A Manual for the Assessment of Backcountry Trails

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TRAIL CONDITION ASSESSMENT MANUAL

This manual provides a guide for assessing backcountry trail conditions, and may also apply to less remote trails. It follows an *indicator*-based assessment model, meaning that the survey form records trail conditions as they change according to a pre-determined, yet flexible set of indicators describing trail elements or characteristics.

Surveyors and managers should modify the survey form to capture additional information or to ignore information they find less useful for their purposes. The current manual follows a format that begins with some general principles of trail work, design, and assessment. The manual then provides a description of indicators and a survey form for recording those indicators.

Currently, the survey form is arranged to capture information in five general categories:

1) general trail characteristics and location features,
2) resource conditions,
3) design characteristics,
4) interpretive features, and
5) hazards.

Indicators within these five categories can capture trail characteristics of interest for trail maintenance, interpretation, and natural resource management programs.

What does 'backcountry' mean?

For the purposes of this manual, 'backcountry' means . . .

> *. . . largely natural, undeveloped, remote areas or wildlands where people visit but do not remain and where their activities largely do not impair the free-play of natural processes.*

Backcountry areas may have roads, trails, or campsites sometimes, and mechanized transportation, such as off-highway-vehicles or mountain-bikes, may be part of some backcountry activities. Backcountry areas are just different from places where you tend to find more people and more features like pavement, planted vegetation, or buildings. Buildings and other human constructions (e.g., campgrounds, paved roads or trails, etc.) are less likely found in a backcountry location. Backcountry trails, roads, or campsites, are generally more limited in size, meant to protect resources, provide visitors a chance for a quiet, private experience, or ensure a safe route or shelter.

What is a "trail" and why might we care about its condition?

A trail is the most basic, rustic route a person can travel when going from one place to another. A trail is typically linear, but rarely straight for long. Trails can be carefully designed and laboriously constructed or they can be nothing more than a line on a map with little indication of anything on the ground.

Trail conditions can be important for many reasons. Hikers, bicyclists, and OHV enthusiasts look for different trail conditions when they visit an area. A trail's condition reflects its location and surroundings, the activities that occur on it, and the maintenance that has been done or is needed, and the vegetation, soil, geology, and weather that interact to shape a trail's characteristics. An assessment of trail conditions can identify management and maintenance needs, opportunities for additional interpretation, or new hazards. Assessments can also provide information necessary to monitor changes in condition or the effectiveness of trail construction work. An assessment of trail conditions can be an important management tool.

How can I assess a trail's condition?

A trail condition assessment is mostly just thinking about the following four sets of questions:

1) What is the problem? *What is the trail's purpose? What are the management objectives for the area? How are water, wind, or people affecting the trail? Do you see need for maintenance? Is the trail in a poor location?*
2) Why is it a problem? *Is the problem specific to a particular time of year? Is it associated with tread design, particular activities, or the amount of recreation?*
3) What options do you have available to address the problem? *Can you improve the situation with some basic trail maintenance? Can you move the trail's location to avoid the problem section? Can you make the trail tread more resistant (i.e, "harder")? Can you divert the water from the trail without causing a new problem downhill? Can you encourage visitors to act in a way that reduces the effects of their visit?*
4) What restrictions or limitations exist? *Do you have materials available at the site? Who is going to complete the work? Are they trained? How much will the work cost and do you have money? Do you have the necessary tools, training, and time for the project? Have you identified all your "control points" (places you want the trail to go or avoid)?*

By carefully thinking through each of these four sets of questions, you can assess the condition of any trail and provide a good estimate of whether problems exist and what is necessary to address them.

What can be done to fix a trail?

There are many types of trail work and most fall into one of the following categories, presented from least to most drastic:

1) Mark it better: install signs, paint blazes, or rock cairns to show people the intended trail tread.
2) Clear it of intruding vegetation: cut away brush, tree limbs, etc. that force people outside the intended or established treadway or roadway corridor.
3) Maintain existing work: clean drainages, stabilize or reinstall rock steps, reconstruct retaining walls, replace bog bridges, etc.
4) Install new drainages: erosion by sudden downpours, even in desert areas, is the most common way trails are damaged; constructed drainages return water to more natural flow patterns.
5) Harden the tread: make the terrain more resistant by installing rocks or logs (sometimes more exotic or radical solutions are needed, such as cement, plastic resins, or concrete blocks, but these are uncommon in backcountry locations).
6) Contain the traffic: inhibit people from traveling outside the intended, maintained, designed tread corridor by installing scree walls or brush.
7) Elevate the tread: prevent widening by installing step-stones, log bog-bridges, 'rock-boxes' (sometimes called 'turnpike'), or stream bridges to provide a direct, preferable route across wet areas from bogs to streams to gullies to rivers.
8) Relocate the tread: shift from an alignment or location that has "weaknesses" to one that is more resistant and stable.
9) Close and rehabilitate the trail: sometimes there is no choice but to close the trail.

Backcountry Trail Assessment Form Guidelines

This trail assessment process uses a simple form and a detailed set of codes to describe trail conditions. The process is to walk each section of trail while pushing a measuring wheel. When surveyors pass an assessment item on the trail, she or he notes the item on the survey form with the distance.

An alternative to recording the survey on a paper form is to use a 'dictaphone' or other small tape recorder to record comments in the field. Once transcribed, the collected information is identical to that on a paper survey form. An advantage is that less time is spent writing in the field; a disadvantage is that occasional mechanical problems can occur, although these are usually easy to rectify. Most small dictation recorders work well inside a sealable plastic bag, if weather turns bad. *By all means, work in bad weather because you will see problems first-hand, as well as possible prescriptions.*

We recommend a measuring wheel with a five-foot circumference and that surveyors can roll backwards if needed. A wheel that rolls backwards is important. Some wheels are designed so that the measurement counter only moves forward. There are often times when a surveyor must backtrack her or his route to check the location of an item. Metric wheels can work fine, as can wheels with other circumferences. Just be sure to note the units at the top of each page.

Trail Assessment Codes and Indicators

Code	Description
General Trail Characteristics and Location Features	
BEGIN (distance)	Start of a new trail section assessment. Describe the general weather conditions (has is been wet or dry for the past few days or weeks?), the elevation, your name (i.e., who is the surveyor?), and the date of the survey. ***Note the wheel's conversion units!***
END (distance)	End of a trail section assessment. Note the total units measured by the wheel. Write the elevation, if appropriate. Note any precipitation that occurred during the day.
TYPE (distance)	The trail type (i.e., is it a hiking, bicycling, horse riding, or some other type of trail?). Repeat this code whenever the *formal* trail type changes.
PATH (begin/end)	Typical width is primarily narrow (2-6 feet with most sections 3-4 feet). *Do not record this code for short sections.*
WIDE (begin/end)	Typical width is primarily over 6 feet and less than 10 feet, as when a trail follows one side or another of an old road. *Do not record this code for short sections.*
ROAD (begin/end)	Typical width is primarily 10 or more feet wide, as when a trail follows a gravel road. *Do not record this code for short sections.*
GRADE (begin/end)	Sections of trail with a grade of more than 20%. Although a characteristic of the trail's design, steep grades often lead to problems with erosion gullies or people establishing an easier route. *Do not record this for short sections less than 10 feet long.*
REF	A recognizable reference point such as an overlook, stream, trail sign, or some other distinctive spot.

Code	Description
(distance)	Record reference points when extended gaps of comments occur, as when you push the wheel along a section of trail in good condition. Also, record reference points near important locations like the beginning or end of a recommended relocation.
Resource Conditions	
MULTI (begin/end)	Multiple treads on the trail. *Note how many treads (2-3 or 5 or more?).*
WIDTH (3/6) (begin/end)	Trail width more than three or six feet wider than normal for this trail section.
WET (begin/end)	Trail tread is "boggy" or muddy. *If the tread is exceptionally dry or wet because of recent weather conditions, try to characterize "normal" conditions.*
WATER (begin/end)	Water is flowing down the trail. *Regardless of recent weather, water flowing down the trail is likely to lead to gullying and erosion.*
GULLY (begin/end)	Noticeable soil loss greater than 1 foot deep is visible. Do not record more minor soil loss because a) some loss occurs during construction and b) you will be here all day. *Note estimated average and maximum depth for each gully.*
ROOTS (begin/end)	Excessive root exposure (i.e., not just a few here or there).
Interpretive Features	
VIEW (distance)	Destination viewpoint. *Do not note every viewpoint.*
TREELINE (distance)	Transition from forest to alpine zones.
NATURAL (distance)	Any notable natural feature or attraction.
HISTORIC (distance)	Visible historic or archeologic site of interest.
SIGN (distance)	Directional or interpretive type signs. *Note type of sign and general condition.*
(OTHER) (distance)	Note any other interpretive feature of interest. Note that springs might be an interpretive feature while stream crossings are best recorded in the REF category.
Hazard	
RELO OPEN (distance)	Abandoned or relocated section of trail visibly connects with formal trail and needs rehabilitation (brush or rocks) to camouflage the old route so people are not confused by it.
TREE HAZARD (distance)	'Widow-maker' over trail (broken branch or tree about to fall).
SLUMP (distance)	Soil has slumped onto or below the trail and makes crossing the section unsafe or additional slumping could occur. *Note the length of the slumped section.*

Code	Description
REBAR (distance)	Exposed metal post or bar, as might occur during some trail construction. *Removal of the bar(s) is needed, so note the scale of the project (is it a single step or an entire section of retaining wall?).*
Design Characteristics	
✍✍ basic maintenance	
BRUSHING (begin/end)	Clearing vegetation from trail. *Note length of section needing work.*
WINDFALL (distance)	Fallen tree needing removal. *Note number if necessary.*
BLAZING (distance)	Paint blazes or rock cairns. *Note only sections needing work (new paint or cairns) and distance of section.*
✍✍ Drainage	
DIP (distance)	Drainage dip (collects water and diverts it off the tread without using a rock or log as a waterbar). *Note the condition: good, O.K., poor.*
WATERBAR (distance)	Rock(s) or log(s) installed intentionally to divert water off tread. *Note condition and length.*
DITCH (distance)	Ditch along *side edge* of tread, often used in conjunction with waterbars to collect and then divert water. *Note condition, width, and length.*
CULVERT (distance)	Open or closed drain *across* trail. Culverts carry water directly from one side of tread to the other, as opposed to waterbars that collect water flowing along the trail and then divert it. *Note condition, width, and length.*
✍✍ Tread hardening, support, or Elevation	
GRAVEL (begin/end)	Gravel fill covering the tread and maintained (not naturally occurring). *Note stability and condition (is it washing?).*
CORDUROY (distance)	Trail corduroy is logs placed across a muddy section of trail. *Often causes more trouble by trapping water and decaying, so encourage replacement.*
STEP STONES (distance)	Rocks installed in tread to provide an elevated walkway through a muddy section. *Note the number and distance if more than 1 step stone.*
ROCK BOX (distance)	Elevated section of trail tread bordered by rocks or logs and containing mineral fill such as gravel, soil, or rocks. Used to traverse wet, muddy sections (also called turnpike). *Note length, condition, and any need for additional drainage.*
PUNCHEON (distance)	Elevated boardwalk that lifts the tread above a muddy section and is often capable of supporting horse traffic.
BOG BRIDGE (distance)	Narrow log walkway consisting of one or more logs supported by two or more base logs (sill logs). *Note length, condition, and number if more than one.*
BRIDGE (distance)	Stream or river bridge constructed to support the type of traffic expected on the trail. *Note length, width, and general condition.*

Code	Description
RETAINING (distance)	Rock or log retaining wall, either uphill or downhill side of tread. Sometimes called "cribbing." *Note length, height, and condition, especially if any metal rebar is exposed.*
STEP(S) (distance)	Rocks or logs installed in the trail tread to hold soil and provide a stable route. *Count and record the number of steps and their general condition. Do they need scree or brush?.*
LADDER (distance)	Wooden steps or metal rungs drilled into rock. *Note length, width, and condition.*

Trail Survey Form (EXAMPLE)

Trail Name or Number: _Blue Bayou Trail_____ Date: __1/1/00_____

Survey code	Begin	End	Description/Comment
Begin	0000		Trail begins at parking lot; trailhead looks fine.
End		5000	trail returns to lot
type	0000	500	beginning of trail is hiking and biking
Wide	0000	500	
width (3)	0000	100	beginning of trail is 4-½ feet wider than needed
water	0250	0260	water runs down trail, entering from R and leaving L.
waterbar	0255		NEED: 8' rock WB draining L. at end of new ditch
ditch	0255	0260	NEED: a short ditch to catch water on R. side of trail.
Brushing	0350	0400	NEED: clear brush to open tread corridor
REF	0500		Jct with Rolling Loop Mtn Bike trail
type	0500	5000	trail beyond jct with Rolling Loop is hiking only
REF	0555		begin crossing intermittent stream
slump	0600	0620	lower edge of trail has fallen away; ½ of tread remains
retaining	0598	0625	NEED: cribbing below trail, approx 3' high; few local trees for materials, so consider rock wall using good rocks avail above location
historic	0700		foundation remnants of old house obvious about ~100 yds. below trail; 6 side paths lead to site; no interpretive sign on trail or at site; some vandalism evident
wet	0800	0830	signs of wet season seep and muddiness; dry now.
width (6)	0810	0835	tread widening to get around seasonal seep
step stones	0800	0835	NEED:40 step-stones to elevate tread through seasonally wet section
waterbar	0900		Existing: 6' log waterbar, good condition, needs cleaning
ditch	1500	1515	Existing: 75' ditch, good condition, no work needed
windfall	2500		NEED: clear 4 trees across trail at this location

Trail Survey Form

Trail Name or Number: _____ Date: _____

Survey code	Begin	End	Description/Comment