

Aquatic Organism Passage at Road Stream Crossings

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Stream Simulation: An Ecological Approach to Providing Passage for Aquatic Organisms at Road-Stream Crossings was developed by the Forest Service Stream Simulation Working Group.

This technical guide is published by the Forest Service, San Dimas Technology Development Center. It covers Stream-Simulation assessment, design and construction, and site examples. An electronic copy of the document can be downloaded online at:

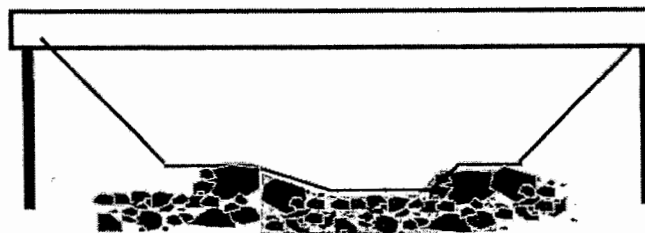
<http://www.fs.fed.us/eng/pubs/pdf/StreamSimulation/index.shtml>

HYDROLOGY- USGS StreamStats Online Program

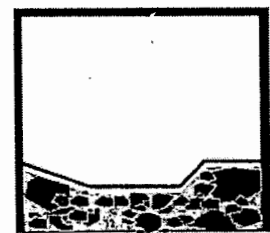
- Delineates watershed from a point, such as a road-stream crossing
- Calculates Peak Flows for 2 year, 50 year, and 100 year events, in addition to Low Flows. Stream Simulation Culverts should be designed for the 100 year peak flows.
- Uses regression equations based on the calculated watershed area.

<http://water.usgs.gov/osw/streamstats/pennsylvania.html>

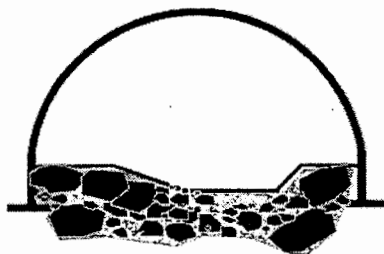
Structure Types for Stream Simulation



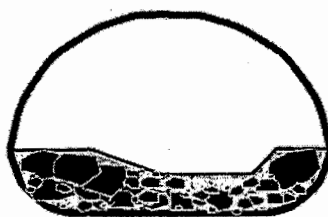
Bridge



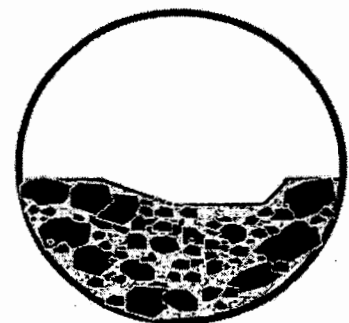
Box



Bottomless Arch



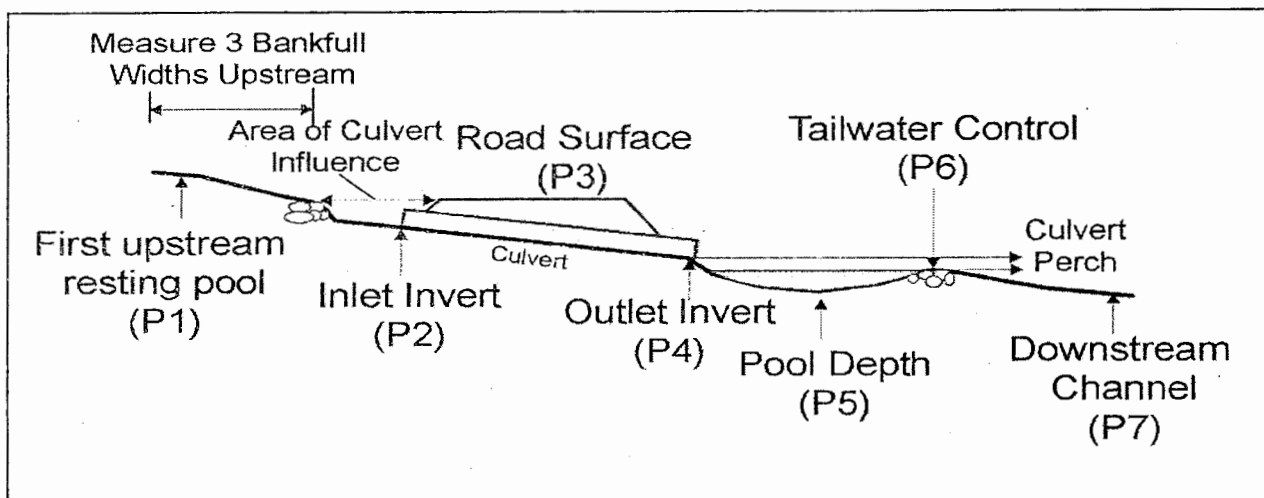
Pipe Arch



Embedded Round

National Inventory and Assessment Procedure- For Identifying Barriers to Aquatic Organism Passage.

- This document includes the fish passage predictive models for Salmonidae (Trout), Cyprinidae (Minnows and Young of year trout), and Percidae and Cottidae (Darters and Sculpin). Further adaptation of this model has been tested in the East.
- Clarkin, K., Connor, A., Gubernick, B., Love, M., WilsonMusser, S. 2003. National inventory and assessment procedure for identifying barriers to aquatic organism passage at road-stream crossings. USDA Forest Service, San Dimas Technology and Development Center. San Dimas, CA.



A longitudinal survey assesses the physical conditions of the stream and the culvert. The upstream points must be outside of the influence from the culvert. The measured parameters are used to determine the stream slope, culvert slope, the outlet perch, and the jump distance (Figure 6). Distance and elevation is measured for each location point designated by Pn.

CALCULATIONS FROM SURVEY

Culvert slope: ___ % $\frac{elev (P_2 - P_4)}{dist (P_2 - P_4)} * 100$ Outlet drop (F): ___ (P₄ minus P₆)

Channel gradient: ___ % upst; ___ % downst Inlet gradient: ___ % $\frac{elev (P_1 - P_2) x (100)}{dist (P_1 - P_2)}$

Ratio of inlet width to channel bankfull width: ___ Residual inlet depth: ___ (P₆ - P₂)

Substrate ratio: ___ (depth of substrate/structure height) Residual pool depth: ___ (P₆ - P₅)

