

STREAM AND ROAD CROSSINGS: CONVERGING DAMS WITH LITTLE HOLES TO NATURAL CHANNELS

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Culverts and bridges are commonly used to permit water to flow beneath roads where they cross streams, thereby preventing road erosion and allowing water to follow its natural course. However, if not designed properly, road crossings are more analogous to dam sites for many physical and biological functions. In the past, engineers designed for hydraulic efficiency as the dominating criteria, giving little regard to backwater effects, scour, and other passage considerations such as bedload, debris, fish, and other aquatic organisms. Historically, water has been viewed as a liability in road design that needed to be managed to avoid destroying an investment. Despite standards and guidelines that address the importance of species movement, the number of crossings either partially or fully impeding passage is enormous. As the number and range of many species have declined, the importance of protecting the remaining populations has multiplied. Properly designed culverts provide for stream structure and function, which in turn provides desired species passage. A holistic, interdisciplinary approach creates a win-win scenario for all. Tradeoffs exist, but it is time to consider an economic reality check. Having the least expensive crossing alternatives and still maintaining aquatic species passage, stream function, maximized structure life, and minimized maintenance costs are unrealistic. Integrating crossing structures, streams and species passage is a win-win scenario that ultimately will help lead to more viable aquatic, semi-aquatic, and terrestrial populations, healthier streams, and engineering maintenance budgets that can focus resources elsewhere.