



USDA-CSREES 2006 National Water Quality Conference

Fish Passage through Road Culverts

In the restoration process of freshwater systems it is important to consider ecological connectivity. In regards to fish passage and road culverts it is the connection between upstream and downstream reaches. The ability of fish and other aquatic organisms to disperse is essential for their survival. The North Carolina Department of Transportation (NCDOT) has regulations that require road crossings to facilitate Aquatic Organism Passage (AOP). Though culverts are less costly to design and build than bridges, it is often harder to get a permit for them, because too little is known about how well culverts meet the current requirements of AOP regulations.

The critical velocity of a fish is defined as the maximum swimming speed that can be sustained for a period of ten minutes, which is equivalent to swimming through a 100m culvert. In this study a flume has been constructed to test the critical velocities of six species of fish native to the piedmont of North Carolina: *Nocomis leptocephalus*, *Lepomis auritus*, *Etheostoma nigrum*, *Lepomis macrochirus*, *Noturus insignis*, *Notropisprocne*. The fish are being collected by electro fishing from local streams. They are then allowed to rest in a pond overnight before the test begins. For the test the fish are placed in the flume and allowed to accommodate at a resting velocity of 20cm/s. The velocity is then increased by 10cm/s every ten minutes, while returning to the resting velocity for five minutes between each step. A minimum of 20 fish from each species is being tested, and from that data a critical velocity for each species will be determined based on their body length. The critical velocities developed in this study can be used as guidelines for the hydrologic designs of culverts, making it easier to gain permits by proving the AOP guidelines have been met.

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