

PCTA Trail Skills College Curriculum
Instructor Planning Guide

Course 101. Brushing and Scouting

Intended for those new to trail work who want to learn how to cut brush and small logs to help clear a trail to proper specifications. After discussion of general safety protocols, students learn about safe and effective use of hand saws and loppers. This class also includes how to complete an early-season trail survey to identify and report major problems, especially blown down logs – their numbers, locations, and sizes.

STUDENT SKILL OUTCOMES:

- “Trail Eyes” to see the PCT trail corridor and clearing limits.
- Ability to accurately survey a trail for logs, brushing and major tread needs
- Safe use of loppers and hand saws, including commitment to PPE.
- Effective lopping and sawing skills to protect trees and maximize efficiency.
- Clear understanding of and commitment to PCTA reporting procedures.

KEY TERMS:

trail corridor, clearing limits, brushing, blow down, log out, spring pole, trail triage, scouting

TRAIL MAXIM:

“When in doubt, cut it out—it will grow back.”
(Applies to brush and saplings only. If a spring pole or pile of logs looks dangerous beyond your skills, walk away.)

TOOLS NEEDED PER 8 STUDENTS:

4-6 loppers, 4-6 hand saws, 1-2 pole saws, 1-4 pulaskis, 1 roll flagging tape, 10' measuring tape. Tool numbers will depend on the clearing to be done. Ideally, each participant should have two tools, though one is ok, if they trade around.

WORK SITE REQUIREMENTS:

One mile section of trail, ideally near the trailhead, that has a wide variety of brushing and hand sawing work to be done. A mix of shrubs, saplings, high limbs and small fallen trees in the trail corridor and drainage outlets is ideal so that trail eyes and all tools are used. Ideally a spring pole to cut. Also, some larger windfall to document would be ideal.

HANDOUTS:

- Trail Work Project Planning form

KEY CONCEPTS:

- 1) Safety Documents and Concerns: Personal Protective Equipment (PPE), Job Hazard Analysis (JHA), Tailgate Safety Session (TSS), Emergency Action Plan (EAP)
- 2) Trail Crew Leave No Trace: Have a positive impact on the land through trail work and be sensitive to off trail and camping impacts.
- 3) Develop “trail eyes”
 - recognize perpetually growing plants
 - keeping the corridor properly cleared
 - take good scouting notes
- 4) Scout Accurately: know where and who to report scouting notes to and make sure they are reported promptly.
- 5) Trail corridor and clearing limits:
 - 3' wide up to 24" (approx. knee height)
 - 8' wide up to 10' height
 - Below the knee, leave obstacles close-in to prevent tread widening and OHV incursions
- 6) Outfall ditches of drainage structures must be cleared of logs, branches, saplings.
- 7) Loppers are easily broken, cut nothing bigger than your thumb, no twisting. Hand saws (folding, scabbard, and bow saws): pros & cons of each. Also pole saw technique.
- 8) Cut flush and deep: close to the ground; limbs flush with bole of tree (leaving collar if present) to help tree heal and avoid “pack grabbers” (staubs). With brush, “When in doubt, cut it out”—it will grow back. Cut extra as “preventative maintenance.” Grub or pull out the roots of multi-stemmed shrubs and small tree seedlings.
- 9) Recognize and safely remove spring poles.
- 10) If time, prepare for log out crew by cutting limbs off blow down across the trail.
- 11) Report work promptly.

BACKGROUND

Brushing and **Reporting** are combined in this class because they make a well-matched and efficient combination of tasks. With expensive gas and limited trail budgets, sending someone out just to report on blow down is a lost opportunity to get other much-needed trail work done at the same time. At the very least, every trail scout should carry a small hand saw to remove a few problems along the way.



Safety Awareness: Discuss the following: overhead hazards, **spring poles**, sharp brush stumps, sawdust and dirt in the eyes, branches slapping the face, sharp saws and loppers (fingers have been lost). In this very first trail class, strongly encourage students to develop a keen awareness of overhead hazards such as **widow makers** whenever they stop along the trail.

Trail Crew Leave No Trace: Students may protest, 'Our job is to leave a trace.' It's true that trail work has an impact on the land... but the work that is completed is meant to reduce overall impacts on the land. There are ways to bring Leave No Trace ethics into all the work completed on the trail, including how we go about completing projects, where we choose to camp and take breaks, and how the crew behaves in relation to other visitors and wildlife. It is important that we foster a Leave No Trace ethic since we are a model for other public land users and are in the position to influence other's behavior.

- Be respectful of other visitors: minimize visual impacts, hide brush whenever possible, store tools and take breaks off the trail, and never leave stubs (AKA stumps, pungy sticks) when brushing.
- Travel and take breaks on durable surfaces: keep off trail disturbance to a minimum
- Dispose of waste properly: pack out garbage you find or create, and dispose human & pet waste properly.

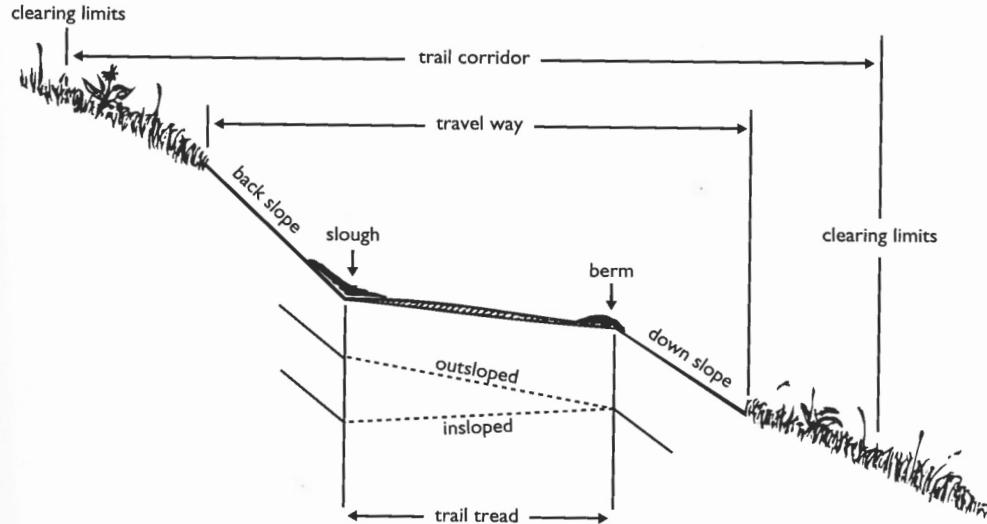
 **Trail Eyes:** Students must learn to see the PCT **Trail Corridor** stretching out ahead as a long tunnel, large enough to accommodate a string of loaded **packstock**. If they have not been around **pack strings** it is difficult to understand just how much vegetation needs to be removed. One long-time crew leader encourages new trail workers to imagine trail corridors large enough for a delivery truck to pass through, since the dimensions of a such a truck are about 8'x10'.

Obviously, in some environments, such as above tree-line, there is less plant material to remove to create the trail

corridor. Different forest types vary dramatically in the amount of brush and tree limbs to remove. PCT **trail stewards** must identify the portions of their trail section that need the most brushing and give them special attention with enough volunteers.

PQuality Work:
Clarify Clearing
Limits just how wide
and how high shrubs,

Figure 1. Trail Structure Terms (IMAGE COURTESY OF THE SCA)



small trees and tree limbs need to be cut back. Three feet wide from ground level to 24" (about knee height); eight feet wide from 24" to ten feet overhead. Show students that their arm span, finger tip to finger tip, is equal to their height and thus allows them to calculate eight feet easily by adding whatever amount is needed beyond their finger tips. Holding a tool outstretched overhead can allow an approximation of ten feet. Most knees are about 24" high and three feet can be estimated using a pulaski or pair of loppers.

Additional clearing width may be needed through areas of high fire hazard, such as the brush fields of southern California. In these and other areas where brush is particularly fast growing, clearing limits need to be expanded to allow for growth. Alternatively, brushing crews need to work the area every year or two.

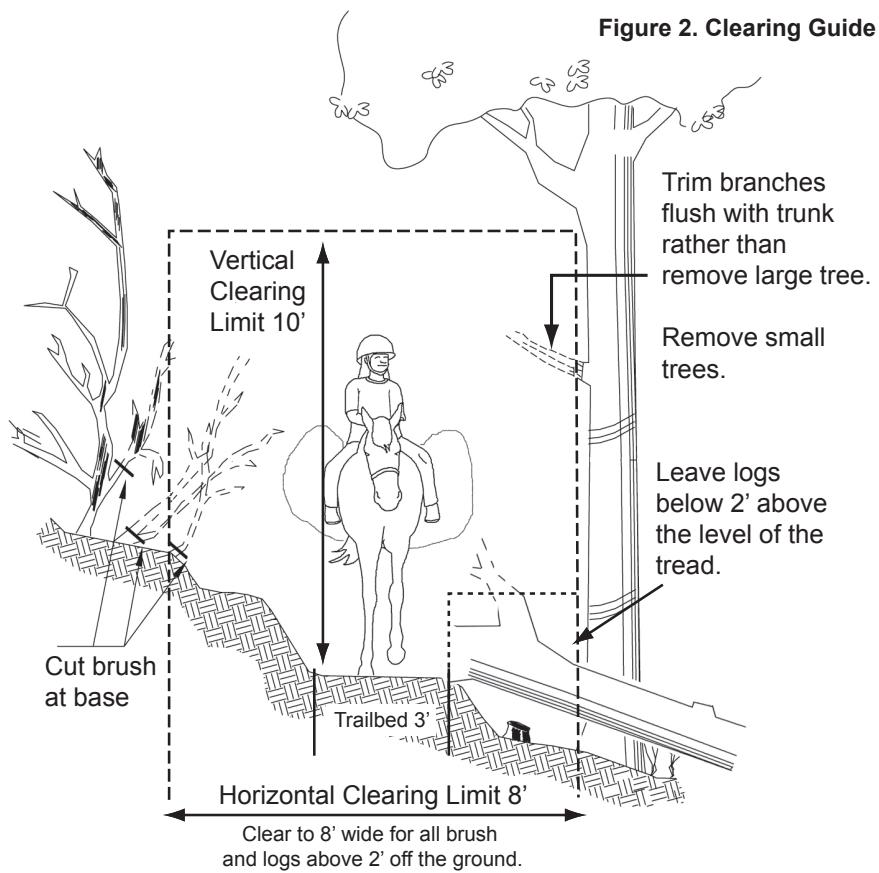
Brushing: Many species of brush grow very fast, closing off a trail corridor in just a few years.

Thus brushing generally needs to be very aggressive. Cut brush close to the base, even if the base is outside the clearing limits. Never just cut off the tips of branches; it is a huge waste of time. Ideally, cut where a single stem at the base removes several branches. Better to make one cut than three (and way better than six for the person brushing in a couple years when the brush grows back.)

In some areas outside of wilderness where brush returns vigorously, it may be worthwhile to get trained using a power brusher. This is a moderately dangerous tool so not suitable for every volunteer. An alternative, if you have enough volunteers, is to grub out such shrubs using Pulaskis, grub hoes, or pick mattocks.

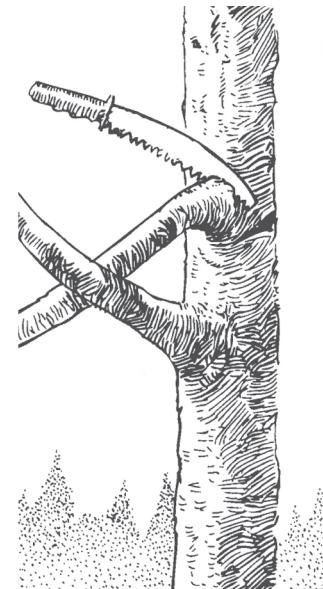
Part of brushing includes removing tree saplings in the trail corridor, ideally before they grow above 24". All sapling stumps must be cut as flush as practical with the ground to prevent unsightly tripping hazards. Completely pulling up seedlings and small saplings to remove their roots is "the permanent solution," preventing sprouts and a future larger sapling in need of cutting.

Brush work can be done with loppers for stems smaller than one inch diameter or use a hand saw for larger stems. Trying to cut wood too large with loppers will damage the tool by bending the metal cutting parts or breaking wooden handles. Emphasize the cost of loppers and how



* These are general trail-wide clearing guidelines, please work with your local land manager to determine if different guidelines are used in your local area.

Figure 3. Saw branches almost flush with the trunk to avoid leaving hat racks. (IMAGE COURTESY OF THE SCA)



easily they are made useless. Always keep hand saws out of the dirt so they remain sharp and make your work easier.

Cut tree limbs growing into the trail corridor with a hand saw. Cut the limb as flush with the trunk as possible to speed healing of the wound and prevent disease and rot. Loppers are not a good choice because they invariably leave stumps that catch packs, are unsightly, and put the tree at risk. On trees that have a collar at the base of limbs, cut just outside the collar--this speeds healing.

For large limbs, it is best to make a one inch deep undercut before cutting from the top. This prevents the heavy limb from ripping off bark as it falls. Instead of removing so many branches that a tree looks ridiculous, cut it out entirely--it will save time now and in future years when branches regrow into the trail.

Read more about brushing at www.fhwa.dot.gov/environment/fspubs/07232806/page07.htm#clea

Pole Sawing: Tree limbs in the trail corridor that originate high in a tree, require a pole saw. Eye protection is essential because of drifting sawdust and a hardhat for falling limbs. Most of the cutting happens on the down stroke. Just as with lower branches, endeavor to cut as close to the bole of the tree as possible and make an undercut first.

Log Out: Small hand saws are capable of cutting **blow down** up to six inches in diameter and thus you can make a great start on clearing a trail. Because a log out crew will follow, there is no need to try to cut larger logs, though some may be easily dragged off the trail if they are neither too heavy nor attached at the base. A complex pile up of several small trees under tension can be hazardous and should be left for a certified log out crew. Utilize **Go/No Go** analysis to determine if this work is beyond your safe skill level.

With loppers and a hand saw it is also possible to prepare large blow down for the log out crew by removing all the branches on the fallen log. It is important to remove all such limbs a few feet beyond the eight foot trail corridor, because as green limbs dry they often bend back into the trail corridor. Cut limbs flush so they will not catch packs and saddlebags.

Preparation for Drainage Work: As part of this work it is absolutely essential to remove any rocks, fallen logs, branches, or saplings that obstruct the outfall ditch of **drainage structures**. If left in the drainage they will trap sediment and quickly render the drainage useless. Because a later crew cleaning drainages is unlikely to carry tools for cutting logs, the log out or brushing crew must take care of these when they pass along the trail.

Disperse cut brush, limbs, and saplings well out of the trail corridor, preferably out of sight and always scattered over a wide area on the ground. Do not toss brush on top of other living brush where they will turn an unsightly brown and advertise to trail users that a careless crew passed this way.



Spring Poles: Spring poles can be extremely dangerous because they look fairly innocuous and often are (as often as not they release with only a little movement). However, an unaware or inattentive trail worker can be severely injured or killed by an unexpected blow to the head or chest from a dramatically released spring pole. Under extreme tension, a large green sapling can release suddenly and ferociously with just a brief touch from a saw in the wrong place.

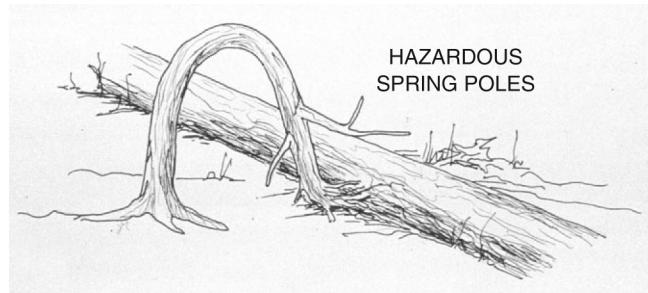
If you are not trained to safely cut spring poles, study the diagram below carefully and read the text. Preferably practice with an experienced sawyer before you instruct others. A 45 degree angle from the intersection of the lines back to the spring pole indicates where to make a series of shallow relief cuts inside the arch to slowly reduce the tension in the sapling. The same process applies to large bent green limbs held down by a fallen tree. Note that the place to make the relief cuts is generally not under the center of the arch, but rather off set a little. A complete discussion of this topic is available at www.fhwa.dot.gov/environment/fspubs/04232822/page16.htm#spring

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Remember: trail work is an excellent opportunity to have a positive impact on the land. Be respectful of other visitors.

Figure 4. Look out for spring poles (trees or limbs that are held down by other trees.) Spring poles can release with great force, causing serious injuries. Make a series of small cuts on the inside of the bend when severing a spring pole. (IMAGE COURTESY OF THE USFS)



Tool Care: It is very easy for inexperienced trail workers to lose and damage tools, especially small ones such as loppers and hand saws. During lunch and rest breaks, store all tools off of the trail in a place that is visible and easily accessible. Stress that loppers are expensive and easily ruined by cutting too large branches. Use a saw for any branch larger than a fat thumb and NEVER use loppers to twist off a stubborn branch. At the end of the day, remove dirt and sap from tools. Sharpen any tool that needs it. A tool cache should have at least one pair of loppers that are marked to cut roots in the dirt, mostly for drainage work. All others should not be used in the dirt. Of, course, hand saws must be kept out of the dirt or they will dull quickly and make work much harder.

Scouting and Reporting: Prompt reporting of trail conditions and work completed is essential to the success of trail maintenance. It enables PCTA and agency staff to know what has been done and what remains to be done. This allows other crews to work on high priority areas and provide up to date information to the public. Unreported work is of little use to others.

Time is of the essence! Work reported even a week late can be of much-reduced value.

Who to report to:

- PCTA staff
- Other staff or trails/volunteer coordinators for partner organizations
- Agency staff
- Other volunteers who may be working in the area

Trail Eyes: Although it is not expected that students in this basic course will have the background necessary to assess complicated tread work needs, this course should impress upon them that scouting requires a keen sense of the trail. This includes the ability to measure logs accurately, determine distances/locations from maps, see the trail corridor so brushing needs can be assessed, and understand the basic mechanics of trail drainage. (Tread & Drainage courses (102, 201, 203) will increase student's trail eyes in the latter and are highly recommended for those who will be scouting.)

What to Report: The PCTA encourages the use of the Trail Work Project Planning Form, available at http://pcta.org/help/volunteer/vol_rec.asp. (Agency units or partner organizations may have similar forms they prefer you to use.) This streamlines the information being distributed and ensures all the needed information is present. Always carry a note pad and pencil. A tape measure is not needed if you

learn the distance covered by your stride (two steps) and the sizes of tools you carry such as a hand saw.

There are three main aspects of the trail to report

- 1) Logs: How many remain across the trail, what size are they and where are they located? Were any logs removed by cutting (<6" only!) or dragged off the trail?
- 2) Brush: Are there areas that the brush is exceptionally bad? Was any brush cut back during scouting?
- 3) Tread: Are there any tread structures that are failing (e.g. bridges, waterbars, retaining walls)? Is the trail braided or overly narrow in spots? Are there gullied/trenched areas and if so how deep and for how long? Are there debris slides obstructing the trail?

Specificity is key! Estimates such as "Lots' of 'huge' blow down on the PCT 'north' of South Sister," are of little use to the next trail crew because "lots" could be 10 or 100, and "huge" could be 20" or 40" and there is a lot of country "north" of South Sister. The next crew leader would not know how many people, of what skill level, what size saw to bring, and where to go!

Examples:

- Thirty-two logs remain across the Six Lakes trail (# 14), ranging from 6" to 36" diameter, located between the trailhead on Road 46 and the junction with the PCT. Twenty-one logs remain across the PCT (#2000) ranging in diameter from 12" to 48" between the junction with the Six Lakes Trail (# 14) and the Island Meadow Trail (# 3). There is also a 500' section of deeply rutted trail (12-18") on the PCT just south of the intersection of the PCT and the Island Meadow Trail. A parallel trail is developing beside this section.
- A pile up of 6 logs (10-30" diameter) completely blocks the PCT to horse traffic near Island Lake, just north of the junction with the Six Lakes Trail (#14). The work appears to be technical. Horses are damaging a nearby meadow trying unsuccessfully to get around the blow down. (Such information indicates the matter needs urgent attention by a skilled crew with a big saw.)
- The horse bridge (4' wide by 26' long) is collapsed across Mesa Creek on the PCT about two miles north of the Wickiup Plains Trail (#12). It appears that horses are bypassing the bridge and fording the stream with little difficulty and minimal erosion. (This indicates clearly that this matter does not need urgent attention.)

Reporting with hand-drawn or GPS maps is not essential, though GPS coordinates may be helpful.

Brushing and Scouting Together—Trail Triage: When brushing and reporting trail conditions, clarify with a supervisor which is the primary objective to guide your work for the day. It is often good strategy to walk to the end of the trail section just making notes on blow down, but also mentally assessing the brush you will need to cut on the way out. Then brush your way back to the trailhead. On the return you can either just take care of critical problems on the whole section, or completely brush to specification a portion of the trail, leaving work closer to the trailhead for another day. If you take the latter approach, include in your report where you left off, in case someone else returns to finish the job.

If it is important to brush a complete trail, but if you have too little time, it is best to emphasize brushing on the uphill side of the trail. This is because excess brush on the uphill side of the trail pushes users, especially horses, to the outside of the tread, often causing it to collapse. If some brush is left on the downhill side of the trail it will push users to the inside of the tread where it is more durable.

Because there is almost always more trail work to do than time to do it, constantly assess what needs your attention now and what work to postpone. Such decisions depend on a variety of factors, but generally give priority to trail problems that present real danger to users or are causing significant erosion that will be difficult to repair if it continues. A supervisor may provide guidance with trail triage decisions, but ultimately all trail users need to develop your own critical thinking skills.

TEACHING TIPS & TECHNIQUES

Brushing Activity: A typical new trail worker has difficulty seeing the trail corridor (develop  trail eyes) and noticing when plants have grown inside the clearing limits. It is very common to see such a person routinely walk past branches that almost hit them, well inside the trail clearing limits. One way to help students develop trail corridor eyes before beginning brushing, is to give each person 10-20 feet of flagging tape and assign them each a section of trail that needs brushing (50-200' depending on work density). Ask them to tie loosely a small piece of flagging to each limb, sapling, and shrub inside the clearing limits. Instruct them to tie it where they would propose to make the cut. Review their decisions as a group with each student explaining their choices. Take opportunities to discuss the finer points of where & how cuts should be made. Have them remove and save the flagging and make the cuts..

After they complete brushing a different section of trail that has not been flagged, have them place flagging on any limbs or brush that are still in the clearing limits. It is common for new trail workers to find more to cut on a second pass.

Scouting Activity: Knowing the distance covered in one's stride is essential to reporting accurate distances. Extend a tape measure for 50 or 100' on flat ground. Have each student walk the distance at their normal pace and count their steps. Have them calculate the distance covered by each stride (two steps). Quiz their math skills- How many strides would equal 200 feet? 500 feet? 1 mile (5,280 feet)?

Scouting Activity: On a section of trail that displays log, brush and tread needs, break the group up into pairs and give each a Trail Work Project Planning Form. Have each pair go through the same $\frac{1}{4}$ to $\frac{1}{2}$ mile section of trail filling out the form as they go. (It helps to stagger their start, so that the pairs can spread out.) Once each pair is finished have the whole group compare their notes. There will probably be a few discrepancies between each other's notes. Whose scouting notes were the clearest? Whose were the most detailed? Discuss how to avoid discrepancies. Finally ask where they would report the form to and when.



Quality Work: For most brushing tasks it should be sufficient to demonstrate a technique then let students practice, critiquing as necessary. Then practice, practice, practice, using a variety of tools.

Clearing Limits: Encourage students to walk along trails with their arms outstretched as a way to better notice if plants are growing inside the clearing limits.

Brushing: pass around a shrub branch and show nodes from which multiple new stems can grow after a single cut, thus emphasizing the importance of cutting at the ground or removing the bush entirely.

Spring Poles: If you do not find a good spring pole on the section of trail you are working, carefully create one using a log to hold down a large sapling. Then demonstrate the proper way to release the tension safely. If it is reasonable to do so, set up several for others to try.

Scouting and Reporting: Have students demonstrate how they would report any large logs or other problems encountered on the trail.

Be sure that by the end of the class that all students have demonstrated the "Student Skill Outcomes" listed above.

TRAIL FUN

For a fun wrap-up do a fast-paced "Jeopardy"-style quiz based on the KEY CONCEPTS.

- 1) Name an item of PPE and why it is important for brushing. Ask this of five different people for better involvement and to cover all the relevant PPE.

- 2) Recite one dimension of clearing limits, why it is that length, and how to measure it without a tape measure. Ask this of three different people.
- 3) Describe how to cut a spring pole safely and why it is so important.
- 4) Name a situation where small trees across a trail should not be cut with a hand saw?
- 5) Describe how to cut a limb off a tree to minimize damage to the tree.
- 6) Give two reasons for prompt reporting of work.
- 7) What are the three main pieces of information the PCTA needs about blow down on a trail?
- 8) What is the best way to report trail issues?
- 9) What is the best way to describe its location?

REFERENCES

Trail Construction and Maintenance Notebook. 2007. Woody Hesselbarth. USDA Forest Service. Pages 44-48 cover brushing. www.fhwa.dot.gov/environment/fspubs/07232806/page07.htm#clea

Saws that Sing. 2007. David Michael. USDA Forest Service. Pages 35-36 provide an excellent treatment of spring poles. www.fhwa.dot.gov/environment/fspubs/04232822/page16.htm#spring

Hand Tools for Trail Work. 2005. USDA Forest Service. Includes good material and illustrations on tools for sawing and brushing. www.fhwa.dot.gov/environment/fspubs/05232810/toc.htm

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Field Reference

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- Ability to accurately survey a trail for logs, brushing and major tread needs
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- Effective lopping and sawing skills to protect trees and maximize efficiency.
- Clear understanding of and commitment to PCTA reporting procedures.

KEY TERMS:

Blow Down: (aka **wind fall**) any trees fallen across a trail, though usually the result of high winds, most commonly in the winter storm season.

Brushing: removal of brush, saplings, and tree limbs to open the trail corridor to proper clearing limits for a given trail.

Clearing Limits: (aka **clearing specifications, trail specs**...) exactly how wide and how high to cut tree limbs, shrubs, blow down and tree saplings to open the trail corridor for users. For the PCT, from the ground to 24" high, cut an opening 3' wide. From 24" to 10' cut an opening 8' wide. This large corridor allows for some vegetation regrowth before packstock are obstructed. Other kinds of trails have different specifications.

Log Out: trail work removing blow down; usually in the spring to open the trail for high use season. In Wilderness areas the work is done with hand tools such as crosscut saws; while elsewhere it is usually done with chain saws.

Spring Pole: a severely bent green sapling tree or branch held by a larger downed tree in such a way to produce dangerous energy in the sapling that can be released suddenly when cut. Very dangerous, especially because it does not look threatening to the uninitiated.

Trail Corridor: (aka **travel corridor or trail prism**) best thought of as a tunnel through the woods, it includes all the elements of a trail affected by construction and maintenance

workers including the excavated back-slope and tread, and the entire area within the clearing limits.

Trail Triage: when there is more work to do than available labor (almost always), we must make choices about which work to do now and what to postpone. Usually problems that threaten the safety of users or are causing serious erosion are top priority.

HANDOUTS:

- Trail Work Project Planning form

KEY CONCEPTS:

- 1) Safety Documents and Concerns: Personal Protective Equipment (PPE), Job Hazard Analysis (JHA), Tailgate Safety Session (TSS), Emergency Action Plan (EAP)
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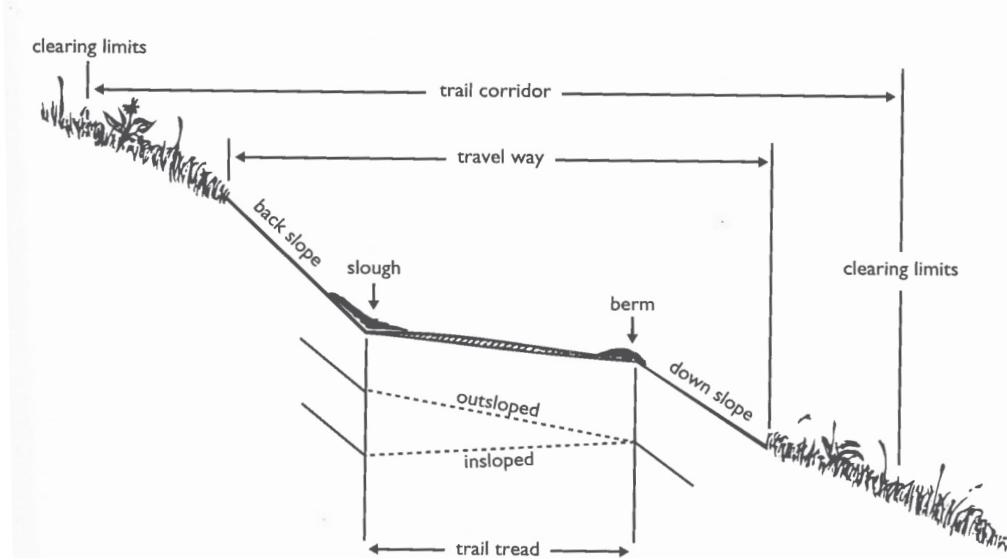
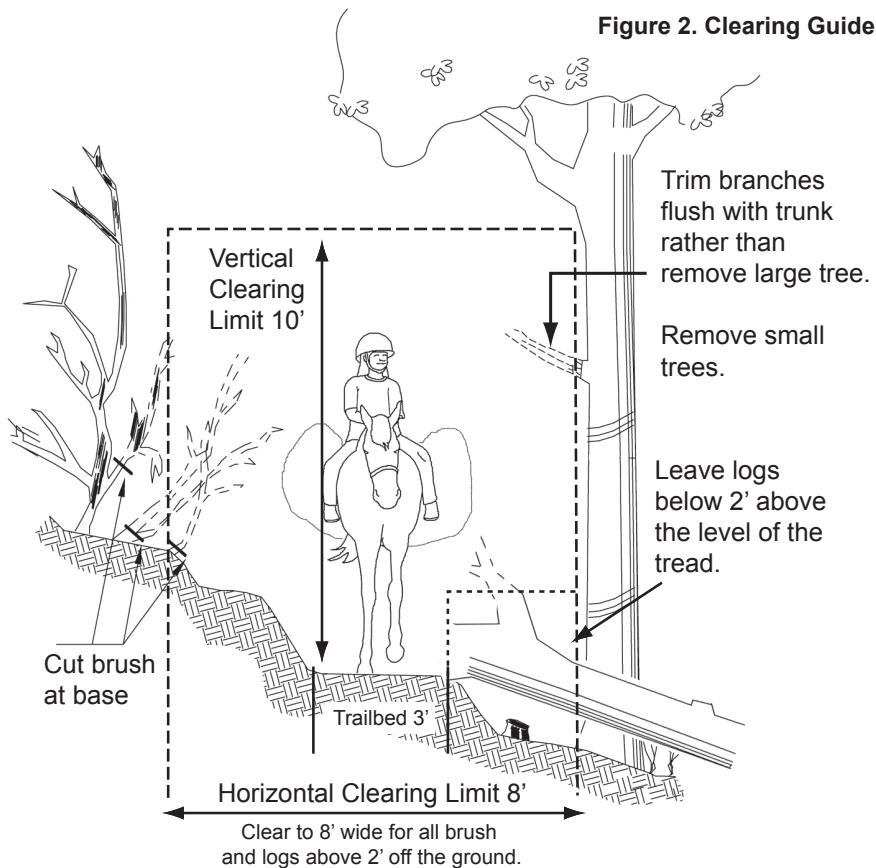


Figure 2. Clearing Guide



* These are general trail-wide clearing guidelines, please work with your local land manager to determine if different guidelines are used in your local area.

Figure 3. Saw branches almost flush with the trunk to avoid leaving hat racks. (IMAGE COURTESY OF THE SCA)

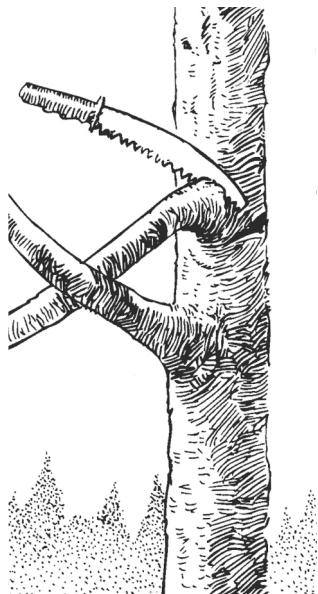


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