

# EFFICACY OF A NITRATE-N WOODCHIP FILTER: THREE YEARS OF FIELD TRIALS

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Nutrient enrichment is a major contributor to water quality impairment internationally. The New Zealand response to water quality problems includes the National Objectives Framework (NOF), and the National Policy Statement for Freshwater Management (NPS-FM, 2014 and 2017), which describe water quality targets and resource management actions. These targets include nitrate-N concentrations and loads.

Achieving catchment water quality targets may require change in land use, land management practices and implementation of various mitigation tools. One device with potential to decrease the load of nitrate-N entering surface waters is the wood chip filter.

We describe the performance of a wood chip filter deployed in the Waituna Lagoon catchment, Southland, over the period 2016-2018. The annual performance was reasonably consistent over the assessment period (greater than 60% removal). There was marked seasonal variation in removal efficacy. Removal was lowest in the winter (approximately 60%), related principally to residence time in the filter bed, and temperature. Removal efficacy in summer and spring exceeded 90%. Month-to-month removal rates were principally related to inflow rates, which directly affected bed residence times.

The filter bed was always a net source of ammoniacal-N, but the flux of ammoniacal-N was small and unlikely to impact adversely on receiving water quality. Several strategies for optimising performance are identified, including hydraulic buffering and bypassing excess flows during winter. Several challenges to performance assessment are identified, as well as a very simple, cost-effective and practical strategy whereby estimation of removal efficiency may be improved.

**Editor's Note:** An extended manuscript has not been submitted for this presentation.