

MASSACHUSETTS

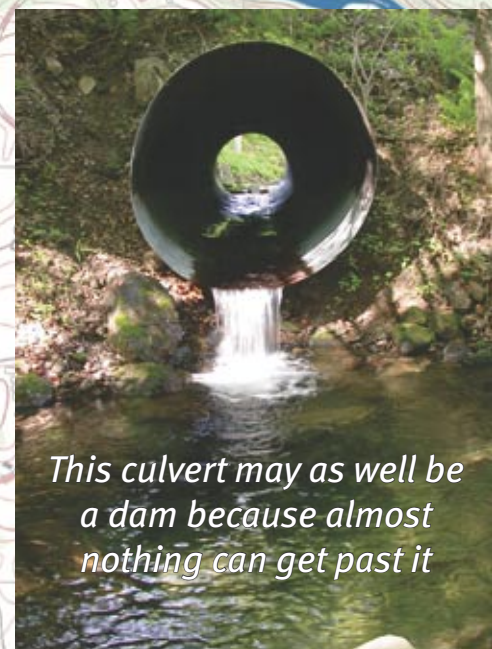
stream crossings

new designs to restore stream continuity

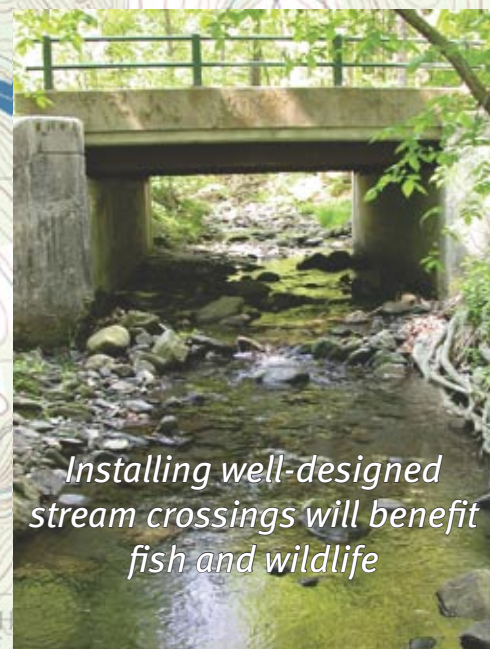
Streams continuity is critical to all creatures that depend on streams including invertebrates, fish, amphibians, reptiles, and mammals. The design and condition of stream crossings determine whether a stream behaves naturally and whether wildlife can migrate freely. Through the combined effects of dams and poorly designed stream crossings, we have fragmented streams and hindered wildlife dispersal throughout our watersheds. In many cases, even crossings that were once effective are now barriers because of stream erosion or mechanical breakdown. Safe and stable stream crossings can accommodate wildlife and protect stream health while reducing expensive erosion and structural damage. By adhering to the crossing standards in the *Massachusetts Stream Crossings Handbook*, town conservation commissioners, highway departments, and town engineers can play a vital role in protecting and restoring stream continuity in Massachusetts.



Crossings should be essentially "invisible" to fish and wildlife—they should maintain appropriate flow and substrate through the crossing and not constrict a stream.



This culvert may as well be a dam because almost nothing can get past it



Installing well-designed stream crossings will benefit fish and wildlife



BRIDGE



OPEN-ARCH

WELL-DESIGNED CROSSINGS

(fish friendly)



KEY FEATURES

- Large sizes suitable for handling flood flows
- Bridges and open-arch designs considered optimum under most conditions
- Crossings are wide and high relative to their length
- Greater than 1.2x stream width maintains dry banks for wildlife passage
- Water depth and velocity match conditions upstream and downstream
- Natural substrates create good conditions for stream wildlife

EFFECTIVE CROSSINGS INCLUDE...

- Bridges
- Open bottom arches
- Culverts that span, and are sunk into, the streambed

STREAM CROSSING PROBLEMS...

UNDERSIZED CROSSINGS



Undersized crossings restrict natural stream flow, particularly during floods, causing several problems, including scouring and erosion, high flow velocity, clogging, and ponding. Crossings should be large enough to pass fish, wildlife, and floods.

SHALLOW CROSSINGS



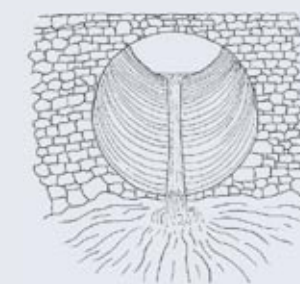
Shallow crossings have water depths too low for many organisms to move through them and may lack appropriate bed material. Crossings should have an open bottom or should be sunk into the streambed to allow for substrate and water depths that are similar to the surrounding stream.

PERCHED CROSSINGS

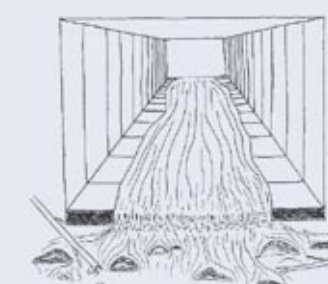


Perched crossings are above the level of the stream bottom at the downstream end. Perching can result from either improper installation or from years of downstream bed erosion. Crossings should be open-bottomed or sunk in the bed to prevent perching.

...AND COMMON CONSEQUENCES



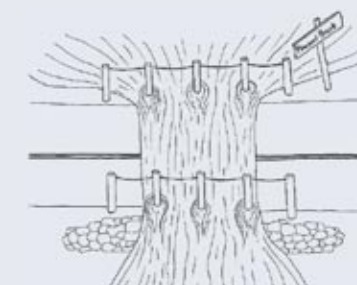
LOW FLOW
Causes: Shallow or perched crossings



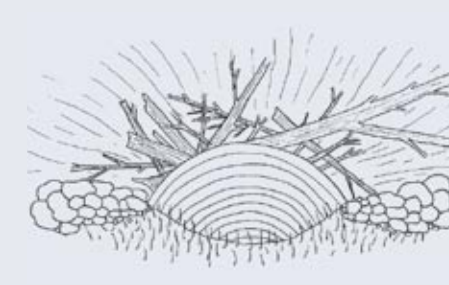
UNNATURAL BED MATERIAL
Causes: Shallow or perched crossings



SCOURING AND EROSION
Causes: Undersized or perched crossings



HIGH FLOW
Causes: Undersized crossings



CLOGGING
Causes: Undersized crossings



PONDING
Causes: Undersized or perched crossings

TO LEARN MORE

This poster is a companion to the *Massachusetts Stream Crossings Handbook*, produced by the Massachusetts Riverways Program. Please consult that publication for further information on stream crossings and design standards.

The Stream Continuity website, maintained by UMass Extension, has up-to-date guidelines and crossing standards and information on crossing problems, the ecological importance of river continuity, and further resources. Staff at the Massachusetts Riverways Program are also available to provide suggestions and guidance to improve fish and wildlife movement through stream crossings. Visit these web sites for more information on stream continuity:

Stream Continuity - UMass Extension www.streamcontinuity.org
Massachusetts Riverways Program www.massriverways.org

ACKNOWLEDGEMENTS

The Massachusetts Riverways Program, a division of the Department of Fish and Game, promotes the restoration, protection, and ecological integrity of the Commonwealth's rivers, streams, and adjacent lands. The River Continuity Partnership is a collaborative effort with the Riverways Program, the University of Massachusetts Extension, The Nature Conservancy, and other nonprofit and agency partners.



Poster copyright by Massachusetts Riverways Program (Commonwealth of Massachusetts, Executive Office of Environmental Affairs, Department of Fish and Game), 2005

Writing, illustration, and design: biodrawersity (www.biodrawersity.com)