

March 2012

Water quality response to the spring 2009 environmental flow release from Tantangara Dam to the Murrumbidgee River

Tantangara Dam, with a capacity of 252 gigalitres (GL), is located in northern Kosciuszko National Park, south eastern NSW. The dam diverts approximately 99 per cent of the upper Murrumbidgee River water to Lake Eucumbene and then to the lower Murrumbidgee River. This has had significant impacts on the ecology, water quality and geomorphology of the Murrumbidgee River downstream of the dam. (Figure 1)



Figure 1. The Murrumbidgee River below Tantangara Dam showing channel contraction and sedimentation of the substrate.

A minor spring environmental flow release of 4.23 GL was made in September and October 2009. The NSW Office of Water measured water quality in the Murrumbidgee River approximately 1.2 kms downstream of Tantangara Dam before and during the release. Hydrolab multiprobes were used to record hourly measurements for water temperature, pH, electrical conductivity, dissolved oxygen (percentage

saturation) and turbidity. Flow releases were increased in small increments from 0 MLd⁻¹ to 240 MLd⁻¹ and back to 0 MLd⁻¹ over several weeks (Figure 2).

Tantangara Dam has increased the diurnal water temperature range in the Murrumbidgee River (ie. higher than normal temperature range in a 24 hour period), with water temperature now driven by ambient air temperature, and reduced dissolved oxygen to levels below the guidelines for aquatic ecosystem health. The main effects of the 2009 spring flow release from Tantangara Dam on water quality in the Murrumbidgee River were as follows:

- reduced diurnal variability in water temperature when flows of 100-240 MLd⁻¹ were released, with no significant improvement in water temperature which was still driven by air temperature at these flow volumes (Figure 2a)
- low dissolved oxygen levels in the Murrumbidgee River (median values around 80 per cent saturation) below Tantangara Dam may be limiting the health of the aquatic ecosystem (Figure 2b)
- short term decreases in dissolved oxygen and pH and increased electrical conductivity on the day that flows were first released on 21 October 2009 (Figures 2b and 2c)
- slightly decreased electrical conductivity and turbidity throughout most of the flow release (Figure 2c), however both generally within ANZECC guidelines
- some minor scouring of the substrate in the main channel.

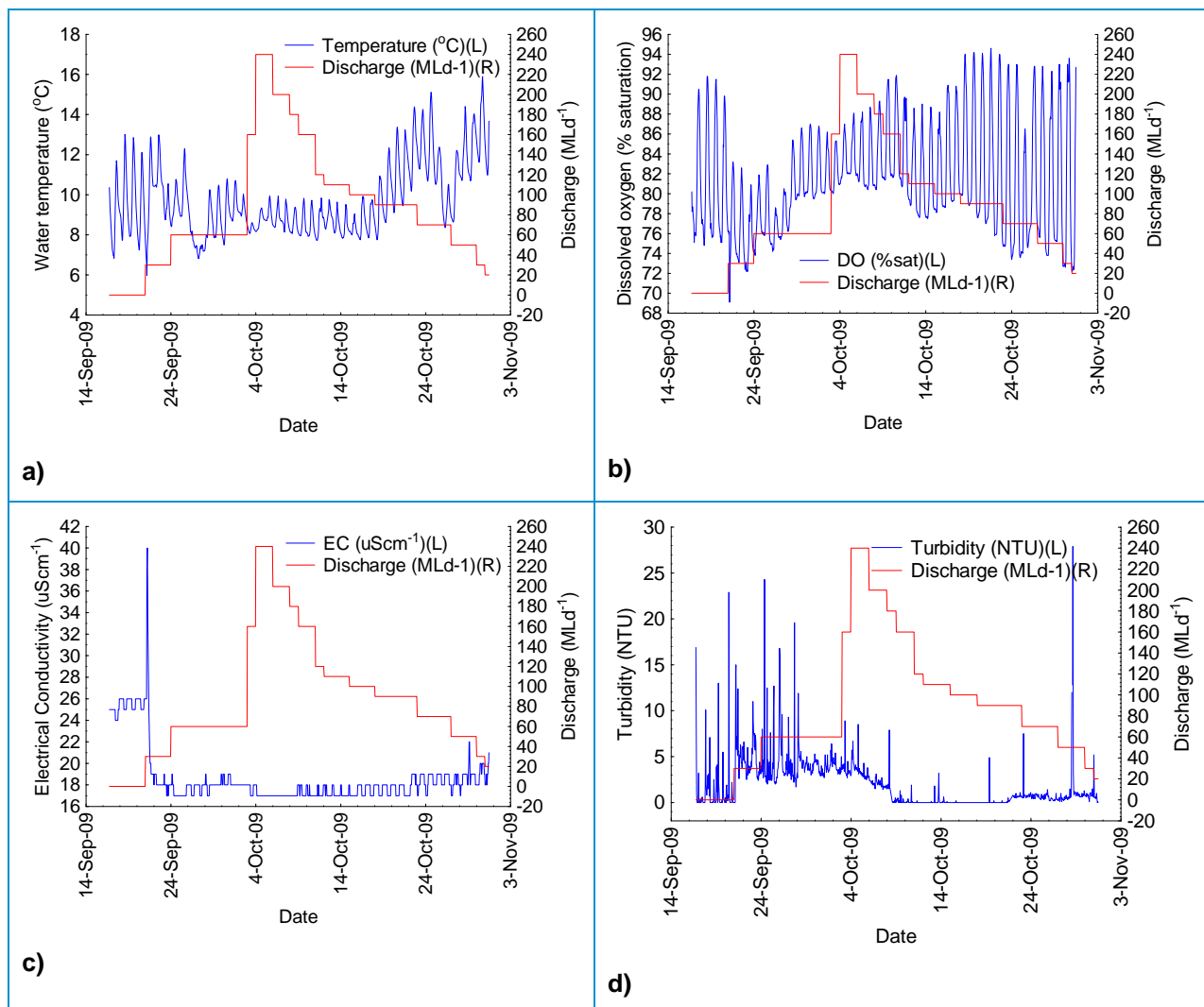


Figure 2. a) Water temperature, b) Dissolved oxygen, c) Electrical conductivity and d) Turbidity.

Up until now, there has been a lack of information on the water quality impacts of Tantangara Dam on the Murrumbidgee River. This study provides valuable information for environmental flow management. Median water temperature reflects air temperature, so although the diurnal range of water temperature is reduced by flows of 100-240 MLd⁻¹, the environmental flow release did not significantly improve the water temperature of the river. There was no improvement in the dissolved oxygen levels, which remain below the ANZECC guidelines for aquatic ecosystem health. The flow release slightly decreased turbidity and electrical conductivity, but only for the duration of the flow release. Whilst the improvements in water quality were short term, there was some scouring of the river bed evident after the environmental flow release, which may indicate benefits for the habitat and spawning requirements of the target species Macquarie Perch. The suitability of the flow release for Macquarie Perch migration is dependent on increase in water temperature to 16-18°C, which was not achieved during the flow release but only after low flows resumed on 31 October. Consequently, environmental flow requirements for Tantangara Dam have been altered to allow for a first peak flow of 1500 MLd⁻¹ for three days in September, increased baseflows with variability in October and November, and a second flow peak of 350 MLd⁻¹ of eight days duration in December.

More information

Robyn Bevitt or Simon Williams, ph (02) 4244 9728, email simon.williams@water.nsw.gov.au

Website: www.water.nsw.gov.au under Water management > Monitoring > Snowy River

© State of New South Wales through Department of Trade and Investment, Regional Infrastructure and Services 2012. You may copy, distribute and otherwise freely deal with this publication for any purpose, provided that you attribute the Department of Trade and Investment, Regional Infrastructure and Services as the owner.

Disclaimer: The information contained in this publication is based on knowledge and understanding at the time of writing (February 2012). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of the Department of Primary Industries or the user's independent adviser.

Published by the NSW Department of Primary Industries, a division of the NSW Department of Trade and Investment, Regional Infrastructure and Services.

11_368