail Inventory and Assessment Process (as shown in Appendix 2-B) should be considered. At this point it is beyond the scope of this handbook to develop a database format or require the various local trail managing authorities to use it. This level of detail may be necessary someday. If current managing authorities desire a detailed inventory, they are encouraged to proceed—keeping in mind that the selected format and the computer software should be compatible with other authorities, and that the data be easily convertible to those electronic software programs.

There are two ways to collect data for this type of database:

➤ Paper Forms

Persons using this method walk the trail and enter the data on a series of forms. The data from the forms is then manually typed into the electronic database back in the office. This method is shown in Appendix 2-B.

➤ GPS/GIS

Persons using this method walk the trail with a Global Positioning System (GPS) unit, keying in the data points and mapping the trail as they go. Back in the office, data from the GPS unit is simply downloaded to a computer and linked to a Geographic Information System (GIS). This method is the wave of the future, and not only provides a detailed inventory of various trail features, but also produces a very accurate trail map. Eventually, the master records and maps maintained by the NPS will be in a GIS.

Some agencies are already using GPS/GIS technology in their trail management activities. As this technology becomes more widely available, others will begin using GPS to inventory and map the trail. When the NPS achieves full GIS capability, data collected by others will be used. At that time, it will be important that the various trail managing authorities have been inventorying similar kinds of trail features and collecting similar data. Therefore, a GPS Data Dictionary is shown in Appendix 2-C. It will be helpful for those who are using GPS technology to duplicate this data dictionary and collect the information shown, **if** it occurs on that segment of trail.

MAINTENANCE ACTIVITIES

When assessing trail maintenance needs, the following groups of general maintenance categories should be considered. Some of the more common maintenance activities required to remedy deficiencies identified during the annual trail evaluation could include:

Trail Maintenance-Vegetation:

- Brushing/clearing areas
- Remove fallen trees/branches
- Hazard tree removal
- Slope revegetation
- Backslope grooming
- Vista maintenance
- Poison Ivy removal (herbicide)

Sign Maintenance:

- Sign repair/rehabilitation
- Sign replacement
- Blaze repainting and maintenance
- Cairn repair
- Barricade/closure device repair

Drainage Maintenance:

- Cleaning/repairing structures
 - culverts
 - waterbars
 - Cowetta dips
 - drainage ditches
- Replacement of existing structures
 - culverts/underdrains
- Install additional drainage structures
 - waterbars
 - culverts
 - grade dips

Structure Maintenance:

- Bridge repair
- Cribbing/retaining wall repair
- Barrier/guardrail repair
- Steps/perron repair
- Fence/gate/stile repair
- Shelter repair

Tread Maintenance:

- Grading tread
 - slough and slide removal
 - slump repair
 - filling erosion ditches
 - grubbing rocks/ roots/stumps
- Spot surfacing
- Turnpike section repair
- Surface replacement (similar material)
- Surface repair
- Remove loose rocks

Litter Clean-up:

- Old dumps near trail
- Current discarded litter

Trail Maintenance-Vegetation: All side branches extending into the trail clearing should be cut flush with the parent branch or stem, leaving no stubs. This is safer, lasts longer, and also allows for the wound to heal naturally.

Small trees and shrubs within the tread should be grubbed out to prevent tripping. Holes should be filled and compacted.

Trees and brush outside the tread (but inside the trail clearing) should be cut as close to the ground as possible, leaving no sharp pointed stumps or stems. Consideration may be given (especially on exotic species) to treating these cut stumps with herbicide — after obtaining proper approval.

Unless prohibited because of ROS setting, using power mowers in open grassy areas or power brush saws in brushy areas should be considered.

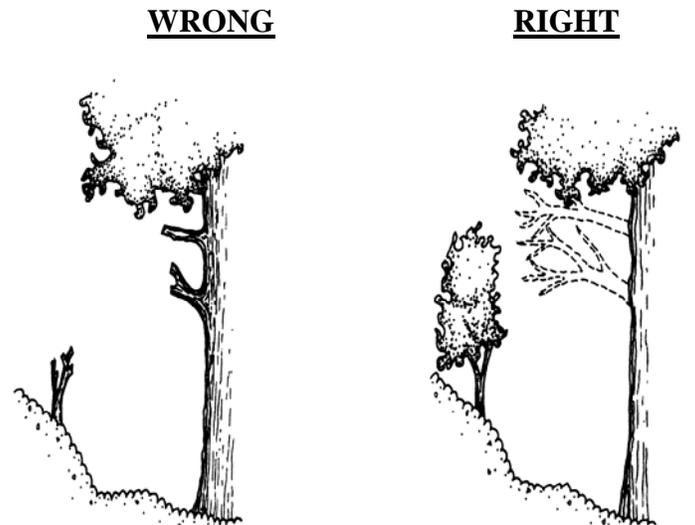
Fallen branches and trees should be removed except for a few large trees/logs near access points (see maintenance tips). On larger logs, remove a section only the width of the tread to further restrict unwanted use.

In high use sections of the trail or near camping areas, dead or dying trees that have a possibility of falling across the trail or camping area should be removed. In Primitive ROS areas, only those trees that may be a serious hazard to users should be removed.

Tread Maintenance: When tread repair is needed, it should be restored to the original design condition, free of loose stones, rock points, stumps, and roots. Attention should be given to dips and outsloping so that water does not collect on the trail.

Drainage Maintenance: Proper drainage protects the trail from erosion damage. Trails should be routinely inspected to ensure that all culverts, dips, waterbars, drainage ditches, etc. are free of debris and ready to function properly at all times—especially during the rainy season or spring runoff. Routine maintenance is not only necessary, but valuable in terms of labor, material, and money saved on emergency repairs, and in the number of days the trail is useable. If repairs are necessary, they should meet or exceed the original construction specifications.

Trail and Support Structure Maintenance: The major consideration in structure maintenance is safety. Bridges, stiles, boardwalks and all support structures should be routinely inspected in order to ensure safe conditions and intended function (see bridge



inspection requirement in Chapter 5). Minor maintenance of structures should be provided by the adopter or trail crew. Deficiencies requiring major efforts should be planned as a separate project. Unsafe structures must not remain unattended. If work must be temporarily deferred, an alternate trail route should provide a bypass of the hazard.

Sign Maintenance: (see discussion in Chapter 7).

FREQUENCY OF MAINTENANCE

Most trail segments need maintenance about three times per year.

Prior to Memorial Day - This may be the maintenance period that involves the most work. The objective is to get the trail ready for the spring hikers. In addition to general trail cleanup, some of the more important tasks are to:

- Remove tree limbs and fallen trees from the trail, and prune encroaching limbs as needed.
- Repaint or replace the blazes if they are faded or missing. (Be sure that they are not obscured by vegetation—consider growth that occurs before the next maintenance).
- Make sure that all signs and trail emblems are in place and well maintained.
- Inspect for water in the trail and take corrective action.
- Carefully inspect all bridges—immediate safety needs should be met and tasks which are too large for immediate action noted.
- Maintain all trailheads, campsites, and other support structures.
- Keep a list of larger jobs or those that require different tools that will require attention at some other time.
- Schedule time for major projects that were identified—round up tools and helpers.
- Pick up litter.

Mid-Summer - Early July is a good time to take care of annual growth so that the trail is kept clear and relatively easy to hike. The hiker should not be assaulted by weeds and briars. Some of the key jobs for mid-summer are to:

- Mow or cut all weeds, brambles, briars, and high grass encroaching on the trail. On sections of the trail that pass through fields or other places receiving direct sunlight, mowing may have to be done on a more frequent basis—perhaps monthly throughout the summer. Brambles and briars may need to be grubbed out by the roots to prevent rapid regrowth.
- Prune all brush and overhanging limbs that have grown into the trail clearing—all blazes and signs must be visible.
- Complete the larger jobs that could not be accomplished the previous spring.
- Maintain and improve water bars, drainage ditches, and all trail structures.
- Be alert for noxious or exotic plant species—remove, kill, or inventory them for future vegetative management projects.
- Pick up litter.

Fall - Fall maintenance is geared toward preparing the trail for the winter months. This is a time to:

- Finish any uncompleted jobs and recheck blazes and signs—replace and repair as necessary.
- Be sure that campsites and shelters are clean and in good repair.
- Contact landowners to thank them for their support.
- Pick up litter.

ORGANIZING THE CREW

Experience and knowledge of the trail will help determine what tools to take and how many persons to recruit. The most efficient way to manage trail crews goes by various names—the "overseer" system, the "trail sponsor" system, the "adopt-a-trail" system. The key is that one person is responsible for a particular segment of trail on a permanent basis, if possible. It is their responsibility to see that the trail segment is maintained, either working by themselves or by recruiting helpers. The advantage

of this system is that the adopter becomes well acquainted with the segment, can deal efficiently with problem areas, and can judge how much and how often work is needed to keep the segment maintained. A disadvantage of this system is that a segment can become so familiar that problems are overlooked or it becomes boring for the adopter. One way to overcome this problem is to rotate adopters between segments every few years . A good reference on crew organization is the Appalachian Mountain Club's *Organizing Outdoor Volunteers*.

The annual trail evaluation or a pre-workday trip by the adopter can serve as an assessment of the work to be done and will facilitate crew organization. Two to four persons can usually maintain 3 to 5 miles of trail per day—depending on the individuals, terrain, vegetation, and the number of maintenance problems.

The exact kind and number of tools for a crew varies from one part of the country to another. In general, tools which are capable of cutting weeds, pruning branches, removing logs, digging and leveling trail, and cleaning waterbars are desirable. It is advantageous to rotate tools among trail workers to provide relief from repetitive motion and effort (see Chapter 10 for tool suggestions).

CLEANUP

The trail must be cleared of all debris following clearing or heavy maintenance. Maintenance results should appear neat and hardly noticeable to a hiker. Inadequate clean-up can spoil even the most thorough clearing job. One person on the crew should be assigned responsibility for this job. All cut growth should be carried off the trail and scattered—not piled. If eroding gullies are nearby, the cut material can be placed in the gully to slow the flow of water and catch sediment (see the third item under maintenance tips-clearing).

All flagging, construction stakes and debris, litter, etc., should be removed.

MAINTENANCE AND CONSTRUCTION TIPS

Work should be organized so every section of trail is left as complete and finished as possible.

Use should be found for as much disturbed material as possible. On every trail there are points where excess material must be removed and sections where material will be needed. Rock and soil removed from a cut on one section can be used as fill on another nearby section. A trail does not have to be worked progressively from beginning to end. Priority should be given to sections needing the most attention. The cut sections may be worked first, followed by the fill areas. Water diversions should be installed prior to trail surfacing work to allow for natural drying and easier working

conditions. If two crews are working along the same trail, work assignments and locations should be scheduled to allow for exchange of equipment and materials.

When constructing new trail, a short, unworked section should be left next to access roads until last—this helps eliminate premature use.

As construction and maintenance is finished in a segment, clean-up should also be completed. Postponing trailside cleanup until later is poor procedure—it seldom gets done.

Time should be taken to do the job correctly the first time around to avoid having to repeat the task.

Clearing

Flagging should be carried for temporary trail marking or to identify work to be done.

For light pruning work that is within reach, hand pruning shears (like those used by a gardener) are quicker and easier than long handled loppers.

A stout but flexible forked sapling (about an inch in diameter at the base) that has been cut about 4 ½ to 5 feet in length (with about a 10" fork at the end) is a very useful tool for flinging small limbs out and away from the trail. When following someone who is using a power brush saw, it is also an excellent tool for flinging the cut brush out of the trail. Used like a pitch fork, it scatters the brush so that it is not visibly concentrated, and is much more efficient than bending to pick up and discard each piece by hand.

A couple of large down logs should be left near trail entry points to discourage wheeled use. Farther down the trail, a section the width of the trail tread can be cut out of large fallen logs for the same purpose.

All main stems or trunks should be cut as close to the ground as possible—or grubbed out. It is very important to avoid leaving short stubs (trippers) as they are a safety hazard. Cut hardwood stems resprout easily, therefore, grubbing is the preferred method as it is a one time treatment.

Larger logs should be carried to the downhill side of the trail and placed perpendicular to the face of the hill to prevent them from rolling and creating a safety hazard.

If a branch needs to be pruned, it should be cut next to the trunk. If not cut next to the trunk, these safety hazards tend to develop suckers or side branches which will have to be cut again and look unnatural. Large limbs should be undercut first to prevent peeling the bark from the main stem when the branch falls.

Conifer branches and weak trees, such as alder, are easily weighted with heavy snow or rain and may require extra clearing.

Painting

Clean, neat ways to carry and apply paint should be practiced. The following suggestions should be considered:

- A 1" wide brush spreads wider during painting. Some prefer using a 2" brush and little pressure so that the blaze doesn't get too wide.
- To illustrate the proper blaze size, a dollar bill is very close to 2" × 6".
- Flat grey or brown spray paint should be carried for use in obliterating old trail blazes.
- Old gloves, a wire brush, and a 2 ½" paint scraper are handy tools.
- Paint can be kept in an old, snap-top detergent bottle. Applying small amounts of paint to the brush can ensure a neater job..
- A paint brush and a small can (to hold paint) are easily carried inside a gallon paint bucket. For comfort, a piece of hose can be slipped over the paint bucket handle or it can be replaced with a wooden handle.
- Cans lined with plastic bags make for easy cleanup.
- Extra plastic bags kept in the vehicle are handy. Brushes can be wrapped in plastic so they won't dry out until cleaned at home. Another method is to bring along mineral spirits or water (depending on type of paint used) to cover the length of the brush bristles. This can be stored in a sturdy, sealable container. Extra care should be taken to avoid leakage.

Signs

When using Carsonite posts, the optional anchor at the bottom should always be installed. This makes them even harder for vandals to remove from the ground while adding little expense.

When installing wooden posts, a piece of scrap lumber should be nailed to the Lower part of the post. It is easier to nail it parallel to the post—this method is just as effective as a perpendicular arrangement and allows for a smaller post hole.