

NEW ENGLAND NATIONAL SCENIC TRAIL



MASSACHUSETTS TRAIL ADOPTER HANDBOOK



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HISTORY OF THE NET & AMC

The New England National Scenic Trail (NET) is a 215-mile hiking trail route designated as a National Scenic Trail in 2009. The NET travels through 41 communities in Connecticut and Massachusetts, and is comprised primarily of the historic Mattabesett, Metacomet, and Monadnock (M-M-M) Trail systems which have been in existence for over half a century. It begins in Guilford, Connecticut and ends at the Massachusetts/New Hampshire state line in Royalston, MA. From there the trail continues to Mt. Monadnock in New Hampshire along the Metacomet-Monadnock Trail. The Connecticut portion of the NET is managed by the Connecticut Forest and Parks Association (CFPA). The 95 miles of the NET in Massachusetts, and the un-designated 18 miles in New Hampshire are managed by the Appalachian Mountain Club (AMC) Western Mass Chapter (formerly the Berkshire Chapter).

Founded in 1876, The mission of the Appalachian Mountain Club is to foster the protection, enjoyment, and understanding of the outdoors. AMC envisions a world where our natural resources are healthy, loved, and always protected, and where the outdoors occupies a place of central importance in every person's life. AMC's region spans from Maine to Washington D.C. The organization manages over 1,800 miles of trail and consists of 12 regional chapters.

The Connecticut Forest & Park Association (CFPA) is a 501c3 nonprofit organization dedicated to connecting people to the land in order to protect forests, parks, walking trails, and open spaces in Connecticut for future generations. CFPA manages over 825 miles of trail within their 'blue-blazed' trail system.

The Metacomet-Monadnock portion of the trail was founded in the 1950's by Walter Banfield. Working with the AMC Western Mass Chapter he led the efforts blazing the trail from Southwick, MA to Mt. Monadnock. In 2005, Congressman John Olver sponsored legislation to designate the M & M Trail and the Mattabesett Trail in CT as a National Scenic Trail in response to a perceived threat to the long-term viability of the Metacomet Monadnock Mattabesett trail system. The designation brought together

partners including the National Park Service, AMC, CFPA, other State and local agencies and community organizations and private landowners to build a trail community.

Trails provide pathways in our communities for hikers to access the natural environment and points of interest. Trails provide protection for the environment, keeping the impact of hikers on durable surfaces and out of sensitive areas. Quality trails are comfortable and safe surfaces to walk on. A corridor that is clear and easy to see along with reassurance markers and signs ensures hikers are oriented.

Trail Adopters are part of a comprehensive system of trail management, maintenance, and construction. This Handbook is a guide to the fundamentals needed to meet the adopter's responsibilities. A resource list is included for those who want to learn more about design, maintenance, and construction.

CONTACT INFORMATION

Staff Contacts

Massachusetts
Bridget Likely
NET Planner
Appalachian Mountain Club
blikely@outdoors.org
413.835.4591

NPS
Andrew Long
NET Trail Administrator
National Park Service
Andrew_Long@nps.gov
413-426-6658

Connecticut
Clare Cain
CT Trail Director
Connecticut Forest & Park Association
ccain@ctwoodlands.org
860.346.2372

NET Committee Contacts

Ray Girard
New England Trail Chair
Rgirard960@gmail.com

Mike Zlogar
NET Volunteer Trail Crew Leader
mzlogar@comcast.net

AMC Western Mass Chapter
Chair
chair@wma-amc.org

Safety

Your safety while working on trails is the highest priority. Many of the safety elements are the same as considered for hiking trips.

- Carry the Ten Essentials for Hiking*:
- Check the Weather and be sure to take appropriate clothing.
- Inform a family member or friend of your plans.
- Do not work alone.
- Be aware of risks and appropriate mitigation measures for poison ivy and ticks*
- Personal Protective Equipment should be with you on every trip and used to mitigate risks of trail work. PPE includes boots, long pants, hardhat, safety goggles, gloves, and ear protection.
- Personal First Aid Kits and Training are essential for every trip*
- Tools must be respected, well maintained and the proper for the job.

Using the proper tool for the job will increase your efficiency in trail work and will also reduce your chances of being injuring yourself or others.

Carry tools in or strapped tools to your pack. When carrying tools in your hands carry them at your sides with the sharp edge down or away from you. If you slip or fall throw the tool away from you and others to prevent falling on the tool. Place tools on the ground and visible to others.

The Circle of Danger is a safety principle that keeps others outside a circle whose radius is the length of the tool held at an arm's length. This is most important for tools that are swung (mattock, axe)

RESPONSIBILITIES OF TRAIL ADOPTERS

While working on the trail, you represent the NET and AMC. You are a valuable resource able to explain to hikers the history of the NET, its partners, and programs. By answering their questions about what you are doing you can give a brief explanation of trail maintenance and the contributions made by volunteers, and possibly recruit more adopters. Do your best to address everyone's questions, including those asked by children.

If you encounter inappropriate behavior or incompatible use, first assess the situation to be sure it is safe to engage these people. You can talk to them about the trail and user ethics as a ridgerunner would to educate them by explaining the consequences of their actions.

In unsafe situations, avoid contact and report the incident to the NET Planner or other authorities.

Here are the tasks for keeping the trail open and in good shape:

Train

- Attend a **Basic Skills Workshop** every three years.
- Utilize the **Adopter Manual** and other material to build knowledge.

Monitor

- **Walk** your section of trail at least **3 times** a year.
- Note and report **trail damage** and issues.
- Keep an **inventory** of your trail for future reference and to track progress.

Maintain

- **Perform** basic maintenance on the trail:
 - **Drainage**
 - **Corridor Definition**
 - **Trail Marking**
- **Report work accomplished.**

TRAINING

There are many training opportunities available to you as an adopter:

- Adopters are expected to attend a **Basic Skills Workshop** every three years. The workshop may be a scheduled training day or be completed during regular maintenance trips. Skills training sessions must be supervised by an approved trainer.
- Periodically the NET Committee of the AMC Western Mass Chapter, our partners and other trail agencies will offer training for a variety of trail maintenance skills. Some courses will not have a fee, others will not, depending on the course and the agency. AMC and the NET Committee may be able to assist with offsetting training fees. These courses will be posted with an invitation to adopters to apply.
- Training for advanced trail maintenance and construction techniques will be available for volunteers with interest in working with the volunteer trail crew on more technical projects.
- For more detailed information, you should obtain one of the trail design and maintenance books listed in the reference section. Each of these reference books covers skills, techniques, and equipment required to plan, build, and maintain trails.

MONITORING

Trail adopters are on the trails frequently and able to find, report and address trail issues early before serious problems develop.

- Walk your section **at least 3 times** each year – early spring to check for winter damage, then again in summer and fall.
- Keep an eye out for trail obstructions, erosion, flooding patterns, insufficient trail markers, significant changes on/around trail, condition of structures (bridges, signs, kiosk, etc), vandalism, incompatible uses, dumping and litter problems.
- Keep an inventory of your trail for future reference and to track progress. Note trail structures (waterbars, rock steps, cairns, attractions).

The following elements can be helpful to identify problems, assess severity and assess overall trail health

- Herbaceous cover helps prevent erosion by anchoring soil in place and preventing erosion. Healthy trees and plants bordering the trail are an indicator of a trail in good condition.
- Soils on trails are affected by three forces: compaction, displacement, and erosion. Exposed soils are most at risk from hiker impact. Changes in the soil can lead to excessive muddiness, root exposure, uneven tread, and loss of tread stability.
- Width of the Treadway should be 18-24” and the corridor 4’. Users widening the trail are an indicator of other problems.
- “Braided Trails” usually result from users moving off trail to avoid an obstacle or unstable tread.
- Exposed rock is the most durable trail surface that resists the forces affecting soils. Be aware of rocks that are obstacles causing users to go off the treadway.
- Exposed roots result from loss or compaction of soil. Roots become a hazard to hikers and when exposed to trampling can kill the trees or plants bordering the trail.
- Standing water will affect the soil and user behavior. These areas should be noted for repair. If possible, check for this type of issue after particularly heavy storms or wet seasons.

MAINTAINING

The Adopter's responsibility is to performing basic maintenance on a regular basis on a section of trail. Some environments are fragile and proper maintenance can help avoid serious damage to the environment. Regular maintenance trips make it easy to keep up with the work and prevent little problems from becoming big projects.

Work should be performed in a manner that is sustainable, protects the natural resources and providing a quality experience for hikers.

Basic maintenance **does NOT** include trail reroutes or construction of structures such as bog bridges, boardwalks, bridges and rockwork. If you want to participate in advance trail construction projects, contact the NET Planner or the NET Committee of the AMC Western Mass Chapter. Advanced trail construction projects can be suggested by contacting the NET Planner or NET Committee Chair

Basic maintenance has three priorities: drainage, corridor definition, and trail marking.

PRIORITY 1 DRAINAGE

Drainage - Natural and constructed features that move water off and away from the trail prevent erosion and protect the trail.

Evaluate the drainage. Is it functional? Brush out the outfall so you have clear working space.

STEP 1 - Clear debris.

Rake leaves and debris out of the water bar, out of the ditch and about five feet up the trail.

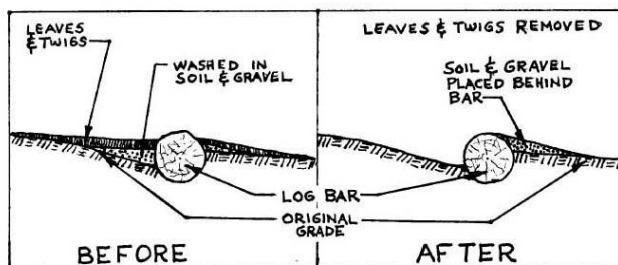
Place these leaves and twigs where they won't interfere with any flowing water; downhill of the outfall if possible. Do not pile the leaves; disperse leaves and twigs, fanning the material out to allow water to flow freely.

STEP 2 - Recover soil and gravel that has settled in the drainage.

Dig the water bar and outfall to the original depth. Place soil on the trail below the waterbar to build up the berm, to stabilize the log or rocks and to provide good footing for hikers.

Be aware of the grade as you dig. Be sure the grade is downhill from the top of the waterbar to the outfall for optimal water flow.

Best Tools
● Hazel Hoe
● Pick Mattock
● Shovel
● Garden Hoe
● Rake



Graphic courtesy WODC

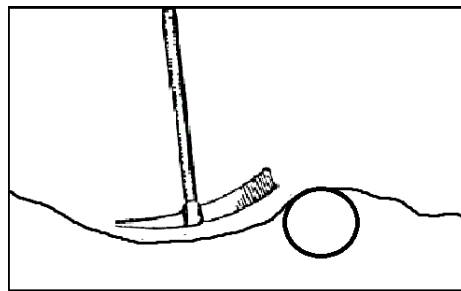
STEP 3 - Fine tune and shape

Shape the waterbar so that 1/3 of the log or rock is below grade to prevent the water from undercutting the structure.

Cut and remove any roots and rocks that could catch any floating debris or slow the water flow.

Shape the water bar to about 20" wide and the profile of a pick mattock head.

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.



If you see water pooling on a mostly flat section of trail, look to see if there is a slight downhill edge or a natural low point at the side of the trail where water could flow away. If yes, use a hoe or mattock to shape a “bleeder” a shallow, wide fan-shaped drain that tapers to a narrow outflow on the downhill side

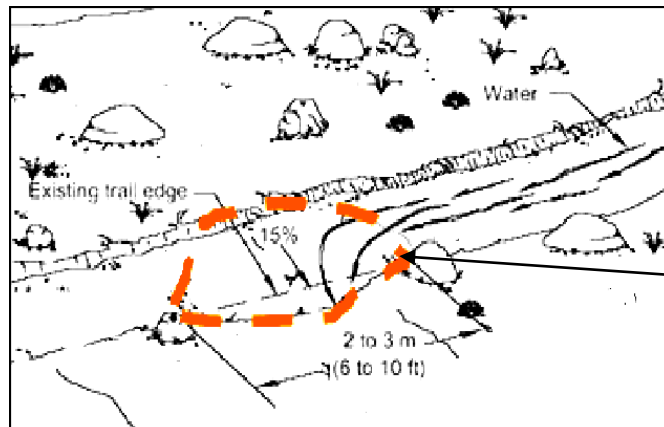


Image courtesy of the AMC White Mountain Trail Adopter Manual

Streams crossing the trail should be cleared to remove logs, brush, rocks, and leaves that may clog the channel and divert the water so that it runs down the trail.

Side ditches are used where water cannot be directed off the trail. The ditch carries water alongside a trail to a waterbar which will direct the water away from the trail. Silt and debris must be removed from ditches to keep the tread dry

PRIORITY 2 CORRIDOR DEFINITION

A well-maintained trail is said to “unfold before you”.

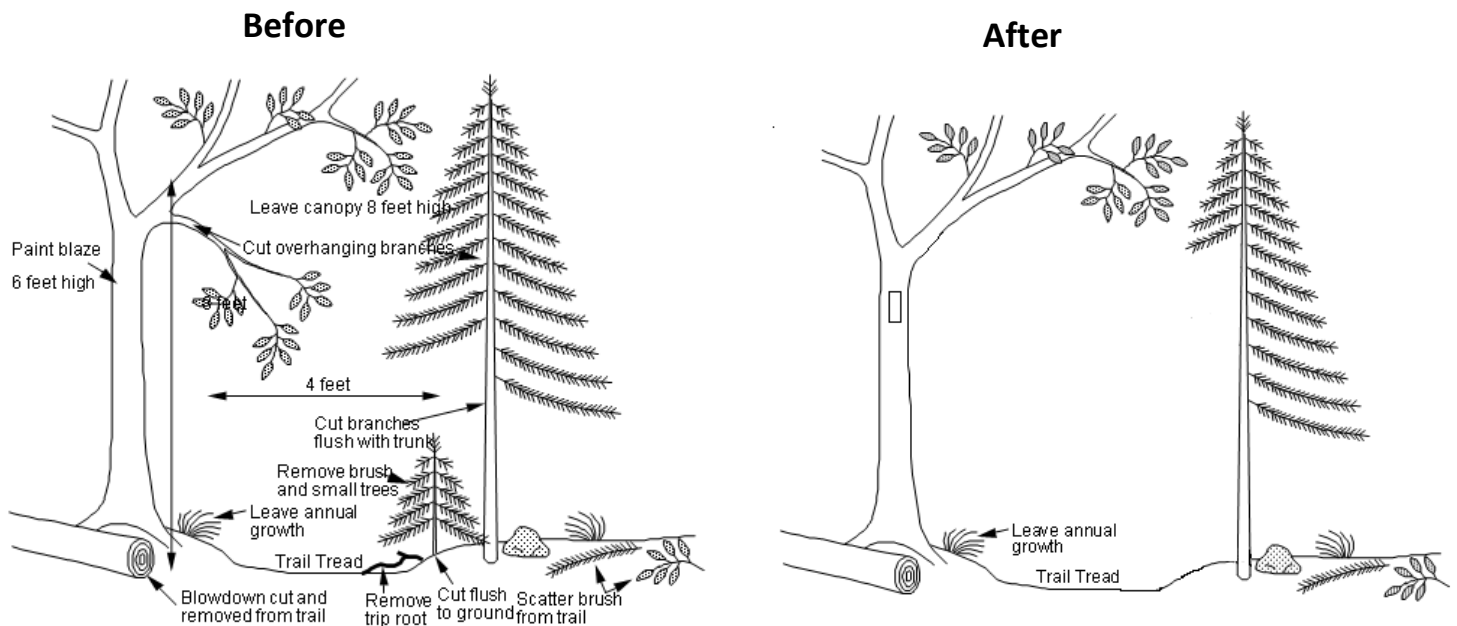
A general rule is to clear the trail so that a large person with a full pack can walk the trail after a rainstorm without getting soaked. Good brushing facilitates unimpeded passage and helps guide the hiker with a visible trail and clear view of trail signs and blazes.

Trail standards specify a clearing width of four feet and a height of eight feet.

Trails used for winter travel may be cleared higher to allow for snow cover.

A four-foot-wide corridor may seem extreme but will guarantee an adequate path for at least a year.

Plants and their branches will quickly fill a smaller opening and make passage on the trail more difficult. The intent is not to have a four-foot wide treadway; the treadway will remain at 18 to 24 inches wide. Proper brushing will keep the corridor clear for the entire time between brushing sessions.



Pruning - Cut branches flush with the trunk or limb (no tip clipping) for a natural appearance and to eliminate hazards to hikers.

Avoid over pruning, remove no more than one third of a tree's branches and never remove the top.

This is not only unsightly but also encourages lateral growth which increases your future work.

Cut plants flush with the ground when removing an entire tree or plant.

Hikers have a tendency to walk on the downhill side of the trail; the result is a steady downhill creep of the treadway, which is intensified when brushing is done mostly on the lower side of the trail.

Keep aware of the terrain and brush the trail (usually the uphill side) to guide hikers to stay on the treadway.

Fast growing plants can overtake a trail in a single season and is no match for annual sessions with loppers. The best strategy is to heavily cut bush back to a width of five feet. After that, annual sessions with a weed whip/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 weed whip/swizzle stick will work fine.

Debris - Pick up all branches, trees, and debris and scatter them off the trail and out of sight. Brush left in the trail can cause erosion and be a hazard to hikers. Large branches should be dragged off the trail butt-end first.

Best Tools

- Hand Pruning Shears
- 6" Folding Saw
- 21" Bowsaw
- 13" Straight Pruning Saw
- Pole Saw

Blowdowns lying across the trail should be cut on each side of the trail and the center section removed. Smaller blowdowns can be cut in pieces and dragged away from the trail. When a tree falls parallel to the trail with branches projecting into the trail the projecting side branches can be cut flush with the trunk without needing to move the trunk itself.

Removing blowdowns is hazardous. Take safety precautions when removing blowdowns from across the trail. Study the situation carefully before beginning, noting the direction in which trees or branches will move and fall. Watch for springpoles that can spring back and inflict serious injury. Directional pressures on the fibers of the wood can cause binds, which can lead to your saw becoming pinched while cutting. Unless a log is lying flat the wood will have varying areas of tension and compression. Plastic wedges can help prevent pinching, but complex situations should not be undertaken without proper training. When in doubt, wait and contact the NET Planner or NET Chair. Chainsaws and other power tools CANNOT be used on blowdowns without AMC approved training. All chainsaw use must be compliant with AMC's Chainsaw Policy (2016).

“Braided trails” often develop when hikers cut switchbacks or avoid wet areas in the trail by hiking off the trail. In dealing with these problems, try to determine why they are happening (blazing, obstacles, poor corridor definition) and correct the cause. After correcting these problems, naturalize the braided trail with leaves and brush to allow new growth to establish.

PRIORITY 3 TRAIL MARKING

Trails are marked with blazes and signs to help hikers, especially those not familiar with the area, know they are on the trail.

Blazes influence where hikers step and help keep them on the treadway and protect the surrounding land. Hikers gain a sense of security from seeing the occasional blaze, cairn or sign.

REASSURANCE MARKERS (Blazes) are one element of trail marking. Consider other elements that help hikers identify the trail including:

- The condition of the treadway
- Quality of corridor maintenance
- Trail structures such as waterbars and drainage
- Signage and Cairns

Frequency (spacing)

Do not over blaze and make the trail look like a highway. Err on the side of too few blazes, once a blaze is placed, it is there for at least 15 years.

Trail marking should provide reassurance that hikers are on the trail. Always think of the safety and informational needs of the hiker.

It is okay if a hiker needs to search for a moment for the next blaze, especially if the alternative is a poorly placed or redundant blaze.

The frequency will vary with the terrain, forest cover or visibility of the treadway.

- Blaze less along trails with well-defined corridors, trails with constructed features, in dense vegetation and along sharp ridgelines
- Blaze more along trails in open forest and in open areas

Best Tools

PAINT KIT:

- Small plastic bucket with handle
- One or two pints of paint in a squeeze bottle or suitable container
- Wire brush
- A one- or two-inch disposable paint brush
- A two-inch paint scraper
- A small rag
- Ziploc bags (to keep wet brush from drying)
- Eye Protection

- Generally, blazes in one direction should be 150 feet apart with the blazes in the opposite directions midway between
- At trailheads, intersections and at confusing changes of direction a blaze should be placed close enough to be readily visible, about 30 feet, along the trail to show the trail direction.
- Blazes should be located on trees that “catch the hiker’s eye” and draw them to the trail
- Only one blaze should be visible to a hiker at any time.

Color, Size and Shape

Blazes are a white 2”x 6” vertical rectangle, with squared-off corners and without gaps or drips

Blazes should be about 6 feet above grade to be visible when snow covers trail. The type of paint used should be a white latex exterior house paint.

A blaze that has expanded as the tree grew should be trimmed back to size with neutralizing paint or scraper.

Method

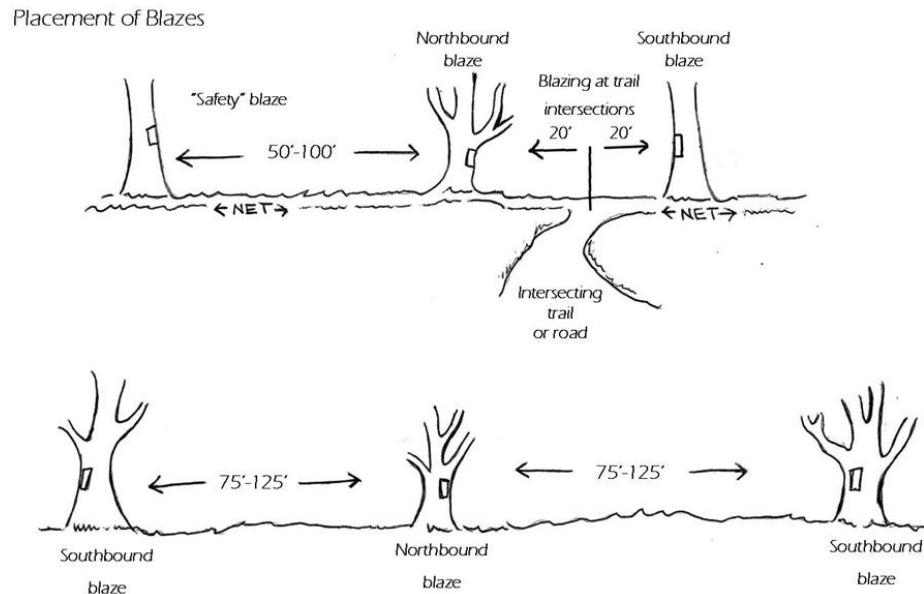
It is best to do the entire trail at one time, or at least complete a section between intersections.

A change in the blaze pattern can be confusing to hikers.

Consider blazing when trees are in full foliage and visibility between trees is at its lowest.

Blaze only in one direction so you can concentrate on proper visibility, frequency and position of the blazes

- The blaze interval (distance between blazes) should be 150’
- Blazes in the one direction should be midway between blazes in the other direction



- Find blazes in the opposite direction. Choose a good location close to midway between.
- Scout the trail for a good line of sight. Select a tree that “catches the hiker’s eye” and draws them to where they should step on the tread.
- Select a live tree with bark that contrasts with the paint color.
- With a scraper, prepare the tree surface by smoothing an area just large enough for the blaze. The thicker and more ridged the bark, the more forceful your scraping needs to be. Be careful not to scrape too deeply especially on thin bark trees (birch and beech).
- Don’t simply repaint old blazes. Take a fresh, objective look at the trail; add or delete blazes as needed.
- In fields or open areas, be sure the blaze is visible across the field. Add a post if necessary.
- **MINIMIZE THE USE OF DOUBLE BLAZES** - use double blazes only for confusing changes of direction, with the top blaze indicating change of direction.
- **Do not paint blazes on rocks. If you are in a large open area (such as above the treeline) and there are no trees available, consider creating a rock cairn to direct hikers.**

SIGNS and KIOSKS are a part of trail marking. Monitor the condition of signs. Report the need for sign replacements or new signs in your work report.

REPORTING TRAIL WORK

Reporting is probably the least enjoyable part of the work* but is important for gaining support for the trail and to document trail improvement needs and future work.

File your report online at <http://newenglandtrail.org/volunteer-opportunities>

If you have difficulties or would like physical copies of the form contact the NET Planner.

*AMC's Stewardship Society Awards are awarded annually to recognize volunteers that contribute over 96 hours or over 224 hours. Individual volunteers who report 250 hours over any period of time receive a "Volunteers In Parks" Pass for free admission to any National Park for a year.

TOOLS FOR TRAIL WORK

The basic maintenance work of adopters does not require a lot of tools or expensive tools.

Most work can be accomplished with hand pruners, loppers, bow saw or pruning saw, pole saw, shovel, hazel hoe, or mattock.

Many adopters have some of the tools since they are the same tools used for landscaping. Some buy their own tools to have the type or brand they are most comfortable with, can properly maintain them, and have them readily available. If you are thinking of buying tools, talk with other adopters and take advantage of their knowledge and experience.

The NET Volunteer Trail Crew has a cache of tools that may be borrowed for short periods of time.

A brief description of the commonly used tools and their uses is provided below.

Mattocks. Mattocks are one of the most important tools used for basic maintenance in New England because of the large numbers of rocks encountered. It is a heavy, sturdy tool that can be used to dig through rocky soil and roots. There are two types of mattocks. A pick mattock has a head with an adze and a pick while a cutter mattock has an adze and a cutter blade. The pick mattock is favored by most maintainers because it can be used for cleaning waterbars and drainages and for prying out rocks when they are encountered. The cutter mattock is useful in soils with fewer rocks but abundant roots.

Hazel hoes and grub hoes. These tools are used for cleaning waterbars, cleaning drainage ditches, and sidehill grubbing. A hazel hoe has a six- to eight-inch-wide adze blade and a curved handle. Grub hoes have a narrower blade and are essentially mattocks without a pick or cutter blade. Garden hoes with the handle shortened represent a lightweight alternative.

Shovels. Shovels, which come in different forms, are useful for removing loose soil from drainages and putting in new soil waterbars and side ditches. Shovels should not be used for prying out rocks as they may break. A pick mattock or crowbar should be used to remove the rock. Some maintainers slightly sharpen the shovel blade to facilitate cutting through small roots. Small folding shovels or foxhole shovels are light and can be carried in a pack.

Clippers, pruning shears, or lopping shears. These are one of the primary tools of adopters. They come in a variety of types and the ones used depend on the work to be done and the preferences of the adopter. The handles may be made of wood, steel, or aluminum. The cutting heads are either the sliding blade-and-hook type or the anvil type. Some have simple pivot actions while others have compound or gear-driven actions that provide increased cutting power. Most clippers provide a one-to-two-inch diameter cut. Pole clippers have a six-to-eight-foot handle. These are useful for cutting high limbs along ski touring trails. Small hand clippers or pruners are useful for light pruning and can be carried in a pocket. They are especially useful above timberline.

Saws are the most frequently used tools and come in a variety of shapes and sizes. Bow saws and pruning saws are available with blade lengths from 13 to 36 inches. Some are collapsible or folding and can easily be carried in a pack. Choose a saw for the type of cutting expected: smaller saws for cutting saplings and limbs too large for the clippers and larger saws for cutting blowdowns. By making an undercut in addition to the top cut, a smaller saw can cut logs with a diameter that is twice the length of the saw blade. Pole saws are useful for cutting high limbs. All saw blades should always be sheathed when not in use. There are many different types of sheaths, such as a segment of garden hose, fire hose wood or aluminum.

Axes are used in trail work for cutting blowdowns. A three and a half pound, single bit axe head is most common. A sharp axe is safer and more efficient. Axes should always be sheathed when not in use.

Swizzle Stick or weed whip is a straight or serrated blade attached by one or both ends to a long handle. This tool is useful for cutting heavy grass and light brush. Some plants are best controlled by regular cutting while they are small and low to the ground. Because swizzles are swung, it is important that the user maintain a safe distance from others. It is recommended that the nuts that are supplied with the swizzle be nylon insert lock nuts before going out into the field. You should also carry replacement nuts and bolts and the tools needed to install them. Always keep the blade sheathed when not in use.

There are other tools available that perform the functions listed above. Some adopters have a preference for a particular style, size or manufacturer. As you gain experience you will find what tools work best for you. Marking personal tools with bright colors and placing uphill when not in use will prevent misplacing them on the trail.

Chainsaws are most useful for trees over 8" in diameter or in storm damage situations where there is a large number of trees to cut. Chainsaws are the most dangerous tool used by trail workers. All chainsaw use must be compliant with AMC's Chainsaw Policy (2016). AMC policy requires any sawyer complete approved chainsaw training and be approved by NET staff, and wear PPE when cutting. To learn more details about AMC's chainsaw policy, please contact the NET Planner.

SAFETY RESOURCES

Ticks & Lyme Disease

- [HTTPS://WWW.CDC.GOV/TICKS/](https://www.cdc.gov/ticks/)
- Lyme Disease Association
P.O. Box 1438
Jackson, NJ 08527
www.LymeDiseaseAssociaton.org

Poison Ivy

- [HTTPS://WWW.CDC.GOV/NIOSH/TOPICS/PLANTS](https://www.cdc.gov/niosh/topics/plants)
- [HTTPS://WWW.POISON-IVY.ORG](https://www.poison-ivy.org)
- [HTTP://POISONIVY.AESIR.COM](http://poisonivy.aesir.com)

Ten Essentials For Hiking

- Map.
- Compass (optionally supplemented with a GPS receiver)
- Sunglasses and sunscreen.
- Extra clothing.
- Headlamp (or flashlight)
- First-aid supplies.
- Firestarter.
- Matches.

First Aid Kit Components

Recommended from AMC's Complete Guide to Trail Building and Maintenance

- 1 package moleskin, molefoam or Secondskin
- Aspirin or ibuprofen
- 1 triangle bandage and safety pins
- Assorted Band-Aids
- 1 Ace bandage
- 3, 4-inch-by-4-inch gauze dressings
- 1 roll of tape or Kling bandage
- Gloves
- Pocket mask
- Antihistamine capsules
- Iodine antiseptic or iodine antiseptic wipes
- Shears or scissors
- Tweezers or "tick spoon"

Signature of NET Planner

Date

*See NET Planner for a copy of AMC's Code of Conduct or visit [outdoors.org/code-of-conduct](https://www.outdoors.org/code-of-conduct)

TRAIL WORK RESOURCES

ONLINE REFERENCES

MA Dept. of Conservation and Recreation: [Trails Guidelines and Best Practices Manual](http://www.mass.gov/eea/docs/dcr/stewardship/greenway/docs/dcrguidelines.pdf)
<http://www.mass.gov/eea/docs/dcr/stewardship/greenway/docs/dcrguidelines.pdf>

Federal Highway Administration, Recreational Trails Program: [Trail Construction and Maintenance Notebook – 2007 ed.](http://www.fhwa.dot.gov/environment/recreational_trails/publications/fs_publications/07232806)
http://www.fhwa.dot.gov/environment/recreational_trails/publications/fs_publications/07232806

Pacific Crest Trail Association: Trail Skills College – comprehensive skills guides
<http://www.pcta.org/volunteer/trail-skills-college/trail-skills-college-course-curriculum/>

PRINT REFERENCES

Birchard Jr., William and Proudman, Robert D. *Appalachian Trail Design, Construction, and Maintenance. 2nd ed.* The Appalachian Trail Conference Harpers Ferry, WV, 235 pp, 2000.

Birchard Jr., William and Proudman, Robert D. *Appalachian Trail Fieldbook. Maintenance and Rehabilitation Guidelines for Volunteers. 2nd ed.* The Appalachian Trail Conference, Harpers Ferry, WV, 96 pp., 2003.

Birkby, Robert C. *Lightly on the Land. The SCA Trail-Building and Maintenance Manual. Student Conservation Association.* The Mountaineers, Seattle, WA, 272 pp., 1996

Staff of the AMC's Trails Department. *Complete Guide to Trail Building and Maintenance. 5th ed.,* Appalachian Mountain Club, Boston, MA, 262 pp., 2021.

RELATED READING

Waterman, Laura and Waterman, Guy. *Forest and Crag. A History of Hiking, Trail Blazing, and Adventure in the Northeast Mountains.* Appalachian Mountain Club, Boston, MA, 888 pp., 1989. *A monumental description of hiking in the Northeast backed by extensive research.*

Waterman, Laura and Waterman, Guy. *Backwood Ethics. Environmental Issues for Hikers and Campers. 2nd ed.,* The Countryman Press, Woodstock, VT, 280pp., 1993.

Wilkerson, James A. (ed.) *Medicine for Mountaineering & Other Wilderness Activities. 4th ed.,* The Mountaineers, Seattle, WA, 416pp., 1992.

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Wilkerson, James A. (ed.) *Medicine for Mountaineering & Other Wilderness Activities. 4th ed.,* The Mountaineers, Seattle, WA, 416pp., 1992. *Other first aid manuals are available.*