



## Chapter 12

# Making Hiking Trails

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## **Trails add interest**

Our property is so densely wooded that I've made hiking trails to provide access to scenery as well allowing periodic inspection of our property. These trails also provide access for collecting firewood.

We enjoy walking through our woods on our trails. We were, however, surprised to discover that they are also appreciated by the local wild critters. Most of the foot traffic on our forest trails is of the four-legged kind. Deer travel these trails in preference to pushing through brush and jumping logs. Over the years, we have seen the tracks from a wide variety of animal species on our trails.

Creating good hiking trails, or other kinds of trails for that matter, is both a technical problem and an art. The technical problem is making sure that your trails are useable and maintainable. The art is in how you enhance your property with them. The following paragraphs will give you some insight into what is involved with both.

Of course, every piece of land is different. Tools and techniques for trail making vary with the local terrain. Our Ozark hardwood forest area is representative of a large portion of the North American continent, though, so I will focus my discussion on that kind of land.

## **Systematic trail design**

There are four main steps in designing hiking trails. The first is to decide what the trails will be used for. Will they be for scenic nature walks, or access for firewood collection and woodland management, or simply a way to get from point A to point B on your property? Will these trails be used for foot traffic only, horses, recreational machines such as ATVs and snowmobiles, or firewood collecting equipment? Trail use will determine issues such as trail width, cleared height, allowable slopes, curve radius, and other such details.

The second step is to study your land to identify what areas or locations you wish to provide access to and what areas you wish to avoid. Examine topographic maps if available to better understand elevation changes and identify potential trail routes. Explore your property to locate interesting scenery, foliage, and terrain. This will then help determine waypoints and destinations for your trails.

The third step is to lay out the exact routes for your trails. In deciduous hardwood forest such as found here in the Ozarks, the best time of year for trail layout is winter. The leaves are off the trees and underbrush so the topography of the land is easier to see. I buy inexpensive rolls of plastic survey marking tape at the hardware store to

hang from tree branches as I work out trail routes. In the following paragraphs, I'll cover rules that can guide you in your trail layout activities.

The fourth step is to build the trail. If you have done the work for the second and third steps thoroughly, this should not be too difficult. You will likely have avoided most of the really difficult terrain. You will probably also chosen routes that avoid removing large trees or thick brush.

## **Scenic Trail design rules**

There are a number of handy design rules for trail layout. These rules come from the experiences of people who build trails for our state and national parks. Of course, they are just guidelines and it may be necessary at times to vary from them but it's always best to pay attention to what experienced people have to say about the subject.

For scenic trails, straight sections of trail should be kept to one hundred feet or less. Curves and bends in trails increase the trail's visual interest and a feeling of remoteness. A long straight section of trail, especially in dense woods, tends to produce a tunnel effect that draws people's attention away from the surrounding scenery. Shorter straight sections of trail can also serve to keep ATV and snowmobile speeds down. Trail sections that cross clearings or open fields, however, should be kept straight to provide a clear indication of the correct direction to travel.

Curves in trails should be gentle when possible. Gentle curves give a more relaxed feel to the trail while discouraging people from taking shortcuts across sharp turns. The entrances to and exits from curves in trails intended to support machinery travel should be widened to ease maneuvering.

Sustained grades of a quarter mile or more should be kept below ten percent. That is, only one foot rise or fall for ten feet of horizontal travel. Steeper grades of up to twenty five percent are OK for distances of up to one hundred feet. Steep trail sections tire hikers and erode quickly from rainwater runoff. Occasional changes in grade and dips should be incorporated to improve visual interest while giving temporary relief from a longer climb.

Trails should be cleared to a minimum height of eight feet and a minimum width of six feet. Varying the clearing height and width will minimize a tunnel effect. Trails for horseback riding must be cut higher and trails for machinery cut wider. Lower or narrower clearings are more quickly closed off by new foliage growth.

The center two or three feet of a trail should be cleared of tripping hazards and made relatively even for comfortable walking.

Nature trails should be laid out in loop patterns. This maintains hiker interest and normally allows more miles of trail to be built in a small area. Trails that provide a single in/out route to a location should be avoided.

Trails should be visually isolated from each other if practical. This enhances each trail's appearance of remoteness.

Trails for ATVs and snowmobiles should have a minimum of one hundred feet of sight line along a trail. This is necessary to allow adequate stopping distance to avoid hitting trail blockages or oncoming traffic.

Optimum casual use hiking trail length is greater than one quarter mile but less than about two miles. Trails between one quarter and one half mile in length are most popular for relaxed strolls through the woods.

This is my own private rule: The finished trail must be maintainable with a riding mower. This allows me to knock down the grass and new tree saplings that come up in the trails in the spring. It also allows me to use my garden tractor and cart to haul firewood out of the woods.

## **Scouting and marking a trail route**

Trail layout is best done in the winter or early spring in deciduous forest like we have here in the Ozarks. That is when the trees are bare and it is easy to see the best way to route a trail. This may also be true for evergreen forest areas that have dense broadleaf brush between trees.

Your first job will be to find waypoint locations. These are spots you want your trail to pass through. You will choose these spots for either scenic interest or to simply route the trail for proper slope or to avoid obstructions. Mark these locations with streamers of bright colored plastic survey ribbon. These waypoints should be no more than about 100 yards apart so they will not be difficult to find later.

The waypoints now define the general route of the trail. Your next job will be to mark the route between the waypoints. Walk back and forth over each segment, keeping the trail layout rules listed above in mind. Mark a trail route every few yards using plastic survey ribbon. Take your time with this part of the job. Picture how the trail and the scenery around it will look. Adjust the trail's route as necessary to best show interesting sights.

Along with scenery, you must also be watching the texture of the ground the trail is passing over. Walking a trail looking at scenery and perhaps watching for wildlife is easier when you don't have to keep glancing down at the ground to avoid tripping over rocks, stumps, and logs. Smoothing out a trail's surface is much less work if it starts out with relatively few of these items to deal with.

My first trail looks a bit like someone hacked his or her way through the woods. Eventually I learned to look for and follow easy ways to get through the trees and around rough terrain. These newer trail routes tend to wander a bit but are more interesting, often looking like I was merely widening animal trails and old footpaths through the woods.

When your entire trail is marked, walk its entire length back and forth a couple times to check for any final adjustments that might be needed.

## **Tools for trail work**

The list of tools I use for trail work is fairly short:

1. Long handle lopper
2. Chainsaw
3. Professional model leaf blower
4. Sledgehammer
5. Four foot long steel pry bar
6. Field and brush mower

That selection of tools is specific to the conditions and foliage types found on our property. A good place to start figuring out what tools would be best for your property would be find out from local rural fire district personnel what tools they use for hand cutting firebreaks. Firebreaks are cut several feet wide through wild land ground cover. They are similar in most respects to foot trails, except of course that they are routed to best stop a fire, not to provide a scenic path.

In our part of the Ozarks, the primary firebreak-making tools are a commercial grade backpack leaf blower and a heavy duty firefighter version of a leaf rake. A firefighter fights fire by walking along just outside the edge of the burn blowing burning material further back into the burned area. The leaf blower cleans off dead leaves and most other flammable material down to bare dirt. The rake finishes by moving any packed down material. I found that same tools work great for clearing trails.

Two examples of other excellent firebreak tools you might consider are the Pulaski and the McLeod. The Pulaski is an axe with a strong narrow hoe blade on the back of

its head. It is used to cut brush at ground level. The McLeod is a heavy-duty hoe, rake combination tool with a blade nearly a foot wide. It is great for chopping brush and scraping the ground bare.

The easiest way to cut trails, when practical, is to use a field and brush mower. These machines are heavy-duty rotary mowers, the larger models of which can mow small trees and brush up to two inches in diameter. They are available from several different manufacturers.

Field and brush mowers differ from lawn mowers in several important ways. The first is that they are built sturdy to handle rough terrain and heavy foliage. They use much thicker blades. Their blades are belt driven so that heavy blade impacts do not cause a bending force on their engine crankshafts. They have skids on the front to glide over rough ground. And, they have large driven wheels on at the back to push the heavy machine along the ground.

Field and brush mowers are especially good at clearing tall grass and brush. They normally have fixed mowing height of about four inches though so aren't usually very good as lawn mowers. Also, owners often use them on terrain and foliage that would quickly destroy ordinary lawn mowers so they do require more frequent maintenance.

## **Cutting a trail**

In our Ozark hardwood forest terrain, underbrush consists primarily of stiff, spindly, hardwood tree saplings. The ground is covered year around with dead broadleaf tree leaves, often several inches deep. The soil under the leaves is mostly clay with varying amounts of rock.

I do most of my trail clearing with the lopper. The lopper cuts brush and small trees up to about two inches in diameter. I try to route my trails around trees larger than that. When I can't I use my chainsaw.

In open areas with low brush density, I have used my DR Field and Brush Mower to clear a trail. It makes trail clearing fast and easy. In dense woods, I prefer the lopper for the first pass because if find I am trimming the limbs of trees and shrubbery that extend into the trail as much as I am cutting stuff off at ground level. I also enjoy the quiet of not using machinery while working in the woods.

Over the years, I've learned a sequence for cutting trails that works well for me. I first clear a trail path as best I can using my lopper. I'm usually able to lop about seventy-five yards of trail per hour.

My next pass is with my leaf blower. I blow the leaves off the trail down to bare dirt. We keep our trails mowed and clear of leaves to minimize our encounters with the chiggers and ticks that are so common here in the Ozarks.

I then slowly work my way along the trail removing rocks, trimming off small stumps left from lopping, and using a chainsaw to cut any larger trees remaining in the trail path. How fast I can progress along the trail depends upon how much rock I have to deal with. I average about twenty-five yards per hour on rocky ground or one hundred yards per hour without rock.

I remove rocks from the trail bed as best I can. I either knock them loose with my sledgehammer or prying them up with the steel pry bar. I often use smaller stones to backfill holes left when larger stones are removed.

I use my sledgehammer to break the tops off rocks too big to move. Using a sledgehammer to break rock is not hard once you learn the technique. The hammer must strike with the face of its head flush to the stone. When properly swung, the hammer will strike with a dull thud and not bounce. With practice, you will also learn where to strike each rock to achieve the maximum effect with each blow.

Always wear safety glasses and heavy boots when breaking rock with a sledgehammer. Rock chips fly fast and hit hard. Many are razor sharp. I end up with multiple small bloody cuts when I attempt rock breaking in shorts and a tee shirt. Never hit a rock with a sledgehammer without your safety glasses on.

I finish up by mowing the trail to trim off any small weeds or saplings that I didn't bother cutting with my loppers.

The sequence I just described was developed for the conditions on our property and using the tools and machinery I have available. As I mention above, other kinds of foliage and terrain may require a different approach.

Trails in coniferous forests typically do not need to be cleared to bare dirt. The needles protect the trail and help smooth out irregularities in the ground.

There is an additional step that can improve the appearance of trails. That is to remove any dead wood or branches from the trees and shrubs near the trail. Pruning the dead growth gives the foliage near a trail a fresher, healthier look.

## **Erosion control**

A problem commonly encountered when laying out trails is figuring out what to do about erosion. Bare dirt on trails tends to wash away on slopes. What might have started out as a simple trail up and down a hillside could turn into a gully after a heavy rain.

The first step in minimizing trail erosion is to avoid long trail segments that run directly down or up slope. The next is to avoid routing a trail through the bed of a gully. When routing a trail along a hillside, do not completely level the bed of the trail. Slope the trail bed side-to-side so as to shed water to the downhill side of the trail.

Of course, often times a trail cannot be routed so as to eliminate all potential erosion problems. There are techniques you can employ to minimize erosion damage in those cases.

Where rainwater might tend to follow and erode a trail, water stops can be installed. Digging a shallow lined trench at an angle across the trail creates these stops. These trenches should have slightly raised ridges on their downhill sides created using partially buried stones or logs.

A trail that crosses the bottom of a gully can be protected by installing a culvert or by making a rock channel for water to flow through. In no case should you allow water to flow over dirt you have used to fill in low spots in a trail. In more extreme situations, gullies may be bridged.

## **Water crossings and bridges**

Routing a trail over water or marshy areas presents special problems. Shallow streams of up to about two feet in depth may be crossed by wading or using stepping-stones. Water deeper than two feet should be bridged.

Bridges for trails can range from as simple to as elaborate as you can imagine, however, simpler designs usually seem more natural in rustic setting. Often simply using a single log to span a creek bed is more than adequate. Even a simple log bridge takes some care to construct so it may be used safely.

Logs for bridging purposes should be debarked to prevent rot. They should be set in well-drained rock or logs at either end. Unprotected wood rots quickly when in contact with the ground. The log should be braced or staked so it cannot roll and its top surface should be flattened for better footing. Creating a flat walking surface is

done by cutting shallow crosswise horizontal cuts with a chainsaw and then chopping the wood between the cuts out with an axe or adze.

In general, bridges should be overbuilt. That is, they should be constructed using thicker and stronger materials than those you estimate to be adequate under normal use and loads. More robust materials are usually more expensive but their use means that little or no maintenance will be required once the bridge is built.

Crossing a marshy area can be done using a bridge or a boardwalk with supports set into firm ground under the mud. A trail through shallow mud overlaying firm ground can be built up using rock and gravel to provide a dry walking surface.

## **Maintaining trails**

I prefer to perform my landscape and trail maintenance with a riding lawn mower. So far, I have been reasonably successful at achieving that. Most of my trail maintenance is done that way. In the spring and summer, I mow our trails about once every two weeks. That is a rainy time of year so tree saplings and weeds sprout in the trails.

About twice a year, though, I walk our trails with loppers to trim off any branches that have grown out into the cleared trail volume. This is usually not hard work as the new growth is usually easily cut.

Trails should be inspected for erosion after each heavy rain. Install water stops to deflect future runoff. Any backfilling of low areas created by rainwater runoff should be done with rock. Dirt backfill will wash away during the next heavy rain.

Bridges should be inspected periodically for damage or loose fasteners. Check carefully around bridge footings for animal burrows. Burrowing animals like to make their homes under bridges for protection from weather and larger predators.

After a year or two, the effort needed to maintain trails decreases. Most of the tree and brush limbs that tried to grow over the trail have been pruned back. The trail bed becomes stable with grass, moss, rock, or firm soil. There is little to do to these trails except enjoy them.