

2024 - 2025

TRAIL MAINTENANCE HANDBOOK

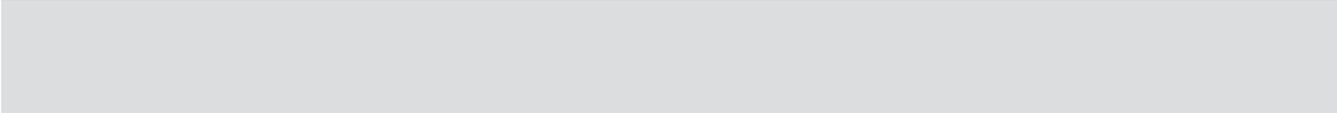
SALIDA MOUNTAIN TRAILS



Table Of Contents

Safety, Awareness & Being Prepared	Page 03
Safety Checklist	Page 04
Purpose of Trail Maintenance	Page 06
Trail Terminology	Page 07
Tools	Page 08
Trail Maintenance Objectives	Page 09
Maintenance Techniques	Page 10
Reading the Trail Tread: Inslope & Outslope	Page 11
Drains	Page 12
Weeds	Page 13

SAFETY, AWARENESS AND BEING PREPARED



Working On An Open Trail

Since trails remain open to users during maintenance, it is important to be alert and aware of others while working. This includes being visible, especially to downhill riders. Be extra cautious when working in a blind turn. Be aware of another trail or trail segment that may be below where you are working. Control loose rocks, especially large ones. Try to avoid working during busy times. Don't wear headphones. Be friendly.

Tool Placement

When putting down a tool, place it completely off the trail, to the uphill side. If there is a sharp edge to the tool, place it sharp-side down. Putting the tool on the downhill side of the trail or leaving it on the trail is dangerous to you and others.

Be Prepared and Safe

Prepare yourself for being outdoors and for some hard work. Wear sturdy shoes, like boots. Wear work gloves and protect your eyes with glasses or sunglasses. Protect yourself from the sun or cold and check the weather forecast before heading out. Bring the food and hydration needed for the duration. Let someone know where you will be working in case of an emergency.

Hazards

Be aware of the hazards in nature. In the SMT Trail System, you may encounter:

- Rattlesnakes
- Spiders (including black widows), scorpions, ants and other stinging bugs
- Mountain lions and bears
- Bighorn sheep and deer (although not usually dangerous)
- Lightning
- Sudden changes in weather

When Not to Work on Trails

- Dirt is too wet to work and sticks to the bottom of shoes
- Trail is closed for wildlife closure
- Trail is being used for an event



Safety Checklist

You are responsible for your own safety and that of other trail users while working on SMT's trails. Below are some safety issues that you should keep in mind:

For your personal safety:

Wear appropriate Personal Protection Equipment (PPE) including sturdy work shoes, gloves, eye protection (sun glasses), hat, a hard hat if working in timbered areas, long pants and sunscreen.

Bring sufficient water and snacks.

Notify someone as to where you will be working.

Beware of environmental hazards such as:

Wildlife such as snakes, scorpions (when moving rocks), even deer defending their young. If working at dawn/dusk, consider the possibility of mountain lions.

Weather changes, especially lightning, high winds, or excessive heat.

Carry and use tools properly. When walking, carry your tool(s) at your side NOT over your shoulder. Keep the sharper side of the tool facing down. Be prepared to throw the tool away from you if you trip.

Inspect your tools to confirm that handles are in good condition and working pieces are properly attached.

When working, there is no need to swing tools above your waist. Pick/mattocks are most efficient when used in short chopping motions rather than big swings.

If working with others, be aware of how close you are. Remain at least one tool length apart. If walking past another volunteer, announce your presence and allow them time to stop work. If you want to bring a work partner(s), they must sign a waiver with SMT.

Be situationally aware. Pay attention to your surroundings and do NOT wear headphones or earbuds that might prevent you from hearing an approaching rider/hiker.

Do not work beyond your physical limits.

What To Expect



If you find yourself unsure about what to do in any situation, first priority is personal safety as well as the safety of all trail users. Contact an SMT representative to discuss/agree on any next steps.

For the safety of other trail users:

Again situational awareness is important, please no headphones or earbuds.

If you are working near a corner where an oncoming trail user might not see you, consider putting an extra tool or your pack above the turn to alert them to your presence.

Never leave a tool in the trail tread. Place unused tools above the trail with the sharp side down where you or other trail users will not trip over them.

If rolling a rock out of the trail, confirm that no one is below you.

Do not leave unfinished work that might be hazardous to trail users.



Purpose of Trail Maintenance

Repair

Repair damage and trail degradation due to erosion and general use.

Manage

Manage water flow and direct off of the trail.

Reduce

Reduce further erosion and subsequent trail damage.

Restore

Restore trail character and trail user experience.

Address

Address safety issues



BEFORE



AFTER

Trail Terminology

Tread

The tread is the actual travel surface of the trail. This width varies by trail.

Trail Corridor

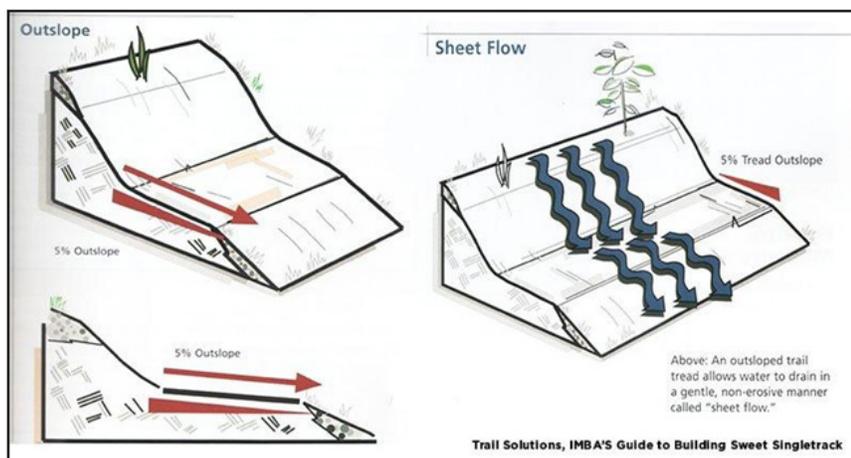
The space the trail travels through that needs to be maintained. This includes the tread, the backslope, the outslope and the width of the cleared vegetation.

Backslope

The uphill side of the trail, off the tread

Sheetflow

The ability of water to flow downhill in a consistent sheet which reduces soil erosion.



Deberming

Removing a raised lip, or berm, on the outer edge of the trail to allow water to flow off the trail. A process done to mend a cupped tread.

Outsloping

Angling the tread from the inside edge of the trail to the outside. In general, trails are outsloped by 5%.

Flow Trails

Mountain bike trails that incorporate banked turns, rollers, frequent grade reversals and often jumps. Examples in the SMT system are Solstice, Sol Train East and West, Rusty Lung, Burnpile, and sections of Chicken Dinner.

Insloping

Angling the tread from the outside edge to the inside edge (outside edge is higher), such as banked turns, often referred to as berms.

Tools



RAKES

Rock Rakes: Rock rakes are just that: sturdy rakes that hold up to moving a lot of small and medium sized rocks. There are two types you may use:



Finish Rake: The finish rake is a poly garden rake (basically, a leaf rake) that is used as the final step in maintaining a trail.

Might be the only tool needed on a trail, depending on the amount of rocks in the soil as well as the frequency of maintenance.

Very effective in reshaping the trail because it can grab lots of loose dirt.

Important last step in smoothing the tread and making the maintenance last longer

GRUBBING & DIGGING TOOLS

These heavier tools are often needed to rake or removed rocks. These tools are used before using the rakes.



McLeod

Pick

Mattock



Safety When Carrying Tools

When transporting tools, carry them at your side—NOT over your shoulder—with the sharp side facing down. This is for your safety, and the safety of those around you.



Trail Maintenance Objectives



Trail maintenance encompasses the entire trail corridor. This includes the backslope, tread, out-slope and drainages. Below are some common trail maintenance issues.

Backslope

Rocks constantly loosen from the backslope and fall onto the tread. Over time, these rocks can build up, along with dirt, on the inside edge of the trail. This pushes trail users to the outside of the tread, causing tread creep and a loss of a safe trail width. This is most noticeable and more of a problem on narrow trails.

Tread

Loose rocks and weeds build up on the outside edge of the trail (called the critical edge). This creates a raised lip, called a berm. Because of this, the trail will become cupped, or troughed, over time. Deberming and re-establishing a 5% outslope of the tread allows for proper sheetflow. This is a common reason trails need maintenance.

Drainages

Water will find the lowest point on a trail where it can drain off. Clogged drainages (from loose sediment, weeds, sticks and rocks) causes water to collect on the trail, creating puddles. In some cases, this can cause water to flow down the length of the trail, creating ruts and excessive erosion. Drains routinely get clogged and need constant maintenance.

Maintenance Techniques

The first step in trail maintenance is an assessment of the area, which helps determine what is needed and which tool to use first.



Start with the backslope

If addressing tread creep and/or the buildup of large rocks and soil, it's often helpful to first use your hands to remove larger rocks. Do not blindly toss rocks off trail. Instead, try to place rocks where they can be useful or move them off trail to an unobtrusive place. If chopping into and reshaping the backslope is needed, use a heavier tool, like a McLeod or Rouge Hoe.

Using the rock rake, lightly rake the backslope sideways, along the length of it, instead of downward to the tread. This allows the rocks to fall to the tread, at the same time moving loose dirt across to fill small holes and rills (small ruts) that have developed. This will create more of a mess for you to clean up on the tread, but is part of the process and best done first. If you rake the tread before touching the backslope, you'll need to rake the tread all over again.

Tread

Starting at a drain, work your way uphill along the trail, using a rock rake to sort rocks from dirt. Modify the rake pressure to avoid ripping up the tread. Really focus on sifting, so dirt settles in place and only rocks are moved by the tool. Rake the rocks up towards a high point on the trail, like a roller (if there is one) then completely off the tread. Rake rocks to the outslope of the trail, unless working on a banked turn (berm) - in this case, rake up over the backside of the berm. This technique avoids raking or casting the rocks/debris into the drain areas. By sorting the rocks from the dirt, there is dirt left on the tread for reshaping the tread with a finishing rake.

Reading the Trail Tread: Inslope and Outslope

It is important to understand and be able to read the trail appropriately before performing maintenance.



Not all sections of trails should be outsloped by 5%. Many trails, especially flow trails, incorporate insloping, such as banked turns. This insloping is designed to force water to the inside of the tread and then down and out to a drain. When maintaining a banked turn, rake dirt and rocks up and over the backside of the turn.

Drains

To function properly, drains need to be lower than the tread surface and free from obstructions. Large rocks, sticks and weeds can be removed by hand. Remove this debris completely from the drain; do not just toss it farther down the drainage. Drain maintenance is especially important in flat terrain, which complicates sheet flow and makes drains more prone to clogs. In some cases, a heavier tool, like a Mcleod, may be necessary to clean and reshape drains.



Weeds

Controlling the growth of weeds and grasses is an important part of trail maintenance. It:

- Allows water to flow off of the trail and keeps drains open
- Maintains proper trail width and character

Weeds and grasses can be a problem for trails and for trail users by:

- Trapping water on the trail; blocking drains
- Narrowing wider trails; hiding optional, fun technical trail features

It is best to pull the weeds before they seed. Place pulled weeds off of the trail, not blocking any drainages. A rock or log can be placed on top to prevent them from blowing back onto the trail.

Trail Rating

Our trails open to bikes are built and maintained to International Mountain Bike Association (IMBA) standards. Keep these standards in mind when working on each individual trail.

IMBA Trail Difficulty Rating System 					
	 EASIEST WHITE CIRCLE	 EASY GREEN CIRCLE	 MORE DIFFICULT BLUE SQUARE	 VERY DIFFICULT BLACK DIAMOND	 EXTREMELY DIFFICULT DBL. BLACK DIAMOND
TRAIL WIDTH	72" (1,800 mm) or more	36" (900 mm) or more	24" (600 mm) or more	12" (300 mm) or more	6" (150 mm) or more
TREAD SURFACE	Hardened or surfaced	Firm and stable	Mostly stable with some variability	Widely variable	Widely variable and unpredictable
AVERAGE TRAIL GRADE	Less than 5%	5% or less	10% or less	15% or less	20% or more
MAXIMUM TRAIL GRADE	Max 10%	Max 15%	Max 15% or greater	Max 15% or greater	Max 15% or greater
NATURAL OBSTACLES AND TECHNICAL TRAIL FEATURES (TTF)	None	Unavoidable obstacles 2" (50 mm) tall or less Avoidable obstacles may be present Unavoidable bridges 36" (900 mm) or wider	Unavoidable obstacles 8" (200 mm) tall or less Avoidable obstacles may be present Unavoidable bridges 24" (600 mm) or wider TTF's 24" (600 mm) high or less, width of deck is greater than 1/2 the height	Unavoidable obstacles 15" (380 mm) tall or less Avoidable obstacles may be present May include loose rocks Unavoidable bridges 24" (600 mm) or wider TTF's 48" (1,200 mm) high or less, width of deck is less than 1/2 the height Short sections may exceed criteria	Unavoidable obstacles 15" (380 mm) tall or less Avoidable obstacles may be present May include loose rocks Unavoidable bridges 24" (600 mm) or narrower TTF's 48" (1,200 mm) high or greater, width of deck is unpredictable Many sections may exceed criteria