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Proper Sizing of Land Management Road Stream Crossings

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Proper Sizing of Land Management Road Stream Crossings

Maine Forest Service, DEPARTMENT OF AGRICULTURE, CONSERVATION & FORESTRY
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Properly sized and installed permanent stream crossings that provide access to forest land help protect water quality and aquatic habitat. Properly installed and sized crossings ensure that fish and other aquatic life can reach important upstream habitats. On the other hand, premature failure of improperly sized crossing structures often has significant detrimental impacts on stream water quality and aquatic habitats. Permanent stream crossing installation is a regulated activity that requires attainment of certain performance standards. The following recommended best management practices can assist landowners in achieving these performance standards. Becoming familiar with the rules and regulations that affect your particular location within a watershed will ensure successful results.

Considerations for installing permanent crossing structures.

Stream crossing structures which are properly sized and installed according to best management practices: 1) maintain natural stream substrate within the structure, eliminating most passage barriers; 2) provide embankment grade stabilization from reduced slopes; 3) maintain natural stream flow by extending bank to bank; 4) disperse road drainage into filter areas; and, 5) reduce land management road costs by prolonging the useful life of the crossing structure.

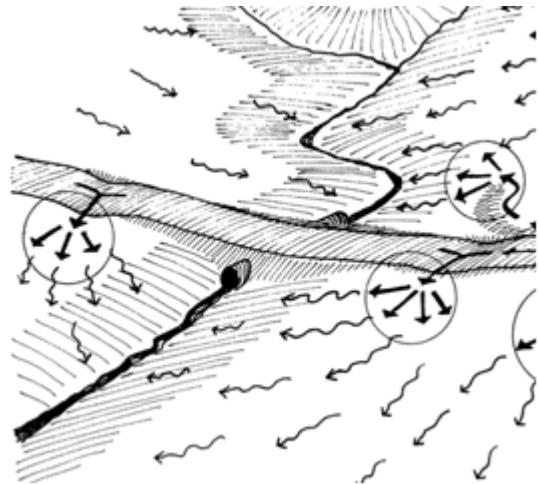
Conversely, improperly installed crossings: 1) create passage barriers for fish, amphibians and macro-invertebrates; 2) have excessive slopes that allow soil to slump into the water from unstable stream banks and inadequate compaction; 3) alter stream flow often resulting in downstream scouring; and, 4) fail prematurely from inadequate maintenance.

How do I properly size a stream crossing structure?

For temporary crossings or permanent crossings that will be maintained regularly, the Maine Forest Service recommends designing stream crossing structures to handle at least a 10- year flood event, the highest flood level a stream is likely to reach, on average, in any 10 period.

For permanent road crossings that will not be maintained or roads that will be discontinued without removing the culvert or crossing structure (a more common scenario), the Maine Forest Service recommends designing stream crossing structures to

handle at least a 25- year flood event, the highest flood level a stream is likely to reach, on average, in any 25 period.



Note elevated crossing diverting water flow from the road into filter areas

A 4 -step process:

STEP 1:

Determine the degree of flooding the crossing must handle without being damaged or washed out. This will depend on what type of crossing you want and how long you anticipate the crossing to be in place. The longer a crossing is in place, the larger the flood that is likely to occur at any particular location.

STEP 2:

Determine the opening size needed to accommodate the expected flood event. The field method described in MFS's publication, *Best Management Practices for Forestry: Protecting Maine's Water Quality*, provides calculations and tables for determining the opening size based on actual stream dimensions at the crossing location. *Be sure to use streambank evidence to measure at the normal high water mark—not just the existing water level.*

STEP 3:

Design the bridge or culvert to meet or exceed the minimum opening size.

STEP 4:

Adjust the bridge or culvert size as necessary to:

- minimize disturbance to the stream channel and banks;
- allow for unrestricted normal flows; and,
- allow fish to pass when water is present.

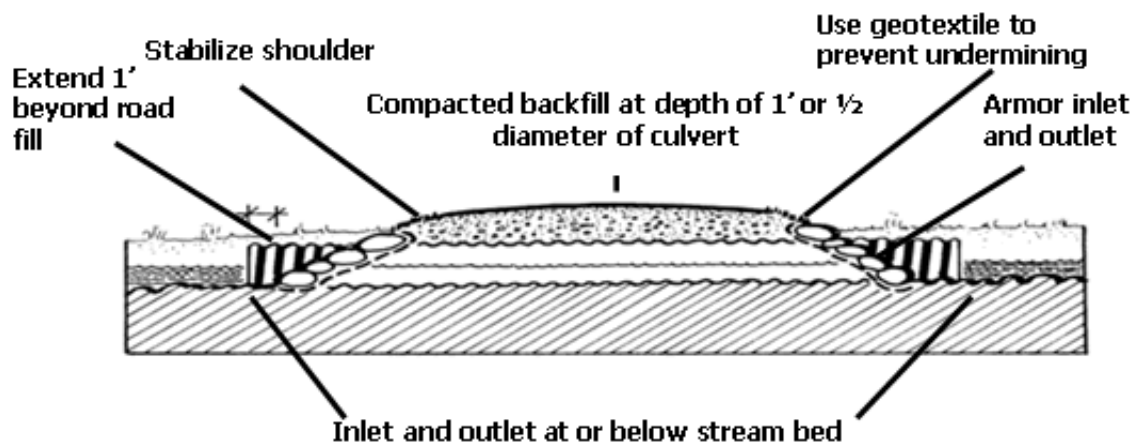
How can I extend the useful life of my stream crossing and prevent pollution to the stream?

Regular maintenance is key to extending the useful life of your stream crossing structure. Undersizing, woody debris blockage, and erosion from the road approaches to the crossing are the most common causes of premature failure.

Additional Resources:

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

When installing permanent crossings



For more information, please contact:

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