

Sustainable infrastructure: wastewater treatment



Indicator 9.3 Percentage of nitrogen and phosphorus removed at Wastewater Treatment Plant and by land treatment **GETTING BETTER**

Purpose of indicator

Discharging nutrients into our lakes affects lake water quality. Nitrogen and phosphorus can have a significant effect on the trophic level index of the lakes.

Wastewater is treated at the wastewater treatment plant (WWTP) and sprayed on to the Whakarewarewa Forest. It then seeps through the soil, leaving behind its nutrients before it enters the Waipa stream and Lake Rotorua.

Current information and trend

Nutrient removal from wastewater

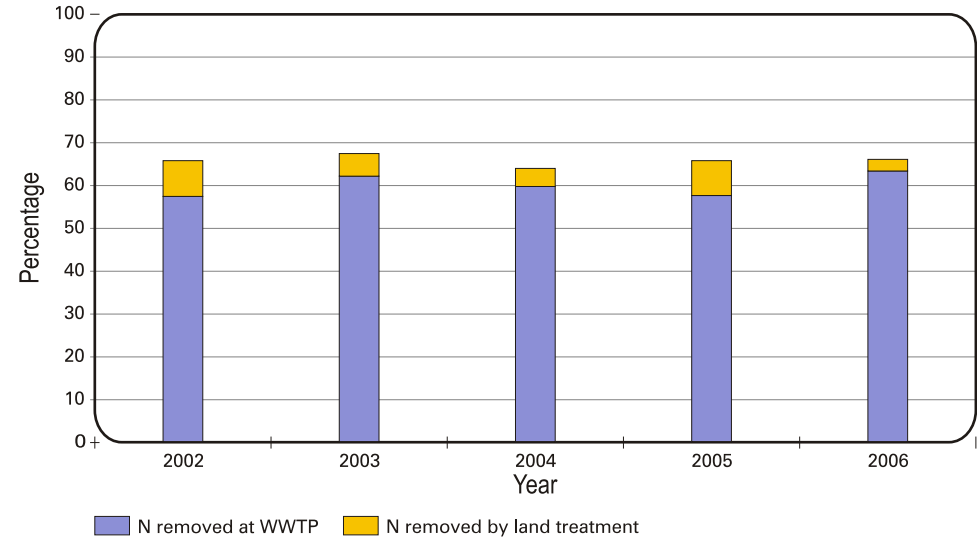
The wastewater treatment plant currently services approximately 57,000 people. Figure 9.4 shows that the waste water treatment plant is highly effective at removing nitrogen and the land treatment system is highly effective at removing phosphorus. These two processes combined result in a higher nutrient removal from wastewater.



In 2005 the treatment plant was upgraded for better nutrient removal. In 2006 the WWTP process removed 86% of nitrogen and 61% of phosphorus from wastewater received. A further 4% of nitrogen and 39% of phosphorus was removed through the land treatment system (Figures 9.4 and 9.5). This means that a total of 90% of nitrogen and 99% of phosphorus was removed from our wastewater before it reached Lake Rotorua.

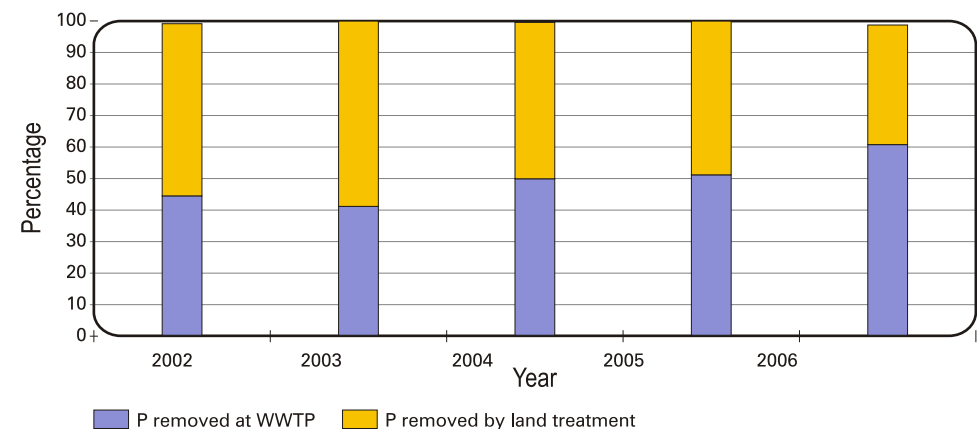
The sewage reticulation scheme for lakeside communities means there will be a greater load of wastewater to the WWTP in the future. Engineering and upgrades to the WWTP have taken place to ensure that an increased load can be treated.

Figure 9.4 Percentage of nitrogen removed at wastewater treatment plant and by land treatment



Source: Rotorua District Council, 2006

Figure 9.5 Percentage of phosphorus removed from wastewater



Source: Rotorua District Council, 2006



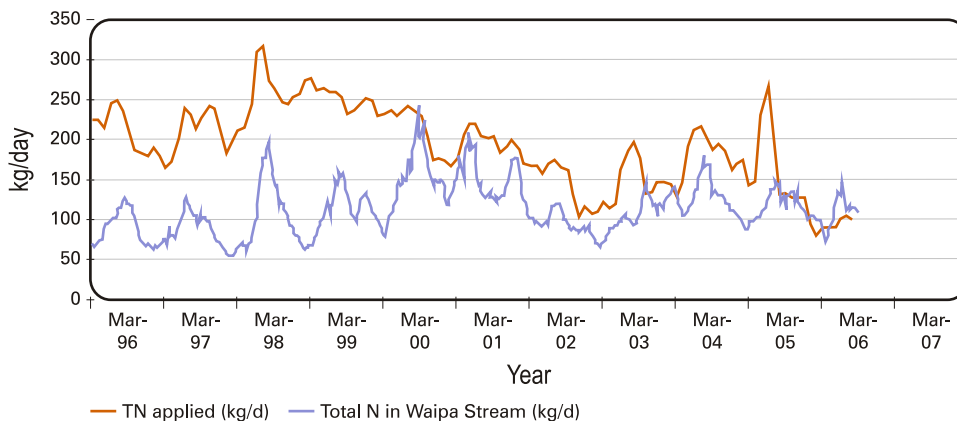
Nitrogen and phosphorus entering Lake Rotorua

The total nitrogen or phosphorus sprayed on the forest is the amount of nutrients in the final effluent. Final effluent is the liquid end product of the WWTP processes. The water, or final effluent, after being sprayed into the forest then travels through the soil and flows into the Waipa Stream. Water samples are taken from the Waipa Stream and tested for nutrient levels. The difference in the amount of nutrients found in the final effluent, versus the amount found in the Waipa Stream, is the amount removed by land treatment. The amount of nutrients removed and the patterns that emerge in Figures 9.6 and 9.7 can be influenced by many variables, such as rainfall, felling, irrigation patterns, and lag time as the water moves through the soil at different speeds.

The amount of sewage derived nitrogen and phosphorus entering Lake Rotorua is steady at around 32 tonnes of nitrogen and less than one tonne of phosphorus per year (Figure 9.6 and 9.7).

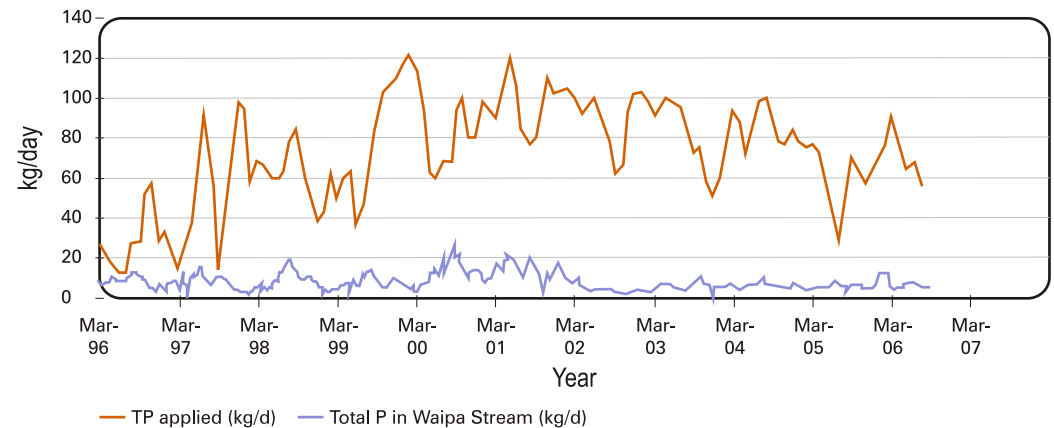
The figures show the land treatment method is highly effective at removing phosphorus. Nitrogen removal seems to be decreasing slowly. This may be due to a

Figure 9.6 Total-N sprayed on forest and found in Waipa Stream



Source: Rotorua District Council, 2006

Figure 9.7 Total-P sprayed on forest and found in Waipa Stream



Source: Rotorua District Council, 2006

number of factors, some of which may be:

- The soil may have almost reached saturation point (because it can only hold a certain amount of nitrogen).
- The water may not be diffusing through the soil but rather tracking underground through preferential pathways.
- Because of changing irrigation patterns or short periods of high rainfall, nitrogen may be held for a short period and then flushed through quickly.

Measures are being taken to address the nitrogen issue, and over the past five years a consistently high proportion of nutrients were removed before the water reached the lake.

What the community said

Ninety nine percent of Rotorua residents were satisfied with the sewerage treatment and disposal system.



MAKING A DIFFERENCE WHAT YOU CAN DO TO HELP YOUR ENVIRONMENT



ACTIONS YOU CAN TAKE



Drinking water

In 15 minutes

- ✓ Only water your lawn when necessary and preferably at the end of the day when it is cooler so the water will not evaporate. Wash your car on the lawn.
- ✓ Take a shower rather than a bath and shorten shower times.
- ✓ Fix leaks in hoses and taps.



In 1 hour plus

- ✓ Install water efficient taps and shower heads.
- ✓ When purchasing washing machines and dishwashers choose items with higher water and energy efficiency.



Wastewater

In 15 minutes

- ✓ Be aware of the amount of water your household uses and try to keep this to a minimum.
- ✓ Never pour chemicals down the drain.
- ✓ Avoid disposing of cooking oils/ fats down the drain.

WEBSITES FOR MORE INFORMATION AND IDEAS

Wastewater Issues and Government Policies

Ministry for the Environment
www.mfe.govt.nz

Information about wastewater services

Rotorua District Council
www.rdc.govt.nz

Saving water

Smarter Homes
www.smarterhomes.org.nz

Sustainable Living
www.sustainablehouseholds.org.nz