



November 2008

Snowy River flow response monitoring and modelling – fish

Following construction of the Snowy Mountains Scheme between 1955 and 1967, flows in the Snowy River have been severely altered. To improve river health, water was released to the Snowy River via the Mowamba River as a result of the de-commissioning of the Mowamba River aqueduct. The Snowy River Flow Response Monitoring and Modelling program was established to assess the changes in river conditions that could be attributed to the new environmental water releases. This summary assesses the first stage Environmental Flow Regime (EFR) to the Snowy River from August 2002.

Fish assemblages across the Snowy

The fish in the Snowy River can be described as:

- Consisting of two main groups above (upper) and below (lower) the major fish barrier of Snowy Falls (Figure 1). Upper and lower reaches refer to locations above and below Snowy Falls.
- The fish in the upper Snowy River had a low abundance or absence of migratory fish (except eels) and a greater abundance of short-finned eel and trout.
- The fish in the lower Snowy River comprised of a greater abundance of Australian smelt, congoli and long-finned eel.

In both the upper and lower reaches, smaller differences were also observed between the main river sites of the Snowy River and the unregulated tributaries sites (Figure 2). These groupings can be explained by greater abundances of the fish identified in Figure 1.

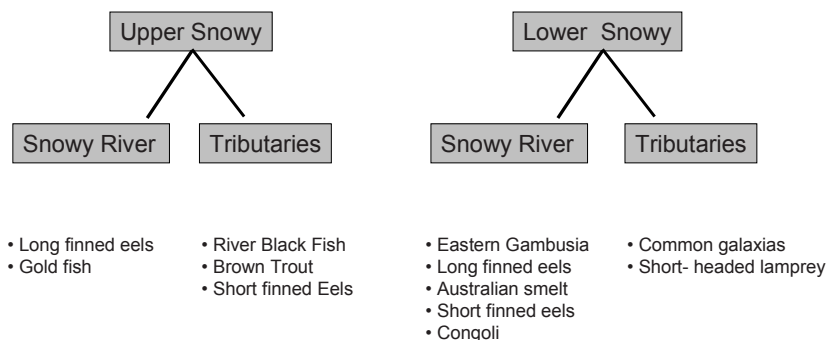


The EFR has had little influence on the fish of the Snowy River or the indices used to measure fish health, including native species richness, the proportion of individuals that were native species, population size structures, the abundance of trout, the proportion of individuals that were pest species or the abundance of each individual species.

Figure 1 (left): The Snowy River at Snowy Falls is a significant natural barrier to the upstream passage of migratory fish.

Figure 2 (right): Classification of fish samples in the Snowy River catchment. Four distinct site groupings occur in the Snowy River before and after implementation of the first increment of environmental flows.

Source: Gilligan and Williams (2008).



Fish passage in the Snowy

Four major natural barriers are known to occur in the Snowy River: Stone Bridge Falls, Corrowong Falls, Snowy Falls and Pinch Falls. Reductions in flow in the Snowy River has made it more difficult for fish to move along the river, as these barriers could only be passed during large flow events.

In an attempt to define the types of events required to provide fish passage across the key flow barriers in the Snowy River, scientists assessed one of the four major fish barriers in the Snowy River, Pinch Falls. A combination of one-dimensional and two-dimensional hydraulic models was employed at Pinch Falls. It was determined using the models and the available literature that Australian bass were capable of passing through the back channels created at Pinch Falls at flows of 100 cubic metres per second (m^3s^{-1}) or 10,370 megalitres per day (Mld⁻¹) for adults, and $130 m^3s^{-1}$ or 13,350 Mld⁻¹ for juveniles (Figure 3).

An analysis of the flow record was undertaken at McKillops Bridge (located 44 kms downstream and the nearest gauge with a sufficiently long record to undertake historical analysis) to determine the impacts of Jindabyne Dam upon fish passage at Pinch Falls. The results indicate that fish passage discharges have been significantly reduced in number with the important Spring flow events falling from an average of 4.6 per year to less than one per year and the longest period between fish passing flows since the construction of Jindabyne Dam being almost four years (Figure 4).

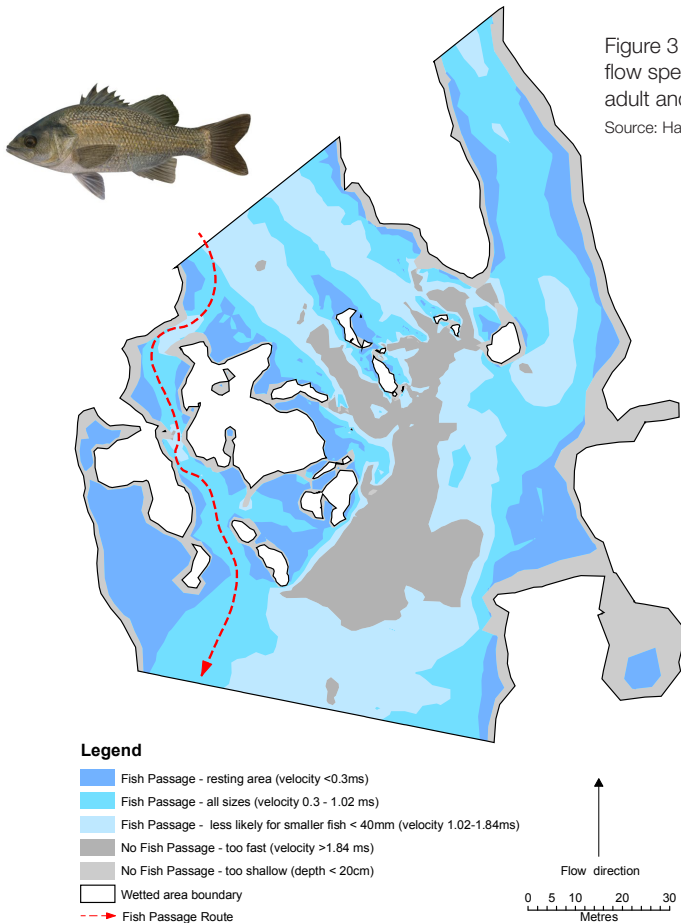
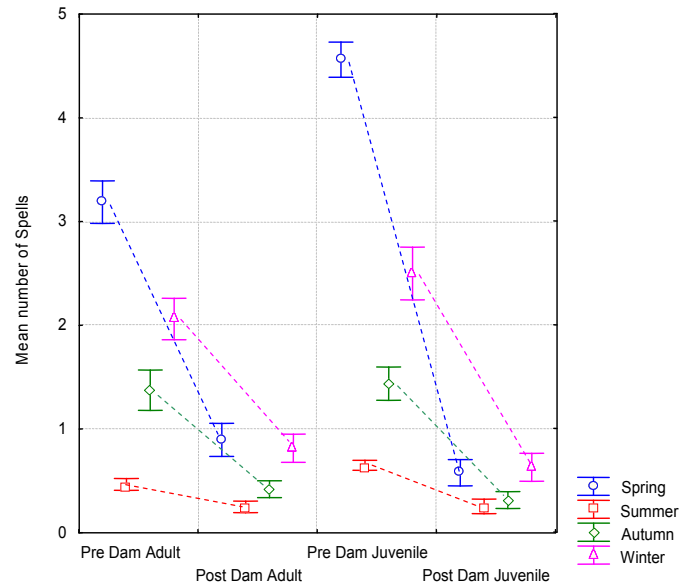


Figure 3 (left): Seasonal distribution of fish flow spells pre and post dam construction for adult and juvenile bass.
Source: Haeusler and Bevitt 2007.

Figure 4 (below). Hydraulic modelling of fish passage conditions for adult Australian Bass at a flow of 10,370 Mld⁻¹.
Source: Haeusler and Bevitt (2007).



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