

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* is 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 down stream 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 Rices 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 part 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

Gavin Rees, Karina Hall, Darren Baldwin, Shane Perryman (2008) The lower Broken Creek : aspects of water quality and growth of *Azolla* species.

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