

Enhancing Fish Passage at Road Crossings in Mat-Su, Alaska

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The Matanuska-Susitna Borough (MSB) covers an area the size of West Virginia and is one of the top 50 developing areas of the U.S. The MSB is home to large wild runs of five species of Pacific salmon, and fish passage is a priority issue. Over 260 culverts have currently been identified in the Matanuska-Susitna Valley, with a median constriction ratio of 0.6 compared to the active channel and a median active channel width of 7 feet. Approximately 77% had perches less than 4 inches, and 23% more than 4 inches. Culvert design for stream crossings must satisfy many requirements ranging from fish passage to flood conveyance. A series of 2004 culvert replacements by the Mat-Su Borough with funding from the Fish and Wildlife Service and NOAA were evaluated from design through construction. These eight culverts were designed to pass the 100-year event and the stream simulation methodology used by the U.S. Forest Service. Stream simulation design was developed to improve both physical and biological connectivity along the stream corridor. In general, this is performed by partially filling the culvert with substrate similar to stream conditions, accounting for flood forces, and installing a culvert wider than the width of the active channel. Stream hydrology, sediment and debris transport is enhanced, and improved passage is created for all aquatic organisms and some terrestrial wildlife. Design criteria and construction results for these culverts will be presented, as well as successes and lessons learned.

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