Waste Stabilisation Ponds

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Waste stabilisation ponds (WSPs) are the most common wastewater treatment system in New Zealand. Pond systems for treating wastewater have existed for centuries with use of the first constructed WSPs beginning in the 1920s. New Zealand has a considerable investment on WSPs, which make up over 60 % of wastewater treatment plants (WWTPs) – most are located in small- and medium- sized communities.

In the Rangitikei District Council (RDC) WSPs make up over 90 % of WWTPs.

However, wastewater treatment is coming under increasing scrutiny and pressure to improve as concerns are raised about the risks that microbial pathogens (bacteria, protozoa, viruses) in wastewater pose to aquaculture, tourism, mahinga kai and recreational water, if they are not adequately removed. Also critical nutrients frequently observed at elevated levels within the effluent of municipal sewage include nitrogen and phosphorus contributing to poor water quality of the receiving water.

Impacts of eutrophication (highly nitrified water) can include toxicity to humans and animals via ingestion, dramatic and unsightly algal growth; oxygen deficiencies that vitiate support of aquatic life, and odours generated from decaying organic matter.
Coupled with the need for better disinfection and nutrient attenuation is the requirement for technologies to be sustainable.

Although considered old hat, WSPs still have much to offer in terms of modern day thinking about wastewater removal. For example, WSPs are cheap to build and simple to operate, they use little or no energy in their operation so they could be considered environmentally sustainable compared with other wastewater technologies, they provide havens for birdlife, and they produce low volumes of bio solids (sludge) that require disposal.

Two possible solutions to the eutrophication of lakes, rivers, streams etc. are:

(1) prevention through a radical change in lifestyles; and

(2) water/wastewater treatment to remove existing contaminants, including microbial pathogens and excess nutrients.

Radical lifestyle changes are a worthy pursuit; however, the scope and significance necessary to reverse the damage would make it a challenging option. Treatment, as an alternative in many forms, is more within our reach.

Most industrialized countries currently rely heavily upon mechanical treatment to improve the quality of the water emitted from their wastewater facilities. While those techniques generate high-quality water, they can be expensive to maintain and they require costly upgrades when populations expand.

An alternative to the mechanical treatment of wastewater is the implementation of floating treatment wetlands (FTWs). Instead of investing in higher technology treatment, WSPs can save hundreds of thousands of dollars in capital and operational costs, minimising the

burden on ratepayers; and ensuring that WSPs remain a fundamental part of RDC wastewater infrastructure.
FTWs offer a unique ability with a zero land space approach with high treatment and bio-sequestering abilities. Strategically placed islands or clusters of islands will sequester nutrients and remove suspended solids by providing the ideal habitat and huge surface area for the base of the food chain. Bio films and microbial activity that supports water life and all associated water quality begins on the root zones and amongst the matrix itself. These extremely important microbes convert nutrients and what is regarded as pollutants, to an available food source for plants and invertebrates.

FTWs are unique in their properties of being able to support aerobic and anaerobic zones in the same surrounding area. These zones are essential for the de-nitrifying and nitrifying of wastewater.

Attenuation of nutrients and the removal of total suspended solids using Floating Treatment Wetlands technology have been well studied and documented by the National Institute of Water & Atmospheric Research.