Factors affecting water quality and growth of *Azolla* sp. in the Broken Creek

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Abstract: Microbial processes in sediments have a major role in determining the dissolved oxygen levels within the water column.

Project Aim: The aim was to determine the following:
- What standing biomass of *Azolla* in present in the Broken Creek?
- When does *Azolla* grow, at what rate does *Azolla* grow, and what factors drive the bloom and bust cycle?
- To what extent are phytoplankton important in the Broken Creek?
- How important are decomposition processes in the sediments?
- Do sediments play a role in determining water quality in the Broken Creek?

Methods: Studies were carried out on Rices Weir, the most downstream weir pool on the Broken Creek.

Standard methods were used to measure water quality, nutrients and chlorophyll–a. Water surface chambers and harvesting were used to measure *Azolla* biomass and growth rates. Benthic chambers were used to measure sediment respiration. In-stream production and respiration was derived from diurnal cycles in dissolved oxygen levels.

Preliminary Results. Estimates of the amount of *Azolla* growing on rice ranged between 27 and 277 g (dry weight)/m² with single layers of plants, which corresponded to 0.3 - 4.2 kg (wet weight)/m². Wind played a major role in determining distribution of *Azolla* in the weir pool. Phytoplankton abundance, (measured as chlorophyll-a concentration) was generally between 40-70 µg/L, but a major bloom (240 µg/L chlorophyll-a) occurred toward the end of the death phase of the *Azolla*. High sediment oxygen demand (SOD) was found throughout Rices Weir and DO could be reduced close to 0 mg/L at depth. The presence of *Azolla* exacerbated the DO declines.

Reasons for the eventual decline in *Azolla* populations are not yet known.

Application to Management/works to be undertaken

Develop better real-time monitoring to predict low DO events in Rices Weir.

Further Reading


¹Murray-Darling Freshwater Research Centre/CSIRO Land and Water.