Basis Of Design For A Fish Barrier In German Gulch near Anaconda, Montana[AFS]

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German Gulch supports a population of genetically pure westslope cutthroat trout, physically isolated from rainbow trout due to historic mining activities near Butte, Montana. The ongoing restoration of Silver Bow Creek, into which German Gulch flows, will eventually reconnect these populations. This project involved the development of design criteria and the design of a fish barrier. Design criteria included conditions that would prevent fish from swimming or leaping over the barrier. Due to a lack of published data on rainbow trout, the swimming and leaping capabilities for pink and chum salmon were used. The barrier design consisted of rock configured to create a weir and downstream apron in a reach of channel confined by generally vertical exposed bedrock. A hydraulic model of a stylized

barrier was used to determine water velocities and depths, and the location and configuration of the hydraulic jump. Four different barrier heights were evaluated (4 to 7 ft). A 6-ft high structure was selected as it satisfied the swim and leap criteria at the 2-year through 100-yr flows. As swimming over the structure at lower flows was also a consideration, the model was run at flows of 10 cfs (considered baseflow), 20 cfs, 40 cfs and 80 cfs. While water velocities at these lower flows did not satisfy the swim impedance criterion, shallow water and a compound weir surface probably would nonetheless limit fish passage at low flows.