

# Floating Wetlands - Fact Sheet

Linking lake restoration with end users for positive environmental outcomes

## Treatment wetlands for managing water quality

Lakes and rivers are under increasing pressure from sediment and nutrient loads associated with intensification of agriculture in New Zealand. Eutrophication and toxic algal blooms (Figure 1) are a common problem in shallow Waikato peat lakes within intensive agricultural



Figure 1 – Lake Kaituna

Streams and drains running through intensively farmed systems have high suspended sediment and nutrient concentrations compared with low-intensity agriculture and forested catchments (Figure 2; Graph 1).



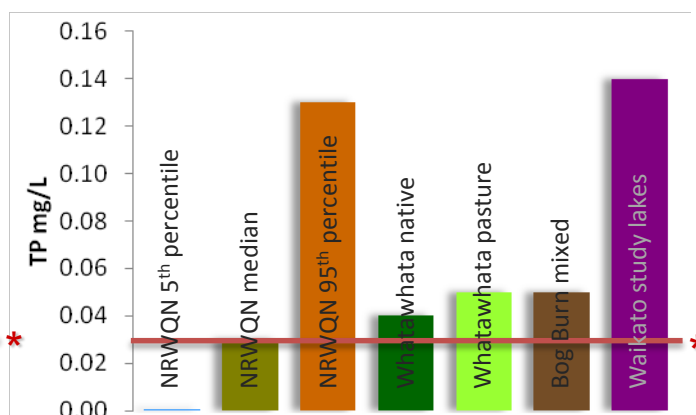
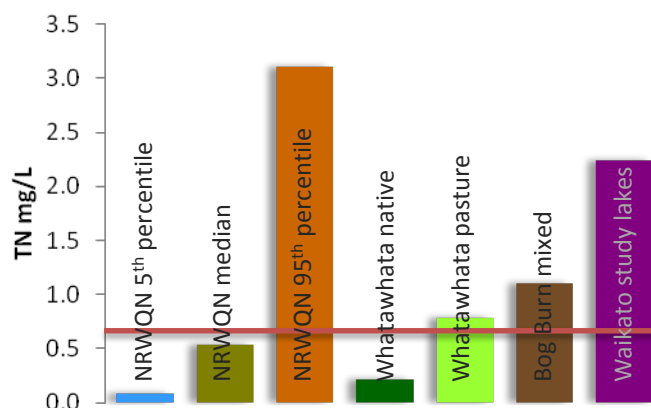
Figure 2 – Drain inflow to lake

Wetlands are often referred to as the “kidneys of the landscape”, filtering water as it moves down the catchment, physically removing particles of sediment and attenuating nutrients through plant uptake and bacterial processes such as denitrification. In New Zealand the use of constructed wetlands to mitigate direct effects of inflows of nitrogen (N), phosphorus (P) and suspended solids has become more widespread, particularly within agricultural regions.



To support peat lake restoration in the Waikato, end-of-drain treatment systems including constructed wetlands, sediment traps, and floating wetlands have been implemented as management tools to reduce sediment and nutrient inputs to downstream lakes (Figure 3 and 4). Research is currently being carried out to test their efficacy.

» Graph 1 – Comparison of total nitrogen (TN) and total phosphorus (TP) concentrations across different land uses with Waikato study lakes and the National Rivers Water Quality Network (NRWQN) for 2003-2007. Red lines indicate ANZECC guidelines.



## Floating wetlands & sediment traps in Lake Kaituna

Lake Kaituna in Horsham Downs, Waikato, is a shallow peat lake surrounded by intensive agricultural land use. In 1981 the lake was 4 m deep, however by 1995 the depth had decreased only about 1 m due to high loads of sediment from influent streams and drains carrying runoff from surrounding dairy farms.

Construction of sediment traps began in 2000 on all influent waterways as a management tool to collect sediment and prevent further inputs to the lake. Monitoring from 2010 to 2012 has demonstrated the sediment traps are relatively effective at capturing coarse sediments with one trap retaining more than 200 cubic meters of sediment in 18 months. However, fine sediments and high nutrient concentrations were still reaching the lake.

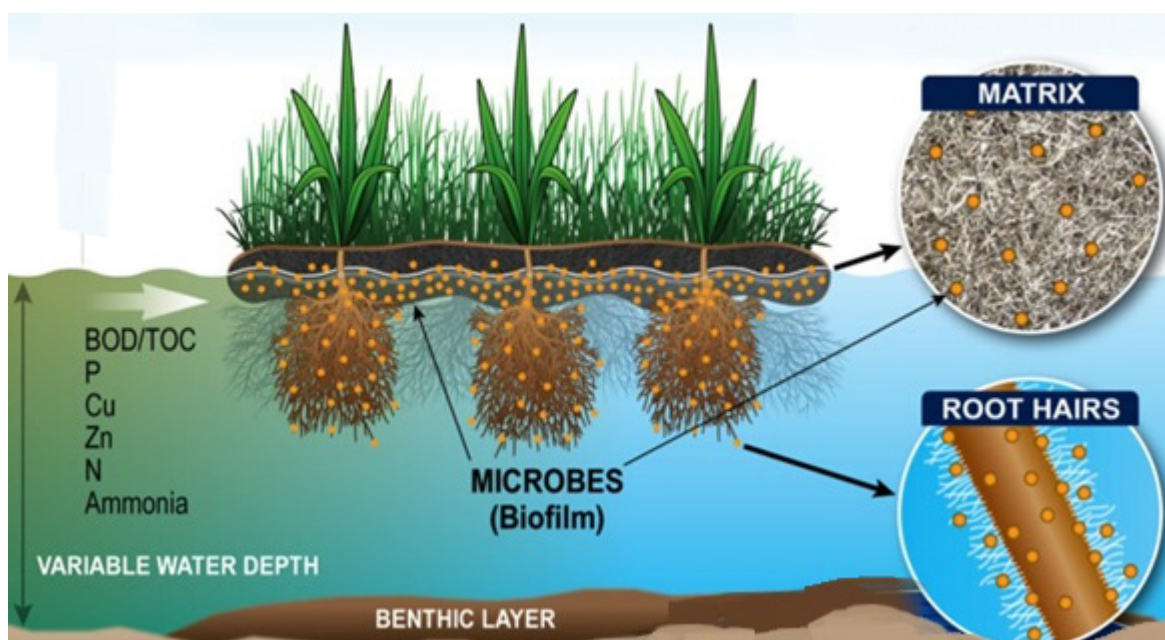
To reduce these nutrients and fine sediments floating wetlands have been installed in two sediment traps that discharge into Lake Kaituna (Figure 5).

Floating wetlands can remove pollutants from the water through direct uptake via their root systems, as well as through bacterial biofilms on root hairs and the matrix of the floating raft (Figure 6). Research is quantifying the effectiveness of these systems and the scope for broader applications to water bodies facing similar threats to water quality, ecosystem health and biodiversity.

Figure 5 – Floating wetland, Lake Kaituna



» Figure 6 – Schematic diagram of floating treatment wetland



» Source <http://www.floatingislandinternational.com/>