

Lake Horowhenua water quality improvement project

A three-year project, based in the Horizons Region, to reduce sediment and nutrient loss from horticultural farms into the Arawhata Stream and Lake Horowhenua is now nearing its final stages.

The initiative is one of eight projects under the Lake Horowhenua Fresh Water Clean-up Fund programme and has been a collaborative effort by LandWISE, Horizons Regional Council, the Taranaki Vegetable Growers' Association and local farmers with support from the Ministry for the Environment. The purpose was to create integrated drainage and sediment control plans for up to 500 hectares of cropping farms.

"There were real issues in the Arawhata Stream catchment during severe storm events with ponding and the loss of cropping farm soil into drains, and eventually to Lake Horowhenua," says project manager Dan Bloomer of LandWISE.

"The drainage system was not built to contain water run-off, and instead was a legacy of an historic stock drinking water race system."

The first step in the project was to map all of the farms within the area and identify where water was going to pond and where flows would be in heavy rain. Then solutions could be identified. In some cases crops were planted across, rather than down slopes which led to erosion in heavy rain. The solution was planting rows down the slopes, resulting in less ponding and sediment loss.

On some properties soil build up was also occurring at the end of each row, again leading to ponding and loss of crops and soil. Lowering headlands to allow furrows to drain, and planting grasses to keep sediment from drains, eased this considerably.

Precision surveying with GPS tractors has made a considerable difference. Growers can map their properties and use computer models to determine ponding areas, flow paths and depths. Software creates cut and fill plans, which are fed back to the tractor guidance system to control blade depth on the ground-shaping equipment, leading to effective drainage with minimum soil movement.

"Dan and his team listened to property



Wide grassed-headland and grass-protected drain (right) at McLeavy's Road.

owners and investigated the issues to come up with some relatively simple but incredibly effective solutions," says Horizons group manager natural resources and partnerships Dr Roygard.

"Property owners are already seeing positive results on their farms from a production perspective and the works are also contributing to broader restoration efforts for Lake Horowhenua as part of the Lake Horowhenua Accord."

The project has seen individual farm plans for each property created and the uptake from farmers has been incredibly positive.

"Over the past few years we have built a really strong relationship with farmers and are working together to solve these issues," says Dan.

"In some cases farmers aren't even waiting for our formal reports, they are getting on and putting together the solutions themselves, with great results."

Local grower John Clarke agrees.

"We have installed additional drainage, converted some areas of the property to grass and adjusted the design of crop rows with very good outcomes. We have experienced reduced crop loss from water ponding, less soil erosion and better yields."

Horizons also surveyed the drainage system within the catchment area, measuring culverts and channel dimensions. Staff met with farmers to discuss the issues, enhanced drainage was designed and the system is being progressively rebuilt. Farmers are also upgrading their own drains to improve flow.

The integrated stormwater management plan complements other activities carried out to improve the health of Lake Horowhenua. These include the building of a sediment trap where the Arawhata Stream enters the lake, the establishment of a full native planting buffer strip around the lake and harvesting lake-weed to improve water quality.



Before (top) and after (below) images of a riparian planting site.

Why riparian planting?

In recent years the planting of riparian margins has become increasingly popular and is now a common feature of many of the Region's streams compared to ten years ago.

In addition to the aesthetic enhancement, riparian zones have many benefits for waterways. Many of the Region's lowland waterways suffering from excessive submerged or emergent aquatic weed (macrophyte) growth can be reduced by the planting of riparian buffers. Macrophytes can completely smother the waterway that they grow in, resulting in the trapping of sediment and fluctuating dissolved oxygen concentrations, making waterways less-friendly for fish and insects. Widespread growth can also create an impression that the waterway is shallow and easy to cross, creating a risk for animals and people.

Like all plants, macrophytes require sunlight to be able to grow. Shading decreases the amount of sunlight that reaches the waterway, reducing macrophyte levels. While macrophytes can be problematic, some growth is important as it provides a food source for macroinvertebrates and for habitat for aquatic species.

The ability to be able to get complete shading of a stream depends on its size and

generally for complete shading it needs to be less than three metres wide. However, partial riparian vegetation hanging over the water is just as beneficial; as it helps by preventing stock access which reduces pugging and erosion on the banks, reducing algal growth, and lowering water temperatures. Elevated stream temperatures make habitat unsuitable for aquatic life. For every kilometre of riparian planting (and shading) there is potentially a one degree drop in temperature with more significant decreases being seen in smaller streams.

Riparian vegetation also provides habitat for native invertebrates which then become a food source for some freshwater fish such as banded kokopu, which can derive up to 80 percent of their food source from invertebrates that fall onto the water's surface.

The riparian margins also have the potential to provide a food source for birds and bees if the right species are planted.

If you are in the Horizons Region and have a freshwater project in mind that may involve riparian fencing or planting get in touch with one of the freshwater team at freshwater@horizons.govt.nz to see what subsidies and/or advice is available.

LAWA – an environmental data one-stop shop

Have you heard of LAWA? It's a one-stop shop for each Region's scientific environmental data provided by the regional sector located at www.lawa.org.nz.

Land Air Water Aotearoa (LAWA) is a website that was initially developed to showcase the water quality data that regional and unitary authorities collected. It has since evolved into a user-friendly way of allowing individuals and communities to find out what the water quality is like in their local lake, river or beach. The website has continued to improve with weekly updates now available on indicator bacteria E. coli throughout the summer months for popular swimming spots, water availability in groundwater and surface water zones, not to mention air quality information.

Search for your local stream or river to see if it has a monitoring site. Each site displays

a state and trend for a range of water quality parameters including bacteria, water clarity, nitrogen and phosphorus. The state of a site shows how your local stream compares to similar sites around the country, while trends look at whether the site has improved or declined over the last 5–10 years. Some sites also feature an ecology dashboard that displays three parameters used to describe the ecological health of a river.

Horizons Regional Council's LAWA data currently features 92 sites for water quality, 73 ecology, 79 summer swim spots, six lake, seven coastal, 192 groundwater level, 41 surface water availability, and two air pollution moni-

toring sites. As more data becomes available, more sites will be added.

Councils are continuously collecting environmental data, LAWA uses this information in its real time data feeds. Water quality state and trends are updated annually, that all councils contribute to. Each prepares and checks their data for Horizons to then collate and undertake the national analysis. The 2017 update is due to go live on September 15.





Water metering

As the summer irrigation season approaches, Horizons' technical field team are packing their gear to hit the road.

Each year the team visits as many of the telemetered water metering sites as possible to inspect the telemetry equipment, and ensure the telemetry is accurately returning the water use data as read by the water meter on site. Priority is given to sites where there is a known data issue, or where the power supply has been interrupted over the winter, which can affect the accuracy of the reporting.

Horizons now collects real-time water use data from over 300 consents and provides that data back to users, alongside individual consent limits and flow restriction information, via the WaterMatters webpage (www.horizons.govt.nz/managing-natural-resources/water/water-matters). The website allows consent holders to monitor their own water use against their consented daily volumes and ensure they are compliant with flow restrictions as river flows decrease over summer. Telemetry installation also removes the need for daily water meter reading and manual return of the records to Horizons, increasing accuracy of data and decreasing effort for both the consent holder and environmental monitoring staff.

Currently, the telemetry equipment is provided, installed and maintained free of charge by Horizons who retains the ownership.

The water use data is used to monitor overall compliance with consented limits, and

to inform water resource management decision making. The telemetered data can also be fed into on-farm systems to plan and manage irrigation scheduling, alongside soil moisture information collected on site.

Water meter installation is a standard condition for all water take consents granted in the Manawatu-Whanganui Region, and in accordance with National Regulation on water use measurement, the return of water use data is standard for all consents that take at 5 litres per second or more. This is also standard where the allocation in a water management zone is close to, or at, the limit of available allocation.

If you have a water metering system there are some simple things you can do to make sure you get the best out of it this season:

- Read your resource consent to ensure you're familiar with your obligations and limits;
- Inspect your pipe work for any obvious damage or leaks;
- Check your water meter is working – get professional help from an IrrigationNZ 'Blue Tick' accredited installer if it needs attention;
- Get in touch with Horizons on 0508 800 800 if you need help with telemetry faults, or have any questions about your consent;
- Register to access your data on the WaterMatters website (visit the My Meter page).

IN BRIEF

IRRIGATION OPERATING AND MANAGER TRAINING

Horizons is partnering with IrrigationNZ to provide a one-day Irrigation Operating and Manager Training course for our consent holders. This course will provide information on irrigation regulations and how it affects your business, best practice advice on scheduling irrigation applications and information regarding operation and maintenance, and performance assessment. Places are limited to 24 participants, so please get in touch to register your interest with waterinfo@horizons.govt.nz. More information will be available once numbers are confirmed.

WATER QUALITY MONITORING PROGRAMME

From November, the extended recreational water quality monitoring programme will be underway for another swimming season. Last summer was the first time Horizons ran the extended programme, upping the number of sites monitored from 17 to over 80. This increase resulted in positive community feedback, and was coupled with Horizons' first ever Summer Swim Spot campaign. Keep an eye on Horizons' Swim Spot Map online for updates and swimmability indicators as the data is updated weekly.

CATCHMENT SUMMARIES

Horizons' science team is currently preparing a series of detailed catchment summaries, which will be aimed at consent holders and applicants, to provide information on the current state of water quality. The aim is to provide some context around water quality state and trends to assist with their resource consent applications, particularly those applications that may affect water quality in some way. It compares Horizons' water quality monitoring data against One Plan targets and standards outlined in the National Objectives Framework. The first to be released and available online will be for the Upper Manawatu Catchment, with others to follow.

Nutrient trends

Ask anyone about the Manawatū River and you're likely to raise some strong opinions about its water quality.

Encompassing nine sub-catchments in the Horizons Region, the river is an integral aspect of Manawatū life, valued for its natural beauty, water supply, recreation, and biodiversity. More recently – particularly for lobby groups and political parties – the river has become a symbol for water challenges nationally. While it is true that a history of human activity in and around the river has brought about degraded water quality, considering the wider context for the region's work on remediation shows how far we have already come. In the case of the Manawatū, this has been shown through the commitment of a wide range of stakeholders to the Manawatū River Leaders' Accord which has committed over \$46 million worth of work to restore the river and has resulted in accelerated efforts to continue the restoration of the catchment.

Challenges we face today are different from those of the past. Reports from the 1950s describe conditions in the Manawatū River that would now be unacceptable to many people. These conditions include untreated wastewater and freezing works discharges, along with visible sewage scum and animal fat. In the 1970s, untreated dairy shed discharges resulted in one Eketahuna waterway being

locally known as 'Black Creek'. The water quality at the time, was on some occasions, at a level that resulted in fish dying due to lack of oxygen in the Mangatainoka, Tokomaru and Manawatū rivers.

As awareness about the importance of water quality grew, action was taken to reduce the effects and limit further degradation. Around 330 discharges of dairy farm effluent to water ceased, and secondary wastewater treatment processes were introduced, directly tackling the point-source avenues for pollution in the catchment. In recent years, efforts have been also been directed to addressing diffuse discharges, remediation, and the development of more sustainable limits as a means to improve water quality throughout the region.

Horizons is continuing to work with communities, farmers and industry to improve water quality, with projects reducing the nutrient footprint of rural land-uses through lining of effluent ponds, installation of stock crossings, and through the use of nutrient management plans. We also have our Sustainable Land Use Initiative (SLUI), where Horizons staff work with local farmers to retire farmland and plant trees to reduce sediment erosion. The SLUI programme

alone, is on track to reduce sediment loads across the catchment by around 30 percent by 2043. Meanwhile, urban pollution is being addressed through tightened consent conditions and wastewater treatment plant upgrades. Our expanded water quality monitoring network now includes over 80 summer swim spots, 61 algae sites and 82 macroinvertebrate sites across the region. The Manawatū River Leaders' Accord has also sparked action throughout the catchment from farmers, industry, community groups, iwi and more.

Overall, our monitoring shows there has been a significant and meaningful improvement in some water quality parameters. Over the ten-year period from 2006–2015, 16 sites across the Manawatū catchment were monitored with 75 percent of them showing improvements in nitrogen levels, 37 percent showed improvements in turbidity, 31 percent improved in bacteria levels and half resulted in significant and meaningful improvements in phosphorus levels. While it takes some time for remedial works to be reflected in scientific data, the trends in action and attitude will continue to bring better water quality for the benefit of our future generations.



Community group volunteers help with native planting at Whirokino.