



Managing Water on Roads, Skid Trails, and Landings

Forest Management Practices Fact Sheet Managing Water Series #2

Introduction

Water moving over forest roads, skid trails, and landings causes erosion. Sediment that reaches water bodies can hurt aquatic organisms. Soil also makes water appear muddy and can carry in nutrients and chemicals. *Water diversion devices* can reduce erosion. In fact, by controlling water speed and volume on the top one-third of the road, erosion can be reduced by more than 65 percent.

Where Used

Application

Operators use water diversion techniques on forest roads, skid trails, and landings.

Water diversion techniques include the following:

Water bars divert water from a road into vegetation on either side. Water bar spacing varies with the slope (grade) of the road. Types of water bars include:

Earth-berm water bars are built with soil and are used mainly on closed roads or trails. Operators also use them during logging operations on roads with steeper slopes.

Logging debris and logs are used on closed roads and skid trails.

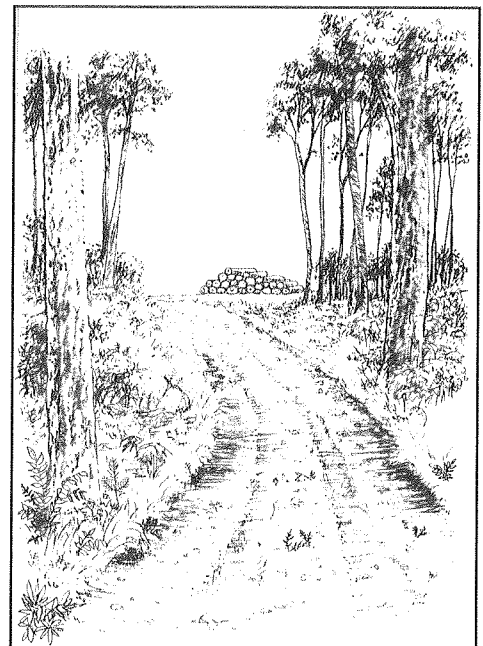
Conveyor belts, old snowmobile treads, and other similar material can be used in place of soil to build water bars. Straw bales, staked onto roads or trails, also can divert runoff.

Broad-based dips are wide depressions that channel water. Operators use them on active roads and skid trails with slopes of 10 percent or less.

Open-top culverts are installed across the surfaces of active roads and skid trails.

Shaping roads and trails using *crowning*, *insloping*, or *outsloping* can help control erosion. On crowned roads, the road surface slopes from the center to each side. Operators use crowning on high-volume roads with two-way traffic. On insloped roads, the traffic surface slopes down to the uphill side of the road. Insloped roads usually require a ditch and a cross-drainage culvert to move water to the other side of the road. On outsloped

Best Management Practices (BMPs) can prevent or minimize the impact of forestry activities on rivers, lakes, streams, groundwater, wetlands, and visual quality.



Temporary road

roads, the traffic surface slopes to the downhill side. Operators use outsloping and insloping on low-volume, single lane roads and trails.

Cross-drainage culverts let water (not in a stream channel) move from one side of the road to the other without crossing the surface.

Roadside and diversion ditches are best built during initial construction. They discharge runoff into vegetated areas well away from open water.

Operators can armor any of the above with riprap materials underlain with geotextile. (Geotextile is a fabric mat that lets water drain through it while supporting materials above.) This works well for any area where water turns sharply or flows rapidly (e.g., the face of a check dam that diverts water in another direction, the inlet or outlet of a culvert, or points where water empties onto a steep slope).

Advantages

Heavy equipment can quickly destroy some devices. Improperly built road ditches can make erosion problems worse. It's hard to build devices during frozen conditions. Installation and maintenance can require time and money.

Disadvantages

Maintain all structures and road and trail surfaces until the area is closed and permanently stabilized by vegetation.

Maintenance

Water diversion devices improve operating conditions. They increase the lifespan of roads and reduce maintenance costs. Good planning and proper use of these practices can reduce long-term costs for the operator and landowner.

Cost

Relative cost ranking for installation and maintenance:

<u>Practice</u>	<u>Relative Cost</u>
Water bars	Low – Moderate
Broad-based dips	Moderate
Crowning	Moderate
Insloping/outsloping	Moderate
Road ditches	High
Open-top culverts	High

Related Fact Sheets in This Series

Project Planning: Locating Roads, Landings, Skid Trails, and Crossings (FS-6970); *Earth-Berm Water Bars* (FS-6972); *Using Logging Debris or Logs to Build Water Bars* (FS-6973); *Conveyor Belt Water Bars* (FS-6974); *Broad-Based Dips* (FS-6975); *Open-Top Culverts* (FS-6976); *Shaping Roads and Trails* (FS-6977); *Roadside and Diversion Ditches* (FS-6978); *Cross-Drainage Culverts* (FS-6979); *Project Closure* (FS-6980); *Making and Using Measurement Tools—Basal Area* (FS-6981); and *Making and Using Measurement Tools—Slope* (FS-6982).

Cooperators

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