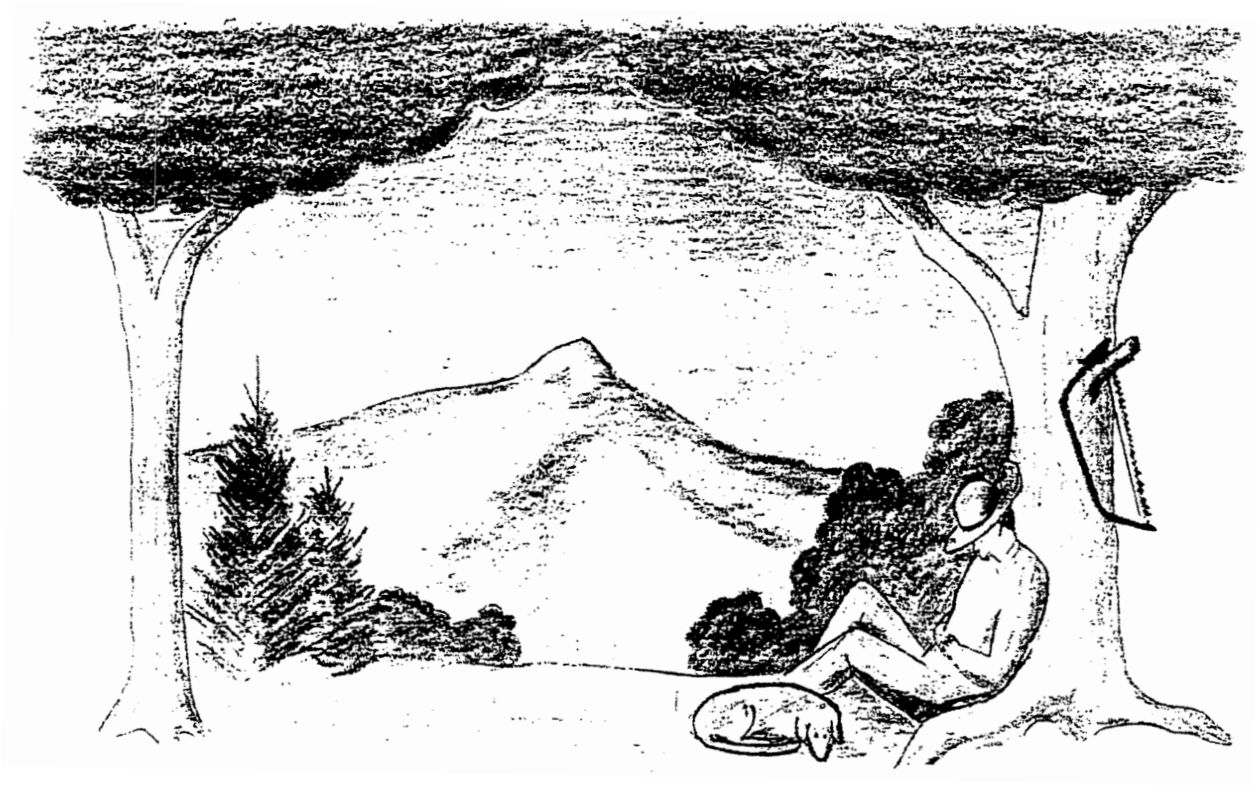
TRAIL TENDING



A Guide for Trail Volunteers

INTRODUCTION

This manual is written for the trail adopter for the purpose of understanding what is required for basic maintenance of hiking trails and the study of the theories behind what is needed to protect the trail. It is not meant to take the place of training.

After reading this information you will be asked to participate in a trip to the trail you are interested in with your maintenance coordinator. The purpose of this trip is to give you a chance to be shown and to have a hands-on experience in what is needed for that particular trail. All aspects of what is expected of you or your group, such as the trail hot spots, reporting on what is completed, and any future problems and needs.

At this time, it must be pointed out and credit given to the Wonalancet Outdoor Club for the information in this manual written by Chris Conrod and approved by the W.O. D.C. Trails Committee chaired by Peter Smart. At the time I was involved in developing this manual but it was only in the capacity of commenting and suggesting. I was sent a copy of the finished manual and immediately contacted Peter for permission to use it for the purpose of the use by volunteers of Traiwrights (The Belknap Range Trail tender were not in the picture at the time), the Division of Forest and Lands and Trails Bureau of the Division of Parks. It is the best manual I have come across in my years in the trails community. Very little information was changed or edited for the manual. Only very minor changes were made and most of them were to have names, mountains, etc., edited to fit our use. All art work is copied as is and again edited to fit our use.

All information contained in this manual is in compliance with "Best Management Practices for Erosion Control During Trail Maintenance and Construction", a manual published by the Bureau of Trails. It is recommended for all adopters to read this publication. Now it's time for some good reading and then to contact your coordinator and get out on your trail!

Happy Trails,

Hal Graham

Maintenance Coordinator

TRAIL TENDING

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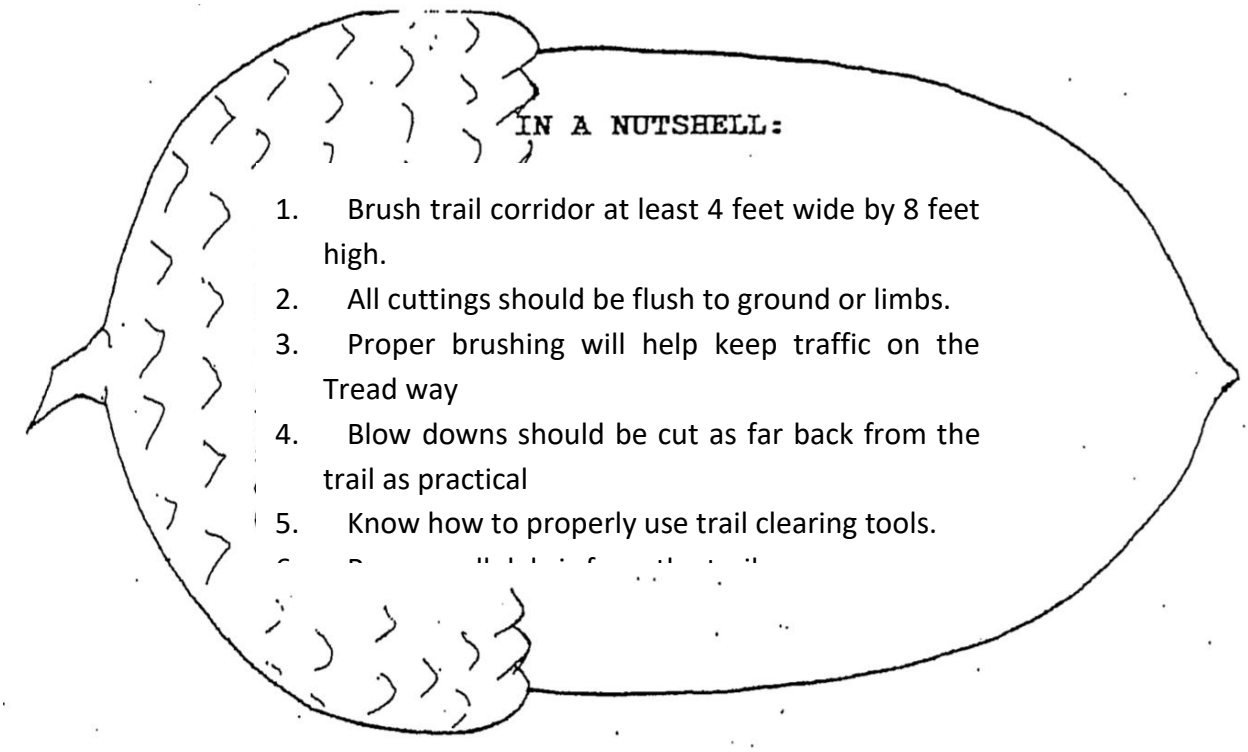
CHAPTER 1 - CLEARING THINGS UP

Brushing and Blow down Removal

The primary responsibility of the trail adopter is to maintain a pathway that provides an obvious and practical route for the hiker. This task should be performed with an eye toward aesthetics and conservation.

No easy task! Theory and individual opinion could bog us down before we set foot on the trail. How wide should we clear? How high? How often? Should this tree be pruned or removed? These questions and countless others have been asked of and by the trail gurus and in many cases consensus eludes us.

Nevertheless, the following guidelines are offered in an effort to standardize trail maintenance and provide to the hiker a suitable and attractive route.



BRUSHING

In general, trails should be cleared so that a large person with a full frame pack can walk the trail after a rain storm without getting soaked, Allowing for re growth between brushing sessions, the recommended corridor width is four feet with a height of eight feet. If the trail is used frequently in the winter, the adopter has the option of clearing higher to allow for snow cover.

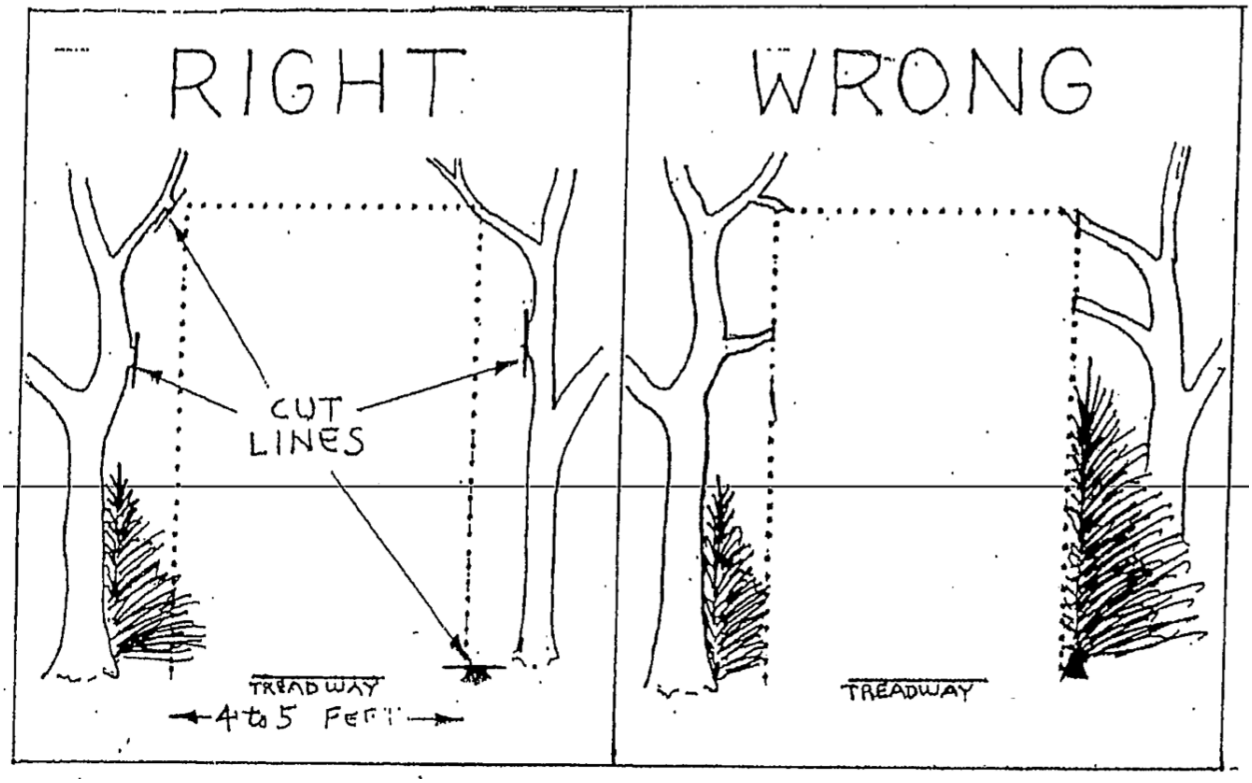
A four-foot width may seem extreme but when put into practice it will guarantee an adequate path for at least a year. Plants and their branches are very adept at finding and occupying open spaces. A two or three-foot-wide clearing will fill up quickly. Branchless tree trunks are allowed within this clearing width as long as the hiker does not have a hard time squeezing between them. In fact, these larger trees will help shade the trail and retard understory grown.

The intent is not to have a four-foot-wide tread way (the surface area of ground that is actually walked on) but to keep that area clear for the entire period between brushing sessions. In most cases the tread way will remain at about 18 to 24 inches in width. Exceptions occur when a trail is very heavily used or when erosion and drainage problems exist.

Plants that are entirely removed should be cut flush with the ground. Branches should be cut flush with the trunk or limb from which they are removed. This results in a natural appearance and eliminates potential hazards to the hiker.

Try to avoid over-pruning trees and never remove the top. This is not only unsightly but also encourages lateral growth which increases your later work and produces an even uglier tree. N.H. Parks Department suggests that not more than one third of a tree's branches be removed.

Sometimes removing one third of the branches is not enough to provide a proper clearing. In this case, it is best to remove the entire tree. In fact, many adopters have come to the conclusion that when a small sapling needs pruning, the best course of action is to remove it because it will present problems later on.



Unfortunately, the same respect for nature and the stewardship ethic that led us to become trail maintainers sometimes prevents us from doing a thorough job. Trail clearing is not for the squeamish. If a tree is a hindrance it must go.

SPECIAL CONSIDERATIONS

Good brushing practices not only facilitate unimpeded passage but also help guide the hiker along the trail. Signs and blazes should be kept clear of any growth that obstructs visibility.

The adopter should remember that heavy brushing will sometimes open up alternative routes, resulting in multiple tread ways. If this situation cannot be avoided by judicious brushing, the less desirable routes should be blocked by, placing downed limbs, large rocks or logs to keep hikers on the intended tread way. This practice is commonly called "brushing in."

At some point, most trails slab along the side of a hill. Hikers have a tendency to walk on the downhill side of the trail, probably because the lower (relatively) vegetation provides a more inviting route and better view. The result is an almost imperceptible but steady downhill migration of the tread way called trail creep, which is intensified when an unwary trail brusher concentrates mostly on the lower side of the trail.

By keeping aware of the terrain and favoring one side of the trail while brushing, usually the uphill side, the adopter can help guide foot travel toward the most stable route.

Another problem many adopters face is hobble bush. When this weed overtakes a trail, it can drive the most dedicated adopter to tears. Semi Annual sessions with loppers are no match for this fast-growing invasive plant.

The solution is an intensive brushing session with a large crew. After the hobble bush has been cut back to a width of four feet, annual sessions with a swizzle stick will keep the weed in check. The trick is to stay ahead of it. As long as you are working with year old growth, the swizzle stick will work fine.

The extent of brushing and tree removal should be limited to providing a clear path.

BLOW DOWNS

There is some debate over when a blow down should be removed, especially in wilderness areas. Some adopters believe all dead wood should be removed while others think that only those blow downs that significantly impede passage need to be removed. The decision is yours as long as the following considerations are given.

Any fallen or leaning wood that requires the hiker to crawl under or climb over should be removed. This not only facilitates travel but also lessens the likelihood of bootleg relocations. Most people confronted with an obstacle will search for a route around it. On a well-used trail, it is only a matter of weeks before a new route is established. The sooner a blow down is removed, the less damage is done to the surrounding area.

It is best to remove as much of a blow down as possible. The goal should be not only to clear the path for travel but also to retain a natural appearance. Sawed ends of logs protruding into the trail detract from the wilderness experience and can also impede future brushing efforts.

If the tree is small enough, it can be dragged off the trail butt first or cut in sections and removed. Larger trees usually require two or more cuts to remove the section blocking the trail. Cut this section as large as possible to lessen the visual impact of the remaining pieces.

Some large blow downs that fall nearly parallel to the trail are best moved by rolling or shifting with pry bars. A make shift pry bar can be made using a small 3-4" sapling. The use of a strap will also be very helpful. You would be amazed at the size of a tree that can be moved this way. If you have such a monster on your trail, contact the Trails Coordinator for help.

After the path has been cleared, be sure to check for and remove any branches extending into the trail clearing. Protruding broken branches can cause serious injury to hikers.

TOOLS

Personal preferences notwithstanding, there are a few tools that can be deemed essential for trail clearing and others that should be used only with caution, if at all.

Loppers, also called pruners, and saws are the two most useful tools for brushing. Loppers are the best means of cutting the small woody growth that reappears between clearing sessions. They are safe and effective. The double action anvil type has the most cutting power. Loppers are good for anything up to the size of your thumb. Larger branches are best removed by saw. For brushing, a 21-inch bow saw is generally adequate. Loppers work best on live plants, whereas a saw is better on dead ones. Small hand pruners are also very handy for small growth. In addition there has been a plethora of newer Folding saws that have proven very effective. They come in many sizes and they cut on the pull stroke rather than the push stroke as in conventional saws.

The swizzle stick, as mentioned earlier, is excellent for removing new low growth. It is swung like a golf club and can clear a sizable area in a short time. Just remember to keep both hands on the handle, wear heavy boots and long pants, and make sure no one is within twenty feet of you.

A 36-inch bow saw is light weight, relatively safe, and will handle most anything an adopter would want to cut by hand. It is not too cumbersome to pack provided it has a blade guard.

Careful scrutiny of the blow down before beginning is needed to prevent pinching. The saw cut should be made on the side of the log that will open when the log sags. Oftentimes this is on the bottom of the log which although difficult, is usually possible; and beats the alternative of leaving the blowdown in the middle of the trail with a broken saw blade protruding from it.

Axes don't have the pinching problem, and many adopters prefer them over saws. A well sharpened axe in experienced hands can make quick work of the meanest blow down. The key word is experience. Carelessness leads to footlessness. Until you feel confident with an axe, work slowly and carefully and always have a partner with you.

Cross cut saws are also excellent for larger blow downs. Lighter than a chain saw they and can handle very large diameter logs. Be sure and have a wooden wedge to help prevent binding.

The safe and proper use of these tools can only be taught by a hands-on demonstration. If you have any questions on tool use and safety, don't hesitate to contact the coordinator.

CLEAN UP

A properly cleared trail has a tread way clear of any debris. Cuttings left in the trail have a messy, unnatural appearance and, in some cases, may linger for years. All cuttings should be removed from the tread way and preferably disposed of in an inconspicuous manner. As previously mentioned, blow downs should be cut well back from the trail and dragged out of sight if possible. And above all do not be a Lopendroper. Lopped and dropped and left where it falls.

This is a good time to scrutinize the result of your labors and determine if any alternate, undesirable routes exist. They can be brushed in using cuttings and/or previously downed limbs as discussed in the Special Considerations section of this chapter.

When disposing of debris, keep an eye out for drainage channels. Do not place anything where it might block the flow of water. The water may end up in the trail. There is a tendency of trail maintainers to fill in low areas with discarded brush that can dam up runoff and cause major problems. The importance of good drainage cannot be over emphasized.

SCHEDULING

How often you decide to schedule your work trips is up to you, but we do request that you adhere to a few minimal requirements.

The most important work trip of the hiking season is the first. The trails take a beating over the winter. Due to wind and snow fall most of the blow downs occur during this period. It is advisable to plan your first trip to coincide with the final snow melt, which is usually in mid to late April.

You may just want to concentrate on blow downs on this trip. After all, it's been a long winter and you won't want to haul in too many tools on your first hike of the season. This is also a good time to check out the general condition of the trail, including water/mud problems and the state of the drainage structures, which will be discussed in the next chapter. There is nothing like a good spring run-off to test the limits of water bars and ditches. This is the time to look for problems.

Keep in mind that this is also the season when the trail is most delicate and vulnerable to traffic. Tread lightly and if you come across a section of trail that is particularly wet and loose it may be best to postpone any work in this area until drier conditions prevail.

Brushing can be done any time of the hiking season. This writer prefers the late summer and early fall. The bugs are mostly gone and seasonal growth has all but ceased. What is removed at this time will remain removed until the growing season starts up the following spring.

The most 'important thing is to brush the trail thoroughly every year. If you keep on top of it, the work is relatively easy; if you let it get ahead of you, it will feel like there is no catching up. If you can, you may want to do a trip in November, before the snow falls. There is almost always at least one wind and rain storm in the summer/fall that causes some trail damage. Whatever you get on this trip will be work you won't have to do in the spring, and the winter trekkers will thank you for it. This is especially important on the more skiable trails.

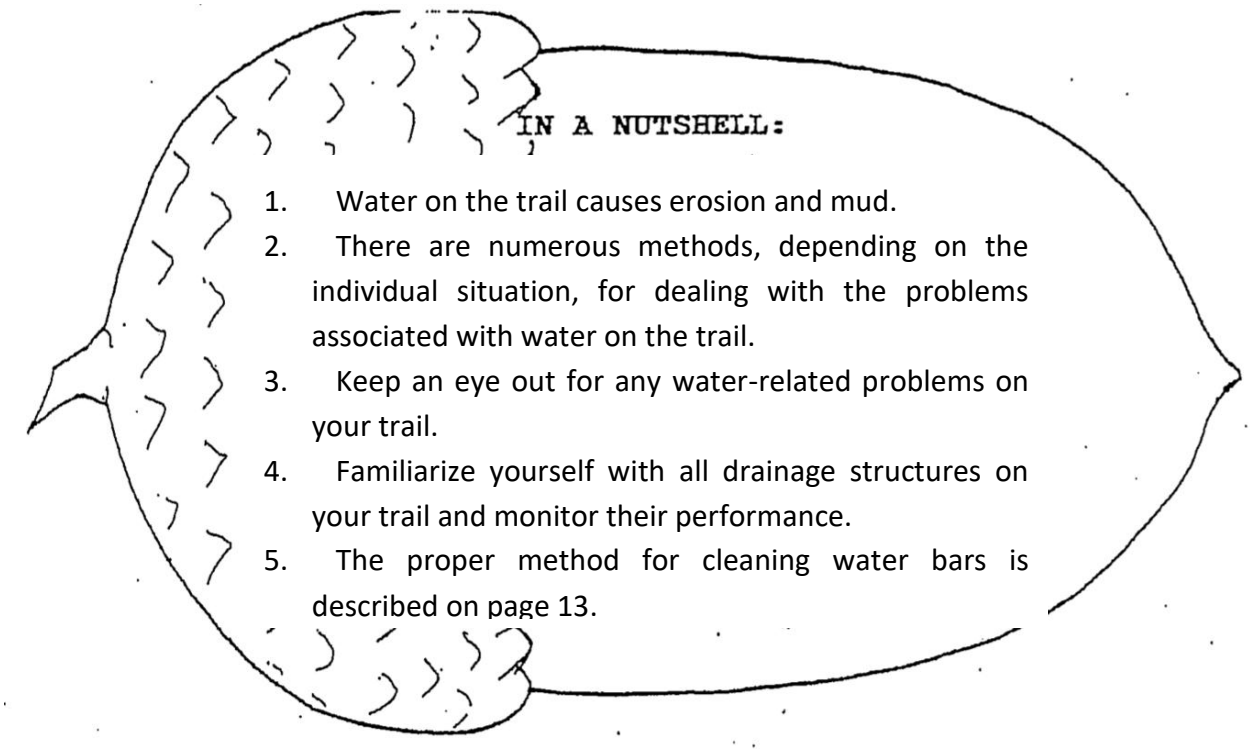
It is hard to give an estimate of the total time required to keep a trail in good condition. Length, soils, wind exposure and vegetation all fit into the equation. If you find that your trail needs a greater time commitment than you can afford let the coordinator know. We are always willing to work out an agreement that satisfies both the volunteer and maintenance requirements of the trail.

CHAPTER II – WET FEET AND LOOSE STONES

A look at Drainage and Erosion Control

The preceding chapter outlined the basic responsibilities of the trail adopter and therefore, you are armed with all the knowledge and wisdom you need, right? Wrong ! Yes, the job of the adopter is to keep the trail clear for enjoyable and safe passage, and no, we do not expect you to build water bars and dig ditches; but you are the one person who visits the trail on a regular basis. You are the one who sinks to your knees in the mud hole. You are the one who gets caught in the torrential downpour and witnesses fist sized stones being swept down the trail.

This chapter and the next two chapters provide a concise look at some of the perennial concerns that we, as trail tenders, all must address. We hope that after digesting this information you will look at your trail from a new perspective that will help you identify problems before they become severe and understand the ramifications of all trail activities, be it usage or maintenance.



WATER IS BAD

Actually, it is our feet that are the culprits. It is the continued treading that allows the water to collect on the trail, but since we are not about to turn in our hiking boots and sprout wings let's assign the blame to water. Water is bad. Moving water takes the soil with it and creates gullies. Standing water deposits silt and sand, resulting in mud holes.

From the moment a trail is created the process starts. The hikers arrive, the plants are trampled and die. The now dead roots and forest duff are ground into flour and the soil becomes unstable and compacted. An ever so slight depression is formed and then the water begins its dirty deed.

Sheet runoff, best described as uncontained flowing surface water that appears after rain storms, is intercepted by the depression, and ground water close to the surface springs from the edges as the tread way slowly sinks. On trails with a considerable grade the water flows down the trail, scouring and eroding the surface and ultimately resulting in a gully. In level areas and natural concavities the water collects along with fine soil particles and organic debris, giving birth to the classic mud hole.

In theory the solution is simple: get the water off the trail. More important, remove the water at its source, before it can inflict any damage. When drainage and erosion control is considered during the planning stage the task is relatively easy. Proper trail design/grade eliminates the need for many drainage structures and facilitates the construction of those that are required. When the problem isn't addressed until decades after trail construction the task becomes monumental.

So now we are not only faced with the task of removing water to prevent trail damage, but also we must deal with those areas that are so deeply scoured it is virtually impossible to remove the water by using conventional means.

When faced with this additional dilemma we are tempted to throw up our hands in total frustration, abandon the mutilated section and relocate the trail to new ground. In some cases, this may be the best solution, but we have an ethical responsibility to deal with our mistakes in a more direct manner. Our actions should be those of stewards, not exploiters.

Generally, relocations should be avoided for two reasons. First, relocating the trail does nothing to address the damage caused on the original path. Often times once the water has scoured out a route it will continue to do damage even after the trail has been abandoned. Second, alternative trail routes in the same area are likely to pose the same problems. If the trail can be moved to a site where soil and slope conditions are more suitable, then fine. But moving a trail from one delicate area to another is counter-productive.

Over the years the role of trail workers has changed dramatically. We are no longer the tamers of wilderness, but its protectors. Nowhere else is this new role more evident than in the job of drainage and erosion control.

REMOVING THE WATER

When dealing with water removal it is always important to remember two things. First, it is best to remove water at the source. Find where the water is coming onto the trail and provide a route of egress at that point or the nearest downhill site that is practical. Second, the simplest solution is the best solution.

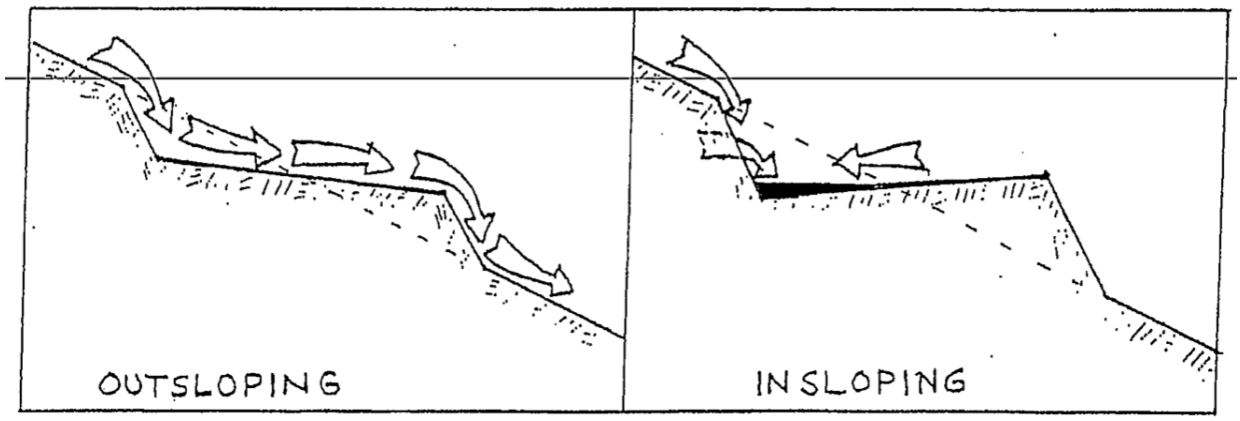
The ultimate simple solution is to have a tread way that will shed water on its own. This is called **out sloping** and is most commonly used on trails that are slabbing across or diagonally up a slope. It is most effective on relatively dry soils and will shed any sheet runoff originating above the trail.

Out sloping is accomplished by side hill grubbing (digging into the upslope side of the tread way and pulling the loosened material down) and grading the tread way to slope towards the downhill side sufficiently to allow water to drain off the trail rather than down the trail. A word of warning: the steeper the hillside, the less stable the tread way. In extremely steep situations retaining walls or cribbing would be required.

On hillsides having wetter soils, **in sloping** will sometimes work. As the name implies, this is simply out sloping done in reverse. Instead of shedding water across the trail, it collects water on the uphill side. This will usually provide a dry tread way but we are still stuck with the problem of removing the water before it causes erosion.

In sloping has to be employed either above a natural water shedding site on the trail or in conjunction with some other drainage device, which complicates matters. It also causes hikers to walk on the downhill side of the trail which may lead to further wear and erosion problems. It should only be used when side hill seepage is heavy and frequent enough to render out sloping ineffective.

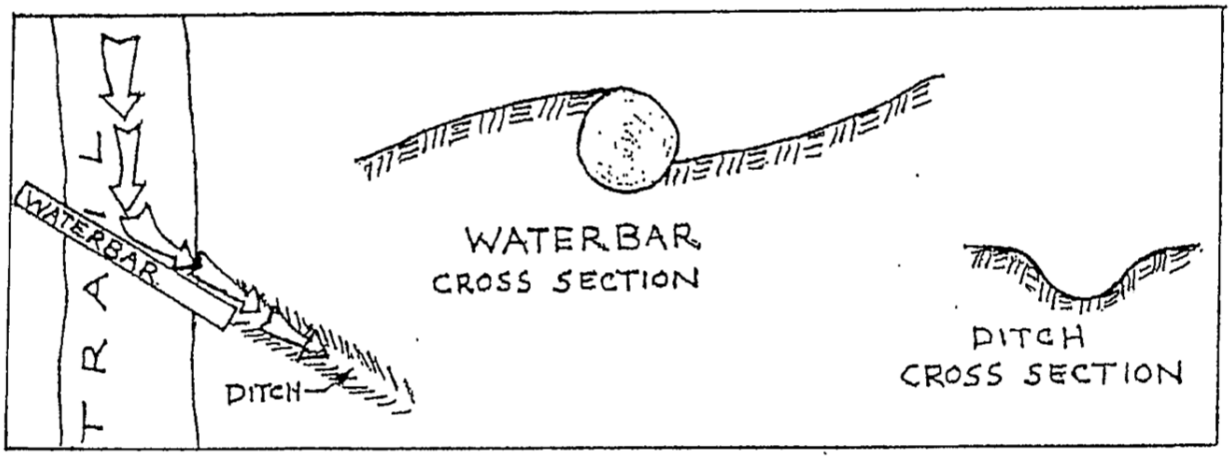
Interceptor Ditches are a variation of in sloping: A well-defined ditch is dug on the uphill side of the trail to collect runoff and seepage. This allows a flat or out sloping tread way but still requires other provisions to ultimately remove the water.



WATER BARS

Water bars are probably the most recognized means of coaxing water off the trail because they are the most visible. The idea is simple and effective as long as a handful of rules are followed. The water bar should extend beyond both edges of the trail and be angled at 30 to 45 degrees (referenced to perpendicular to the trail). It should be sloped enough to keep the water from depositing any debris without scouring out the bottom of the bar.

The ditch extending from the end of the bar should be long enough to ensure the water does not return to the trail and should have a cross section shaped like a low amplitude sine wave (well rounded edges and bottom, and wider than it is deep). On steep slopes it is good to have a step above the water bar to slow velocity and one or more steps below to stabilize the tread way.



If you take an inventory of all the water bars on your trail you will probably notice that many have at least one deficiency. For some this may be due to poor construction or maintenance but for most it is simply because site constraints limited what could be done. The result is less than perfect but should be the best possible solution for that situation.

What really counts is how effectively the water bar removes runoff from the trail and how well it encourages hikers to stay on the tread way. The latter is easy to discern. Where do you want to step when passing the bar? If you pass directly over it everything is fine. If you tend to go around it or over one end we have a problem, because the wear and tear of foot traffic will eventually provide a route for the water to bypass the bar.

Determining a water bar's runoff removal ability takes a little more study. The most conclusive means involves getting ourselves soaked in the process, and while it pays to take advantage of coincidental occurrences none of us (OK, maybe a couple of nuts) are willing to head for the hills at the first sound of thunder. However, a good "dry run", if you will, involves the use of a golf ball. A regulation soft ball also works.

After arriving at the test site and carefully looking and listening to be sure no hikers will witness your lunacy, release the ball on the lowest part of the tread way about five feet uphill from the water bar. If everything is

perfect the ball will travel at a moderate speed and with minimal bouncing down the trail, along the face of the water bar and a considerable distance into the ditch. If the ball stops anywhere before reaching the ditch there either isn't enough slope or there are too many obstacles. If, on the other hand, the ball ricochets around like a pinball and/or goes careening out of sight down the trail we also have a problem.

The golf ball test is only useful on a freshly cleaned and groomed water bar (a topic to be discussed later), and even then it has a limited usefulness, but we hope it will help you visualize the mechanics of a well-designed and maintained water bar.

On more moderate slopes earth bars, drainage dips or swales can be substituted for water bars. These devices are built similarly to water bars but do not have the log or rock. Instead, earth removed to create the dip is used to build a berm directly down slope. The advantages of this method are speed and low impact, both visually and environmentally. A big disadvantage is the susceptibility of the berm to erosion from both traffic and water.

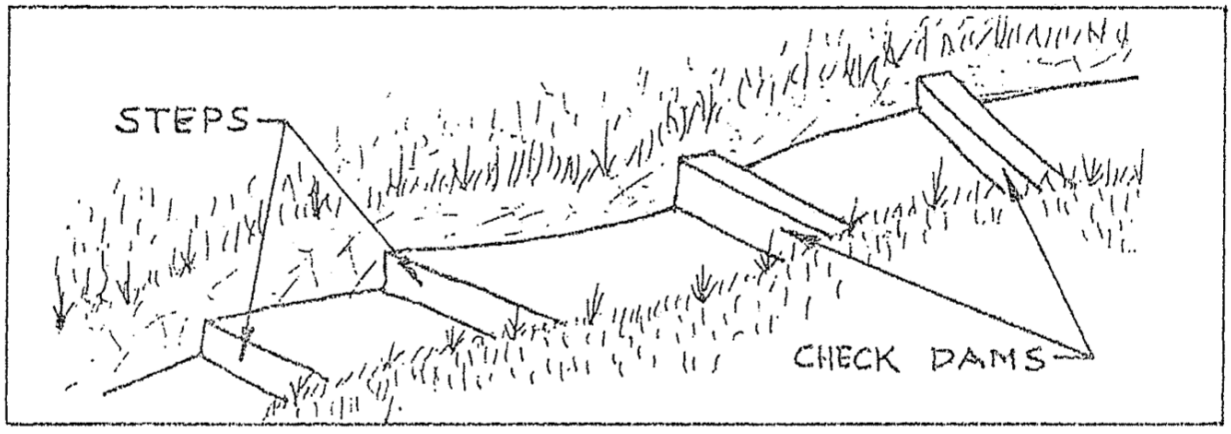
Dealing with Serious Erosion Problems

Deep gullies pose the biggest problem. They form on steep slopes where the trail goes straight up the fall line. a difficult situation for preventive measures, never mind attempts at reconstruction. Even with a drainage device at the head of the gully we will still have water coming in during storms. The best we can do is try to control the flow (velocity and location) and provide a tread way acceptable to the hiker that will at least stop the erosion, if not reverse the process.

Steps are the common means of stabilizing gullies. They retard both water and traffic erosion by placing immovable objects in the path. They are quite effective in smaller gullies and are the next best thing to filling and hardening back to the original grade.

More effective than steps but less well received by hikers are **check dams**. These are basically steps whose tops are above the tread way. They slow the water, allowing the soil to settle out, and if properly installed will eventually fill in and serve as steps. If enough soil is being carried down the trail, successive check dams can be added over a period of time until eventually the tread way is brought back to original grade.

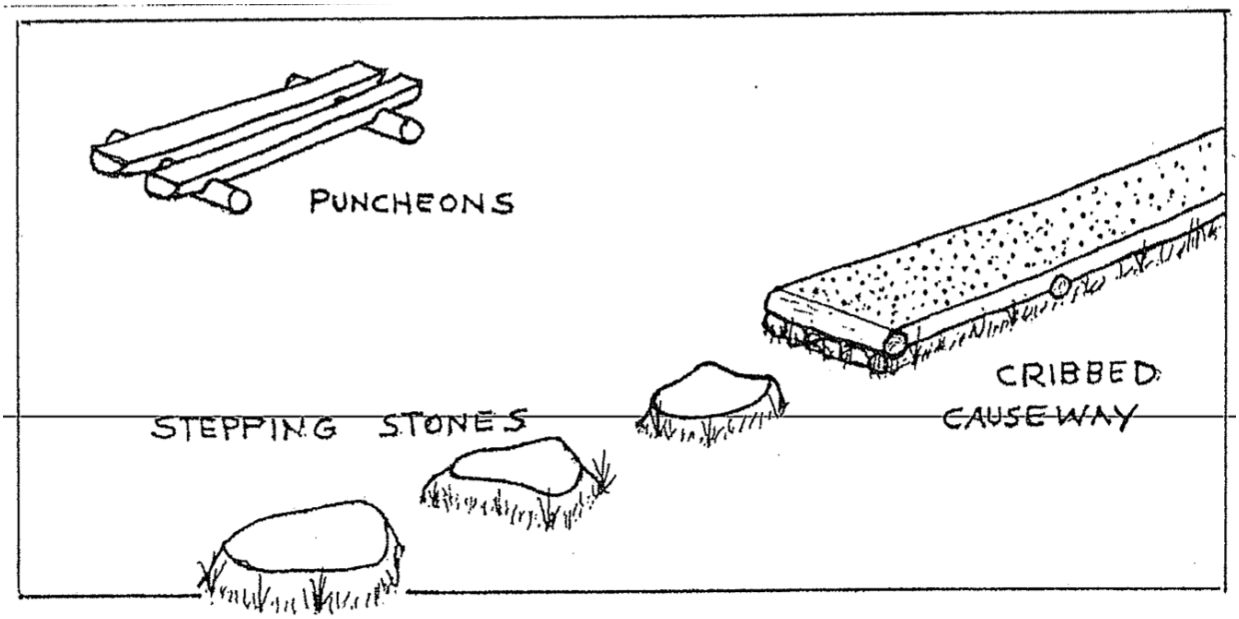
We must remember though, that this soil is coming from somewhere else. There is a tradeoff here that should be carefully considered, but if soil is being carried by the runoff anyway, we might as well take advantage of it.



In addition to erosion there are some places where we just can't get rid of the water. The tread way has sunk below the water table and no amount of ditching will remove it. These places are where mud holes are born and the only option, short of relocation, is to build a raised, hardened tread way.

The traditional method of dealing with this problem has been puncheons, log bridges with cross members that rest in the muck. Puncheons have gone out of vogue recently for a number of reasons, mainly because they have a limited life span and require almost as much work as more permanent measures. Add the fact that they give an artificial man-made look to the trail and you can see why many people would rather not see them in wilderness.

Besides suffering all the drawbacks of puncheons, corduroy also gives poor, slippery footing and requires an inordinate amount of raw material compared to the surface area covered. This method has not been extensively used in recent times except for vehicular access.



Stepping stones are the quickest fix and do an excellent job on short sections of wet trails. Hikers will try to avoid them unless they are properly spaced, large enough to have a solid, stable look and provide an ample flat surface for stepping and do not protrude more than an inch or two above the wetness.

Causeways, **turnpikes** and **hardening** are all variations of the more ambitious method of reestablishing an entire tread way. They are often built in conjunction with ditches, cribbing, open culverts and whatever else is deemed necessary to provide a solid path while allowing for any drainage available for controlling water level.

These methods can in the truest sense be called trail reconstruction. They require a large amount of time and material but in many cases are the best means of correcting trail problems.

Maintenance: Who Does It?

The quintessential water bar is a rare, almost mystical object. It not only efficiently removes runoff but cleans itself in the process. This rarity is most readily recognized in the field by the imprints of knees where pilgrim trail tenders have knelt to revere its glory.

But alas, the other 99.9% require periodic grooming to insure continued performance. Without this maintenance, the water bars will eventually fill in with soil and organic debris which will eliminate their usefulness, sometimes causing them to resemble steps. You may want to closely examine the next "step" you see. Could it be a long forgotten and neglected water bar?

We ask that you become aware of the drainage structures on your trail and monitor them closely. By using the work trip reports you can keep us informed of where the greatest needs are. If you see a particularly ominous problem, take a minute or two to clean out the worst of it and let us know about it.

How to Clean a Water bar

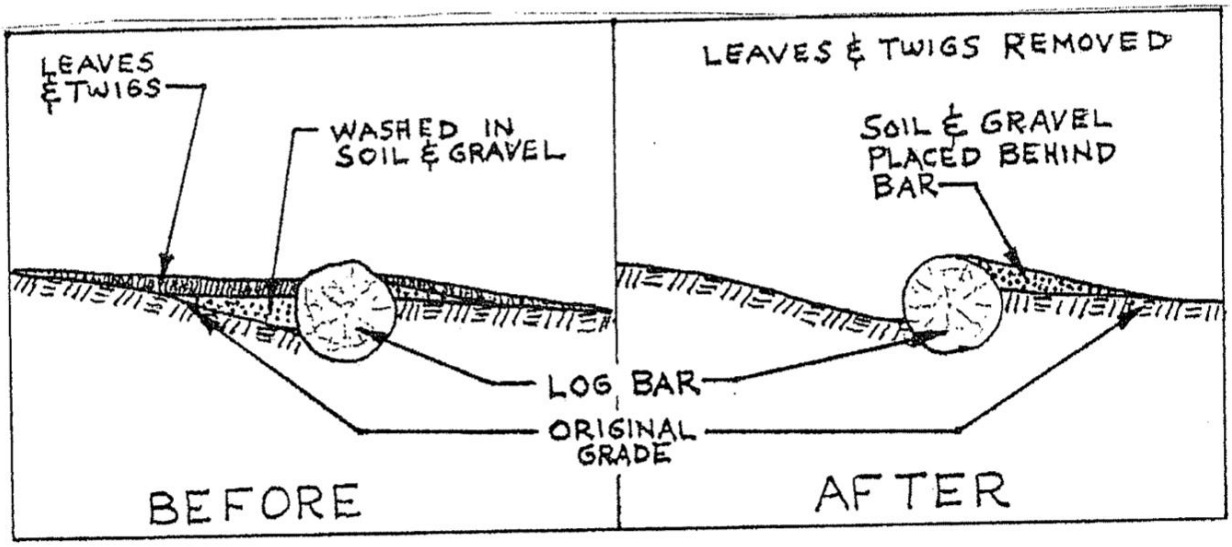
Your Greatest Responsibility as an Adopter

A water bar in need of cleaning usually has a mix of soil and plant matter deposited in the drainage way. First, rake the organic debris out of the water bar, the ditch and about three to five feet up the trail. Make sure these leaves and twigs are placed where they won't interfere with any flowing water, keeping in mind that any material placed directly uphill of the drainage will eventually end up in the way again.

After the plant matter has been removed, the soil and gravel that has settled in the drainage way should be dragged over the bar and onto the trail directly below the bar, thus building up the berm behind the water bar. This helps stabilize the log or rocks and, as a side benefit, reduces the chance of hikers tripping over the bar.

Make sure that you don't dig down below the original excavation unless you are sure it will improve the drainage performance. On log bars, 1/4 to 1/3 of the log should remain below grade on the uphill side. On a truly well-built rock bar, the majority of the rock should be below grade. Unless you participated in its construction you can have

no idea how deep it is. Proceed on faith and assume that the original excavation is correct.



Now it is time to fine tune the drainage way. Cut and remove any new root growth so that none can catch any floating debris or slow the water flow. Remove any other obstacles, such as rocks. Grade the sides of the outflow ditch to a moderate slope and round the top edges and bottom of the ditch. This will help prevent the ditch walls from sloughing off and clogging the ditch. Rake everything smooth and you are done. The outflow should resemble a fan shape so no twigs Etc. get caught up and block the outlet.

Another help in cleaning water bars is to be sure you brush out branches and brush that make working on the outlet hard to get to.

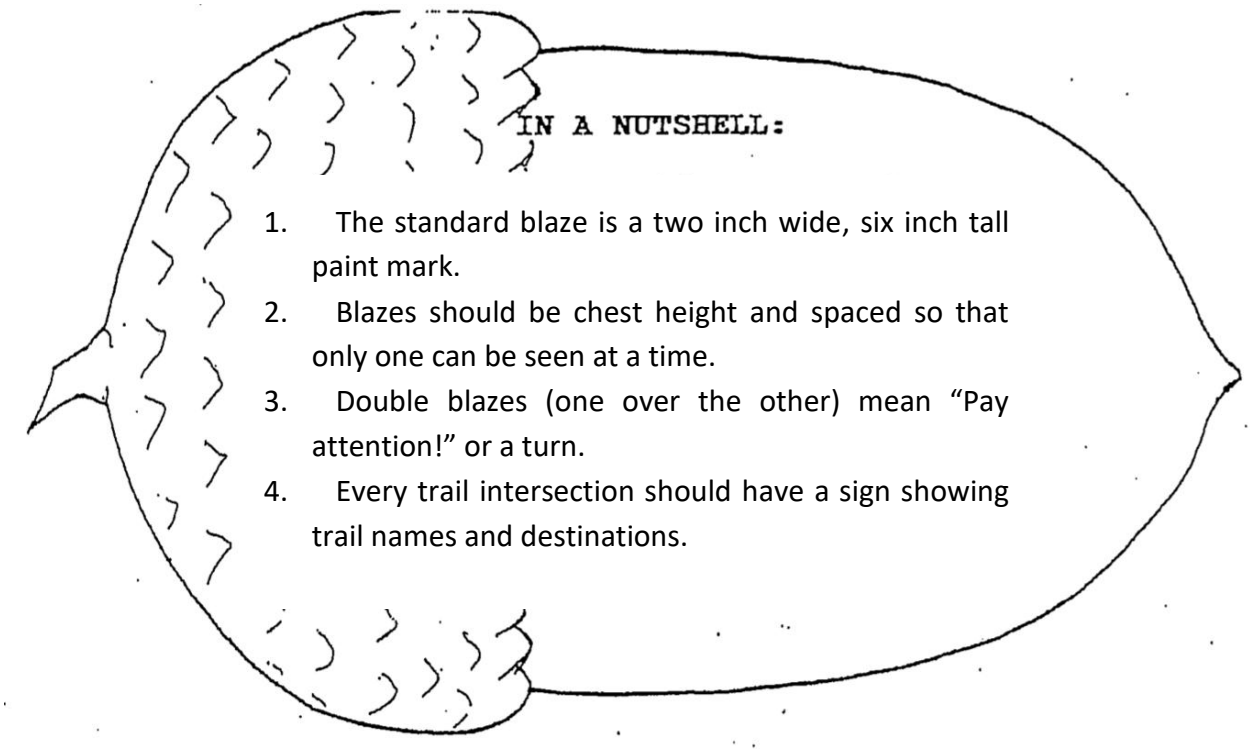
Cleaning water bars requires only a simple garden hoe (the wider the better) and a small rake with fine tines. Cutting off part of the handle to your liking makes the hoe even lighter. Of course, the more expensive and heavier tools such as Hazel Hoes (grub hoe) and fire rakes work well and have been used for many years by trail crews. Newer on the scene are rouge hoes that also are helpful and over time more and more tools become available. Another helpful tool is a round nose shovel.

CHAPTER III – SHOWING THE WAY

Blazing and Signing

With all the various controversial issues inherent to backcountry management, it seems odd that such a simple matter as trail marking should cause so much debate. The spectrum of opinion runs from the "blitzkrieg" method where paint consumption rivals the mileage of the worst gas guzzlers to the "natural selection" theory of weeding out the unwary hikers by losing them in the woods.

It is also somewhat puzzling that after decades of refining and standardizing by the benevolent giants (ATC, AMC, USFC, etc.), a significant amount of hikers and even some trail maintainers are not familiar with the conventions of trail marking, Perhaps a brief history of the evolvement of trail blazing w6uld help clear things up.



THE BLAZE

The traditional definition of the word “blaze” predates recreational hiking by many centuries and denotes a mark on a tree made by chipping off a piece of the bark. The blaze was used to mark the most efficient routes between inhabited locations before more substantial trails and roads could be cut. This traditional blaze was adopted by "trail blazers" when the first hiking routes were established in the nineteenth century and earlier.

As paint became more readily available and as trails became more numerous, the painted blaze was used to make the marks more obvious and later to differentiate between trails or trail systems. Land surveyors adopted identical methods for delineating boundaries and of course some confusion resulted.

Partly because of this confusion, and most likely also because of expediency, the true blaze was omitted and the paint mark was applied directly to the bark. But the term "blaze" has continued, and in its broader definition is most appropriate, for these paint marks certainly do "render conspicuous."

Free of the confines of the chipped area, the blazes took on various shapes limited only by the imagination of the blazer. Anyone who has hiked on Mt. Monadnock can testify to this, for many of the trails are named for their blazes (White Cross, Red Dot, White Arrow, etc.). Along came other contrivances, such as tin can lids and stamped metal trail emblems.

As trails became more numerous and popular leaders of the hiking community saw a need to adopt a universally recognized method of trail marking. They wanted something that was easy to apply, did minimal damage to the tree, was visible without being overpowering, and would not be confused with various marks made by forester and surveyors. The result is what we use today.

By general consensus and Forest Service standards the accepted trail blaze is a two inch wide by six inch high rectangle the size of a dollar bill painted on the bark of a tree. When properly applied, these markings will last for as much as ten years yet can easily be erased if the trail is relocated or discontinued.

THE RULES OF BLAZING

Trees are not always willing to grow where a blaze is needed so we must use a little latitude when practicing the art of blazing, but let's proceed on the assumption of at least a near perfect scenario.

At the trailhead and at any intersection, the first blaze should be prominently positioned far enough along the trail to provide a definite sense of direction yet close enough to be readily visible. Twenty to thirty feet would be the optimum range. The distance between subsequent blazes depends on the obviousness of the trail corridor.

In open hardwoods, where the trail can be obscured by leaves in the fall and snow in the winter, it is best to blaze so you can see from one blaze to the next. In softwoods, where the trail is obvious year-round, blazes should be positioned so that as you pass one blaze, the next blaze becomes visible after traveling fifteen to twenty steps along the trail. Above tree line, where the trail has scree walls and cairns, blazes every one-hundred to two-hundred feet are generally sufficient. On open ledges, where no tread is visible and cairns are scarce, blazes should be closer together.

Hikers should generally only be able to see one or maybe two blazes at a time, and a trail should never look like a highway with blazes every ten feet.

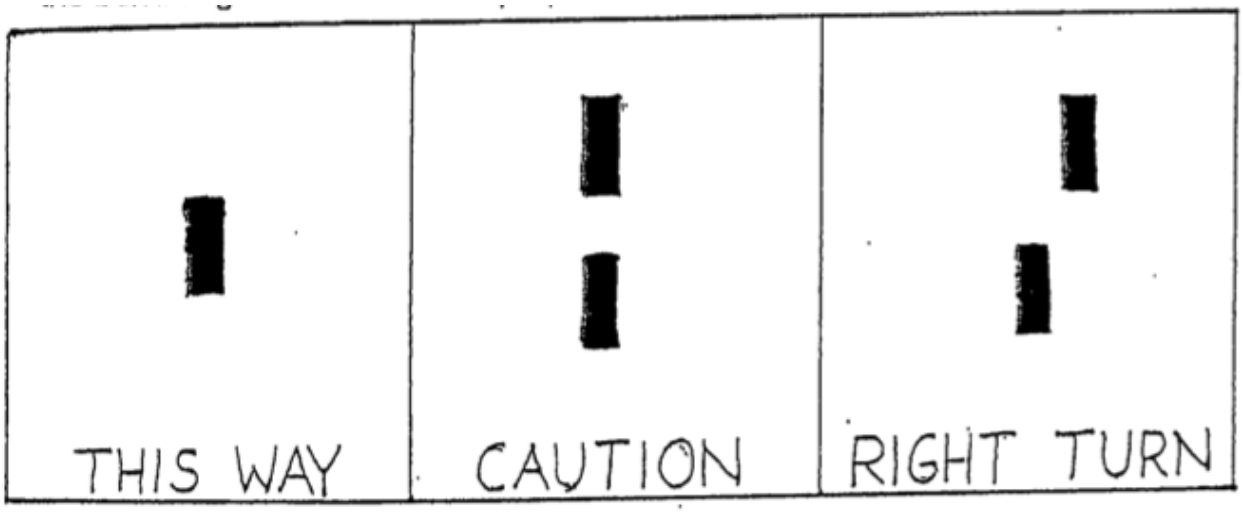
Blazing should be done in only one direction at a time. It is virtually impossible to do a decent job when travelling in the opposite direction. Pick out the trees most visible to hikers going in each direction. If the trail is unclear to you, walk ahead and figure out where it goes exactly before blazing.

Blazing the front and back of a tree is not ideal. If the tree blows down, two blazes will be lost. But if it turns out that the tree is the best location going both ways, go ahead and blaze it.

It is best to do the entire trail at one time, or at least complete a section between intersections. A sudden change in the blaze pattern or frequency can be confusing to the hiker.

Blazes should be at chest level or slightly higher. If they are higher than this, they are apt to be obscured by branches. If they are much lower, they can be covered by snow. Avoid placing blazes on dead trees as they are likely to blow down, and the blazes will be lost. With white blazes, avoid white birches and yellow birches, as the blazes will not show up well. Pick dark trees for contrast. Above tree line, place blazes on rocks and ledge in the trail. Blaze only where you want people to walk. When coming to a junction or road crossing, place double blazes, one on top of the other. Sometimes the upper blaze is shifted to one side or the other to indicate an abrupt change in trail direction.

The double blaze is a little used and often misinterpreted tool. It consists of two standard blazes, one above the other. It is most often used just before an intersection and therefore it is believed by many, if not most, hikers to be a warning of an approaching intersection. In actuality the double blaze is analogous to a flashing yellow light on the highway. It simply means look out, you should pay attention because something ahead could cause you to wander off the trail. At a jct. the double blazes are a little different. The upper blaze should off to the side that the direction the turns. See below for a right turn.



Don't paint an arrow or directions, unless absolutely needed. If the trail takes a difficult turn, simply add extra blazes around the corner.

PAINTING THE BLAZES

The following materials are recommended for painting blazes:

- One pint of latex paint
- One 1-inch paint brush
- Nylon dish scrub pad or wire brush
- A 2-inch paint scraper
- Rags
- A pail or large can fitted with a rope handle (you can cushion the handle with a length of garden hose slipped over it)
- A small container of water

The rag comes in handy for cleaning up spills, blazes that run and for brush cleanup. The pail or large can is for carrying all the equipment. The scraper is for scraping the bark of rough-barked trees prior to blazing. The nylon scrub pad or wire brush is for wiping dirt and lichens off smooth-barked trees and rocks.

Do not scrape the bark of pine , spruce and fir trees too deeply , as pitch will ooze out and cause runs or discolor the blaze. Lightly scrub off any lichens and dirt. Smooth-barked trees such as beech and young maples need only to be scrubbed. Use the paint scraper to smooth a blaze size area on trees with rough bark such as oak and hemlock and large pines and Spruce . Do not cut through the outer layer of bark on any tree.

Your coordinator will let you know the proper color of your trail. Stir the paint before each use, and occasionally during blazing. Blazes should be 2 inches wide by 6 inches high. If you find yourself making blazes too large, too small, or irregular, just remember that the blaze size is very close to the size of a dollar bill.

Make blazes neat. Wipe up any spills and runs. Don't leave gobs of paint on the lower end of a blaze. Though the paint dries quickly, it may not if there is too much. Don't blaze right after a rain or if it may rain within an hour or so. The paint won't adhere.

If there are sections of trail where the blazes were improperly placed, use enamel spray to cover over the improperly placed blazes. A gray, black or brown spray paint should do the trick. If an old blaze is the wrong color, simply paint a new blaze over the old one.

SIGNS

Signs provide the properly outfitted hiker (don't forget your map, compass and whistle!) with all the information needed to confidently follow a selected route. Without them, the possibility of a missed intersection is dramatically increased, which we all know can result in embarrassing, if not dangerous, consequences. For the trail adopter, it is important to check the signs on a regular basis. Every trailhead and intersection should have a sign that identifies the trail name and shows destinations. Any side trails to views, shelters or springs should have a sign labeling it as such. Keep an eye out for those cases where blazing may not be enough to keep hikers on the trail. Perhaps a "Trail" or arrow sign would help. As we keep saying, let us know what is needed on your trail.

APPENDIX

Bibliography

A list of selected publications about the use, maintenance and management of the back country.

Birchard, William Jr. & Proudman, Robert D. Appalachian Trail Field book; ATC, 1982. Intended to be used in the field for evaluation of trail conditions.

Trail Design, Construction, and Maintenance; ATC, 1981. The Bible of the ATC; it offers a well written, intensive look at all trail aspects. Excellent illustrations and an in-depth section on tool use and care.

Hampton, Bruce & Cole, David. Soft Paths; Stackpole Books, 1995. The how and why of low impact back country recreation.

"Nessmuk". Woodcraft and Camping; Dover Publications, 1963. Originally published in 1920, this book provides an interesting look at how things were done 75 years ago.

Proudman, Robert D. & Rajala, Reuben. Trail Building and Maintenance, Second Edition AMC, 1981. Written by people familiar with the White Mountains; this is a comprehensive treatise.

Best Management Practices for Erosion Control During Trail Maintenance and Construction; 2004 State of N.H. Dept. of Natural, Cultural Resources (DNCR) Div. of Parks and Recreation Bureau of trails. A State publication intended to help the trail maintainer abide by applicable regulations. It provides a useful reference for dealing with wet trail sections.

USDA Forest Service. Sandwich Range Wilderness Management Plan; WMNF, 1989. Contains both general planning and specific recommendations that affect WODC trails.

Waterman, Laura and Guy. Backwoods Ethics: Environmental Issues for Hikers and Campers; The Countryman Press, 1993. Describes the "new ethic" of low impact hiking, camping and alpine management.

Wilderness Ethics: Preserving the Spirit of Wildness; The Countryman Press, 1993. Concerned with preserving the wildness in wilderness.