

Impact of irrigation diversion screens on juvenile lampreys in the Columbia River Basin

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Pacific lamprey (*Entosphenus tridentatus*) populations in the Columbia River basin have declined in recent years and improving lamprey passage at irrigation diversions is a high priority for their recovery. For this reason, we tested the effectiveness of five common fish screen materials (perforated plate, interlock, vertical bar, and 12 and 14 gauge wire cloth) to protect lamprey ammocoetes (ranging from 28–153 mm in length) at a simulated water diversion in a recirculating flume. The perforated plate screen prevented entrainment of 85% of the fish, protected fish larger than 46 mm, and offered the best overall protection of all the screen types tested. The interlock and vertical bar screens protected 74% and 67% of the fish and prevented fish larger than 58 and 55 mm from becoming entrained. The 12 and 14 gauge wire cloth screens prevented fish larger than 90 and 78 mm from becoming entrained and offered the lowest overall protection, preventing only 34% and 38% of all fish from entrainment. For all screen types, entrainment of fish usually occurred within the first ten minutes after release and injuries were rare, despite most fish contacting and becoming impinged on the screens during testing. If data are available, we will also present results from studies evaluating the biological effects of passing ammocoetes over horizontal flat plat fish screens under a variety of hydraulic scenarios. Our results should contribute to the development of operational and design criteria for fish screens to protect juvenile lampreys and could facilitate lamprey population recovery in some areas.