



North Carolina  
Forest Service

# FORESTRY Leaflets

July 2012

WQ-3

## Protecting Water Quality at Stream Crossings

Stream crossings can be the 'hot zone' for potential water quality impacts when improperly installed or used. Because of the close proximity to the water, there is a greater likelihood that sediment and other polluting agents may get into the water at a crossing. Refer to the mandatory requirements outlined by the statewide regulations called the **North Carolina Forest Practices Guidelines Related to Water Quality (FPGs)**.

In addition, due to the high level of attention needed at crossings, there are detailed recommendations provided in the **North Carolina Forestry Best Management Practices Manual to Protect Water Quality**. This manual and stream crossing advice are available from your local office of the N.C. Forest Service and at [www.ncforests.org](http://www.ncforests.org)

### If a Crossing is Needed

- ✓ Limit the number of crossings. Understand the regulations related to crossings.
- ✓ Cross the stream at a straight, narrow section of channel.
- ✓ Align the crossing at right-angles (perpendicular) to the direction of the channel.
- ✓ Establish the crossing and approachways on level ground where possible.
- ✓ Install erosion control structures to divert and control runoff or sediment (refer to *Forestry Leaflet WQ-2*).
- ✓ Avoid significantly disturbing the stream channel; minimize heavy equipment usage.
- ✓ Install the crossing during a low-flow period if possible.
- ✓ Immediately seed over and mulch exposed bare soil areas at the crossing and approachways.
- ✓ Obtain technical assistance and advice for locating, choosing and installing a crossing if you are unsure.

### Types of Crossings

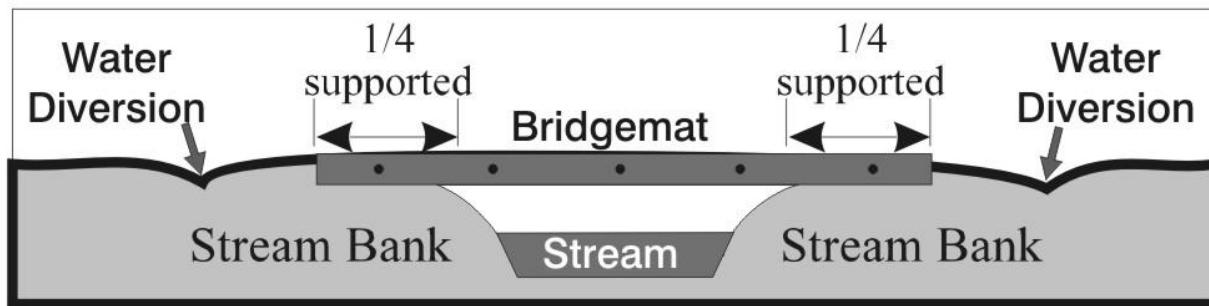
There are four main types of stream and ditch crossings commonly used on forestry sites:

**Bridgemats:** Temporary access, usually for logging or heavy equipment usage.

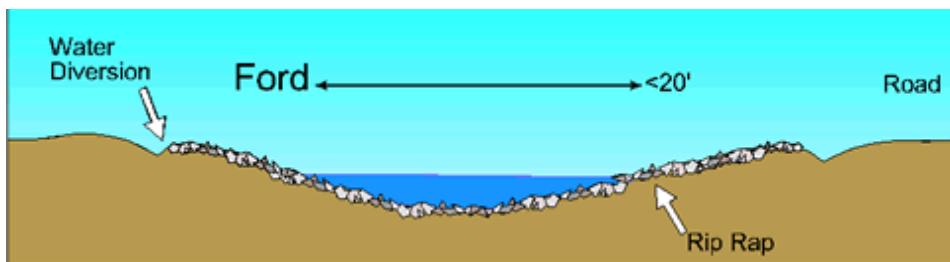
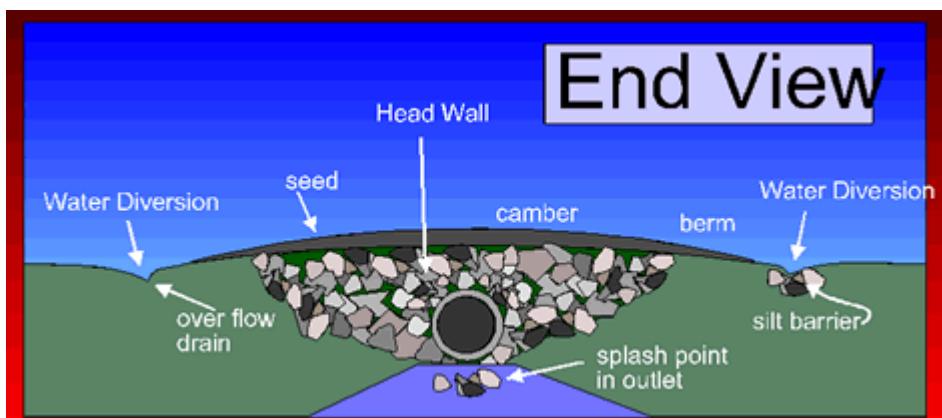
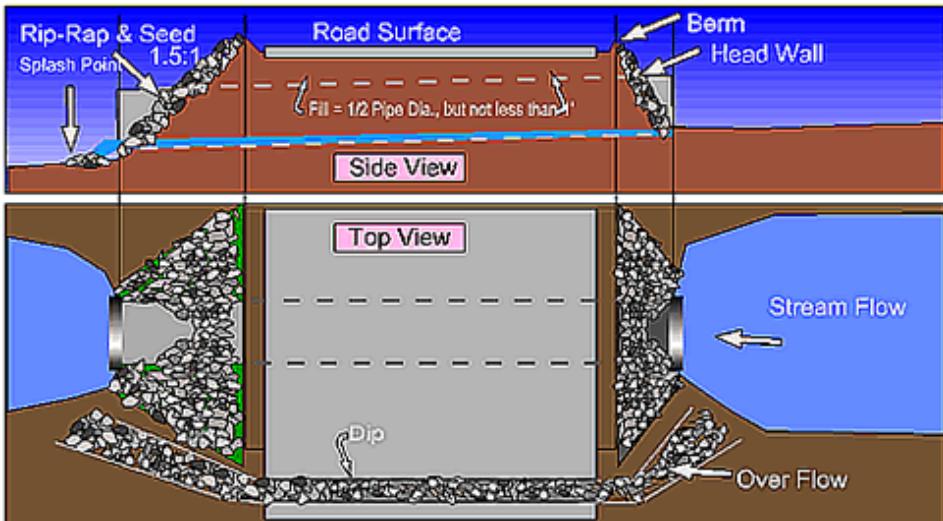
**Culverts:** May be temporary or permanent. Seek assistance to select a correctly-sized culvert.

**Fords:** Permanent crossings that should only be used for road traffic access, not for log skidding.

**Poles/Logs:** Temporary access across a ditch, ephemeral drain, or dry intermittent stream.



Bridgemat for Stream Crossing



Forestry Leaflet # WQ-3

### Culverts

- Minimum diameter of 15-inches.
- Set on a downslope grade to promote drainage and self-cleaning.
- Install on the bottom of the stream channel, or slightly below-grade if a permanent crossing.
- Extend culvert ends at least 12-inches beyond the edges of the fill material.
- Apply at least 12-inches of fill material atop the culvert. Periodically pack down firmly.
- Install rip-rap or other energy-absorbing material at the splash point of the culvert outlet, but do not obstruct streamflow.
- Create overflow spillways around the culvert to carry floodwaters in order to avoid a 'blow out' of the culvert during high water flow.
- Harden the headwalls on the inlet and outlet ends of the pipe.
- Install multiple culverts in swampy, low-lying or wetland areas to allow adequate flow of surface water.
- Stabilize the surface of the crossing atop the culvert with stone or other road material that can carry the traffic load and protect the culvert from caving in.

### Fords

- Do not obstruct streamflow.
- Use clean, washed stone.
- Leave a shallow trough along the centerline of the stream's bottom to allow water flow in dry times.
- Install ample stone atop the approachways to limit mud from being dragged into the crossing.

### Poles/Logs

- Do not obstruct streamflow.
- Install a drainpipe on the bottom of the crossing to allow water to flow.
- Use clean, de-limbed logs that are free of soil or loose debris.
- Do not place soil atop the logs.
- Stack the logs slightly higher than the channel's banks. This maintains the channel's structural integrity once the logs compact together after repeated passes.
- Immediately remove the log crossing when no longer needed.