



# Shaping Roads and Trails

## Forest Management Practices Fact Sheet Managing Water Series #8

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

### Introduction

Water running down forest roads and trails can erode surfaces, moving soil and other pollutants into nearby lakes, wetlands, and streams. One way to prevent this is to shape road surfaces so water runs off of them into nearby vegetation, rather than pooling or flowing along the surface.

*Properly shaping roads* reduces erosion and maintenance costs. Such roads are strong enough to safely handle traffic. Three options for road shaping are crowning, insloping, and outsloping. In a cross-section, this appears as:

- crowning — sloped from the center to the outside;
- insloping — sloped into the uphill side;
- outsloping — sloped out to the downhill side.

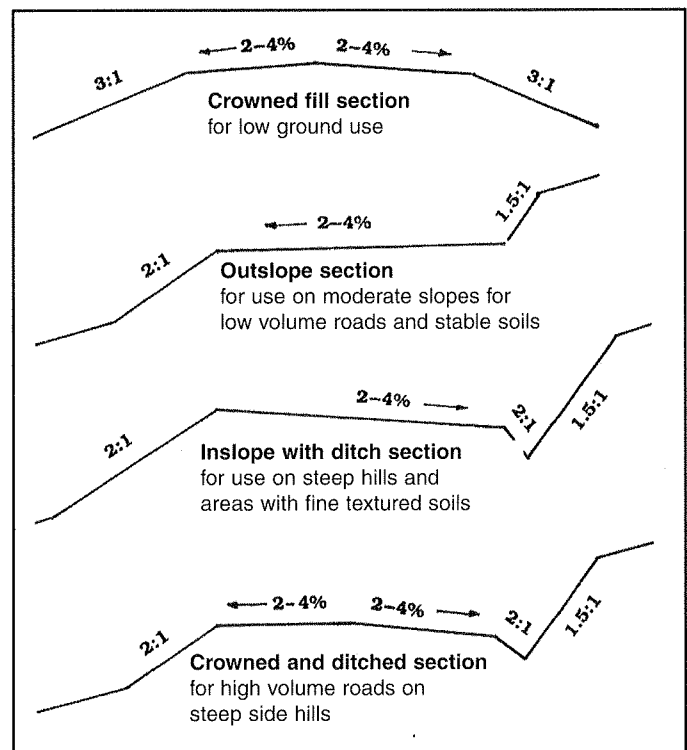
### Where Used

Crowned roads are best suited for heavy traffic. Insloping and outsloping are more commonly used for low volume roads, skid trails, and landings. Outsloping reduces the need for ditches and cross drainage. However, for safety reasons, insloping is commonly used on curves on steep hills.

### Application

Consider the terrain and location when deciding which shape of road to build. When properly shaping roads:

- ▶ Design the low point of the traffic surface to be at least 2 inches lower than the highest point.
- ▶ When cutting into a hillside (cut-and-fill) to build a traffic surface, make both the cut (uphill) and fill (downhill) side slopes as gentle as practical so they can be easily revegetated.



Typical road profiles for drainage and stability

Make slopes less than 3 feet high whenever possible to reduce the risk of slumping. Seed and mulch side slopes when needed.

- ▶ Don't bury debris in the road base. This causes uneven settling, which can lead to erosion and frost heaving.
- ▶ Compact fill material or allow it to settle before using the road. This helps the road become firm enough to support equipment and keeps the base material free of water. Ultimately, this reduces maintenance and erosion.
- ▶ Use gravel or other stable material to surface traffic areas on steep slopes or where heavy traffic is expected.

Crowned roads are normally designed for two-way traffic. They often require ditches and may need gravel or other surfacing material. Outsloping is most commonly recommended because there is less need for ditching.

### **Advantages**

Proper shaping reduces maintenance needed on a road. It limits erosion, increases the number of operable days, and extends the service life of the surface. Traffic can continue to use roads and trails that are properly shaped.

### **Disadvantages**

Roads and trails require regular maintenance to retain their shape. Costs to build and maintain these roads are moderate.

### **Maintenance**

Outsloped roads are the least expensive to build and maintain. Crowned and insloped roads, along with any ditches, must be maintained more frequently to retain their shape and function.

### **Related Fact Sheets in This Series**

*Project Planning: Locating Roads, Landings, Skid Trails, and Crossings (FS-6970); Managing Water on Roads, Skid Trails, and Landings (FS-6971); 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); 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**

University of Minnesota Extension Service, Minnesota Department of Natural Resources, Minnesota Logger Education Program, Michigan Department of Natural Resources, Michigan State University Extension, and Wisconsin Department of Natural Resources.



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