

FOREST TRAILS AND LANDINGS

Vermont Conservation Practice Job Sheet

655



Forest trail after water bars installed and seeded on eroded section

Definition

Forest trails and landings are routes, travel ways, or cleared areas within a forest to provide access on a periodic basis. Generally, forest trails (a.k.a. skid trails) are used to carry or skid trees to the landing. Forest access roads, built to a higher standard, are used to transport logs (e.g. log truck), firewood, etc. from the landing to a public road. Landings are cleared or open areas where trees are sorted and processed.

Purpose

- To support forest management by treating existing forest harvest trails and landings at site-specific locations or sections which are actively eroding.
- To address soil erosion and water quality concerns associated with forest trails.

Use

In addition to forest management, forest trails and landings may be used for recreation such as hiking, hunting, and skiing. However, this practice is not designed to stabilize roads for frequent, wheeled recreational vehicle use. The practice standard is written to both provide infrequent access to forest stands for management activities and for removal or

collection of forest products (firewood, pulpwood, saw logs, chips, or maple sap). Landowners who use ATVs or tractors on these trails will need a much higher level of maintenance and will be expected to maintain the structures as designed.

Criteria

This practice will be used to minimize damage to resources, including forest soils and water bodies, by controlling erosion on forest trails and landings. This will often require the use of heavy equipment to shape trails or install structural measures to manage runoff and reduce soil erosion and sedimentation. Meeting the criteria in this jobsheet may not meet all *Acceptable Management Practices (AMPs) for Maintaining Water Quality on Logging Jobs in Vermont*. Refer to the AMPs for more information.

- Water flows will be controlled using techniques such as water bars, crowning, rolling (broad-based) dips, in-sloping and out-sloping, and culverts in limited circumstances.
- Areas of exposed soil must be seeded and mulched within 50 feet of streams.
- Ruts will be smoothed where there is potential for gullying.

Stream Crossings

In general this practice is not used for addressing stream crossings. It may however be utilized to stabilize the approaches to stream crossings and to stop sediment from reaching streams

Water bars

Water bars are one of the most basic and commonly used forest practices to minimize erosion on forest trails (Figure 1).

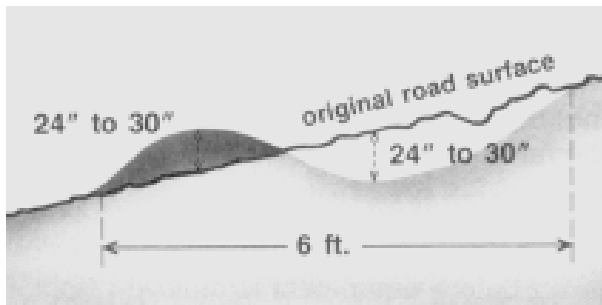


Figure 1. Water bars may be shallow or deep. Deep water bars are usually used on roads that will be closed for extended periods

Water bars Guidelines

- Water bars can be constructed with hand tools, but excavators and bulldozers are more commonly used and generally more effective.
- It is best to start at the end of the forest trail and work toward the landing so that completed work is not damaged by the construction equipment.
- Water bars will be installed at a downslope angle of ~30 degrees.
- Water bars shall be at least 12-18" deep and installed with a ~3% outslope when ledge and rock permit. Deep water bars (24-30"), should be used on roads that will be closed to traffic.
- The outlet of the water bar shall extend beyond the forest trail and drain away from the road and onto undisturbed litter or vegetation. Rocks, slash or logs will help reduce erosion at outlet.
- The uphill end of the water bar shall extend beyond the side ditch line of the road to fully intercept any water flow.
- Water bars and other drainage measures should be spaced according to Table 1 as outlet conditions allow.

Log Reinforced Water Bars (LRWB)

LRWBs are suggested when anticipated traffic volume is a concern or in areas especially prone to erosion and rutting such as steep sections of skid trail and on approaches to stream crossings where soil conditions may be wet. LRWBs will maintain their shape and

will not become worn down during logging or other uses as compared to traditional water bars constructed from forest soil.

LRWBs should be installed 50 feet back from the edge of the stream. Use large low-grade or cull logs 16-20 inches in diameter. Make sure to anchor the ends of the log so it will hold in place when driving over it. Install them at a 10 degree angle to remove water from the skid trail and for ease of getting over them with equipment.

Table 1 - Recommended Distances Between Drainage Structures on Logging Roads (AMPs)

% Road Grade	Distance Between Water Bars (feet)	Distance Between Culverts (feet)	Distance Between Turnups, Dips & Pole Culverts (feet)
1	400	450	500
2	250	300	300
5	135	200	180
10	80	140	140
15	60	130	130
20	45	120	120
25	40	65	-
30	35	60	-
40	30	50	-

Outsloping

Outsloping a road means building the road surface so that it is tilted outward 4-6 percent so water can run off the road surface. Outsloping works well on moderate slopes with short back slopes (above the road). Outslopes become a problem if maintenance is not performed or when ruts begin to form. The ruts will then act as channels that concentrate surface runoff causing soil erosion. The following conditions are favorable for use of outsloped roads with no ditch:

- Short back slopes (above road)
- Terrain slope less than 20 percent
- Road grades steeper than 3 percent
- Seasonal road use
- Light traffic
- Fast revegetation of cut and fill slopes.

Insloping

Insloping a road means building the road surface so that it is tilted inward towards the slope of the land 4-6 percent so that water can run off the road and collect in a shallow ditch. At the first opportunity available, the ditch is turned out into a vegetated buffer area to prevent runoff from coming back onto the road. If physical constraints prevent this, install cross-drainage structures on the road. The following conditions are favorable for use of in-sloped roads with ditch section:

- Long and/or steep back slopes
- Terrain slope greater than 20%
- Areas with fine textured soils
- Winter logging
- Areas where drainage is necessary.

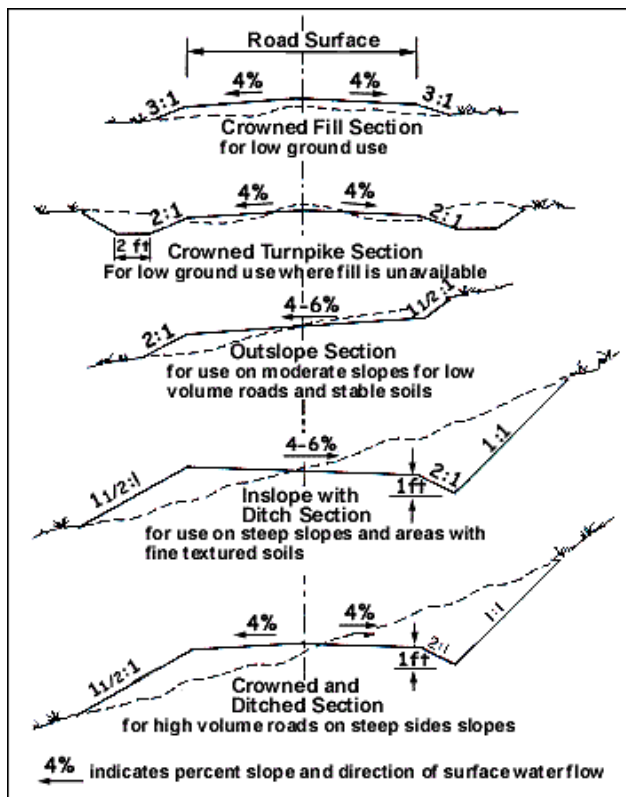


Figure 2. The choice of cross-section for a road or section of a road depends on drainage needs, soil stability, slope, and expected traffic volume. Dashed lines indicate natural land contours, and solid lines indicate constructed road. (USFS).

Crowning

To crown a road means to create a high point that runs lengthwise along the center line of the road. Either side of this high point is sloped at a 4% grade away from the center toward the outer edge of the road. Surface runoff is diverted into a vegetated buffer area or a ditch.

Rolling (Broad-based) Dips

Broad-based dips are shallow, wide diversions usually constructed on forest roads but may also be used on trails having a gradient of less than 10 percent. Proper construction usually requires a trained equipment operator. Dips can be constructed with a bulldozer or excavator by cutting a few feet out of the skid trail and bulldozing a fill area to build up grade on the lower side. For more information and diagrams see Vermont AMPs.

Ditches and Culverts

Ditches and culverts are primarily associated with forest roads but they may also be used on larger forest trails depending on the topography and frequency of use. Pipe culverts are used to move water under the road before it gains sufficient flow to erode the ditch on the uphill side of the road.

Spacing of culverts used for ditch drainage shall be determined according to Table 1 (above). Culverts should be installed at a 30 degree angle down grade, should angle downhill at least 4 degrees when ledge and rock permit for self-cleaning and should outlet onto rock, gravel or logs to prevent scouring resulting in soil erosion. A minimum of 12 inches of soil should be used to cover culverts. Use NRCS design procedures for sizing culverts. Ditches should be properly stabilized.

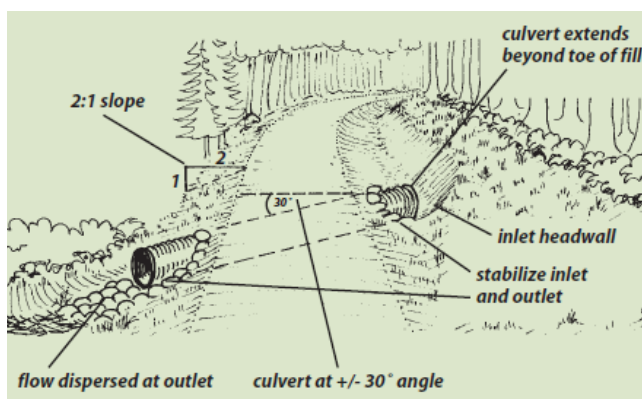


Figure 3. Design & installation of pipe culverts (ME BMPs Top & VT AMPs Right).



Wildlife Considerations

Abandoned trails and landings offer an opportunity to provide additional wildlife habitat. Areas selected for wildlife plantings may include log landings and gently sloping sections of trails with open canopy where the soil is suitable for establishing vegetation with normal farming practices.

Operation and Maintenance

Upon completion of this practice, trails shall have permanent waterbars, trails will be properly graded and outsloped if needed and ruts smoothed. Trails should be inspected during the establishment period to ensure that drainage systems and structures for water control are properly functioning and that vegetation has attained full coverage where specified. After construction, it is expected that the roads are not driven on for 6 months to a year depending upon local site conditions and specifications in jobsheet below.

Seeding

Seeding options for Forest Trails and Landings can be found within the 342 Critical Area Planting Specification Guide Sheet. See Table 2 – Logging and Haul Roads for four permanent seeding options.

Another temporary seeding option is to seed winter/cereal rye at 112 lbs/ac. Follow seeding
VT NRCS Job Sheet – Forest Trails and Landings (655)

requirements including mulching with straw from Critical Area Specification.

http://efotg.sc.egov.usda.gov/references/public/VT/VT342_Specs.pdf

References –

Much of the text and figures are from the following sources:

Acceptable Management Practices (AMP) for Maintaining Water Quality on Logging Jobs in Vermont. VT Forests, Parks and Recreation. 1987.
http://www.vtfpr.org/htm/gen_publications.cfm

Best Management Practices for Forestry: Protecting Maine's Water Quality. Maine Forest Service. 2004

http://www.maine.gov/dacf/mfs/publications/handbooks_guides/bmp_manual.html

A Landowner's Guide to Building Forest Access Roads. USFS. 1998.

<http://www.na.fs.fed.us/SPFO/pubs/stewardship/accessroads/accessroads.htm>

655 Forest Trails and Landings *VT NRCS Conservation Practice Job Sheet*

For:	Tract #: Land Unit(s):
Designed By:	Signature:
Date:	

Purpose
Forest Management Logging Wildlife Habitat Erosion Control

Layout and Dimensions – Indicate treatment for each separate section of forest trail

Site #	Section ID	Length feet	% Grade	Prescription – Include number (e.g. waterbars), spacing, type (e.g. culvert), size, cut and fill, width and length depending upon treatment)

Additional specifications:

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Is a Permit required?

If Yes, has it been obtained?

Permit Number:

Type:

Plant Materials Information

Species	Seed lbs./ac. or lbs./ 1000Ft. ²	Lime lbs./ac. or lbs./ 1000Ft. ²	Fertilizer lbs./ac. or lbs./1000Ft. ²	Mulch lbs./ac. or lbs./1000Ft. ²	Planting Dates

655 Forest Trails and Landings *Vermont NRCS Conservation Practice Job Sheet*

Additional planting specifications:

Site Preparation & Planting Method

Operation & Maintenance Requirements

Inspect trails periodically to be sure the measures are functioning as intended. If problems are found, take corrective actions to maintain the measures.

Include an aerial view or a side view of the trails and landings (sketch drawing or digital maps), including location of water control structures, a direction arrow and other relevant information and complementary practices may also be included.

Scale 1" = _____ ft. (NA indicates sketch is not to scale.)

Questions regarding the planting or maintenance of the buffer planting should be directed to:

Name of Technical Specialist

Phone Number