

Stream Crossing Initiative

Making Stream Crossings Fish Passable

THE ISSUE AT HAND

Few people consider the effects of road crossings, utility crossings, and other infrastructure on the quality of stream habitat. Stream conditions may be quite different upstream and downstream of a stream road crossing and may look different during low or high water. The design and condition of a stream crossing determine whether a stream behaves naturally and whether animals can migrate along the stream corridor.

Fortunately, we have learned how to design stream crossings that allow wildlife unrestricted access to a watershed, maintain natural stream conditions, and help protect roads and property from some of the damaging effects of floods. Georgia ES biologists are using this information to assist others in designing safe, low-environmental impact stream crossings.

OUR APPROACH

STAGE 1: Research

Recent research in one north Georgia basin estimated that 34% of all culverted crossings, and over half of the crossings constructed with pipes, were impassable to small-bodied fish. Most of these were culverts installed in the past decade.



Chub; Steve Holzman, USFWS

Undersized culverts are unable to accommodate high flow events without increasing water velocity exiting the pipe; increased water velocity can hinder fish



Undersized pipe culvert during rain event; Will Duncan, Alice Lawrence USFWS



Arch-span culvert; Will Duncan, USFWS

passage through the culvert and generally results in downstream scour that erodes stream banks and leaves the culvert perched (i.e., with a waterfall at the culvert outfall). Oversized culverts tend to lower water depth in the culvert at baseflow, often resulting in flows that are too shallow to allow fish passage.

STAGE 2: Policy

Georgia ES coordinated with the Savannah District, Army Corps of Engineers, to revise Regional Conditions for the 2007 Nationwide Permits. The new Regional Conditions contain specific guidelines for designing, sizing, and embedding culverted road crossings to promote the safe passage of fish and other aquatic organisms

Since the new Regional Conditions were approved in March 2007, Georgia ES has reviewed over 70 projects with road crossings and provided comments that either resulted in positive design changes or design clarification on nearly 45% of the projects. As a result, these newly-installed culverts are less likely to be undersized, to alter water velocity or depth, and/or to become perched. All of these factors provide direct benefit to movement of interjurisdictional fish and other aquatic organisms.



U.S. Fish & Wildlife Service, Georgia Ecological Services

STAGE 3: Online Tools

Many of the NWP applications submitted to the Corp and FWS have designs that are improperly sized or are not consistent with the Regional Conditions. This is partly because calculations can be difficult. Georgia ES created an Excel spreadsheet designed to help engineers, consultants, and managers calculate the area of a culvert that is embedded in stream sediments, depth to which the culvert is buried, and width of the streambed inside of the culvert. This calculator helps ensure that pipe culverts do not alter the pattern and profile of the stream and are properly embedded.



Perched pipe culvert; Eric Prowell, USFWS

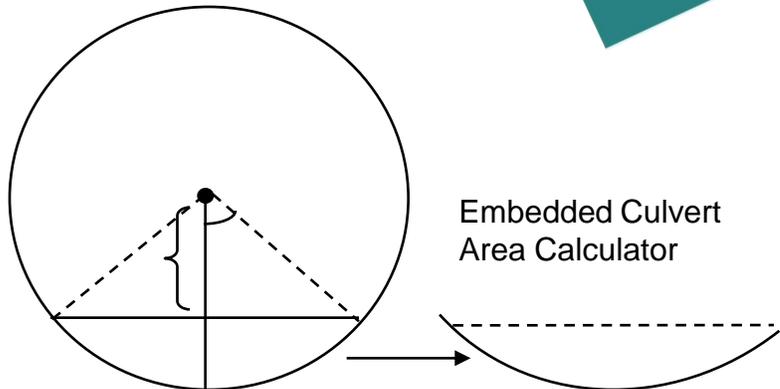
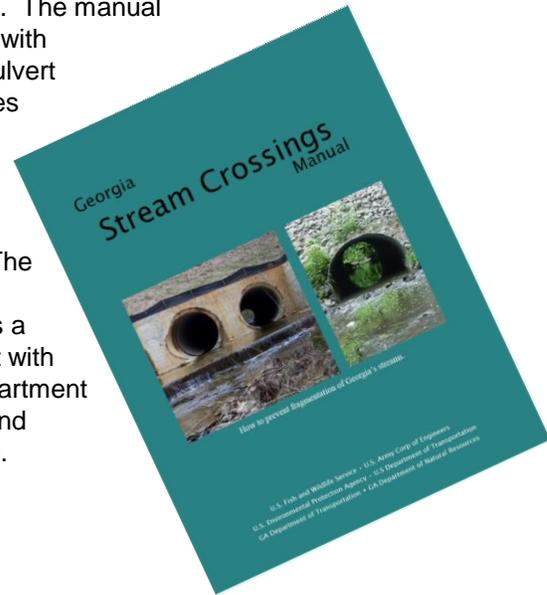
Georgia ES' website will also provide engineers and consultants with alternatives to conventional pipe-culvert designs, and additional clarification on Regional Condition requirements.



Perched box culvert; Eric Prowell, USFWS

STAGE 4: Education

Georgia ES is developing a manual to educate consultants, engineers, and construction workers about design and installation of road crossings in stream habitat throughout the state. The manual highlights problems with conventional pipe culvert designs and identifies alternative designs that will minimize the culvert's impact on stream stability and fish passage. The Georgia Stream Crossings Manual is a collaborative project with Massachusetts Department of Fish and Game and agencies in Georgia.



Additionally, Georgia ES is developing digital video of FWS employees explaining the importance of fish passage and culvert design. Filmed in an entertaining and educational format, this video will be available to the public on the FWS website.

STAGE 5: Evaluation

Are culvert design measures required under the new Nationwide Permit Regional Conditions being implemented? Starting in Fall 2007, Georgia ES will evaluate many new stream crossings throughout the state to ensure they were installed in compliance with Service recommendations and Corps authorization.

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