

DEVELOPING A SEPARATOR FOR JUVENILE LAMPREY

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ABSTRACT

Juvenile Pacific lamprey are often inadvertently collected at juvenile bypass facilities designed to divert juvenile salmonids away from turbine intakes. We set out to develop a device that would allow separation of juvenile lamprey from salmonids in the bypass raceways at McNary Dam. Our experiments examined behavior of both lamprey larvae (ammocoetes) and recently metamorphosed juveniles (macrophthalmia). Experiments with macrophthalmia were conducted in a flume supplied with ambient Columbia River water at the McNary Juvenile Bypass Facility. For each 1 h experiment, five replicates using 10 lamprey each were done with two different screen materials: 6.5 mm square stainless steel woven mesh and stainless steel plate with staggered 6 × 25-mm oval perforations. For each material, we tested the screen in horizontal, angled (9°), and vertical orientations. We found that the macrophthalmia moved most readily through materials oriented vertically (both the mesh and the plate) and were reluctant to move through an angled or horizontal separator. We conducted longer (24 h) experiments using both macrophthalmia and ammocoetes to determine whether fish would volitionally move either vertically, or horizontally through a variety of materials (6.5 mm – 12 mm openings). The results of this work confirmed that macrophthalmia were resistant to moving downward, while ammocoetes readily moved in a downward direction. Both groups moved horizontally through all materials. Based on these findings, we designed, built and installed a lamprey-friendly raceway screen at the McNary Juvenile Bypass holding raceways. The new screen was oriented vertically and made from 6.5 mm square stainless steel woven mesh. Preliminary sampling of raceways with and without the lamprey-friendly screen indicated that fewer juvenile lamprey were retained or impinged by the lamprey-friendly material.