



Air, land and water in the Wellington region – state and trends

## Wairarapa Valley sub-region



This is a summary of the key findings from State of the Environment monitoring we carry out in the Wairarapa Valley. It is one of five sub-region summaries of eight technical reports which give the full picture of the health of the Wellington region's air, land and water resources. These reports are produced every five years.

The findings are being fed into the current review of Greater Wellington's regional plans – the 'rule books' for ensuring our region's natural resources are sustainably managed.

You can find out how to have a say in our regional plan review on the back page.

### Key features

The Wairarapa Valley is the agricultural powerhouse of the Wellington region, with dairying, drystock farming, orchards and vineyards playing a significant role in the area's economy. The sub-region covers 3,555km<sup>2</sup> (44% of the Wellington region) and includes the five main Wairarapa towns of Masterton, Carterton, Greytown, Featherston and Martinborough. The Ruamahanga River is a central feature – with its headwaters in the Tararua Range north of Mt Bruce, the river flows south and then southwest for 130km before emptying into Palliser Bay via Lake Onoke.

### What we routinely monitor in this sub-region

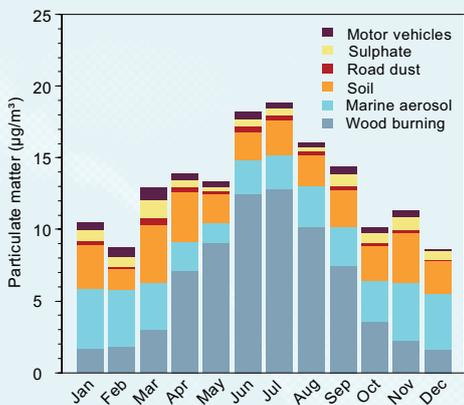
- Air quality in Masterton
- Soil quality and soil moisture at selected locations
- Rainfall at 18 locations
- River flows and/or water levels at 26 sites
- Groundwater levels at 77 sites (35 of these via automated level readers)
- Groundwater quality at 48 sites
- General water quality and ecological health at 20 river/stream sites
- Recreational water quality at selected locations on the Ruamahanga River and its tributaries
- Water quality in Lake Wairarapa and Lake Onoke

### Key points

- Air quality is very good overall except in urban areas on cold and calm winter nights when fine particles in smoke from household fires don't disperse
- Soil quality is generally good, but some dairy soils are compacted and contain too much nitrogen, while some soils in vegetable growing areas have low carbon and high phosphorus levels
- Demand for freshwater continues to grow. Most Wairarapa Valley rivers are fully allocated for water use and some deeper groundwater aquifers now show signs of pressure from water takes
- River and stream health is excellent in the ranges but poorer on the plains, especially in intensively farmed areas. Parts of the Waipoua and Ruamahanga rivers are sometimes unsuitable for swimming because of faecal contamination
- Lake Wairarapa is in a poor but stable condition



Surveying fish life in the Waipoua River



On a year round basis, natural sources such as sea salt and soils make up a significant proportion of the PM<sub>10</sub> in Masterton's air. But during winter, when around 80% of households burn wood or coal in fires, smaller-sized and potentially more harmful particulate matter known as PM<sub>2.5</sub> is released. This leads to higher levels of PM<sub>10</sub>, particularly on calm days when smoke doesn't disperse

### How clean is the air?

Most of the time the Wairarapa Valley has clean air but during cold, still winter nights, air pollution from household fires can be a problem – monitoring in Masterton (2008 to 2010), Carterton (2009) and Featherston (2009) shows elevated levels of fine particulate matter (PM<sub>10</sub>) during winter.

On average the national standard for PM<sub>10</sub> was exceeded twice per year in Masterton during 2006 to 2010 (although annual average PM<sub>10</sub> levels consistently met the national guideline and are decreasing). In contrast, carbon monoxide and nitrogen dioxide in Masterton are low and well within national standards.

### How good is the quality of the groundwater?

Looking across all the key indicators we measure, groundwater is largely fit for drinking, with no significant deterioration in quality in recent years. While that's good news for human users, 16 of the 48 wells we monitor have nitrate levels high enough to potentially affect aquatic life in nearby rivers and streams because of the connections between groundwater and surface waterways. This is particularly so in the intensively farmed Mangatarere and Parkvale stream catchments near Carterton where nitrate-enriched water in shallow aquifers discharges into the streams above.

### Are the soils healthy?

Of the more than 50 monitoring sites sampled in the Wairarapa Valley between 2000 and 2010, most had healthy soils, with the seven key soil quality indicators (including soil structure, nutrients, organic matter and pH) suitable for their respective land use. Only a handful of sites associated with dairying, drystock farming and vegetable growing had two or more indicators outside their target range.

Region-wide, vegetable growing and dairying are the land uses showing the greatest impact on soil health. Low carbon and high phosphorus levels are the main concerns at vegetable growing sites. In contrast, soil compaction and too much nitrogen are the main issues for dairy soils.



Sampling of dairy farm soils across the region shows that both nitrogen and phosphorus levels have increased significantly between 2000 and 2010. Excess nutrients can have a significant effect on the underlying groundwater and nearby waterways



Checking the groundwater level

### How healthy are the rivers and streams?

It's a mixed bag. Six of the 20 river sites we routinely monitor have excellent water quality but eight sites are graded just 'fair' or 'poor' because at least two key indicators don't meet recommended guidelines. These sites are generally on the lower reaches of rivers and streams in largely agricultural catchments – like the Ruamahanga River at Pukio, Parkvale Stream and the Taueru River at Gladstone. Urban sewage discharges also affect some waterways, particularly the Mangatarere Stream in Carterton.

### Our assessment

To get an overall picture of river and stream water quality we combine six key indicators into an index: water clarity, oxygen content, dissolved reactive phosphorus, nitrite-nitrate nitrogen, ammonia and *E. coli* bacteria.

#### Water quality index

- ▲ Excellent
- ▲ Good
- ▲ Fair
- ▲ Poor

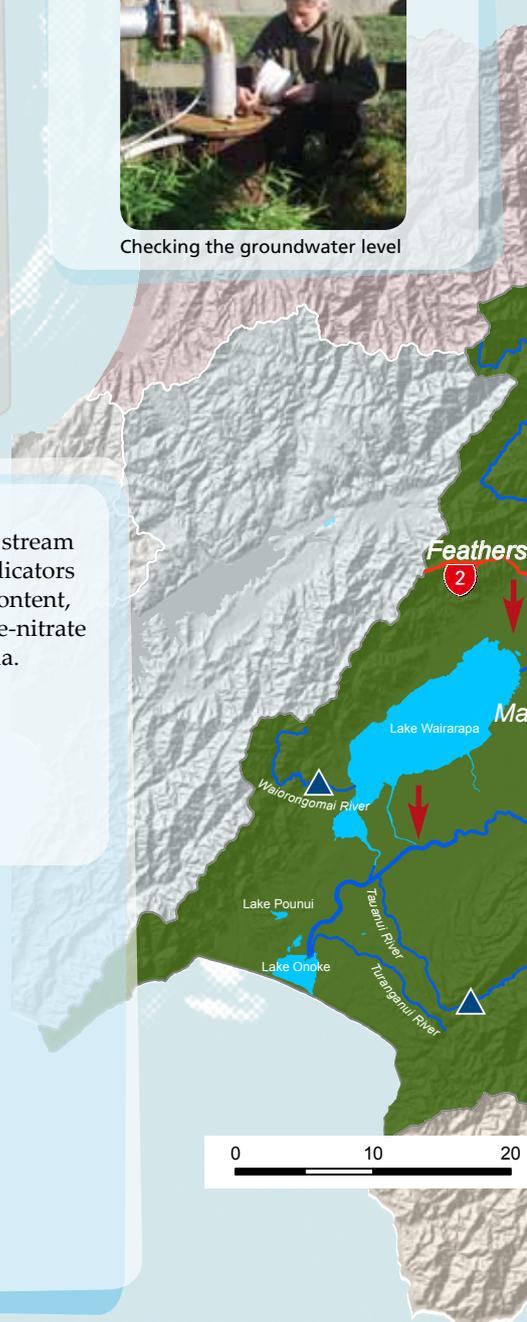
### Are they getting better or worse?

Water quality across most monitoring sites remained stable between July 2006 and June 2011. The lower Whangaehu River is an exception; several indicators – including water clarity and dissolved and total concentrations of phosphorus – have deteriorated at this site. Aquatic health is also poor.

In terms of trends in aquatic health, both the Taueru River at Gladstone and the Kopuaranga River at Stewarts showed increases in nuisance algae and decreasing invertebrate health over the period assessed.



Stock trampling a tributary of the Mangatarere Stream. Intensive agriculture, treated sewage, stock access and high water abstraction all contribute to the poor condition of the Mangatarere Stream

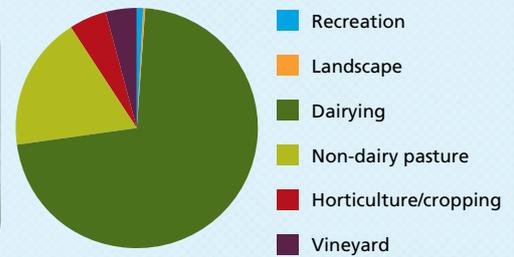


## Water resources – what's being used and how much is left?

The answers are 'a lot', and 'not that much'. As at the end of 2010, 270.3 million cubic metres per year of water was allocated through resource consents in the Wairarapa – 120.2 million cubic metres more than in 1990. Just over half of the current water allocation is to irrigate pasture, orchards, crops and vineyards; other significant uses are for town water supplies and agricultural water races. Nearly 70% of the Wairarapa's allocated water comes from surface water (rivers, streams and Lake Wairarapa), with the remainder from groundwater aquifers.

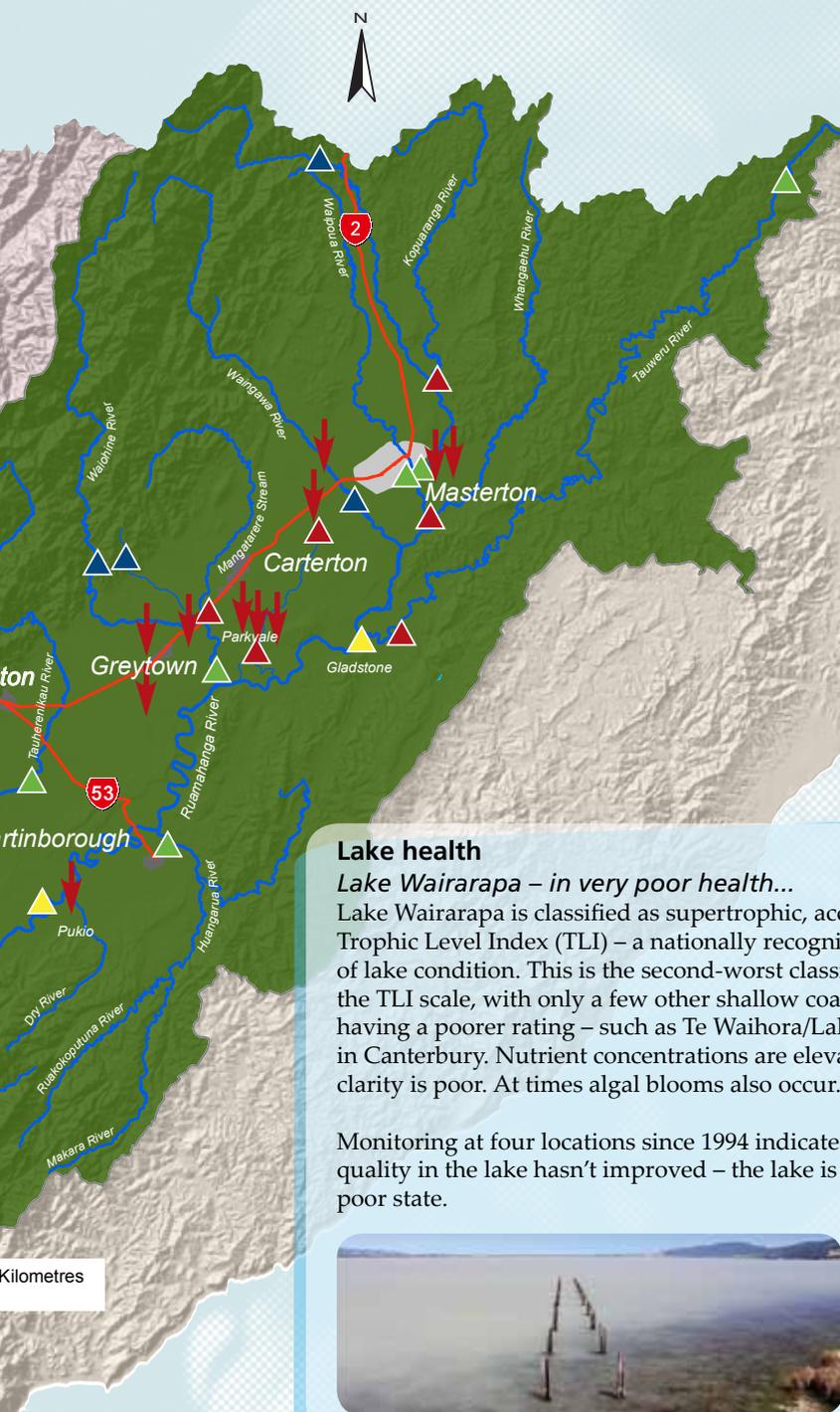
Most of the increase in allocation between 1990 and 2010 was for dairy pasture irrigation. Many of the rivers and streams in the Wairarapa Valley are now 'fully allocated', which means additional water takes would affect their ability to support aquatic life, and compromise other uses such as recreation.

 The arrows on the map show sites where groundwater levels significantly declined (1994 to 2011)



While dairying accounts for most of the irrigation water in the Wairarapa, water allocated to irrigating vineyards increased eight-fold from around 0.8 million cubic metres per year in 1990 to 6.2 million cubic metres per year by the end of 2010

Groundwater resources in the Wairarapa Valley are also under more pressure. Groundwater allocation quadrupled between 1990 and 2010, and analysis of a selection of 29 groundwater monitoring wells found water levels in almost half had significantly declined between 1994 and 2011 (see red arrows on map). In several wells the water levels did not fully recover over winter, indicating there is a high risk that the amount of water taken from the underlying aquifer is not sustainable. The highest risk aquifers are the deep confined (artesian) aquifers of the middle and lower valley, such as the Parkvale artesian aquifer.



### Will I get sick if I swim?

Weekly summer monitoring of *E. coli* indicator bacteria between 2005/06 and 2010/11 has shown the Waiohine and Waingawa rivers are nearly always suitable for swimming – sites on these rivers are graded 'very good' for recreation. But popular spots on the Ruamahanga and Waipoua rivers are 'fair' or 'poor' for recreation because there's a greater risk (particularly during or after rainfall) of getting sick from faecal pollution from agricultural and urban areas. During dry weather, stock access and treated sewage discharges may also pose a risk to recreational users at some sites.



Some rivers in the Wairarapa are affected by nuisance growths of toxic algae (cyanobacteria). The algae has been so prolific in some years that the Waipoua River was 'closed' to recreation

### Lake health

#### Lake Wairarapa – in very poor health...

Lake Wairarapa is classified as supertrophic, according to the Trophic Level Index (TLI) – a nationally recognised indicator of lake condition. This is the second-worst classification on the TLI scale, with only a few other shallow coastal lakes having a poorer rating – such as Te Waihora/Lake Ellesmere in Canterbury. Nutrient concentrations are elevated and water clarity is poor. At times algal blooms also occur.

Monitoring at four locations since 1994 indicates that water quality in the lake hasn't improved – the lake is in a stable yet poor state.



#### Lake Onoke – the ultimate receiving environment...

Lake Onoke is at the receiving end of the bulk of the water flowing down the Wairarapa Valley. Therefore it's not surprising that this lake is in a similar 'supertrophic' condition to Lake Wairarapa.

#### Lake Pounui – a hidden gem

Although Lake Pounui has not been included in formal lake monitoring to date, the lake's plant life was surveyed in 2011. The results showed Lake Pounui has 'very high' native plant values, with the lake ranked 66th out of over 200 lakes surveyed nationwide.

Lake Wairarapa is located in an intensively farmed catchment. The lake's shallow nature also drives much of its water quality – sediments on the lakebed are easily disturbed by wind and wave action which reduces water clarity and stirs up nutrients in the sediment. Saltwater from Lake Onoke also affects water quality here

## What's happening now?

Our analysis of the Wellington region's air, land and water resources has been a crucial component in reviewing our current regional plans. We're now developing a new integrated plan to sustainably manage these natural resources. The review has identified several key areas on which the new plan will focus:

- Water quality – stormwater and urban land use
- Water quality – rural land use
- Water allocation
- Coastal and hazards management

As part of the regional plan review process, in winter 2010 we asked people in the Wairarapa Valley sub-region about their environmental concerns at workshops in both Masterton and Martinborough. Water, biodiversity, soils, controlling animal pests and weeds, and managing sewerage systems, were common themes at both workshops. Flood management was also identified as an important area for resource management, both by people wanting more flood control work and by others concerned at the ecological consequences of works. Participants also suggested financial incentives and education to improve resource management.

If you would like to get involved with the review of our regional plans, email [regional-plan@gw.govt.nz](mailto:regional-plan@gw.govt.nz).



### What you can do to help

- Burn only dry untreated wood in your fireplace and insulate your home to cut down on fuel use
- Choose the right land use for your soil and land's capability – avoid using heavy machinery, high stocking rates or effluent application when the soils are saturated
- Use water efficiently – only use what you need and irrigate during the night to reduce evaporation
- Plant vegetation along stream margins to help prevent bank erosion and improve habitat in the stream for aquatic life
- Keep stock, especially cattle and deer, out of rivers and streams, including small feeder streams and marshy areas in catchment headwaters



The Ruamahanga River at Gladstone, 10km downstream from Masterton, where water quality is graded 'fair'. The river receives treated sewage (either directly or indirectly through tributary streams) from four of the five main towns in the Wairarapa

### More information

- Find out about the health of air, land and water resources across the wider Wellington region in the *Regional overview* summary – and for more detailed information download the full technical reports. See [www.gw.govt.nz/ser](http://www.gw.govt.nz/ser)



- Check out what we currently monitor and where at [www.gw.govt.nz/environmentalmonitoring](http://www.gw.govt.nz/environmentalmonitoring)
- Contact us at [environmentalscience@gw.govt.nz](mailto:environmentalscience@gw.govt.nz)

For more information, contact Greater Wellington:

Wellington office  
PO Box 11646  
Manners Street  
Wellington 6142  
T 04 384 5708  
F 04 385 6960

Masterton office  
PO Box 41  
Masterton 5840  
T 06 378 2484  
F 06 378 2146

Upper Hutt office  
PO Box 40847  
T 04 526 4133  
F 04 526 4171



[www.gw.govt.nz](http://www.gw.govt.nz)  
[info@gw.govt.nz](mailto:info@gw.govt.nz)



GW/EMI-G-12/152  
June 2012