



Culverts

Forest Management Practices Fact Sheet Crossing Options Series #3

Introduction

Harvesting or other forestry operations can damage stream habitat and water quality. Operators who need to move vehicles and equipment across streams must consider how they can do so and still protect streams.

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

Where Used

Culverts are made from metal, concrete, polyethylene pipes, or wood boxes. An operator sets a culvert in the crossing and the stream flows through it. Workers can use a bulldozer, backhoe, or excavator to install or remove a culvert.

Application

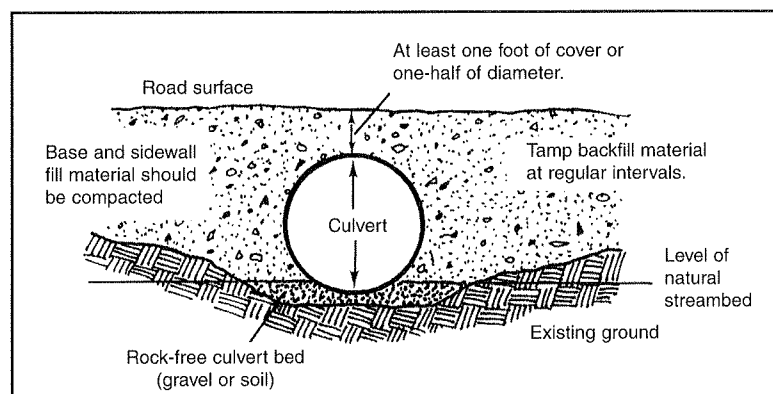
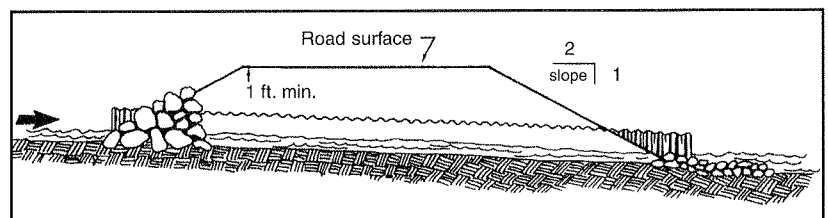
Culverts are used in streams with well-defined, deep channels without a lot of woody debris. Culverts need to be large enough to handle peak flows.

Do not install or remove culverts during fish spawning, incubation, or migration. Check with the appropriate regulatory or natural resource agency in your state to see if permits are required. You may be able to buy used culverts from highway departments or road-building companies. Consult local water-permitting authorities or county highway engineers when sizing and installing culverts.

When installing culverts:

- ▶ If possible, install and remove culverts when the streambed is dry. In a flowing stream channel, use sediment basins, a temporary diversion channel, or a pump to divert water away during installation and removal.

Install culverts so there is no change in the natural stream bottom elevation.



Installation of culverts.

(Adapted from Montana Department of State Lands, 1992.)

- ▶ Dig a channel at least twice the width of the culvert. Follow the natural slope and course of the streambed.
- ▶ Use a single large-diameter culvert rather than several small culverts. It's easier to maintain tight seals around one culvert than around more.
- ▶ Size the culvert so that each end extends about 2 feet beyond the side slopes of the fill.
- ▶ Install the culvert on compacted granular material. Set it into the streambed and cover the inside with streambed gravel.
- ▶ Pack fill firmly by hand around the sides and lower portion of the culvert.
- ▶ Cover the top of the culvert with fill to a depth recommended by your local BMP guidelines. Often, this depth is one-half the pipe diameter or 12 inches, whichever is greater.
- ▶ Make sure the side slope does not exceed 2:1 (horizontal to vertical).
- ▶ Riprap the culvert's inlet and outlet to protect against erosion.
- ▶ Revegetate bank cuts immediately. This will keep them from eroding into the stream.
- ▶ Remove temporary culverts as soon as you are done using them. Remove when the channel is dry or during low flow to minimize movement of sediment downstream. Restore the stream channel to its natural shape to the extent possible.

Advantages

Culverts are very portable and are usually readily available locally. Operators can install and remove them quickly.

Disadvantages

Culverts cannot be used in some areas because of local regulations. Operators may need technical assistance to correctly size culverts for each crossing. If sized or installed incorrectly, they can damage the stream. Relatively large quantities of sediment can enter the stream during installation and removal.

Maintenance

Keep culverts free of debris that can cause clogging.

Related Fact Sheets in This Series

Temporary Stream Crossing Options (FS-7001); Fords (FS-7002); Ice Bridges (FS-7004); Timber Bridges (FS-7005); Railroad Car, Steel, and Prestressed Concrete Bridges (FS-7006); and PVC or HDPE Pipe Bundle Crossings (FS-7007).

Cooperators

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



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