



greater WELLINGTON

REGIONAL COUNCIL

Te Pane Matua Taiao



Air, land and water in the Wellington region

State and trends

June 2012



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

Regional overview



This summary highlights the key findings from State of the Environment monitoring we carry out of natural resources across the Wellington region. It is drawn from eight technical reports which give the full picture of the health of the Wellington region's air, land, fresh waters and coast. The reports, published every five years, are based on environmental monitoring and investigations over the past five to ten years (and longer for some resources).

The findings are informing the current review of Greater Wellington's regional plans – the 'rule books' for ensuring our region's natural resources are sustainably managed. These plans are now more than ten years old and we are developing a new integrated plan.

Community input to the review is critical – you can find out how to have a say on the back page.

How do we measure the health of the region's air, land and water resources?

Regional councils have a legal responsibility under section 35 of the Resource Management Act 1991 to monitor the state of the environment – this essentially means tracking the quality and quantity of the region's natural resources over time. Greater Wellington does this through long-term monitoring programmes across the region focusing on:

- Air quality at 6 locations
- Soil quality (118 sites under a range of different land uses) and stability
- Rainfall (at 50 sites) and river flows/levels (at 45 sites)
- Groundwater levels (at 146 sites) and quality (at 71 sites)
- Water quality at popular river and beach recreation spots (100 sites)
- River/stream water quality and ecosystem health (at 55 sites)
- The health of selected estuaries and our two harbours



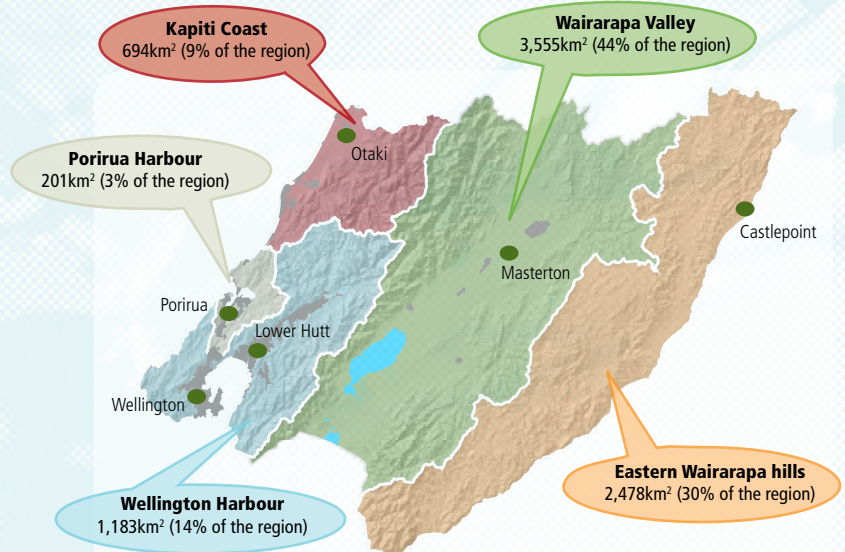
Measuring river flow

We also carry out short-term investigations where our routine monitoring identifies gaps or potential problems, such as poor air or water quality.

The Wellington region

The northern boundary of the Wellington region is a line from north of Otaki on the Kapiti Coast across to north of Castlepoint in the eastern Wairarapa. The region has a land area of 8,111km² and a coastal area of 7,867km² along almost 500km of coastline. There are 1,634km² of high-class soils, 12,300km of rivers and streams, three extensive groundwater sub-regions, and 14 lakes/wetlands greater than 10 hectares in area.

The region can be divided into five sub-regions (see map). These areas are based largely on the natural catchment drainage patterns (the areas that rivers and streams drain into, such as Porirua Harbour and Wairarapa's east coast).



The five sub-regions of the Wellington region. There are separate summaries on the health of air, land and water resources for each sub-region.

This summary provides the full regional overview...

AIR

How clean is the region's air?

- Air quality is good most of the time. Fine particulate matter (PM₁₀) is the only pollutant that fails to meet the national standard – and only in the Wairarapa Valley
- PM₁₀ concentrations are sometimes higher in inland valley areas (Lower Hutt, Upper Hutt, Wainuiomata and Wairarapa) where domestic fires are common and when it's cold, clear and still. Most of this PM₁₀ is in the form of extra fine particles (PM_{2.5}) which are more strongly associated with adverse health effects than PM₁₀
- The Wellington, Porirua and Kapiti areas are not as prone to air quality issues because their mainly coastal location brings more wind and fewer frosts. However, there can be 'pockets' of poor air quality due to household fires in low-lying areas under cold, clear and still weather conditions
- Emissions from transport are significant in the region but they do not result in poor air quality for the three pollutants we monitor: PM₁₀, carbon monoxide and nitrogen dioxide. On-road vehicle exhaust testing in 2006 showed that the most polluting 10% of vehicles were responsible for about half of the total carbon monoxide and smoke emitted and just over a third of total nitric oxide released

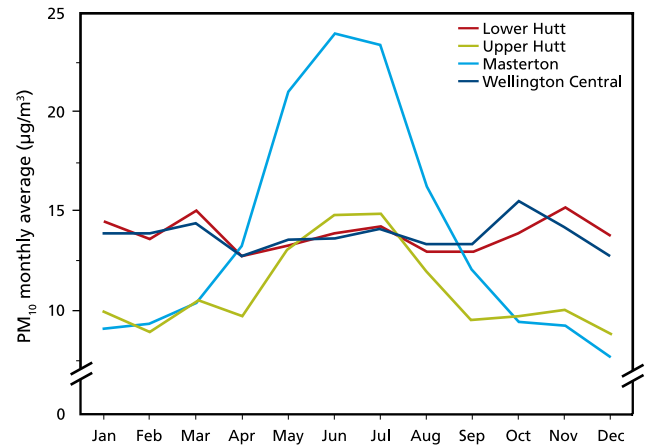
Is it getting better or worse?



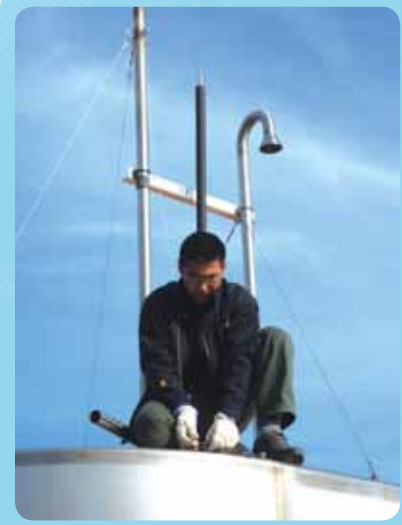
Overall PM₁₀ levels have decreased – but there has been little change in winter concentrations where fires are commonly used for home heating. In Wellington city, levels of all pollutants measured declined between 2004 and 2007, with little change from 2009 onwards



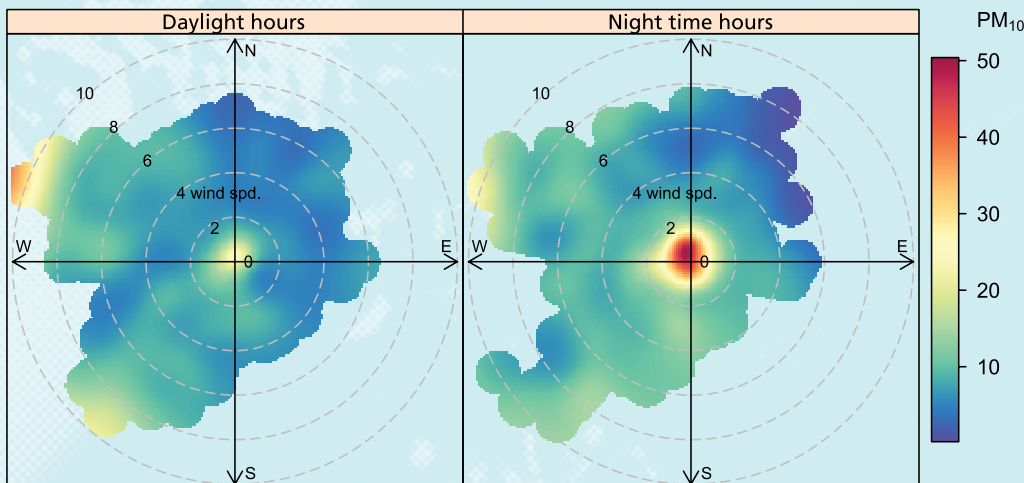
The region's hilly nature means there can be 'pockets' of poor air quality in low-lying areas during light wind and clear sky winter nights – when smoke from household fires doesn't disperse



This graph summarises average PM₁₀ levels at four of our six long-term air quality monitoring sites, based on continuous measurements over 2008 to 2010. PM₁₀ levels peak during the winter months in Masterton and Upper Hutt due to smoke from winter fires. Winter levels are highest in Masterton because the Wairarapa Valley is more prone to temperature inversions that trap pollutants overnight. Our monitoring sites in both Lower Hutt and central Wellington show little seasonal differences in PM₁₀ levels – air quality at these sites is more heavily influenced by traffic which is constant all year round



Air quality instruments need frequent calibration and maintenance to ensure measurements are accurate and meet national air quality reporting requirements



These plots summarise winter day time (left) and night time PM₁₀ concentrations measured in Masterton between 2008 and 2010. The centre of the night time plot shows concentrations were highest under very low wind speeds (less than 1 metre per second). In contrast, PM₁₀ concentrations were much lower during the day, except under occasional very windy north-westerly conditions

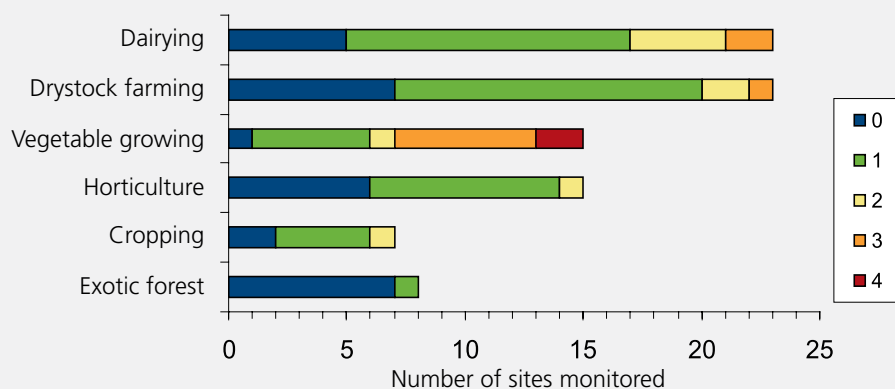
LAND

How healthy are the region's soils?

- Soils at 78% of the sites we assessed were in good health – they met the targets for at least six of the seven key quality indicators we measure (bulk density, macroporosity (compaction), pH, total carbon, total nitrogen, anaerobic mineralisable nitrogen and plant-available phosphorus)
- Of the types of land use we monitor, vegetable growing returned the most challenging soil results – many sites failed to meet targets for three or more indicators. Low carbon and high phosphorus levels are the main concerns
- Dairying is also having an impact on soil health. Soil compaction and too much nitrogen are the main issues for dairy soils – though phosphorus levels are also quite high
- The soil quality indicator of most concern across most land uses was macroporosity – which shows how compacted soil is. In almost all cases the soils were too compact. This is not good for production or the environment. From an environmental point of view, compacted soils in wet weather can allow nutrients and sediment to flow across the land surface and into nearby streams instead of soaking into the soil



Market garden near Otaki – one of the main vegetable-growing areas in the Wellington region



This graph shows the number of key soil quality indicators outside target range values, grouped according to the different types of land use we monitor (based on the most recent round of soil quality monitoring across each land use). Note: native forest site results are not shown (no target range values available)

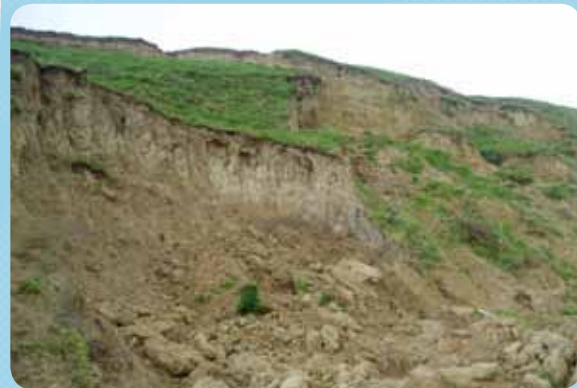
Are they getting better or worse?

Dairying and vegetable growing are the two land uses where we have enough information to assess trends in soil health – between 2000 and 2010 we found:

- ☹️ The ratio of carbon to nitrogen decreased significantly across vegetable growing sites. Low carbon levels means there's less organic matter to trap nitrogen, so nitrogen can leach into the groundwater below and, from there, into nearby streams
- ☹️ Average levels of both nitrogen and phosphorus increased significantly across dairying soils. Excess nutrients can have a significant effect on the underlying groundwater and nearby waterways
- 😐 Compaction reduced across dairy farm soils but more improvement is needed – the current level of compaction is still too high

How stable are the soils?

- Around 15% of the Wellington region's land area is classed as having unstable land surfaces. This is based on an aerial photography survey in 2010. Just under 30% of the region's soil was 'disturbed' and there was about 8,900 ha of bare soil. Most of the erosion-prone farmland in the region is in the eastern Wairarapa hills and 42% of this land still needs some form of soil conservation cover (eg, plantings)
- The major land use activities that contribute to soil disturbance are farm and forest tracks. The other half of the disturbed soil is the result of processes such as landslides, slumps and surface erosion
- Comparison of the 2010 aerial survey with one carried out in 2002 showed only minor changes in soil stability – there was a small increase in the amount of land classed as 'stable', and nearly 2% (almost 15,000 hectares) more land under soil conservation cover. Most of the additional cover is plantation forestry



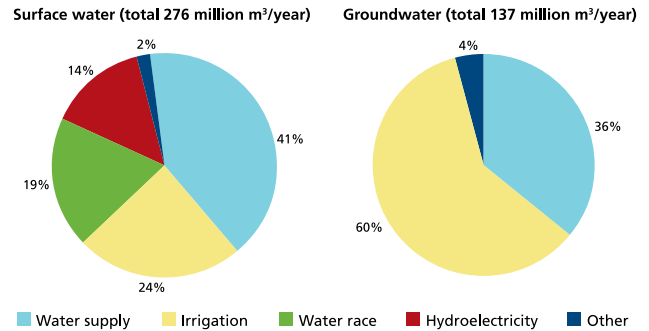
Severe soil erosion in the eastern Wairarapa hill country

WATER

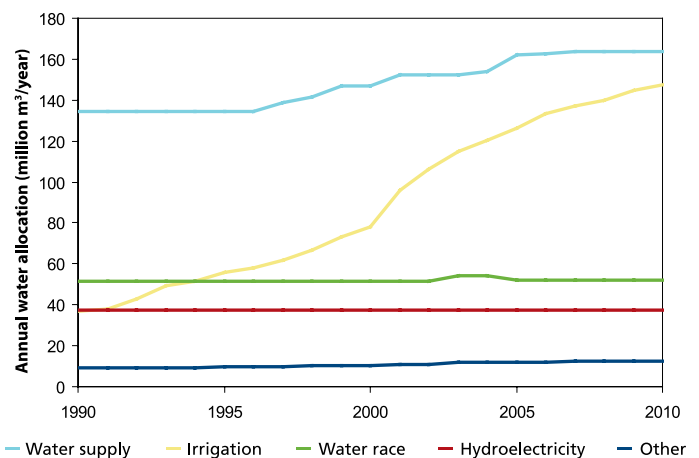
How much is being used and what's left?

When freshwater is taken from rivers and underground for use it is 'allocated' under a resource consent. Reviewing the volume and uses of this allocation gives us information about how we use water and what remains in natural systems.

- In the Wellington region as a whole, about equal amounts of water are allocated to public supply (40% of the total take) and irrigation (36%) – most of the rest goes to water races (primarily for stock drinking supply) and hydroelectricity
- However, the proportions vary a lot when you break it down for different parts of the region: in the west where the cities are, public supply is the dominant use, while in the Wairarapa 52% of the take is for irrigation
- Nearly three-quarters of the region's irrigation water take (70%) is for dairy pasture. Other irrigation includes non-dairy pasture (18%), horticulture (6%), viticulture (4%) and recreational land (eg, golf courses 2%)
- Most of the region's major rivers are fully allocated – this means at normal to low flow there is only just enough water to meet all the consented water takes while still maintaining environmental values
- While there is still water available in many of our groundwater systems under existing regional plan policies, the amount of water that can be safely allocated is likely to reduce in the future. This is because surface water and groundwater systems are linked and we now know more about how groundwater takes affect nearby river and stream levels



Consented surface water and groundwater allocation in the Wellington region by use type (as at December 2010). Groundwater provides 60% of the region's irrigation allocation, and 30% of the region's public and community water supply allocation



The amount of water allocated for irrigation in the Wellington region increased four-fold between 1990 and 2010. Most (83%) of this increase occurred in the Wairarapa Valley – and most of the increase (73%) was for dairy pasture irrigation. The annual volume of water allocated for water supply also increased significantly (22% between 1990 and 2010)

Have there been any significant changes in rainfall and river and groundwater levels?

In general, rainfall and river flows haven't changed, but groundwater levels are declining in some places.

- While the six years to June 2011 were slightly drier than normal (and summer 2007/08 was particularly dry), there were no regional-scale or major changes over the longer term (1980 to 2011) in summer rainfall or the length of dry spells. Similarly, despite being characterised by slightly lower than normal river flows in the past six years, there have not been any major changes in low flow magnitude or frequency since monitoring began in the 1970s. However, it's unclear if flows in the lowest reaches of rivers have changed significantly over time – most of our river flow monitoring sites are generally upstream of where most of the water is taken for use
- Significant declines in groundwater aquifer levels occurred between 1994/95 and 2010/11 in 15 of 44 wells looked at (the remaining wells did not show any clear trends in water level). Twelve of these wells represent eight aquifer systems that have been categorised as 'very high' and 'high' risk, meaning they require careful management. In some of these wells water levels do not appear to be recovering in winter as is normally the case. The four 'very high risk' wells are located in the deep confined (artesian) aquifers of the middle and lower Wairarapa Valley. The 'high risk' wells are spread between the Kapiti Coast (two wells) and the Wairarapa Valley (six wells) and draw from a mix of water table, semi-confined and deep confined (artesian) aquifers

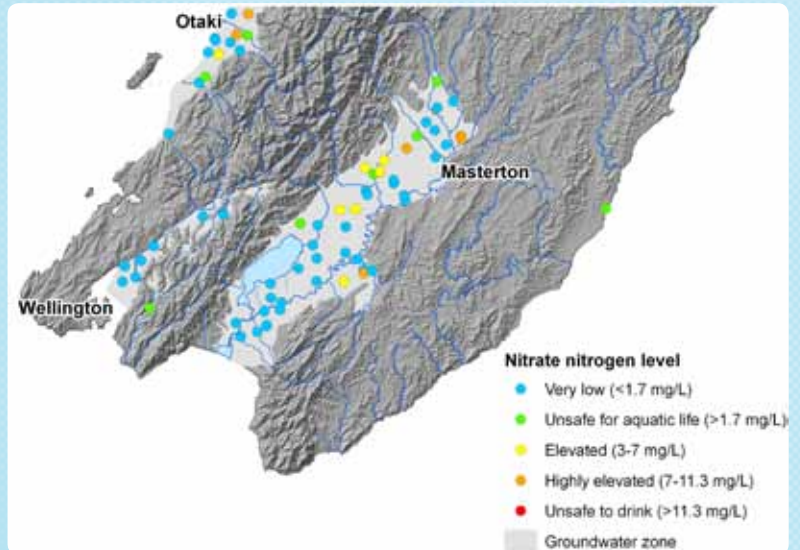


Though the region is not getting drier overall, droughts still occur, such as the summer of 2007/08. This was the third worst drought in 40 years in parts of the Wairarapa and many rivers experienced low flows with an estimated return period of 15 years. The Waipoua River (pictured) dried up into a series of pools near Masterton

WATER

How good is the quality of the groundwater?

- Groundwater quality in the Wellington region is generally very good, particularly from a drinking water perspective. Iron and manganese levels in some wells are above the national drinking water standard but only three of these wells are used for drinking water (and these three wells only failed on an aesthetic guideline value for iron)
- Overall, our Drinking Water Quality Index classified 75% of the 71 sites as 'good' or 'excellent' for drinking. However, our Aquatic Ecosystems Index showed just 49% of sites were 'good' or 'excellent'. This is because water is considered toxic to aquatic life forms at lower levels of contamination than for humans. In the case of nitrate – the most commonly reported indicator of groundwater quality – 23 sites had median levels above the level that is toxic for aquatic life. Most of these sites are in unconfined to semi-confined groundwater aquifers where there is some connection with surface water. In some intensive agricultural areas, including the Mangatarere and Parkvale streams near Carterton, nitrate-enriched groundwater is affecting water quality in streams it supplies
- Surveys in 2006 and 2010 show there are only traces of pesticides and herbicides in groundwater in the Wellington region. Similarly, a one-off assessment of heavy metals in 2009 found no significant contamination issues – arsenic is present in many areas but this appears to be a result of natural rock-water interaction



Median nitrate nitrogen levels in 71 groundwater sites sampled quarterly between mid-2005 and mid-2010. Levels above 3 mg/L tend to indicate human influence

Is it getting better or worse?



There's not much obvious change – analysis of 10 key groundwater quality variables showed only a few statistically significant and environmentally meaningful trends over the five years we looked at (2005–2010). Over half of these trends relate to a reduction in the level of a contaminant, which means water quality has improved



Nitrate levels have declined in a few wells on the northern Kapiti Coast – but the current levels are still higher than ideal

What is the condition of the region's lakes?

- Water quality in Lake Wairarapa hasn't improved since monitoring began in 1994. The lake has poor water clarity, high levels of nutrients and sometimes high algal biomass. It remains classed as 'supertrophic' (the second-worst classification) on the Trophic Level Index (TLI) – a nationally recognised indicator of lake condition
- Lake Onoke in the lower Wairarapa Valley has similar water quality to Lake Wairarapa
- Lake Waitawa on the Kapiti Coast is in a poor state – a water quality investigation during 2009 and 2010 revealed very high nutrient levels and toxic algal blooms were present
- In contrast, surveys in 2011 of aquatic plant communities in Lake Pounui (lower Wairarapa Valley) and the Parangarahu lakes (Lakes Kohangatera and Kohangapiripiri, commonly referred to as the Pencarrow lakes) at the entrance to Wellington Harbour rated their condition as 'high' or 'excellent'. The Parangarahu lakes are considered outstanding examples of lowland lagoon systems



In terms of ecological condition, Lake Kohangatera was ranked 10th best in New Zealand in a survey ('excellent' condition) and noted as an outstanding example of a lowland lagoon system



Staff using an echosounder (sonar) during a bathymetric survey of Lake Wairarapa

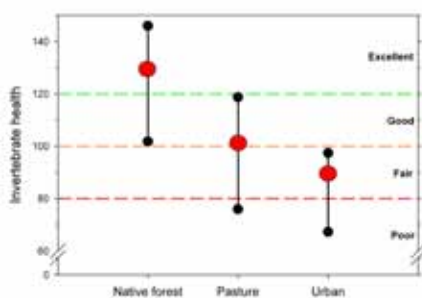
WATER

How healthy are the rivers and streams?

- The results are mixed. Water quality at 18 of the 55 river and stream sites we monitor is classed as 'excellent', while 13 are 'good', 9 'fair' and 15 'poor'. This is based on an index that combines six key indicators – water clarity, oxygen content, dissolved reactive phosphorus, nitrite-nitrate nitrogen, ammonia and faecal bacteria (*E. coli*)
- The larger rivers flowing out of the forested ranges are in excellent health – such as the Otaki River and the upper reaches of the Hutt, Wainuiomata, Waiohine and Waingawa rivers. In contrast, water quality and ecological health are degraded in small lowland streams in largely farming or urban catchments – the worst sites are located on the lower reaches of the Mangaone (Kapiti), Porirua, Waiwhetu (Lower Hutt) and Mangatarere (Carterton) streams, and the Mangaroa (Upper Hutt), and Kopuaranga (Masterton) rivers. Water at these sites commonly has high levels of nutrients and faecal bacteria, and poor water clarity. At times high levels of heavy metals are found in some urban streams
- The health of aquatic ecosystems aligns fairly well with our water quality grades – sites that have the highest water quality generally have the healthiest invertebrate communities and are mostly free of nuisance growths of algae. But it isn't always that clear cut. Some sites such as the Awhea River in the eastern Wairarapa have good water quality but don't support healthy aquatic life – because of a lack of flow in the stream, a lack of streamside shade and a streambed smothered by fine sediment



The Otaki is the only river we monitor that has excellent water quality in both its upper and lower reaches. Aquatic health is slightly degraded in the lower reaches though – mainly because the river's wide and shallow nature means the diversity of habitat is reduced



Median (red circles) and range of invertebrate health scores at 55 river and stream sites, grouped according to the dominant land use in the upstream catchment (native forest, pasture or urban). These scores are generated from a nationally recognised index – the Macroinvertebrate Community Index (MCI). The scores presented here reflect current invertebrate health, based on annual sampling between 2009 and 2011



Native fish communities are also degraded in highly urbanised or agricultural catchments. In addition to poor water and habitat quality, physical barriers such as weirs or perched culverts can prevent some species, like this torrentfish, migrating to and from the sea as part of their natural breeding cycle

Are things getting better or worse?



Overall, water quality at most of the 55 sites was largely unchanged from 2006 to 2011. Where trends could be seen, some of these were improvements, such as decreasing soluble nitrogen levels. However, there were a number of sites where deteriorating trends were observed, such as increasing levels of soluble phosphorus or a drop in water clarity



Ecosystem health was also generally unchanged for most river and stream sites. However, at a few sites deteriorating trends were observed, such as increases in nuisance algal growth and a decline in invertebrate health

Will I get sick if I swim?

- Water quality at popular river swimming sites across the Wellington region is generally good. Most (20) of the 23 river swimming spots monitored met the national guideline for safe swimming (260 *E. coli* per 100mL or less) at least 85% of the time over the five summers we assessed
- Rivers with a high proportion of forest and scrub in the upstream catchment are the safest for swimming; these include the Otaki, Waiohine and Waingawa rivers (all monitoring sites on these rivers are graded 'very good' for recreation). In contrast, sites in catchments draining urban or intensive agricultural areas – such as the lower reaches of the Hutt, Waipoua and Ruamahanga rivers – are graded 'fair' or 'poor'. High counts of *E. coli* bacteria occur more often here
- The most risky time for swimming is during or just after heavy rain. Apart from sites surrounded by native forest, most river swimming spots are likely to be contaminated for up to 48 hours after rainfall
- At times during low flows and warmer temperatures, widespread growth of potentially toxic algae (cyanobacteria) at sites on the Waikanae, Hutt and Waipoua rivers means these rivers are unsuitable for swimming and dog walking – even when *E. coli* bacteria levels are low



Children swimming in a tributary of the Ruamahanga River

WATER



Pauatahanui Arm of Porirua Harbour – extensive algae growth can be seen at low tide

Will I get sick if I swim?

- Water quality is generally very good at beaches in the Wellington region. Over the five summers we looked at, 67 out of the 77 sites monitored met the national guideline for safe swimming on 90% or more of sampling occasions (see graph). A high proportion (64%) of beach sites are currently graded 'good' or 'very good', which means the region's beaches are suitable for recreation most of the time
- A few beach sites regularly record high levels of faecal pollution. In urban areas this is usually the result of stormwater and sewage leaks, overflows or faults. Owhiro Bay on Wellington's south coast, Robinson Bay on the Eastbourne coast, and beaches around Porirua (Porirua Harbour, South Beach at Plimmerton and Titahi Bay) are graded 'poor' at least in part for these reasons. In a few rural areas, the issue is poor water quality in streams that flow on to the beach – such as at Te Horo beach on the Kapiti Coast
- Water quality for shellfish gathering is mixed, with only four of the nine sites assessed regularly meeting national guidelines
- Swimming and collecting shellfish up to 48 hours after heavy rainfall is potentially very risky, particularly at sites graded 'fair' or 'poor'. This is because pollutants are washed into streams and coastal waters when it rains



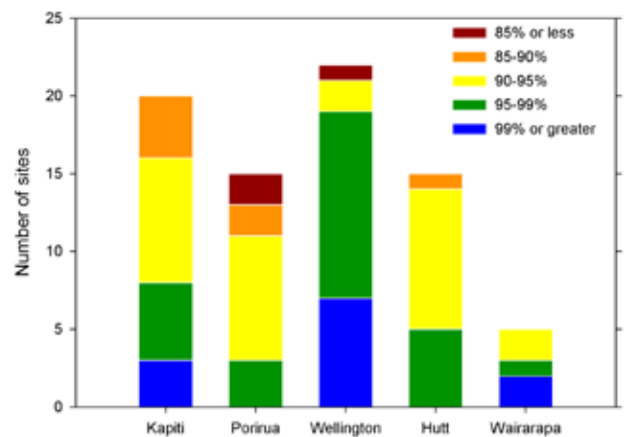
The western end of Island Bay on Wellington city's south coast – this site is one of 41 graded 'good' for recreation



Riversdale Beach – two of three sites along this beach are currently graded 'very good' for recreation

What is the health of our harbours, estuaries and coastline?

- A survey of Wellington Harbour in late 2006 found contaminants from urban stormwater, such as copper, lead and zinc, in the sediments on the bed of the harbour – levels are highest in Evans Bay and the Lambton basin
- Porirua Harbour's ability to support life, and its overall ecological health, is beginning to be affected by the build up of sediment, nutrients and – in places – stormwater contaminants
- The estuaries we monitor are all in a moderate or 'fair' condition but in most, the rate of sedimentation is higher than ideal. Nuisance growths of algae are a problem in some areas, including the sandflats in Porirua Harbour
- Castlepoint Beach – the only sandy beach we monitor for ecological condition – is in good health



Summary of beach site compliance with the national guideline for safe swimming, presented by area. The graph is based on routine water quality measurements made over the 2005/06 to 2009/10 summers (equating to around 100 measurements per site)

What's happening now?

We are developing a new integrated regional plan for the sustainable management of natural resources – air, soil, fresh water, coasts and biodiversity

The review of our existing regional plans started in 2010. We asked the community for their views on the state of our natural resources – air, water, coasts, soils and biodiversity, and how they could be better managed. At the same time we began looking closely at data from our science programmes to see which areas needed the most attention in the new regional plan.

These reviews identified several key issues on which the new regional plan will focus:

- **Water quality – stormwater and urban land use**
Contaminants from the stormwater network that enter rivers, streams and coastal areas affect water quality and the plants and animals that live in these environments. At times, these contaminants can stop people from using the coast for recreation or shellfish gathering. Better management of urban land use and using innovative engineering to stop these pollutants getting into our streams and the coast are solutions that we will explore with city and district councils.

- **Water quality – rural land use**
The poorer water quality often found in the small rivers and streams in intensively farmed areas affect people's enjoyment and use of these areas, the health of ecosystems and the ability to collect mahinga kai and plants used for customary purposes. Managing poor water quality in the rural environment also involves better land management and innovative ideas to stop pollutants getting into waterways. We are working closely with farmers, industry and rural communities to help improve the state of our rural waterways over the short and long term.

- **Water allocation**
Taking too much water affects the health of waterways, everything that lives in them and the people who use them. Inefficient use of water increases demand on this limited resource. In many cases ground and surface water is interconnected, so it makes sense to look after them as one single resource. We are exploring ideas for using water more efficiently and effectively (national regulations now require all consent holders to meter water takes greater than 5 litres/second and record daily usage) including new ways to allocate water to different users, and using stored water.

- **Coastal and hazards management**
The Wellington region is vulnerable to flooding, earthquakes, landslips, coastal erosion and drought. Sometimes engineering structures like seawalls built to protect us from hazards interfere with natural processes and negatively effect the environment. Climate change and sea level rise increase the risk from natural hazards for people living in coastal areas. We need to be prepared for these impacts by carefully planning or avoiding new developments in areas identified as having a high hazard risk.

Our new regional plan will also be addressing tangata whenua and their relationships with land and water, important sites to tangata whenua, biodiversity, climate change, air quality, soil health, our coastal environment and historic heritage.

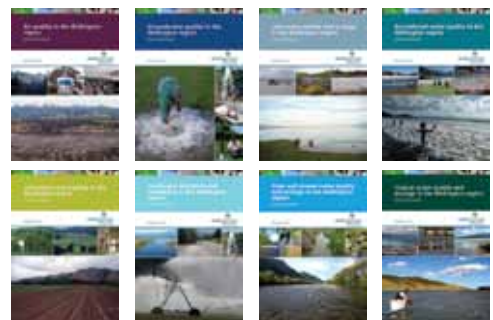
The iwi of our region are now much more involved in managing our natural resources – so in future reporting we'll have more to say about how tangata whenua view the state of our environment, because we will be including measurements of tangata whenua values. Māori attribute significant value to a waterway's ability to nourish spiritual, mental, physical and community wellbeing. This view aligns closely with a whole system – whole community approach to water management being identified in the recommendations of the Land and Water Forum and the National Policy Statement for Freshwater Management. This approach is consistent with Greater Wellington's move to catchment-based planning, monitoring and reporting.

We are also doing much more now in the area of biodiversity – information on this will be included in our next reporting round.

Have your say and get involved with the review of our regional plans – regional-plan@gw.govt.nz.

More information

- Find out about the health of air, land and water resources in particular areas in our sub-region summaries. For more detailed information across all of the Wellington region download the full technical reports. See www.gw.govt.nz/ser



- Check out what we currently monitor and where at www.gw.govt.nz/environmentalmonitoring
- Contact us: environmentalscience@gw.govt.nz

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Kapiti Coast sub-region



This is a summary of the key findings from State of the Environment monitoring we carry out on the Kapiti Coast. 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

Home to the towns of Otaki (in the north), Waikanae, Paraparaumu, Raumati and Paekakariki (in the south), the Kapiti Coast boasts long sandy beaches and a mild climate suitable for a range of agriculture and horticulture – and which make it a popular regional holiday destination. The two main rivers are the Otaki and Waikanae, which flow from headwaters in the Tararua Range. The Kapiti Coast sub-region (694km²) makes up 9% of the Wellington region.

What we routinely monitor in this sub-region

- Soil quality at a selection of dairy, drystock, horticulture, market garden and native forest sites
- Rainfall at nine locations
- River flows and wetland water levels (four sites each)
- Groundwater levels at over 50 sites (22 of these via automated level readers)
- Groundwater quality at 13 sites
- Recreational water quality at selected locations on the Otaki and Waikanae rivers, and along much of the coast
- General water quality and ecological health at 11 river or stream sites
- Ecological health and sediment quality in the Waikanae Estuary

Although air quality isn't routinely monitored – the sub-region is relatively exposed with no major known sources of air pollutants – we have done some short-term air quality monitoring in Raumati South and the results are reported here.

Key points

- Most soils in vegetable growing areas have low carbon and high phosphorus levels, while some dairy soils are compacted and contain too much nitrogen
- Demand for freshwater has increased over the last few decades, largely to meet the needs of a growing population
- The groundwater is generally fit for drinking but nitrate levels are elevated in some areas
- Lake Waitawa is in a poor state – nutrients levels are too high and toxic algal blooms occur
- River and stream health is excellent in the ranges but degraded in the smaller lowland streams draining intensively farmed or urban areas. Water quality in the two main rivers is almost always suitable for swimming
- Water quality at the beaches is mostly 'good' for swimming – no sites are graded 'poor' or 'very poor'
- The Waikanae Estuary is in a moderate condition



Recording groundwater measurements

How clean is the air?

Air quality isn't monitored on a regular basis on the Kapiti Coast because this sub-region is relatively windy and extremes in temperature are fairly unusual. However, from time to time the conditions that trap air pollutants can occur (ie, low-level temperature inversions). A short-term monitoring programme in Raumati South during winter 2010 found poor air quality on some nights due to fine particulate matter (PM₁₀) from household fires.



Smoke from home fires in Raumati South during winter 2010. The smoke particles are largely made up of extra fine particles called PM_{2.5} which are potentially more harmful to human health than PM₁₀ because they're smaller and penetrate more deeply into the lungs

Are the soils healthy?

Some soils are healthy, but some could be better. Only around two-thirds of the 37 monitoring sites sampled between 2000 and 2010 scored well against the seven key indicators used to measure soil quality (including soil structure, nutrients, organic matter and pH). Soils from 7 of the 10 vegetable growing sites had at least two or more indicators outside their target range – two sites 'failed' on four indicators. Several dairying sites also had soils outside of their target range for at least two indicators.

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 vegetable growing soils across the Wellington region shows that the ratio of carbon to nitrogen decreased significantly between 2000 and 2010. Low carbon levels means there's less organic matter to trap nitrogen, so nitrogen can leach into the groundwater below and, from there, into nearby streams

What's the condition of Lake Waitawa?

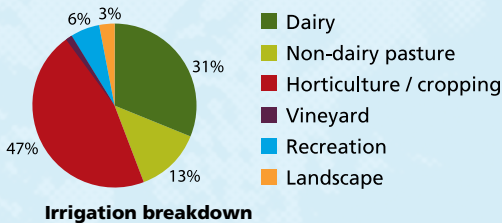
Although we haven't routinely monitored lake health on the Kapiti Coast, from mid 2009 we spent a year investigating water quality in Lake Waitawa. Based on a nationally recognised indicator of lake condition, the Trophic Level Index, Lake Waitawa is classed as supertrophic. This means that the lake is very degraded, with very high nutrient levels and algal biomass, and poor water clarity. At times, we found oxygen levels were also very low in the bottom of the lake – this can affect the lake's aquatic life.



Lake Waitawa's poor condition reflects its location in a largely farming catchment. Potentially toxic algae (cyanobacteria) are common in the lake; on several occasions during our investigation algal levels breached national guidelines for recreation

Water resources – what's being used?

Water allocated through resource consents almost doubled between 1990 and 2010 on the Kapiti Coast. At the end of 2010, the total was 28.7 million cubic metres per year of water. Nearly 60% of this allocated water comes from groundwater aquifers and the rest is from rivers and streams – of which around 80% is from the Waikanae River.



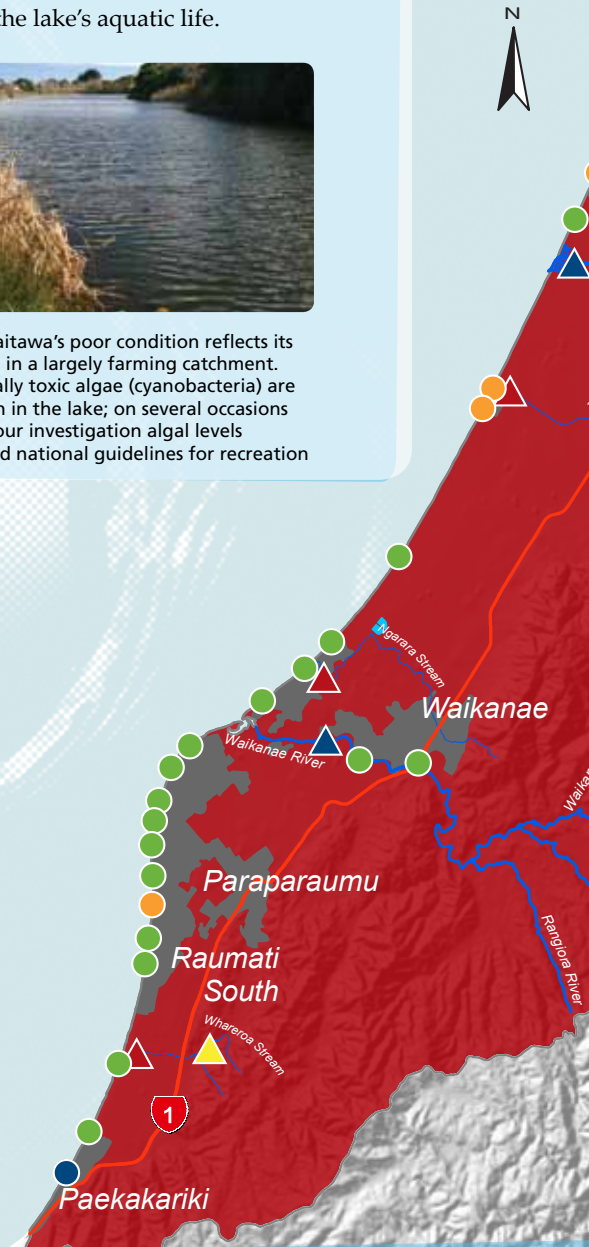
Three quarters of the current water allocated is for public supply and almost all of the remainder – some 6.1 million cubic metres per year – is used to irrigate pasture, orchards and crops

Annual extremes in low rainfall and river flow have not changed dramatically – over the past 30 years there were no significant increases or decreases in minimum summer rainfall amounts or low flows in the Otaki and Waikanae rivers. However, there are a few signs of dropping groundwater levels. Analysis of records from 13 selected groundwater monitoring wells on the Kapiti Coast found that water levels in two wells significantly declined between 1994 and 2011. These wells are in the semi-confined and deep artesian aquifers in the Waikanae and Hautere areas. The decline in water levels may be related to groundwater abstraction and indicates we need to keep a close watch on these aquifers.

How healthy is the Waikanae Estuary?

While the Waikanae River is in good health the estuary is only in a fair or moderate condition. Ecological assessments in 2010 and 2011 show the estuary's sediments are quite muddy – which limits the diversity of organisms that can live there. Sediments from the upstream catchment are being deposited in the estuary at an average rate of more than 30mm/year – 30 times above the natural rate for estuaries.

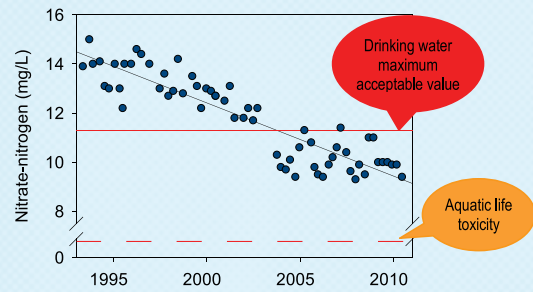
The good news is that levels of organic matter, nutrients and heavy metals in the sediment are all low.



How good is the quality of the groundwater?

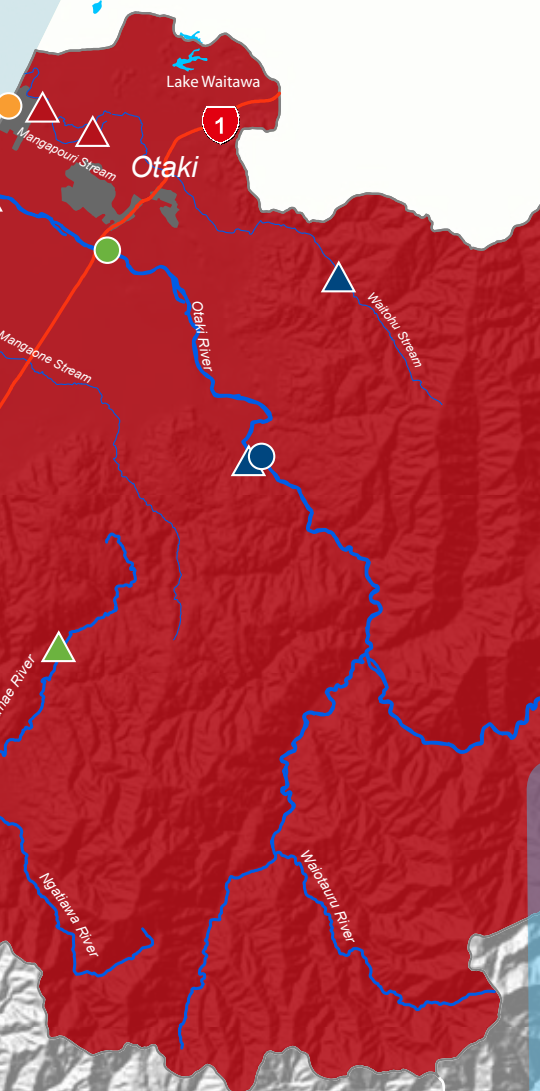
Groundwater quality varies across the Kapiti Coast but – looking across all the key indicators we measure – it's fit for drinking in most areas. Groundwater in one shallow well at Te Horo Beach regularly records the presence of *E. coli* bacteria – but this well isn't used for drinking.

Five of the 13 groundwater wells we monitor have nitrate levels high enough to potentially affect aquatic life in rivers and streams that the groundwater is connected with. The good news is that in one of these wells, nitrate levels declined over the five-year period we looked at – continuing a longer-term trend among several wells on the northern Kapiti Coast. We think this improvement may be due to improved land management practices, eg, more efficient use of fertiliser.



Steadily decreasing levels of nitrate in the Waitohu groundwater zone, north of Otaki. This monitoring well is 27 metres deep but may have some connection with surface water – so the current nitrate levels are still too high. The well is located in an area of horticulture

0 10 Kilometres



How healthy are the rivers and streams?

It's a mixed bag. While water quality at five sites we monitor is graded 'good' or 'excellent', five sites have 'poor' water quality because they fail to meet recommended guidelines for five of our six key indicators. It all comes down to size, location and the surrounding land use. The larger rivers are in good health where they flow out of the forested ranges – but water quality and ecological health are degraded in small lowland coastal streams in largely farming or urban catchments, such as the Mangapouri, Mangaone and Whareroa streams.



Located in an intensive farming catchment, the lower reaches of Mangaone Stream are in poor condition – they fail to meet guidelines for all six key water quality indicators. The impacts flow onto Te Horo Beach where water quality is sometimes affected by the stream

Are they getting better or worse?

River and stream health has largely remained stable, with a few exceptions – water clarity appears to have declined at several sites, including the Whareroa Stream at Waterfall Road where invertebrate health has also declined.

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

Will I get sick if I swim?

The risk is fairly low at popular sites on the Otaki and Waikanae rivers. Weekly summer monitoring between 2005/06 and 2010/11 shows these sites rarely breach the national water quality guidelines for swimming, even when it rains. Recreational users and dog owners do need to keep an eye out for potentially toxic algae (cyanobacteria) on the riverbed though – the algae is common in the Waikanae River during the summer.

Recreation grade

- Very Good
- Good
- Fair
- Poor
- Very Poor

The beaches fare reasonably well too. With the exception of Te Horo Beach and two other sites affected by poor water quality in streams that discharge to the beach, all coastal sites in the Kapiti sub-region are graded at least 'good' for recreation. This means the water is suitable for swimming most of the time. At the four 'fair' sites, water quality breaches guidelines at times, especially after rainfall or if stock or contaminants find their way into the streams flowing onto the beach.



Mudflat and estuarine snails are the most common animals living on the intertidal mudflats in Waikanae Estuary but the estuary is also home to several small crustaceans, molluscs and marine worms



The forested upper reaches of the Otaki River are popular for swimming. Our site at 'the Pots' (Pukehinau) is graded 'very good' for recreation – even after rainfall



Paekakariki Beach at Memorial Hall is graded 'very good' for swimming. The site never went over the 'alert' or 'action' levels of the national recreational water quality guidelines during the five summers to 2010/11

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 Kapiti Coast sub-region about their environmental concerns at workshops in Otaki, Paraparaumu and Paekakariki. Air quality, subdivision development and coastal hazards were important issues. Participants also thought providing opportunities for learning about resource management and support for community care groups were important.

If you would like to get involved with the review of our regional plans, email regional-plan@gw.govt.nz.



Storm surge on the Kapiti Coast



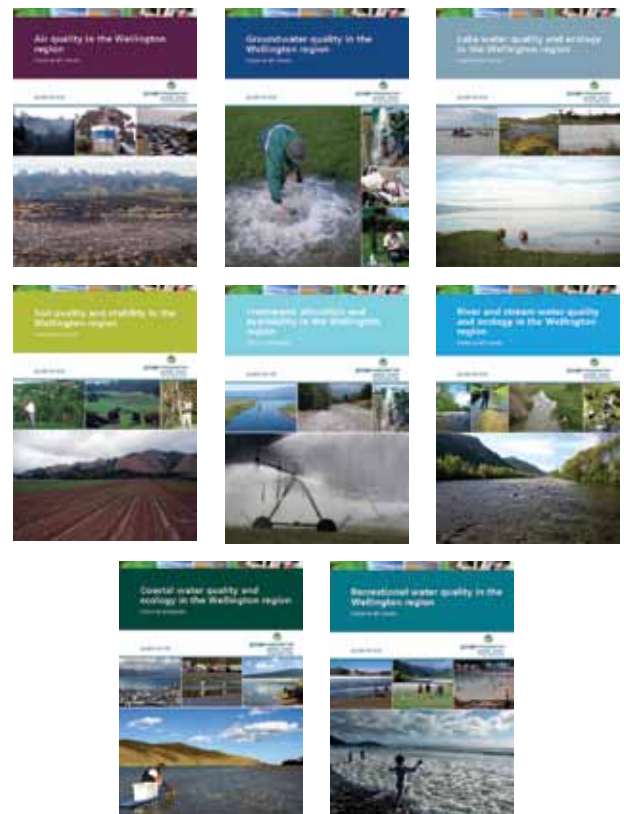
Planting the banks of the Whareroa Stream in Queen Elizabeth Park

What you can do to help

- Burn only dry untreated wood or consider switching to clean heating – see www.gw.govt.nz/warmer-gw
- Develop a nutrient budget that's appropriate for your soils and land use – 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 where possible to reduce evaporation
- Keep stock out of rivers and streams, and plant stream margins to help prevent bank erosion and improve habitat in the stream for aquatic life
- Avoid contaminants entering the stormwater system and, from there, nearby streams and the coast by saving the roadside gutter outside your house just for rain:
 - Clean your car in a commercial carwash
 - Take household chemicals and waste oil to the specific sections at official landfills
 - Leave small leftovers of paint and solvents to dry rather than pouring them down the drain

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



- Check out what we currently monitor and where at www.gw.govt.nz/environmentalmonitoring
- Contact us at environmentalscience@gw.govt.nz

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GW/EMI-G-12/152
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Air, land and water in the Wellington region – state and trends

Porirua Harbour sub-region



This is a summary of the key findings from State of the Environment monitoring we carry out in the Porirua Harbour catchment and surrounding coastal area. 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

Porirua Harbour and its catchment and coastal surrounds form a small but significant sub-region (just over 200km² or 3% of the Wellington region). While the sub-region extends north to Pukerua Bay and includes Titahi Bay, its focus is on the two harbour arms into which most streams drain: Pauatahanui Arm and Onepoto Arm. Together these arms form the largest estuary in the lower North Island, providing valuable nursery areas, shelter and food for numerous bird, fish and shellfish species. Porirua Harbour is widely used for a range of recreational pursuits.

What we routinely monitor in this sub-region

- Air quality at a residential location in Tawa
- Soil quality at a selection of drystock farm and exotic and native forest sites
- Rainfall at Whenua Tapu, Battle Hill and Seton Nossiter Park
- Water flows in Taupo, Porirua and Horokiri streams
- Recreational water quality at Pukerua Bay, Plimmerton Beach, Karehana Bay, Titahi Bay and selected locations in Porirua Harbour
- General water quality and ecological health in Porirua, Pauatahanui and Horokiri streams
- Ecological health and sediment quality at intertidal and subtidal locations in Porirua Harbour

Groundwater isn't monitored because there are no known significant aquifers.

Key points

- Air quality is well within national standards and guidelines for public health
- Soil quality monitoring indicates soils are healthy for their land use
- Stream health is impacted to some degree at all four sites monitored, particularly Porirua Stream where water quality is poor
- Results for 'safe to swim' tests vary a lot between places – most sites are graded 'fair' for recreation but four are 'poor'
- Porirua Harbour's ability to support life, and its overall ecological health, is beginning to be affected by the build up of sediment, nutrients and stormwater contaminants

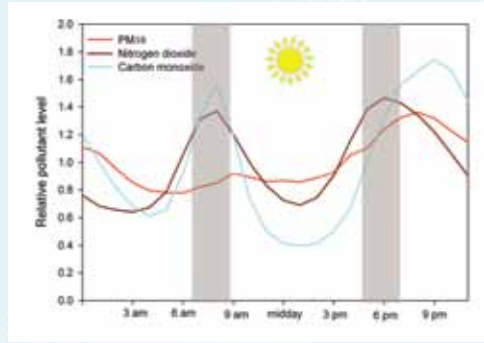


Assessing the health of the intertidal flats of Porirua Harbour

How clean is the air?

Very good, according to continuous air quality measurements made at Tawa over 2009 to 2010. Levels of the key pollutants fine particulate matter (PM₁₀), nitrogen dioxide and carbon monoxide all met national air quality standards.

Though we estimate a third of households in the sub-region use wood at some time to heat their main living area, overall the area's windiness and coastal situation mean the Porirua airshed is likely to be quite clean – the weather conditions that allow air pollutants to build up seldom occur here.



Records from our air quality monitoring station at Tawa show peak concentrations of air pollutants on a typical weekday coincide with early morning and evening rush hour on the roads

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

There are no water supply issues in this sub-region. Unlike other parts of the Wellington region, there are no significant groundwater aquifers and very little water is taken from streams for irrigation or other uses. There are a few consented water takes for small-scale irrigation from some of the streams that feed into the Pauatahanui Arm of Porirua Harbour, such as Pauatahanui and Horokiri streams, but these takes are small in relation to the flow in the streams.

Are the soils healthy?



Aerial photograph surveys found establishing forestry roads and tracks was one of the main contributors to increased soil disturbance across the Wellington region between 2002 and 2010

All 10 monitoring sites (black squares on the map) sampled between 2000 and 2010 had healthy soils for their land use, with most scoring well against the seven key indicators used to measure soil quality (including soil structure, nutrients, organic matter and pH). Only two drystock farming sites and one exotic forestry site failed on one indicator – phosphorus levels were below optimum.

Soil stability is an issue in some stream catchments of the sub-region, particularly those that drain to the Pauatahanui Arm of Porirua Harbour. Revegetation projects and other efforts to increase soil-holding cover are ongoing, aiming to reduce the rate at which soil erodes and washes into streams and then into the harbour – where it can smother cockle beds and other animal and plant life.

How healthy are the streams?

All four of the stream sites we routinely monitor are degraded to some degree. Sites on both the upper and lower reaches of Porirua Stream are graded 'poor' because four key indicators fail to meet recommended guidelines. At these sites, nutrient and *E. coli* concentrations are elevated while water clarity is often low. These sites often also record concentrations of heavy metals (copper and zinc) above recommended guidelines. Not surprisingly, the aquatic life isn't great – a reflection of poor stream habitat as well as poor water quality.



Measuring sediment re-suspended from the bed of Porirua Stream

Our investigations show urban stormwater is likely to be the main source of the heavy metals found in Porirua Stream, while the sewer network is likely a key contributor of nutrients and bacteria. There is some good news though – while nutrient levels remain high and nuisance algae is present in the lower stream reaches, between 2006 and 2011, the level of some nutrients decreased.

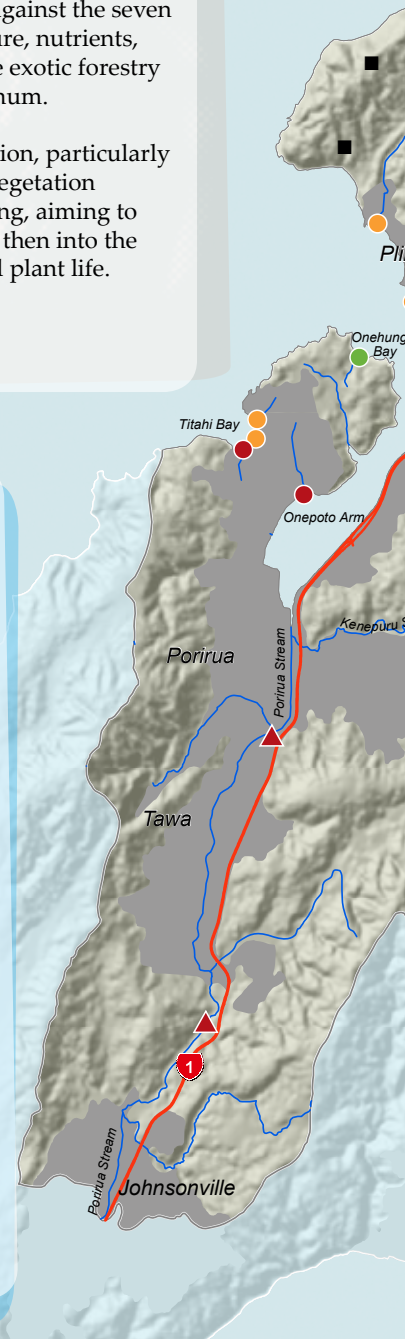
In the Horokiri Stream, water clarity declined between 2006 and 2011 – a possible signal of more sediment entering the stream. Fortunately, this does not appear to have impacted on aquatic life in the stream, with the site at Snodgrass – and the monitoring site on Pauatahanui Stream – considered in 'good' condition for insects and other animals living in or on the streambed.

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



Will I get sick if I swim?

There is an increased risk of illness from contact recreation at some of the 15 coastal sites monitored (particularly if you eat shellfish gathered there). Weekly summer monitoring of indicator bacteria levels has shown that Plimmerton at South Beach, Porirua Harbour at Rowing Club and the southern end of Titahi Bay breach national recreational water quality guidelines the most. These sites, along with Browns Bay, are graded 'poor' for recreation. This is due to faecal contamination from a combination of waterfowl (South Beach), and sewer or stormwater drains.

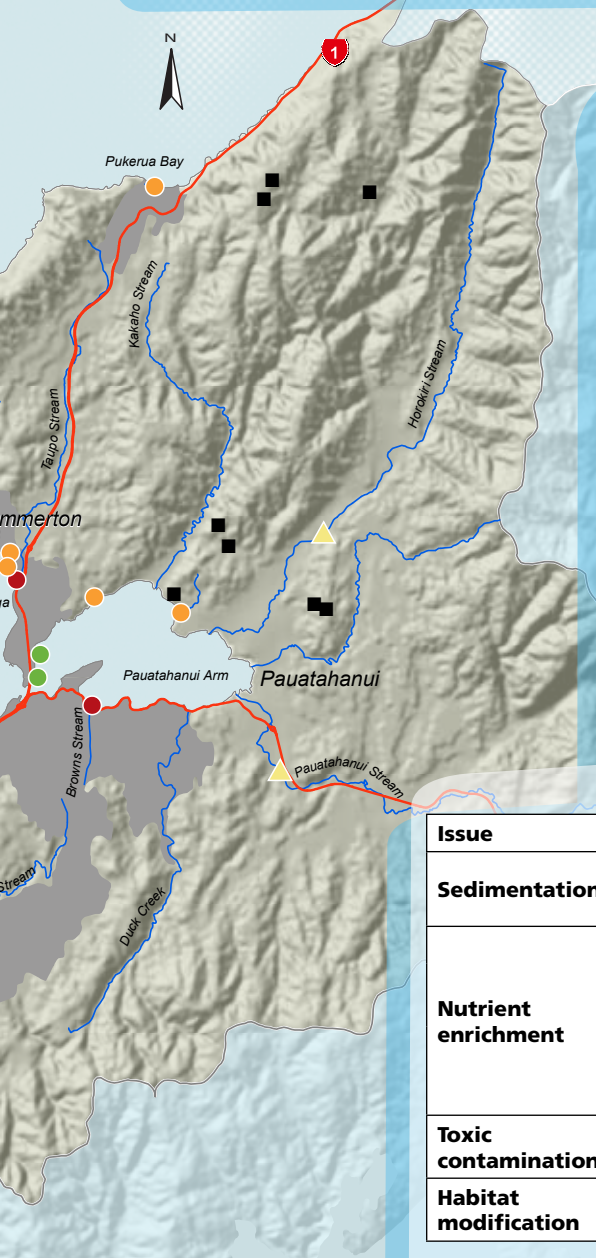


Girls playing at Pukerua Bay

Recreation grade

- Very Good
- Good
- Fair
- Poor
- Very Poor

In contrast, Porirua Harbour at the Paremata Bridge and Onehunga Bay are currently graded 'good' for recreation – water quality at these sites rarely fails national guidelines. Sites graded 'fair' breach guidelines at times, especially after rainfall.



What is the condition of Porirua Harbour?

We've been monitoring ecological health in both arms of the harbour since 2004. The table shows the key indicators we measure and highlights the state of the intertidal sand flats. Here, sediment contaminant levels are generally low and the invertebrate communities are reasonably diverse. However, across four annual surveys between 2008 and 2011, we found nuisance levels of algae on some sandflat areas, and a decline in the depth of the oxygenated layer in the surface sediments.



Whiggle Ltd

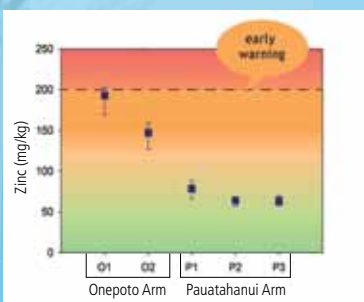
Between 2008 and 2011 the depth of oxygenated sediment (indicated by the lighter-coloured surface layer) at all four intertidal monitoring sites in both arms of the harbour decreased from around 4-5 cm to just 1 cm. Low oxygen levels restrict what is able to live in the sediment



Whiggle Ltd

Thick growths of algae regularly cover large areas of Porirua Harbour's sandflats

Issue	Indicator	Onepoto Arm	Pauatahanui Arm
Sedimentation	Mud content (%)	Low but increasing in upper estuary areas	
	Sedimentation rate (mm/yr)	Low – moderate (higher in subtidal areas)	
Nutrient enrichment	Organic and nutrient content	Low – no obvious trends	
	Sediment oxygenation	Poor – was 'good' in 2008 and has been declining since	
	Nuisance algae cover	Moderate (over 20% of the Onepoto Arm has more than 50% cover)	
Toxic contamination	Heavy metal levels	Low – except in intertidal sediments near stream mouths and stormwater outfalls	
Habitat modification	Saltmarsh and seagrass loss	High	Moderate



Average (and range) zinc levels from four surveys (2004 to 2010)

In the deeper parts of the harbour contaminants that are washed in from the stormwater outfalls are collecting in the sediments. It's worse in the Onepoto Arm where heavy metal concentrations are near or above early warning guidelines. Across four surveys to date, zinc levels are increasing in the sediments of this arm. It's still too early to understand the ecological significance of this, but the diversity and abundance of small invertebrate animals is less in the Onepoto Arm than in the Pauatahanui Arm – this difference is linked to the higher amount of mud, organic matter and metals found in the Onepoto Arm sediments.



In 2008 saltmarsh cover in the Pauatahanui Arm was estimated at 50 hectares – this compares with less than a hectare in the Onepoto Arm. Seagrass cover fares slightly better at 41 and 17 hectares in the Pauatahanui and Onepoto arms, respectively

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 Porirua Harbour sub-region about their environmental concerns. Waterways, biodiversity and soils were common priorities for participants, as in workshops in other areas. Better management of Porirua Harbour, including improving the stormwater network and minimising silt coming off subdivisions, were important issues. Participants in both workshops preferred education as a tool for improving natural resource management. Human health issues were also important. The loss of kai moana from the harbour was a concern, especially for iwi, with pollution compromising shellfish gathering.

If you would like to get involved with the review of our regional plans, email regional-plan@gw.govt.nz.



A return to safe shellfish gathering is an aspiration for many, especially for Ngāti Toa, guardians of Porirua Harbour

What goes in here...



...ends up here



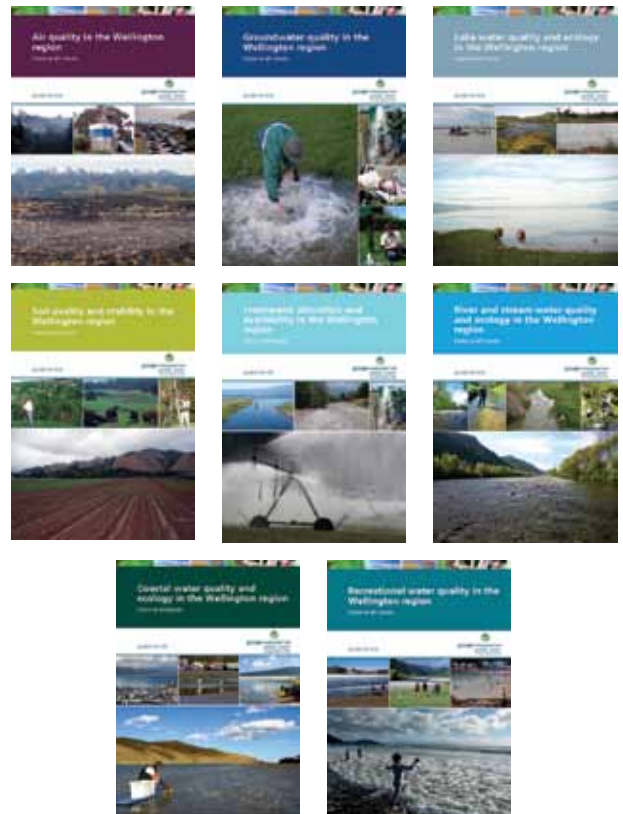
Report activities that you see that might harm the environment to Greater Wellington's 24-hour **Pollution Hotline (0800 496 734)**. Anything you put down a stormwater drain ends up in the harbour

What you can do to help

- Burn only dry untreated wood in your fireplace and insulate your home to cut down on fuel use
- Plant vegetation to help prevent bank erosion and improve habitat in the stream for aquatic life
- Avoid contaminants entering the stormwater system and, from there, nearby streams and the harbour or coast by saving the roadside gutter outside your house just for rain:
 - Clean your car in a commercial carwash
 - Take household chemicals and waste oil to the specific sections at official landfills
 - Leave small leftovers of paint and solvents to dry rather than pouring them down the drain
- Don't swim or collect shellfish near stormwater outfalls or stream mouths, especially after heavy rainfall
- Get involved in the recently launched programme to improve the health of Porirua Harbour and its catchment – see www.pcc.govt.nz (search for 'harbour strategy')

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



- Check out what we currently monitor and where at www.gw.govt.nz/environmentalmonitoring
- Contact us at environmentalscience@gw.govt.nz

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

Wellington Harbour sub-region



This is a summary of the key findings from State of the Environment monitoring we carry out in the Wellington Harbour and south coast catchments. 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

This sub-region is home to most of the people living in the Wellington region – although it only makes up 14% of the region's land area (1,183km²). It covers Wellington, Upper Hutt and Hutt cities, and also the Wainuiomata Valley and Wellington's south coast. The sub-region is centred around Wellington Harbour (Te Whanganui a Tara), which is regionally important for its landscape, ecological, cultural, geological and recreational values. The harbour is also a 'sink' for urban and rural runoff from the entire Hutt Valley and much of Wellington city.

What we routinely monitor in this sub-region

- Air quality at residential areas in Upper Hutt, Lower Hutt and Wainuiomata, and at a busy intersection in central Wellington
- Rainfall and soil moisture at selected locations
- River flows and/or water levels at 13 sites
- Groundwater levels at selected sites (17 of these via automated level readers)
- Groundwater quality at 9 sites, mostly in the Hutt Valley
- Recreational water quality at selected locations on the Hutt, Pakuratahi and Wainuiomata rivers, and at 36 sites around Wellington Harbour and the south coast of Wellington city
- General water quality and ecological health at 14 river/stream sites
- Ecological health and sediment quality in the Hutt Estuary and Wellington Harbour

Soil health is not currently monitored in this sub-region because there are limited high-class soils here compared with other parts of the Wellington region.

Key points

- Air quality is very good overall, except during winter in some residential areas on cold and calm evenings – when fine particles produced by woodburners don't disperse
- The quality of the groundwater is very high
- Most of the freshwater used in the sub-region goes to public water supply – there's very little water left to allocate from the major rivers or groundwater aquifers
- River and stream health is excellent at sites near the ranges but is degraded further downstream, especially in urban areas
- Most beach and river recreation sites we monitor are suitable for swimming but water quality at many – especially river sites – is compromised after rainfall when stormwater and occasionally sewage flow into streams and the coast
- Contaminants from urban stormwater, such as lead, copper and zinc, are present in the sediments on the bed of Wellington Harbour – the levels are highest in Evans Bay and Lambton Basin



Sampling invertebrates in the Kaiwharawhara Stream

How clean is the air?

It's not too bad where people live. Monitoring between 2008 and 2010 shows that air quality met national standards for the three key variables we monitor – fine particulate matter (PM₁₀), nitrogen dioxide and carbon monoxide – in residential areas in both Lower Hutt and Upper Hutt. Levels of PM₁₀ in Wainuiomata were high on some cold and calm winter nights when many homes are heated with fires. Wood burner use in the region is highest in Wainuiomata (39% of homes) followed by Upper Hutt (36%) and Lower Hutt (27%).



Free vehicle emissions check at Westpac Stadium (March 2006) in Wellington city offered as part of the publicity and education campaign running in tandem with the on-road vehicle emissions testing study



In the industrial area of Seaview, monitoring from 2004 to 2007 showed PM₁₀ concentrations were largely made up of marine aerosol and soils (both natural sources) with some zinc, lead and sulphate detected from industrial sources. Benzene and other volatile organics compounds met relevant guidelines when measured

Air quality is also pretty good along roads with heavy traffic flows – national standards were not breached at any sites we monitored (including the now-closed sites at Melling (SH2) and Ngauranga Gorge). At our Wellington CBD monitoring site (Victoria Street) peak levels of PM₁₀ and carbon monoxide declined over the period 2004 to 2010, despite high traffic volumes. Peak nitrogen dioxide levels have also declined since 2005.

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

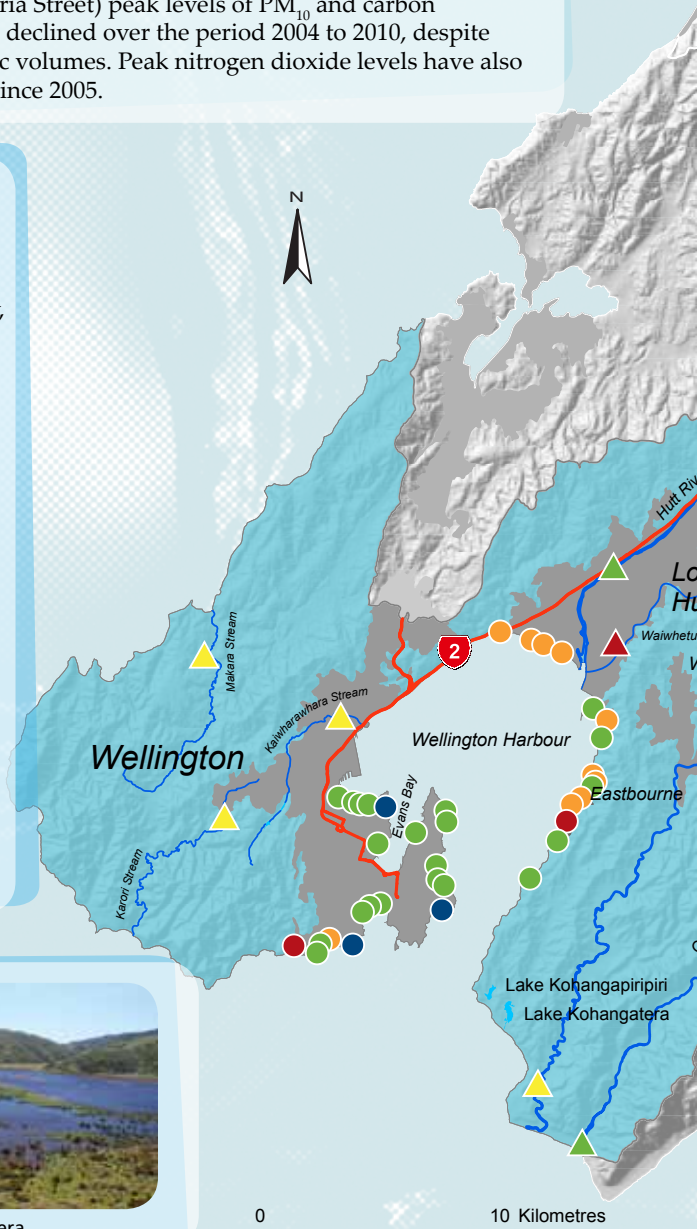
Most of the freshwater used in this sub-region goes to public water supply – there's very little water left to allocate from major rivers or groundwater aquifers. As at the end of 2010, water allocated through resource consents was 114.6 millions cubic metres per year – 94% of this went to public supply, and the rest to irrigation (mainly golf courses) and industry.



The Hutt River near Manor Park. The Hutt, Wainuiomata and Orongorongo rivers are the source of 70% of the public supply, while the remainder comes from groundwater aquifers. The upper reaches of these rivers are highly allocated – during times of low flow, up to 40-70% of water in the rivers can potentially be removed. Prolonged low flows are known to contribute to water quality issues, particularly nuisance algae growth

Between 1990 and 2010, water allocation increased by about 10%. This largely reflects actual and anticipated population growth in the cities.

Annual extremes in minimum summer rainfall and river flows have not changed significantly over the past 30 to 40 years. Groundwater levels also appear to be stable; recent analysis of data from a well in each of the Lower Hutt and Upper Hutt aquifers showed no trend for the period 1994–2010. The Lower Hutt aquifer, the source of 95% of the groundwater contribution to public supply, is fully allocated.



How healthy are the Parangarahu Lakes?

The ecological condition of Lake Kohangapiripiri and Lake Kohangatera (commonly referred to as the Pencarrow lakes) was rated 'high' and 'excellent', respectively, in aquatic vegetation surveys carried out in 2011. Lake Kohangatera was ranked 10th best in New Zealand and noted as an outstanding example of a lowland lagoon system.



Lake Kohangatera

What's the condition of Wellington Harbour?

Wellington Harbour acts as a drainage 'sink' for the entire Hutt Valley and much of Wellington city, so it is no surprise that contaminants from urban stormwater and other land uses accumulate in the harbour sediments. In 2006 we tested these sediments at 17 locations and found levels of some contaminants were above 'early warning' guidelines for aquatic health – including lead, copper, zinc, mercury and polycyclic aromatic hydrocarbons (PAHs). Concentrations of the long-banned insecticide DDT were also elevated – highlighting how long past practices can continue to affect the environment.

Contaminant levels are highest in the sediments of the inner Lambton basin and Evans Bay, a clear indication that nearby urban stormwater outfalls are the main source of contamination. In late 2011 we completed a second survey so we'll soon have a better idea whether this contamination is getting any worse, and what it might mean for the animals living in the harbour sediments.



Total lead concentrations in Wellington Harbour sediments. The length of the bars is proportional to the concentrations present. Bars coloured orange indicate levels above 'early warning' guidelines

How good is the quality of the groundwater?

Very good. Looking across all the key indicators we measure, groundwater in the Wellington Harbour sub-region is fit for drinking, with no significant deterioration in quality in recent years. In contrast with the Kapiti Coast and Wairarapa Valley, nitrate levels in the nine wells we monitor are all within the 'background' range (less than 3 mg/L as nitrate nitrogen).

How healthy are the rivers and streams?

Over half of the 14 monitored sites are located in the Hutt catchment, and water quality is mostly graded 'good' or 'excellent' at these sites. The two exceptions are sites on the lower reaches of the Mangaroa River and Waiwhetu Stream that are graded 'poor' because key indicators don't meet recommended guidelines. The Mangaroa River fails some indicators, as a result of agricultural land use around it, while urban contaminants, including stormwater and sewer inputs, mean the Waiwhetu Stream fails to meet guidelines for all six water quality indicators.

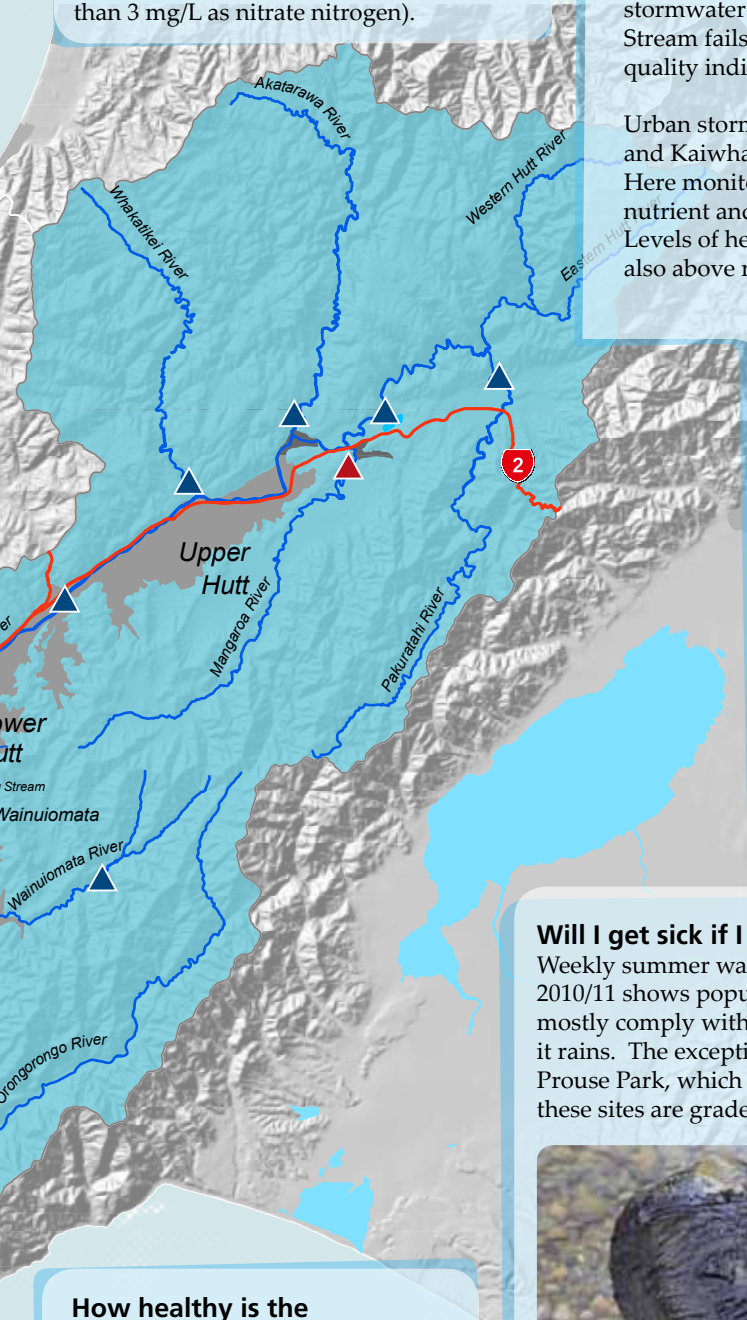
Urban stormwater discharges also affect the Karori and Kaiwharawhara streams in Wellington city. Here monitoring sites are only graded 'fair' because nutrient and *E. coli* bacteria levels are too high. Levels of heavy metals such as copper and zinc are also above recommended guidelines at times.

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



The clean-up of industrial pollutants from the streambed and subsequent native replanting along the banks has improved the stream environment of the lower Waiwhetu Stream. However, water quality is still very degraded and invertebrate health is poor

Are they getting better or worse?

Water quality generally remained stable over the 2006 to 2011 period we examined – but there were small improvements in some indicators at some sites. Unfortunately, levels of dissolved reactive phosphorus and cover of nuisance algae increased in the Mangaroa River. Nuisance algae also appears to have increased at our monitoring sites on the Kaiwharawhara Stream, the Pakuratahi River and the lower reaches of the Hutt River.

Will I get sick if I swim?

Weekly summer water quality monitoring between 2005/06 and 2010/11 shows popular river spots in the Hutt and Wainuiomata areas mostly comply with national guidelines for swimming, except when it rains. The exceptions are sites at Silverstream, Boulcott and Richard Prouse Park, which sometimes breach guidelines in dry weather too – these sites are graded 'fair' or 'poor'.

Recreation grade

- Very Good
- Good
- Fair
- Poor
- Very Poor



Toxic algae (cyanobacteria) is often a problem in the Hutt River in summer – since late 2005, 11 dogs have died after coming into contact with the algae

How healthy is the Hutt Estuary?

Despite its closeness to an urban area and its stormwater discharges, the Hutt Estuary is in a moderate condition. Ecological assessments in 2010 and 2011 found the sediments are quite muddy and slightly enriched with nutrients – which limits the diversity of organisms that can live there. In contrast, levels of organic matter and heavy metals in the sediment are low. Overall, the main issues are the nuisance levels of algae along the estuary margins and a lack of high value estuarine habitat, such as saltmarsh.



Scorching Bay in Wellington city is one of only a handful of sites across the Wellington region graded 'very good' for recreation – water quality at this site didn't breach the 'action' level of the national guidelines on any occasion over the five summers examined

On the beaches...

Almost all of the beach sites around Wellington city are graded 'good' for recreation, indicating that the water is suitable for swimming most of the time. Around Petone and along the Eastbourne coast there are more sites graded 'fair' – these sites tend to breach guidelines more often, especially after rainfall. Only Owhiro Bay and Robinson's Bay are graded 'poor' (see the red circles on the map). Faecal contamination at these sites is at least partly due to sewer and stormwater infrastructure problems.

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 Wellington Harbour sub-region about their environmental concerns. Transport, air quality, rubbish and litter management, riparian planting and stormwater infrastructure were identified as important areas for resource management. Participants in Wellington city meetings also identified community gardens and care groups as important.

If you would like to get involved with the review of our regional plans, email regional-plan@gw.govt.nz.



Workshop participants contribute their environmental concerns and ideas



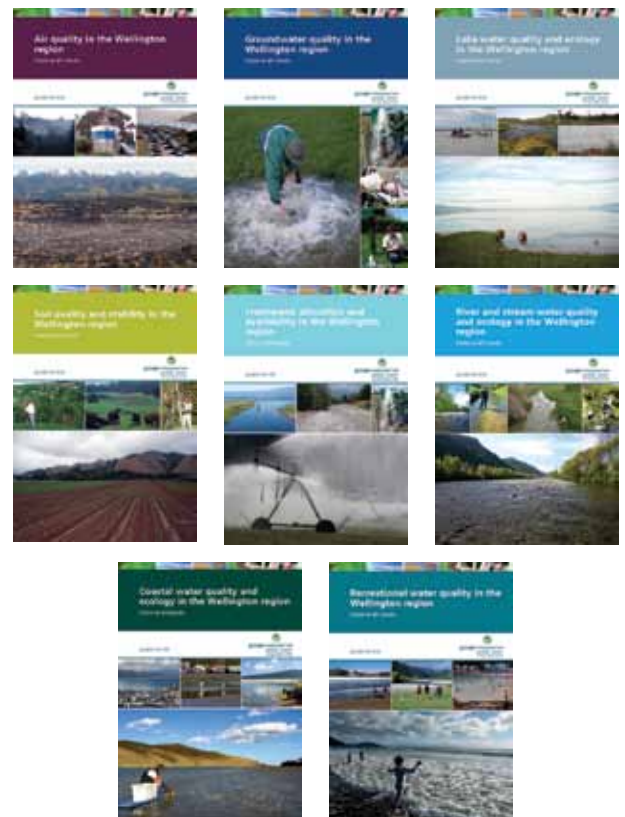
If you see pollution in a river, stream or at the coast, phone Greater Wellington's 24-hour **Pollution Hotline (0800 496 734)**

What you can do to help

- Burn only dry untreated wood in your fireplace or switch to clean heating – see www.gw.govt.nz/warmer-gw
- Ensure you keep your car well tuned so there's less pollution from its exhaust
- Use water efficiently – only use what you need
- Avoid contaminants entering the stormwater system and, from there, nearby streams and the harbour or coast by saving the roadside gutter outside your house just for rain:
 - Clean your car in a commercial carwash where all runoff is treated
 - Take household chemicals and waste oil to the specific sections at official landfills
 - Leave small leftovers of paint and solvents to dry rather than pouring them down the drain. Some paint retailers accept unused/ unwanted paint
- Don't swim or collect shellfish near stormwater outfalls or stream mouths, especially after heavy rainfall
- Keep stock out of rivers and streams, including small feeder streams and marshy areas in catchment headwaters

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



- Check out what we currently monitor and where at www.gw.govt.nz/environmentalmonitoring
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June 2012



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 3,555km² (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

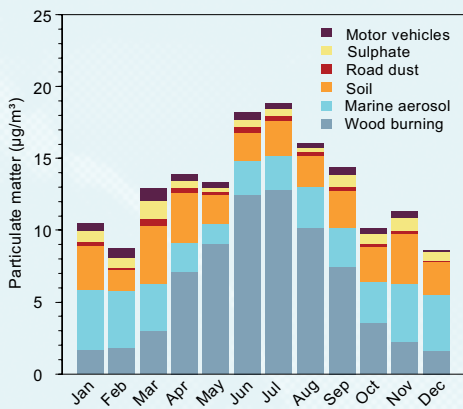
- Air quality in Masterton
- Soil quality and soil moisture at selected locations
- Rainfall at 18 locations
- River flows and/or water levels at 26 sites
- Groundwater levels at 77 sites (35 of these via automated level readers)
- Groundwater quality at 48 sites
- General water quality and ecological 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 PM₁₀ 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_{2.5} is released. This leads to higher levels of PM₁₀, 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 (PM₁₀) during winter.

On average the national standard for PM₁₀ was exceeded twice per year in Masterton during 2006 to 2010 (although annual average PM₁₀ 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

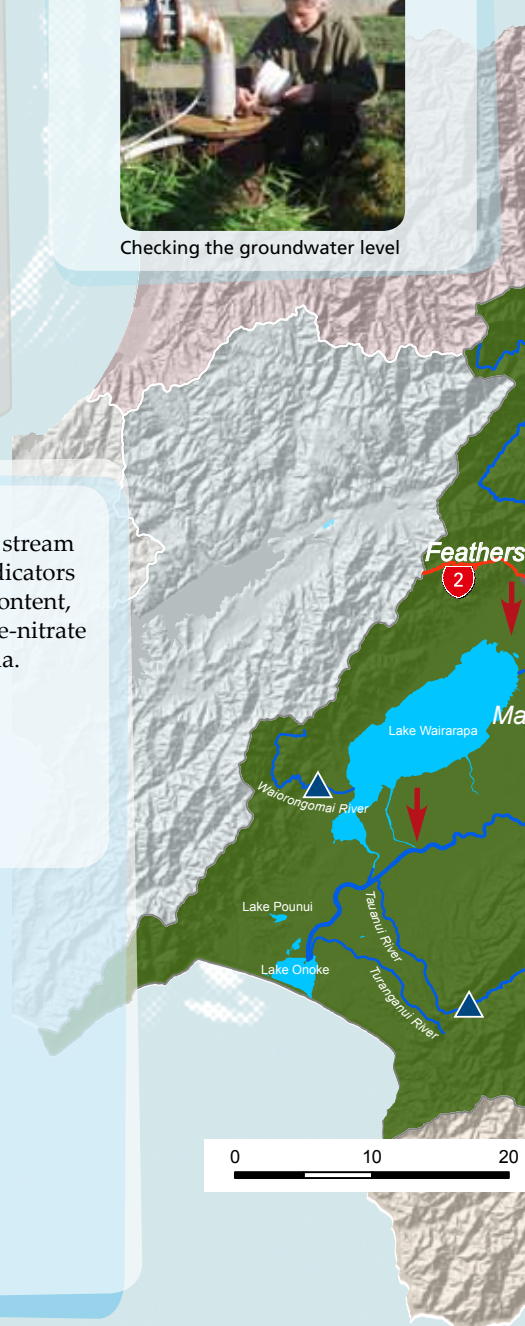
Are they getting better or worse?

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



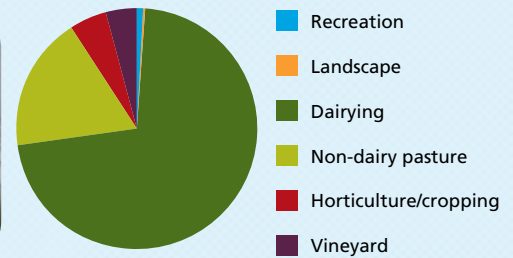
Water resources – what's being used and how much is left?

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.

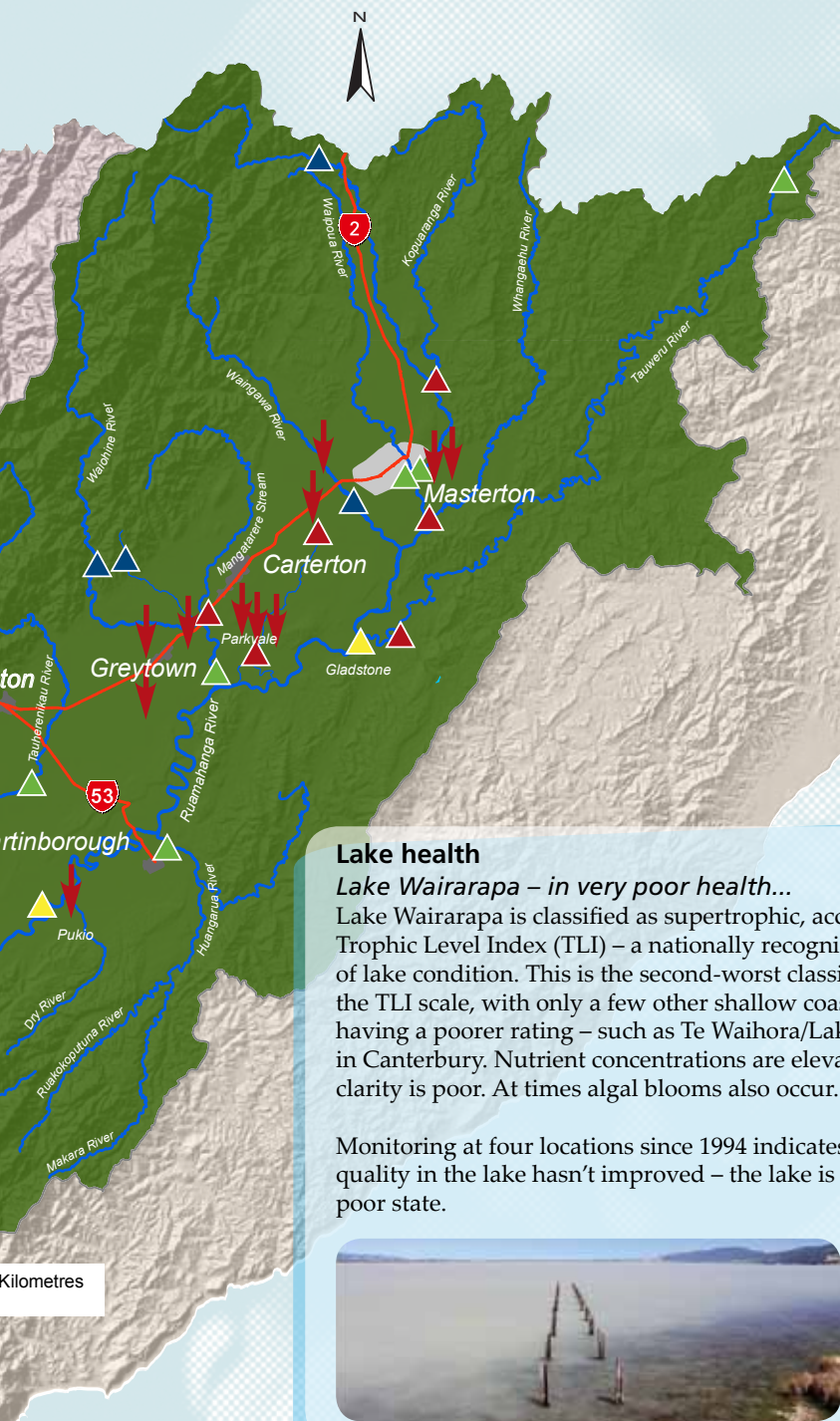


The arrows on the map show sites where groundwater levels significantly declined (1994 to 2011)



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.



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



- Check out what we currently monitor and where at www.gw.govt.nz/environmentalmonitoring
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June 2012



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

Eastern Wairarapa hills sub-region



This is a summary of the key findings from State of the Environment monitoring we carry out in the eastern Wairarapa hill country. 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

Covering an area of 2,478km² (30% of the Wellington region), the eastern Wairarapa hill country drains to the east coast between the Mataikona River in the north and Ngawi in the south, and includes the popular holiday beaches of Castlepoint and Riversdale. It is the driest, windiest and least populated part of our region.



Collecting river water samples

Key points

- Soil stability is still a problem, with fine sediment often running off the land into rivers, streams and the coast – the very high sedimentation rate in Whareama Estuary is impacting on the small animals that live in and on the estuary sediments
- River and stream water quality is generally good but water clarity is often poor and there is a lack of flow in many waterways, especially during summer
- Castlepoint and Riversdale beaches are good for swimming nearly all the time

What we routinely monitor in this sub-region

- Soil quality at selected drystock farm and exotic forestry sites
- Rainfall and soil moisture at selected locations
- Recreational water quality at Castlepoint and Riversdale beaches
- Groundwater quality at Riversdale
- Flows in the Pahaoa River (in conjunction with NIWA)
- General water quality and ecological health at six river/stream sites
- Ecological health of Whareama Estuary and Castlepoint Beach

Air quality isn't monitored because the eastern hills are very exposed with no major known sources of air pollutants.

Results inside...

Is the soil stable?

Soil stability has been a major problem in the eastern Wairarapa hill country due to its steep slopes and soft mudstone rocks. When these soils slip or slump down hillsides and get into waterways and eventually the coast, they can affect water clarity and quality, and the habitat for aquatic plants and animals.

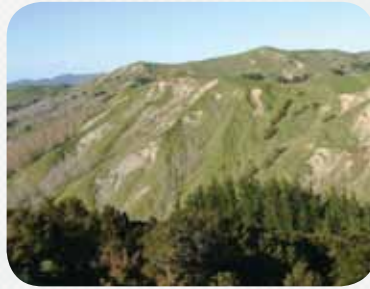
The good news is that our surveys show the amount of soil that's now classed as stable has increased. We compared aerial photographs from 2002 and 2010, which show that there's almost 15,000 hectares more land under soil conservation cover – much of it in new forestry plantations in the eastern Wairarapa hill country.

How healthy are the soils?

We tested the quality of soils at two drystock farm sites in autumn 2007. The indicators we use to measure soil quality (including soil structure, nutrients, organic matter and pH) were all suitable for pastoral land use.



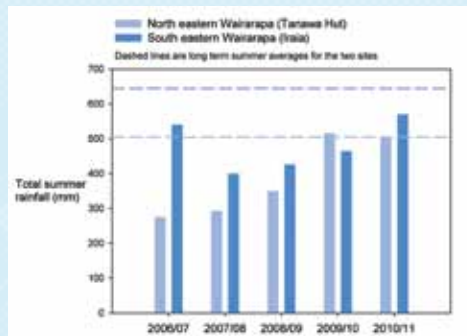
Planting poplars to protect against soil erosion



Greater Wellington's soil conservation efforts have been successful. In 1977 the Wellington region contained 103,000 hectares of erosion-prone pasture land with the vast majority in the eastern Wairarapa hill country. About 60,000 hectares now has stable soils thanks to replanting, natural regrowth and soil conservation works. We're now working to reduce erosion in the remaining 43,000 hectares



Very dry eastern hill country during autumn 2008

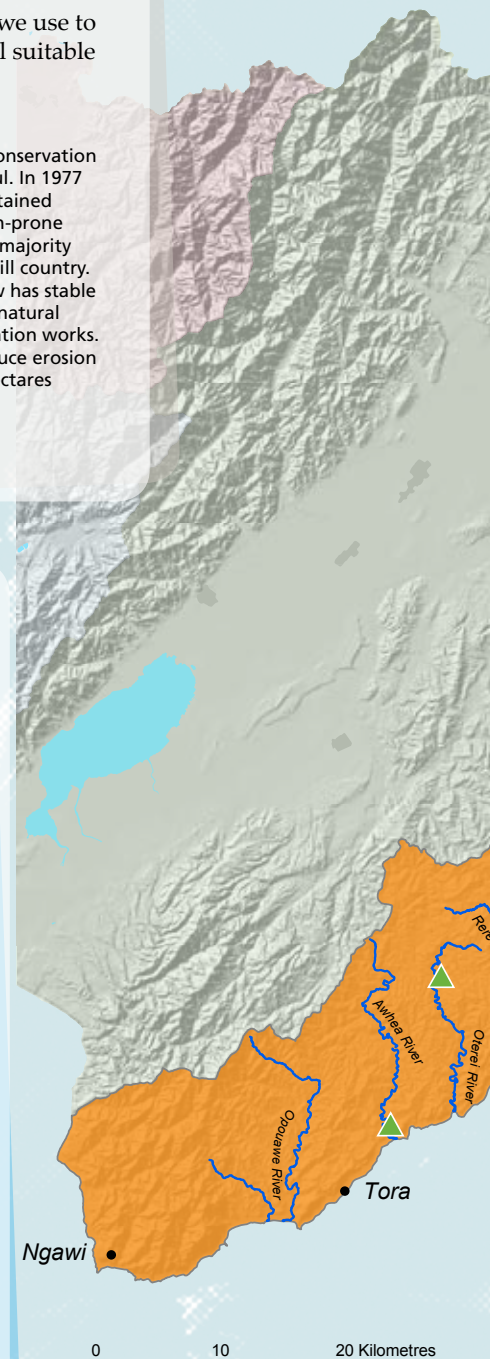


The mean annual low flow of the Pahaoa River at Hinakura is just 95 litres per second (L/s). As of December 2010, 50 L/s is allocated to consented water takes for irrigation, equating to more than half of the water in the river at low flows. This is a relatively high level of allocation. Occasionally the river almost dries up – during the 2007/08 drought, river flow at Hinakura fell to as low as 20 L/s – placing additional stress on the aquatic ecosystem and interrupting irrigation supply

Water – how much is there?

The eastern Wairarapa hill country can be very dry, with low flows in many waterways and a shortage of moisture in the soil, particularly in summer. While we didn't detect any significant changes in summer rainfall and river flows in the Wellington region between 1980 and 2010, the most recent five years were drier than normal across the region, including the eastern Wairarapa (see bar graph).

The most recent drought in eastern Wairarapa was in autumn 2010 – in April 2010 rainfall was less than 25% of the long-term average and our monitoring site at Tanawa Hut (see map) had its driest April since records began in 1956. But this drought was relatively short-lived. Between November 2007 and April 2008, the soils at our monitoring site Lagoon Hill were extremely dry with a severe soil moisture deficit persisting for 100 consecutive days. This affected grass and plant growth.



Will I get sick if I swim?

Both Castlepoint and Riversdale beaches are very popular with holidaymakers. Weekly summer water quality monitoring shows they're safe to swim nearly all the time. The two beaches consistently comply with national recreational water quality guidelines. All five monitoring sites are currently graded 'good' or 'very good' for recreation.

Recreation grade

- Very Good
- Good
- Fair
- Poor
- Very Poor



Children at Riversdale Beach



How healthy are the beach sands?



Measuring the depth of oxygenated sands

The intertidal sands at Castlepoint Beach are in good condition for the creatures living in the sediment, according to ecological assessments from 2008 and 2009. The beach sands are clean and well-oxygenated, supporting small animals such as isopods, amphipods, beetles and polychaete worms.



Wiggle Ltd

What's in the sediment at Whareama Estuary?

Whareama Estuary is the largest river lagoon estuary on the eastern Wairarapa coast and it's not in the best condition. Annual ecological monitoring between 2008 and 2011 found the estuary's sediments to be very muddy with low oxygen levels, which limits the types of small animals able to live there. Only a small cockle population remains and this is under threat from the very high amounts of sediment flowing into it from the upstream catchment. The estuary is filling up with sediment at almost 7mm/year (more than seven times the natural sedimentation rate).

How good is the quality of the groundwater?

We've monitored the quality of the shallow groundwater at Riversdale Beach quarterly since 2008. Results show slightly elevated levels of nitrate and, occasionally, *E. coli* bacteria are present. The groundwater at Riversdale is not used for drinking.

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

How healthy are the rivers and streams?

Two of the six river sites we monitor in the eastern hill country – Motuwaireka Stream at headwaters and Totara Stream at Stronvar – currently have excellent water quality. The other four sites are graded good, because they typically fail guideline values for one indicator – water clarity. That's not surprising as highly erodible mudstone soils that dominate the eastern Wairarapa hill country can lead to murky, sediment-laden waterways.

Are they getting better or worse?

River and stream health are about the same. Based on five years of monthly monitoring between July 2006 and June 2011, water quality across the six monitoring sites has remained stable – though nuisance algae cover may be increasing at a couple of sites.



Good water quality doesn't always translate into good habitat for aquatic animals. Ecological health at some sites like the Awheha River (pictured) is only 'fair' – this generally reflects poor habitat such as limited vegetation along the river/stream banks and low flows during summer. This leads to the water heating up and contributes to increased nuisance algal growth. When you add in lots of sediment (which can smother stream habitat) ecological values can be degraded

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 eastern Wairarapa hills sub-region about their environmental concerns at workshops in Martinborough and Tinui. Good water quality, biodiversity and good soils were common priorities for workshop participants – biosecurity, landuse planning, sewerage systems and landscape protection were also important issues for people in this area.

If you would like to get involved with the review of our regional plans, email regional-plan@gw.govt.nz.



What you can do to help

- Fence and retire steep and non-productive land, and plant trees to stabilise erosion-prone land, enhance biodiversity and provide shelter and shade for stock
- Use water efficiently – only use what you need and irrigate during the night where possible to reduce evaporation
- Restore stream riparian zones 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



Workshop participants contribute their environmental concerns and ideas

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



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June 2012

Water, air, earth and energy – elements in Greater Wellington’s logo that combine to create and sustain life. Greater Wellington promotes **Quality for Life** by ensuring our environment is protected while meeting the economic, cultural and social needs of the community

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