

Waterways under constant surveillance

Keeping tabs on river levels and flows in the region is a 24/7 operation for Greater Wellington Regional Council.

Trout numbers may be aplenty, but that's not why Braden Crocker is dressed in chest waders shuffling sideways across the Ruamāhanga River. Instead of fishing rod in hand, he's carrying an 'acoustic doppler velocity meter', the same technology used on submarines to determine how fast they are travelling.

For Braden, it is not his speed that has got him interested, rather that of the river and he will take up to 20 readings at various points as he crosses to the other side. It is a process Braden, and fellow environmental monitoring officer Matt Rowland, perform on a regular basis at around 30 sites in rivers and streams throughout the Wairarapa.

'Flow gauging' can measure from a trickle in a ditch to a major flood, although when the latter ensues, a different technique is employed.

An 'external staff gauge' – the big yellow ruler extending vertically from the river's edge – provide a useful visual of the river level. In addition, sites have automatic recording devices that typically record river levels every five to fifteen minutes. Data is stored on loggers in 'stilling well towers' at the site, and are also sent back to the Greater Wellington Regional Council (GWRC) database via telemetry to allow for real time monitoring and display on the Council website.

The gauged flow and the water level at the time of the flow gauging are used to build up a flow-rating relationship that is used to convert the continuously measured river water levels into flow values. The flow-rating relationships at each site change often due to events such as a flood which might alter the river bed level, therefore gaugings are undertaken regularly to ensure the correct flows are being calculated from the recorded water levels.

Rainfall and river levels have been monitored for many years in the Wellington Region. Some of the earliest rainfall records date back to 1878 at the Karori Reservoir site and 1890 at the Wainuiomata Reservoir site.

The Wardells Bridge monitoring station has been operating since 1954 and is one of



Braden Crocker taking flow readings on the Ruamāhanga River at Wardells Bridge.

the oldest in Wairarapa. Interestingly, records show that over that time the mean annual river level at Wardells has stayed about the same, although data recording in the earlier years would not have been as precise as it is today, according to Matt.

River level sites were originally installed for a number of reasons including flood warning, public water supply and water resource monitoring. Most river sites have flood alarm levels that are automatically triggered if a river level rises above a certain threshold. Alarms are received by flood warning staff and a flood event will be monitored at any time of the day with warnings to relevant authorities and landowners issued if dangerous flood levels are predicted.

River flow and level data is fundamental to GWRC making decisions around water allocation, river engineering, and policy, which includes water takes both directly from the river, lakes and also groundwater, (often connected to the river). Over 200 water take consent holders rely on accurate data for daily updates on whether water restrictions will be imposed.

As management of the river has changed over the years, from initially a flood prevention approach to now an emphasis on environmental science, so too has the scope of monitoring.



Matt Rowland outside the Wardells Bridge monitoring stilling well tower.



Theo and Elsa Van der Put have been growing freesias on their Greytown property for 12 years.

Flowers win over sharemilker

No matter what size your piece of rural dirt, without water it is pretty useless.

The 16 hectares that Theo Van der Put owns just north of Greytown, has reliable water from a bore. Primarily a commercial flower grower, his water use is relatively modest, but that doesn't diminish the importance of his consent to take water.

"Security of water is everything for farmers, because you never know what you might be doing in the future," says the former Dutch national.

He is a case in point, having made the switch from milking cows to cutting flowers.

A sharemilker at Kahutara for several years, Theo says while he enjoyed milking cows, he wanted out of being locked into the two-times a day, seven days a week grind.

"I have always loved flowers, so I thought I would give this a go."

Twelve years later, he and wife Elsa, have built up a successful business growing freesias and gladioli.

Much of the farm is leased to a crop grower, who is grateful for the use of Theo's water.

In the early years, Theo grew calla lilies, initially exporting the bulbs, then for the

flowers. But now his business is strictly freesias and gladioli.

The freesias are grown undercover in a 3,200 square metre greenhouse where he can manipulate soil temperatures. The gladioli are grown outside.

Freesias turn the best net profit because each bulb produces three to four stems, the gladioli only one. The advantage of the gladioli is that, grown outside, Theo can easily expand his operation, and he has both the land and guaranteed water to do so.

The huge greenhouse was a significant investment, Theo says, and brought with it a lot of risk. He has had to rely on his own smarts to learn his trade, although a hotline back to Holland has proved invaluable.

"I am on the phone to Holland all of the time... people back home have been very good to me."

All of the flowers are grown for the wholesale domestic market. From March to November a courier van picks up between 500 and 600 fresh bunches of flowers three days a week, the bulk of which ends up in Auckland.

A bunch of freesias consists of ten stems, gladioli five stems. It equates to around 80,000

"Security of water is everything for farmers, because you never know what you might be doing in the future."

bunches of freesias, and 12,000 bunches of gladioli per year.

The process from planting to flowering takes around four months. Freesias only flower at a certain temperature range, so to extend the season across nine months Theo has a clever cooling system in the greenhouse consisting of an intricate web of alkanene pipes running under every flower bed.

When finished flowering, the plants get dug up and stored in the drying room to allow all of the goodness in the leaves to be absorbed back into the bulbs. Once dried, the leaves are stripped off and the bulbs stored for about 20 weeks at a controlled temperature ready for the next season.

The whole operation employs two full-time labour units, plus his wife who works part-time in between school teaching. He also hires casual labour at certain times of the season.



Securing a sustainable future

Hill country farmers benefit from irrigated valley

At the mercy of the weather, hill country farmers could be well served by an irrigated Ruamāhanga Valley.

In a typical dry Wairarapa summer, many hill country farmers are forced to send their stock elsewhere as their own feed supplies run out.

Lambs leaving the Wairarapa are trucked all over the country, as far away as Southland and Canterbury. Sold as “store” lambs, they are fattened up on farms where feed is abundant, and then passed on as “prime” lambs to the meat works.

Annually, upwards of 850,000 lambs leave the region prematurely each summer.

Farm consultants, BakerAg, estimate that between \$10 million and \$17 million a year is lost to the region from store lambs leaving the district.

The proposed water storage and distribution scheme would help keep a large proportion of this money in the Wairarapa, according to BakerAg.

Limitations to reliable water mean that

there are very few finishing farms in the Ruamāhanga Valley, and those that are operating take on significant risk when buying store lambs from their hill country counterparts.

Irrigation would provide much needed security and also broaden the options for land use such as growing cash crops and specialists seed crops.

Agribusiness consultant Richmond Beetham says, being able to guarantee feed crops for livestock will give finishing farms the confidence to trade stock over the summer.

Reliable water also means autumn lamb trading can be done with confidence as new grasses establish quicker following crops, he says.

It is also a better outcome for hill country farmers, enabling them to develop good relationships with local finishers.

Long dry spells have become the norm on the east coast of the North Island, and are expected to become more severe as the impacts of climate change take hold.

Low rainfall, high temperatures and wind are the curse of hill country farms, as paddocks quickly die-off and feed crops fail.

Wairarapa farmers are experts at operating in these conditions, however from their experience no amount of grass or crop innovation is going to make any difference without water.

When the elements do conspire against them, prices can plummet as store lambs flood the sale yards. The situation is

compounded when other parts of the country go dry and farmers can no longer hold on to their lambs.

The Water Wairarapa scheme could be the catalyst to open up the store lamb market and help avoid a surplus of stock leaving the region and prices crashing, Mr Beetham says.

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www.waterwairarapa.co.nz

Water Wairarapa is led and funded by GWRC with assistance from Crown Irrigation Investments Ltd.

 **Water
Wairarapa**

Securing a sustainable future

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Treating water as a finite resource

In the same way fire can devastate a forest, so to frost a vineyard. And just like a bush blaze, one of the best defences against frost is, water – loads of it.

Craggy Range's Te Muna Road Vineyard, east of Martinborough, takes no chances when frost fighting. With over 93 hectares planted in grapes producing on average 850 tonne a year, frost management is critical.

It brings into focus the importance of water, something that vineyard manager John Annis is acutely aware of.

The reality is, in the wine making business, no matter how suitable your soils and climate are for producing top quality grapes, if reliable water is not available it is game over.

When the thermometer drops below zero during spring, John cranks up four turbo-cat diesel water pumps capable of pumping 1000 litres of water per second. It is a considerable amount of water, all the more reason then to have significant water storage capacity.

Te Muna Road Vineyard, the biggest stand-alone vineyard site in Wairarapa, was developed in 2000. Frost fighting was front of mind and was the main driver behind building the 144 million litre capacity storage dam.

As a frost protector, the sprinkled water works by freezing a protective layer around the buds and leaves (at 0°C). As water freezes, it releases latent heat which stops further freezing. As long as the action of freezing continues and the water is coming around in the time frame required, there will be minimal damage. Water application is required until melting starts.

"If the system is working properly, and you have got good rotational speed, you can handle quite a reasonable frost," John says.

Although the frequency of frosts is not as high as what it once was, having the ability to act quickly and with maximum impact make the dam a critical asset at Te Muna Road.

With the high water use period predominantly around September to early November there is plenty

of water in the adjacent Huangarua River to replenish supply. In addition to the river supplying the dam, there are also two "small bores" on the property which can draw water 12 months of the year.

Recognising that water is a finite resource is important, and considerable amount of thought and technology goes into managing its use.

"Relatively speaking, vineyards don't use high volumes of water, but what we do use we manage carefully."

Soil moisture probes provide good information around the required level of application. At a wider industry level there is a lot of work being done on 'pressure bombs' to measure more accurately water availability in the plant and this technology has been utilised at key times in the season to refine water applications.

"Not only is water finite, it is also an expense, so you want to make sure that you are putting it into the right areas at the right times."

During summer, irrigation is drip fed and generally done at night to reduce the level of evapotranspiration. This allows for better water holding capacity within the soil giving it

a chance to move down within the root zone. As fruit quality is the number one priority for John, water is applied sparingly during key periods in the season to minimise berry size and encourage flavour concentration and advanced ripeness.

The bores are used primarily to irrigate the vines. About eight weeks out from harvest they are shut off and water from the dam kicks in again.

"Shutting off the bores means that I'm not drawing water at a peak dry period, instead running the dam down and then refilling it during high flow times later in the year.

"It is a conscious thing that we have undertaken, but also I think a sensible management practice."

In addition to their own monitoring, Greater Wellington Regional Council (GWRC) also keeps an eye on water use at Te Muna Road. GWRC monitor both the flow in the river and also what is coming of the bores, ensuring that the vineyard is operating within its consent.

"Every time we start the pump the data is sent to the council via telemetry."



The storage dam is located in the middle of Craggy Range's Te Muna Road Vineyard, east of Martinborough.

