Revolutionising Monitoring of Waterway Health in Merri Creek: A Fact Sheet

Artwork 'Luwaytini' by Mark Cleaver, Palawa

Why *does* water quality matter?

Stream water quality changes constantly. In Merri Creek, this is in part due to large inputs of litter, sediment and other pollutants via runoff and the stormwater drain system, plus rapid urbanisation in the upper catchment, and climate change. Urban creeks often get turbid (cloudy due to large amounts of sediment or other particles suspended in the water) after big rainfall events, especially when soil erosion and land-use changes occur.

Highly turbid water creates problems for plants and animals living in streams. For example, when the suspended material settles, it can smother fish and their food sources. Managers need to know when and where turbid events occur quickly, so they can make informed, timely decisions on how to pinpoint, prevent and mitigate such disturbances.

The project: In 2020-2021, we trialled two different water-quality sensors in Merri Creek (at Galada Tamboore and North Fitzroy): one collected underwater light and temperature data, the other collected turbidity data. Both collect data at high frequency which helps to pinpoint when water-quality issues occur. The telemetered turbidity sensors are expensive whereas the light and temperature sensors are relatively low cost. However, all sensors can be prone to technical issues, which sometimes creates problems with the data. So we also accessed good-quality, open-source turbidity, air temperature, solar exposure, rainfall and water level data. We aimed to find out if light and temperature have potential to act as turbidity 'surrogates' and to better understand and communicate the water-quality dynamics of Merri Creek.

Bio2Lab · ACEMS · Moreland City Council · Merri Creek Management Committee · City of Whittlesea · RMIT University

Merri Creek flows through the Country of the Wurundjeri people of the Eastern Kulin Nation. We acknowledge the Traditional Owners and ongoing Custodians of these unceded lands and waters, and the significance of Merri Creek to the Wurundjeri people. We respectfully acknowledge their Elders, past, present and emerging.

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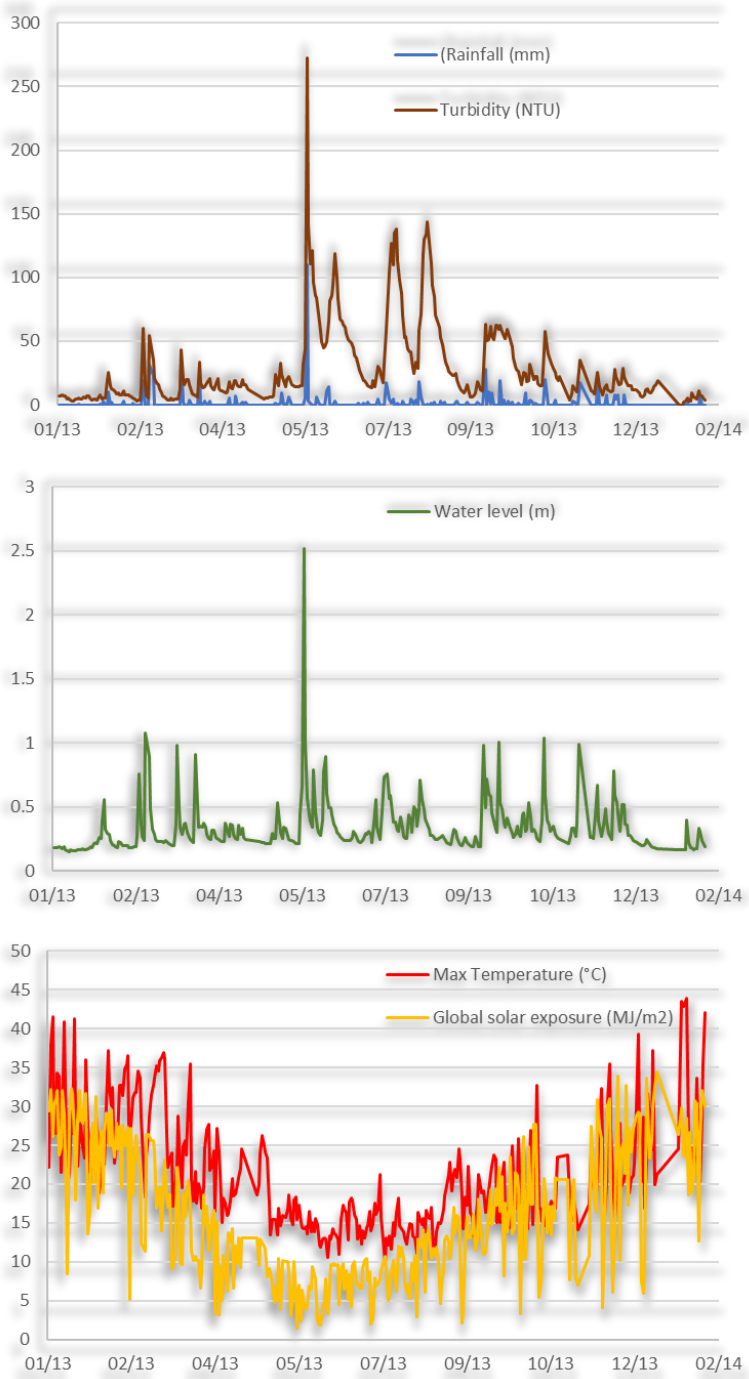
What we found: We tested the ability of different combinations of the daily rainfall, water level, solar exposure and maximum air temperature to predict daily turbidity in Merri Creek at North Fitzroy. Turbidity was best predicted using a model that included rainfall and water level only. This makes sense given turbidity often rises when rainfall in the catchment increases runoff and water levels also rise in response.

Even though solar exposure and air temperature did not relate as strongly to turbidity as rainfall and water level did, they showed some potential in predicting turbidity, given that they were included in the second and third best model. This suggests that low-cost light and temperature sensors could hold promise as potential, easy-to-measure indicators for in-stream turbidity throughout networks.

Where to next? Checking if the light data recorded by low-cost sensor corresponds with turbidity data may help to reveal stronger relationships between underwater light levels and turbid and/ or pollutant-rich discharges into and through stream networks like the Merri Creek system. Continuing to monitor turbidity, light and temperature data is important because it will help to develop better predictive models of turbidity and resolve technical issues with sensors. Making sensor data available to the public to access is a key priority.



Daily values (January 2013 to February 2014) of turbidity and water level recorded at the Merri Creek in north Fitzroy, daily rainfall at Somerton (Merri Creek catchment), and daily solar exposure and air temperature at Melbourne Airport. Data sourced from Department of Environment, Land, Water and Planning, and the Bureau of Meteorology.

This project was conducted by RMIT researchers Drs Catherine Leigh and Sevvandi Kandanaarchchi, Mr Barhgav Rele and Professor Irene Hudson, in collaboration with Bio2Lab, City of Whittlesea, City of Moreland, and the Merri Creek Management Committee. Funding support was provided by City of Whittlesea, an Information Systems (Engineering) Enabling Capabilities Platform grant (RMIT University), and an ARC Centre of Excellence for Mathematical and Statistical Frontiers grant.

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