

**Associations of benthic invertebrates and flow alterations in
the Nymboida River, NSW.**

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Abstract

The natural flow regime of many rivers is threatened by water extraction and other anthropogenic activities. River regulation due to weirs and dams reduces river flows and is associated with declines in habitat condition, decreased water velocity and depth, and loss of wetted habitat. Aquatic invertebrate community structure in different habitats (e.g. slow flowing areas near river margins versus faster flow mid-stream) is largely governed by water depth, velocity, substrate, food availability and physical disturbance through flooding and drying. By studying the distribution of different flow environments in rivers and their benthic invertebrate inhabitants, we may be able to determine which factors are most influential in promoting the maintenance of benthic invertebrate density and diversity, often considered useful measures of ‘river health’.

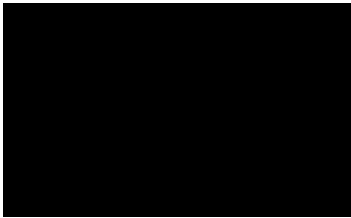
This study compared benthic invertebrates in slow and fast flowing habitats between locations upstream and downstream of a weir on the Nymboida River, and along a nearby reference river lacking a weir, the Bellinger River. Survey results indicated that similar densities and diversity of benthic invertebrates occurred on either side of the weir, and that the fauna of the regulated Nymboida River resembled that of the reference Bellinger River. A flow manipulation experiment at two sites upstream and two sites downstream of Nymboida Weir showed that aquatic invertebrate taxa responded within seven days to increases or decreases in velocity. The capacity to respond to flow was not diminished downstream of the Nymboida Weir, indicating that 80 years of river regulation have not had a lasting effect on this aspect of river condition. Flow-dependent (rheophilic) invertebrates may be valuable indicators of an improvement in river condition under enhanced flows.

The long-term protection of aquatic biodiversity in rivers is likely to be achieved by maintaining the inherent variability of a river’s natural flow regime. In the Nymboida River, this may be achieved with the allocation of environmental flows, particularly during periods when natural low flows coincide with human demands, exacerbating the duration of ‘artificial’ droughts. These flows will promote a diversity of different types of physical habitats and different flow velocities, favouring enhancement of the densities

and diversities of the benthic invertebrate fauna in the Nymboida River, with concomitant benefits for ecosystem function and food for fish.

Declaration

I certify that the contents and substance of this thesis have not already been submitted and is not being currently submitted for any other degree. All assistance received in the preparation of this thesis and all sources used have been acknowledged.



Robert Luke Veal
12 December 2008

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