

Destratification system for Kyogle off-stream storage

COUNCIL NAME

Kyogle Shire Council

WEB ADDRESS

kyogle.nsw.gov.au

SIZE

3584 square
kilometres

POPULATION

9,537

FUNDING PROGRAM

[Building Resilience to
Climate Change](#)

Overview

In 2016, a 200 ML off-stream dam was constructed as part of the Kyogle Water Supply Augmentation Project to provide greater water security during times of drought. Kyogle Shire Council's climate change risk assessment identified that projected temperature rises will increase the risk of algal blooms in the water supply. A destratification system, using renewable energy, was installed to mix and aerate the water to prevent algal blooms and maintain water quality.

Background

The Kyogle Water Treatment Plant receives raw water from a new 200ML off-stream storage facility built to accommodate flows from the Richmond River. There was a risk that the off-stream dam would experience water stratification due to solar effects on the water surface. Cold water at the base of the reservoir is denser than warmer surface water creating layers in the water column that do not mix. The stable water column and warmer surface water promotes algal growth. Stratification occurs more often during warmer months of the year and can lead to water quality issues including excessive algal growth and associated taste and odour issues.

Kyogle Council is committed to managing its water supplies effectively to provide a safe, high-quality drinking water that consistently meets Australian drinking water guidelines, and consumer and other regulatory requirements.

Artificial destratification refers to the use of mechanical energy to mix the layers of water to reduce temperature differences between the stratified layers. Council sought to find a destratification solution for the off-stream storage using triple bottom line criteria to avoid maladaptation, such as increasing carbon emissions through high energy solutions.



Implementation

To identify the best option for the aeration of the off-stream storage, Kyogle Council engaged a consultant to prepare an options report. A solar-powered mixer destratification method was identified as the best option. After a tender process, two solar-powered mixers were installed in July 2016.

Council will maintain the two solar mixers to ensure that algae levels are kept under control. Each unit is fitted with a run indicator light which assists Council in determining if the mixer is operating. Routine maintenance of the solar panels and batteries has become part of the works program.

Outcomes

Using renewable energy meant that the mixers did not need to be connected to the electricity grid. This reduces carbon emissions and ensures running costs are kept low. The destratification system also reduces the need for chemical dosing to meet water quality standards. Regular water sampling and reporting occurs to evaluate the system's performance.

During the commissioning phase, the dam water level was low and water quality results showed high algal levels. However, once the water reached levels where the solar mixers could turn over the water column, algal levels decreased. In the first 9 months of operation since commissioning, no algal blooms have been detected despite their presence in a nearby 87ML storage dam. Ongoing monitoring of water levels and water quality will be required. The system is now operating as designed and is providing a more secure 200ML water supply for the community.

The construction of the off-stream storage to augment the town water supply has reduced the reliance on the Kyogle weir on the Richmond River. As a result, Council has been able to lower the weir and install a fish ladder opening up over 300km of waterways in the upper Richmond sub-catchments as habitat for all aquatic species.

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