greater WELLINGTON
REGIONAL COUNCIL
Te Pane Matua Taiao

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 200km^2 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

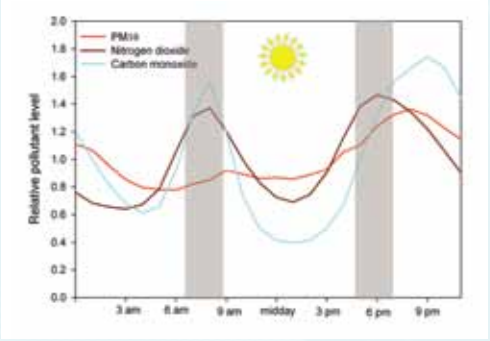
Assessing the health of the intertidal flats of Porirua Harbour

Results inside...

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 (PM_{10}), 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.

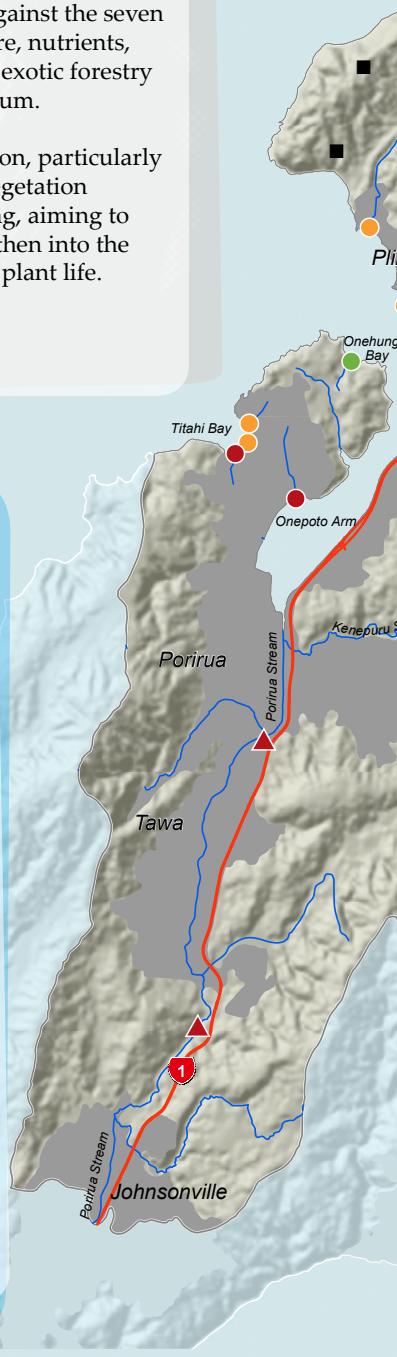
In the Horokiri Stream, water clarity declined between 2006 and 2011 – a possible signal of more sediment entering the stream. Fortunately, this does not appear to have impacted on aquatic life in the stream, with the site at Snodgrass – and the monitoring site on Pauatahanui Stream – considered in 'good'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



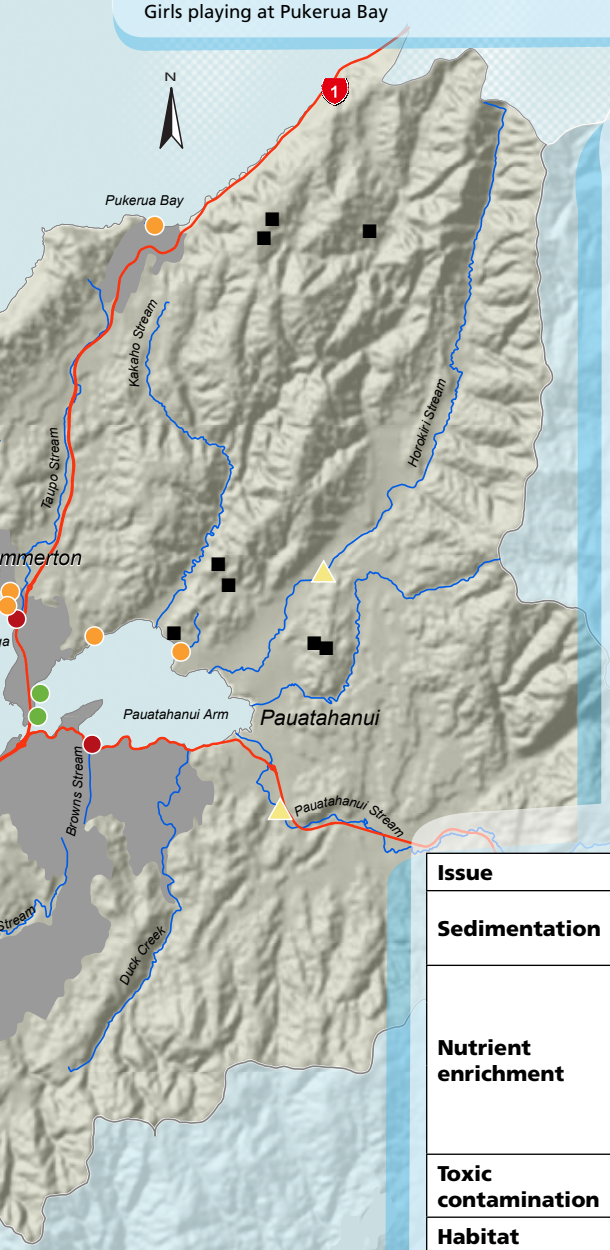
Will I get sick if I swim?

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.

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.

Recreation grade
- Very Good
- Good
- Fair
- Poor
- Very Poor

Girls playing at Pukerua Bay



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.

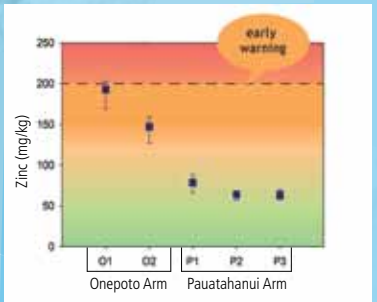
Wriggle Ltd

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

Wriggle 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?

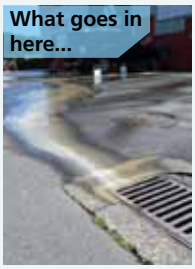
Our analysis of the Wellington region's air, land and water resources has been a crucial component in reviewing our current regional plans. We're now developing a new integrated plan to sustainably manage these natural resources. The review has identified several key areas on which the new plan will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

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

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

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**.



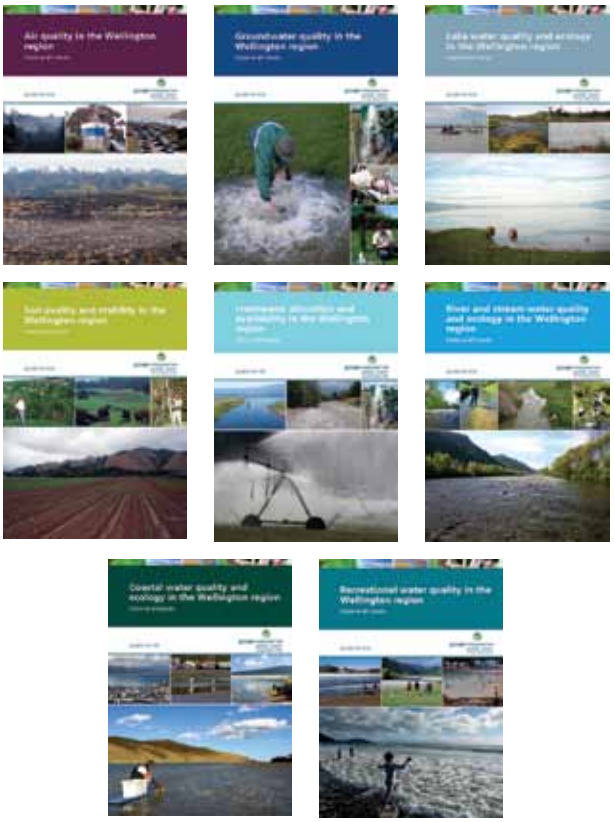
Report activities that you see that might harm the environment to Greater Wellington's 24-hour **Pollution Hotline (0800 496 734)**. Anything you put down a stormwater drain ends up in the harbour

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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