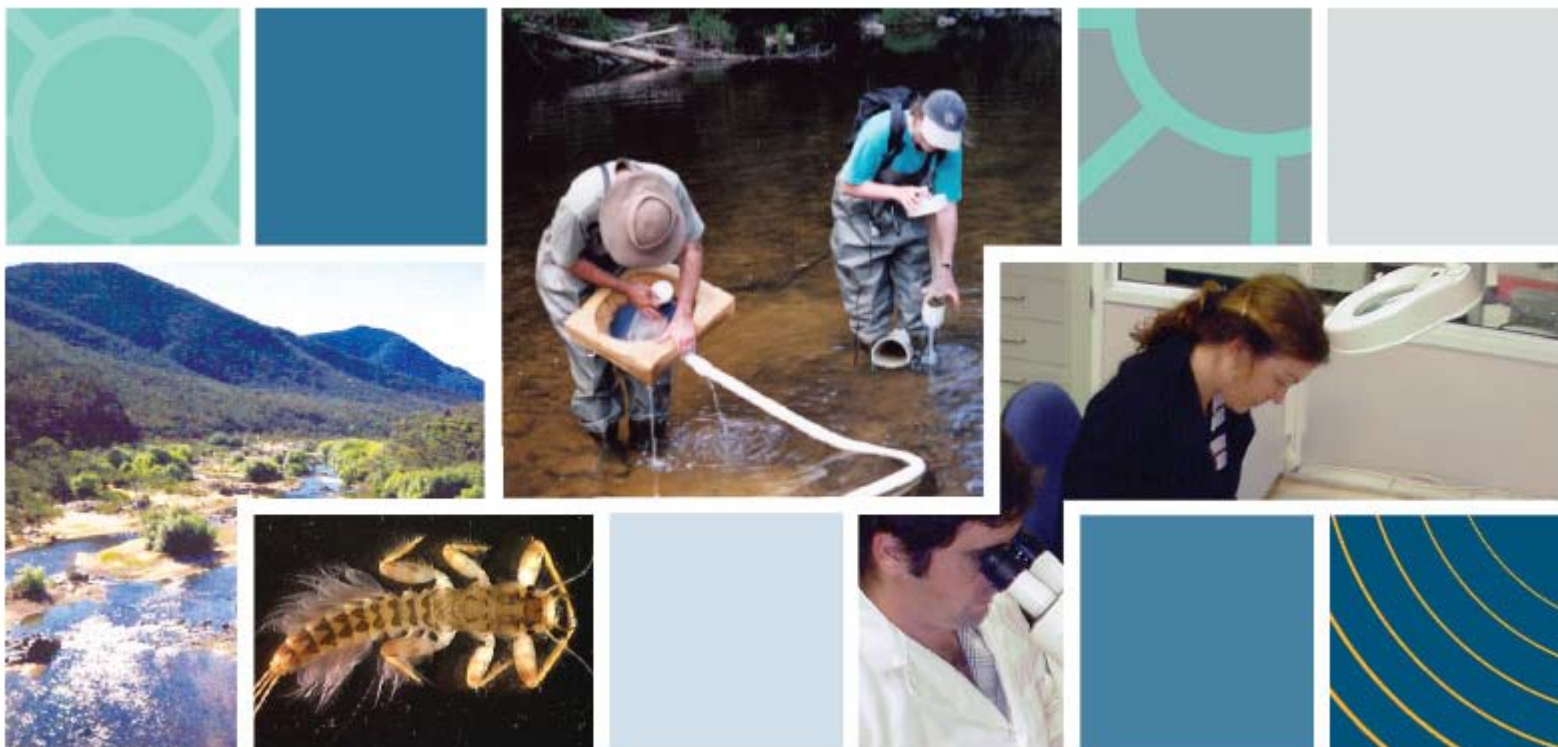


SNOWY RIVER RECOVERY

SNOWY RIVER FLOW RESPONSE MONITORING RESPONSE OF AQUATIC MACROINVERTEBRATES TO THE FIRST ENVIRONMENTAL FLOW REGIME IN THE SNOWY RIVER



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Summary

The construction of the Snowy Mountains Scheme (SMS) between 1955 and 1967 for power generation and to provide water to the Murrumbidgee Irrigation Area diverted approximately 96% of flow from the Snowy River downstream of Jindabyne Dam as measured at Dalgety. The first environmental flow releases to the Snowy River from decommissioning Mowamba River aqueduct occurred on 28 August 2002 and continued throughout the study. The Snowy River Environmental Flow Response Monitoring Project was established in 2000 to provide a physical, chemical and biological assessment of the river and quantify the changes, if any, caused by the implementation of environmental flows. This report documents the effects of environmental flows on aquatic macroinvertebrate assemblages of the Snowy River and incorporates data collected from autumn 2000 to autumn 2005.

The median daily flows in the upland macro-reach of the Snowy River increased by 50% after the provision of environmental flow releases from the decommissioning of Mowamba River aqueduct. These flows were still substantially lower than the simulated natural flows in the Snowy River for the same period (approximately 94% lower) and about 30% of the flow in the corresponding reference sites. The median daily flows in the midland and lowland macro-reaches of the Snowy River and reference sites reduced by approximately 40% during the period with EFR because of the prevailing drought conditions.

The macroinvertebrate fauna of the upper Snowy River, reference sites and control sites remained distinct throughout the study due to ongoing alterations to flows in the Snowy River. These biological patterns were not consistent with the environmental flows significantly altering Snowy River assemblage composition. The continued reduction in habitat diversity and area, and constancy of hydraulic habitats caused by Jindabyne Dam, despite the small increases in flows, are likely to be the principal mechanisms responsible for the upper Snowy River macroinvertebrate assemblages remaining dissimilar to the reference site assemblages. Total wetted area and riffle area increased by approximately 50% with the environmental flows in the upper Snowy River. It is possible that while macroinvertebrate density, family richness and assemblage composition were not altered greatly by the EFR, total invertebrate abundance in riffle habitats may have increased in relation to increased riffle habitat area. There is unlikely to be a change in the upper Snowy River macroinvertebrate assemblage composition until base flows are increased and high flow events are an integral part of the environmental flow regime.

The macroinvertebrate assemblages within riffle and pool edge habitats of the midland and lowland macro-reaches of the Snowy River did not exhibit any responses that could be related to the environmental flow releases. The macroinvertebrate assemblages of the pool edge habitats within the midland and lowland macro-reaches of the Snowy River exhibited drought related effects. These were declines in densities of most macroinvertebrate families and increased densities of oligochaete worms.

The faunal differences between the midland and lowland Snowy River and reference site assemblages could be attributed to comparatively higher flows in the Snowy River and site-to-site variation rather than the effects of Jindabyne Dam. The provision of further environmental flow releases may make the macroinvertebrate assemblages more dissimilar which is contrary to the current hypotheses. The hypotheses for the midland and lowland macro-reaches of the Snowy River (H_3 & H_4) need to be revised to incorporate the current site class differences, the future hydrological changes and potential increase in biological differences with increases in EFR. The macroinvertebrate fauna of the midland and lowland macro-reaches of the Snowy River are likely to exhibit significant compositional changes related to EFR only after the reinstatement of large spring flows.

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