

Ecological Criteria for Prioritization of Culvert Replacement

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Culvert passage issues are gaining national and international focus, because they are implicated in the decline of particular species and in the more general loss of biodiversity in freshwater ecosystems. Millions of dollars are invested annually in the Pacific Northwest for culvert replacements to remedy fish passage. Without an ecological basis for the prioritization of culvert replacements, federal and state agencies risk spending large amounts of money on projects with unknown benefits to aquatic species. In an effort to increase understanding of juvenile fish movement and seasonal habitat use, the USFS Pacific Northwest Research Laboratory, in conjunction with the USEPA Western Ecology Division, are monitoring the movement of juvenile coho salmon, steelhead and cutthroat trout into and out of selected tributaries of the West Fork Smith River (central Oregon coast). Juvenile fish implanted with passive integrated transponder (PIT) tags are being used to determine movement, habitat use, survival and growth. PIT-tagged fish are being monitored with stationary PIT tag readers located in four tributaries with “fish friendly” culverts (i.e. meet current design standards) and with portable PIT-tag readers throughout the watershed. Recaptures of PIT tagged fish are allowing determination of habitat-specific growth rates. Seasonal movements of coho salmon and juvenile cutthroat trout and steelhead, coupled with differences in growth rate between tributary and mainstem habitats, reveal complex patterns of movement and growth at the watershed scale. We will continue to assess the role of seasonal habitat quality upstream of road crossings and its influence on the magnitude and frequency of juvenile movement.