

Wyong Weir Fishway Study

Wyong River, Central Coast, NSW

Background

Wyong Shire Council is presently reviewing fish passage and flow gauging at Wyong Weir. As a result, a trapezoidal weir fishway has been proposed for Wyong Weir to assist fish passage at low-medium flows. As part of this investigation Manly Hydraulics Laboratory was commissioned to undertake a 3D physical model study to evaluate the overall new proposed design in relation to velocities and turbulence. A numerical analysis (CFD) was also undertaken.

Project Scope

The aim of the study was to carry out physical model testing of the new trapezoidal weirs to evaluate and verify the adequacy of the proposed low-medium flow fishway design to safely enable the passage of small-bodied fish by producing low water velocities and turbulence. A preliminary 3D CFD analysis was used to compliment the investigation of the hydraulic characteristics of the trapezoidal weirs.

Our Role

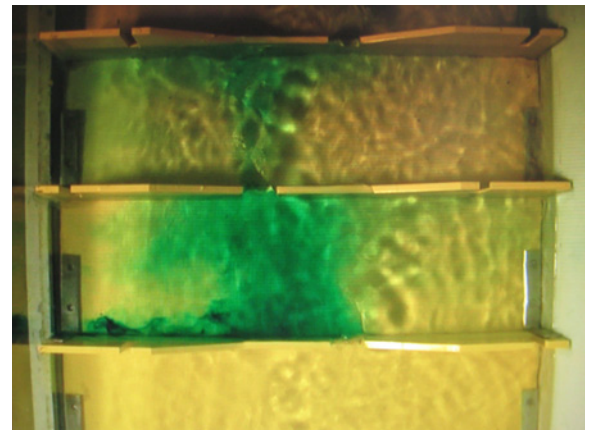
MHL constructed a 1:6 scale physical model of the proposed new trapezoidal weir design, and used a flume to represent the channel section accommodating the correct bed grade of 1 in 23. The testing program used eight discharges ranging from 2ML/d up to 50 ML/d. Measurements of water surface profile and velocity, and flow patterns around/through the weirs using dye were undertaken. A 3D numerical model was also generated with appropriate boundary conditions to resemble physical model conditions.

Outcomes

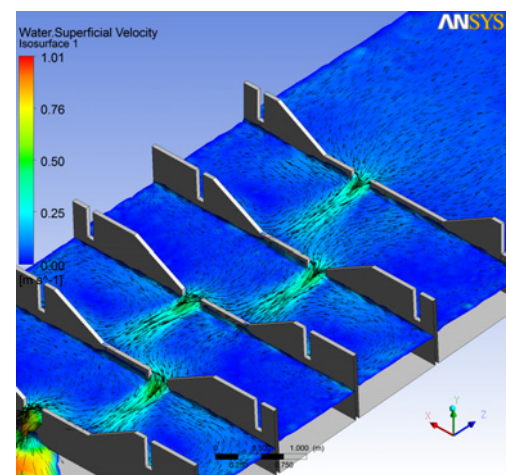
Modifications to the weir were designed focusing on the weir side slope and slot dimensions to improve the hydraulic behaviour for fish passage. For the CFD analysis, the results complimented the understanding of the recirculation zones and turbulence characteristics through the weirs.



Hydraulic behaviour over the trapezoidal weirs



Flow pattern through dye between weir pools



Vector and contour plots showing recirculation zones