

An Experimental Study on Downstream Fish Guidance Efficiency

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Abstract

Hydropower plants restrict or completely block fish downstream migrations, which play a critical role throughout their life cycles. Recent experimental and field studies indicate that there is a need for efficient finer bar rack screens to protect multiple fish species, including the small-bodied ones, at water intakes with minimum head loss. We have experimentally investigated the hydraulic and fish guidance performance of the angled Oppermann fine screen, both with and without a guidance wall. We conducted the experiments at a 45° screen angle, with a bar spacing of 10 mm. According to the analyses, implementing a guidance wall reduces the maximum streamwise velocity gradient in the screen region. The experimental measurements revealed that the tangential velocities in front of the screen tend to increase in the presence of a guidance wall, which leads to an effective guiding current for fish in the bypass channel. The downstream guidance efficiencies for small-bodied fish species of *Alburnus escherichii* and *Alburnoides kosswigi* are presented.