

DRAFT



PORIRUA HARBOUR AND CATCHMENT

Strategy and Action Plan

August 2011



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Foreword

Tena koutou katoa. We are pleased to make public this document – **The Porirua Harbour and Catchment Strategy and Action Plan**.

A huge amount of time, energy, research and collaboration has gone into this by a diverse collection of qualified individuals, groups and organisations.

This document is the first of its kind to specify how we will tackle the challenges facing Porirua Harbour and catchment.

We acknowledge all those who have contributed to this in some way. It is something they can be proud of ... yet this is just the beginning.

The Porirua Harbour and Catchment Strategy and Action Plan is a living document. It will be reviewed every three years and new information will be accommodated within the Action Plan as it becomes available.

Can Porirua Harbour be saved? The overwhelming scientific evidence from extensive research is an unreserved “Yes!”

Who is going to save it? We all are – the people of the Porirua Basin, by working individually and through our councils and the other agencies that have an interest and a responsibility to do so.

Now is the time to take action... while we still can!

Na matou noa, na.

Nick Leggett
Mayor
Porirua City Council

Celia Wade-Brown
Mayor
Wellington City Council

Fran Wilde
Chairperson
Greater Wellington
Regional Council

Te Ariki Wineera
Chairman
Te Runanga
O Toa Rangatira



From Ngāti Toa Rangatira

E ngā mana, e ngā reo, e ngā karangatanga maha kei waenganui i a koutou, nau mai, haere mai ki raro i te korowai mahana nei o Ngāti Toa Rangatira. He mihi tēnei ki a koutou katoa o te hāpori nei o Porirua.

He mea taketake ana ki a tātou katoa o te rohe nei, ko te āhua me te oranga o te moana nei a Porirua. E whai ake nei ētehi kōrero rautaki hei hāpai i ngā mahi e pā ana ki te manaaki, e pā ana ki te āta tiaki i tēnei taonga puiaki o tātou.

Greetings to the many peoples, to the many voices, and to the many affiliations that we share together within our community of Porirua. Ngāti Toa Rangatira extends a warm welcome to you all.

The health and sustainability of Porirua Harbour and our natural environment is a matter of vital importance to Ngāti Toa Rangatira and all people within our local and extended communities. The following strategic plan outlines a number of community goals and outcomes for the long-term health and sustainability of this unique and precious resource.

The Porirua Harbour and Catchment Strategy and Action Plan logo represents the Porirua community's relationship with their harbour through the coming together of family/whanau at the waters edge – the reflection is a statement of connection, identity and involvement, and its clarity, of ecological health and well-being.

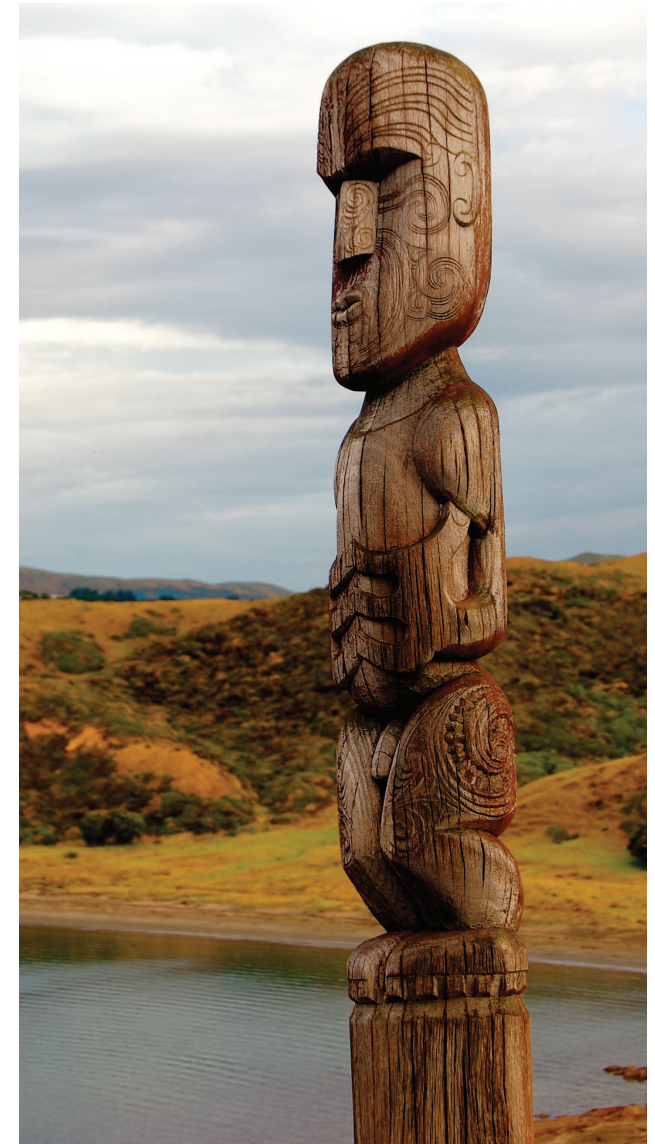
The four figures also represent the four key stakeholders – Porirua City Council, Wellington City Council, the Greater Wellington Regional Council and Ngati Toa Rangatira.

The shape of the figures can also be seen to represent the wahi pou, illustrated on the right, which stands as a guardian over the land surrounding Porirua Harbour.

The importance of the vision statement 'A healthy harbour and waterways' is emphasised by its use in the logo and its translation into Maori – the language of the manawhenua – which acknowledges the vital stake that Ngati Toa Rangatira has in the land and its waters.

The positioning and typographical styling of the title and vision statement is deliberate – the former representing strength and fortitude in mostly land-based activity, the latter the result of that activity as manifest in the health of the harbour and its waterways.

The colours are based around blue and green – colours of ecological health of sea and land.



Porirua Harbour and its catchments

Porirua Harbour is an estuary and outer harbour lying 20km north of Wellington City. The Porirua Harbour catchment stretches north-south 28km from Pukerua Bay to Johnsonville, and east-west 15km from Titahi Bay to Haywards Hill. It is a focal point for Porirua City and a gateway to the Wellington region.

PORIRUA HARBOUR COMPRISES TWO ARMS – the larger Pauatahanui Inlet (470ha) and the Onepoto Arm (240ha) – a harbour entrance and outer harbour facing Cook Strait and the Tasman Sea. The catchment and harbour boundaries covered by this strategy are shown in Figure 1.

The inner estuary area is about 8km² and the catchment covers 185km² comprising pasture (45.8%), native forest and scrub (15%), exotic forest and scrub (22.8%), and an increasing proportion of urban development (13.8%).

The harbour is a significant local and regional ecological resource. It is the largest estuary in the lower North Island and the only one with any significant seagrass cover and it has one of the largest cockle concentrations in New Zealand.

Porirua Harbour has been the home of local iwi and manawhenua **Ngati Toa Rangatira** since the early 1800s. It was once a significant traditional food, plant and recreational resource.

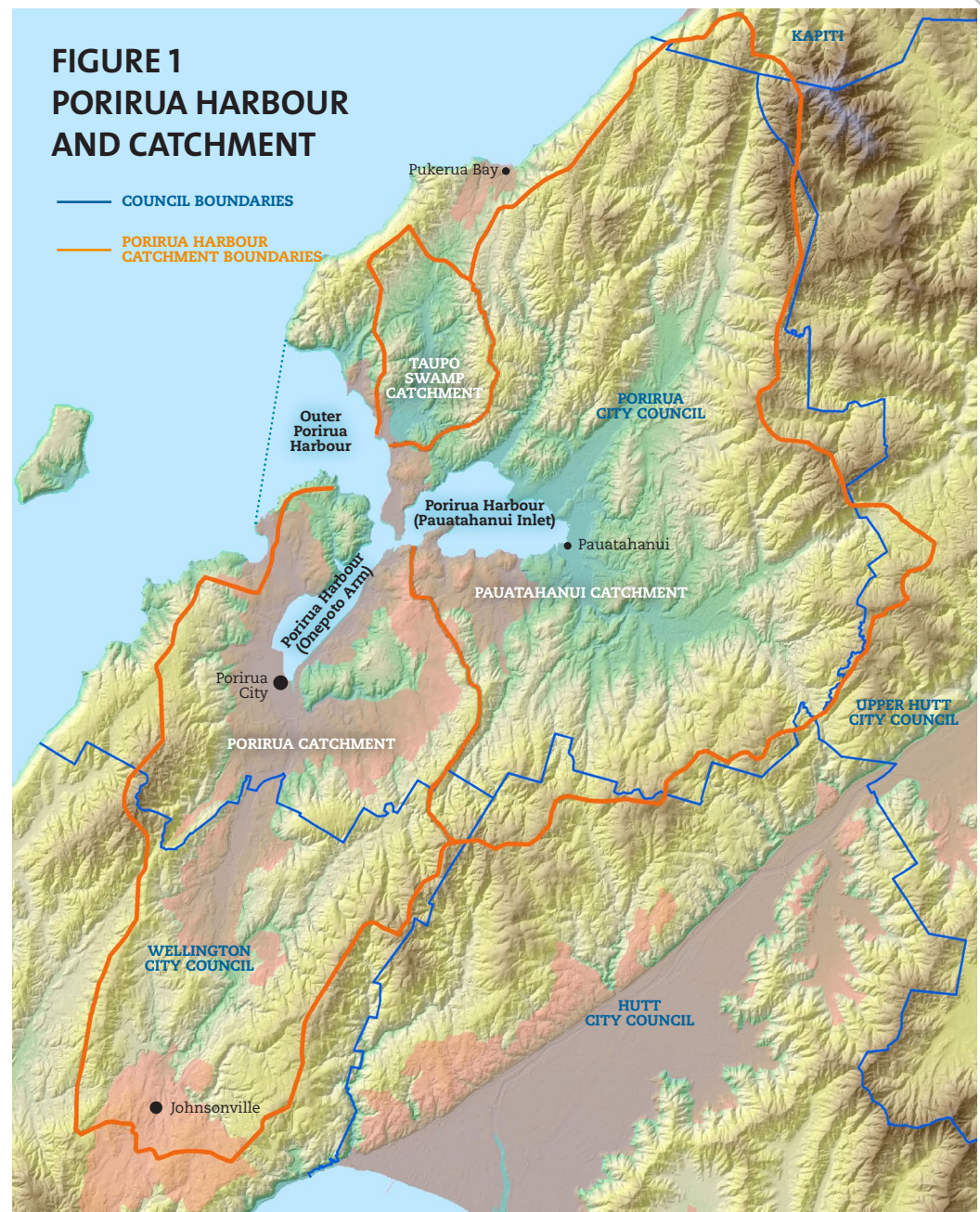


Porirua City has a population of 51,000. About another 29-33,000 people live in the **Wellington City** part of the Porirua Stream catchment. Thousands of people pass through the harbour and catchment each day on trains, cars and other vehicles. The Porirua basin is also a major growth area.

The harbour is also an important recreational asset for Porirua City and the Wellington region. As such, the harbour provides a significant environmental, social, recreational, cultural and economic resource.

WHAT IS AN ESTUARY?

An estuary is a place where freshwater and saltwater mix and creates a special habitat for communities of plants and animals adapted for these conditions.



A tale of neglect and misuse

The past 150 years have seen a gradual but extensive degrading of the dynamics and ecosystems of Porirua Harbour, largely through radical changes to the land use of its catchment areas and modification of the harbour edge.

The harbour and its surrounding forested catchment first attracted settlement by Ngati Ira, then in the 19th century, by Ngati Toa Rangatira. The harbour provided this strong sea-faring iwi with a rich source of seafood and shelter for waka.

European settlement began in the early 1800s. Writings and paintings from the 1850s describe tall, dense lowland podocarp forest and hardwood trees (kahikatea, totara, rimu) from the skyline to the water's edge. By 1885 this forest cover was mostly gone – stripped for pasture and farming.

Conversion of forest to farmland continued through the early 1900s. Mana, Paremata and Plimmerton became small seaside hamlets. New roads, rail and bridges increased access to and through the harbour and its catchment, promoting the process of reclamation and other harbour edge modification.

In the 1950s, Porirua was being groomed as a satellite suburb to Wellington City, with extensive state housing development and motorway expansion. Porirua Hospital peaked at 2,000 patients – its untreated sewage pumped directly to the Porirua Stream and Harbour.

Industrial and commercial development followed and housing spread through the catchment and surrounded the harbour. Further up the catchment, Tawa and Johnsonville similarly developed. Porirua

Very little of the original shoreline is left in the Onepoto Arm, due to reclamation and road developments.

grew into the modern city we have today, but despite significant reclamation, the commercial centre of the fledgling city turned its back on the harbour.

The area around the harbour also developed as a significant transport corridor. State Highway 1 and the North Island main trunk rail line pass the length of the catchment and fringe the harbour, crossing it via bridges at the outlet of Pauatahanui Inlet. State Highway 58 traverses the length of the eastern catchment and fringes Pauatahanui Inlet.

Abandoned, neglected and misused, the harbour and its tributaries deteriorated throughout this time. Pollutants from roads, stormwater and sewerage systems fouled the harbour, particularly the Onepoto Arm. Sediment run-off increased with urban development and associated earthworks.

Modifications to the harbour edge and streams resulted in the loss of important intertidal spawning, nursery and feeding grounds for marine life. Many remaining shellfish beds became contaminated and unsuitable for eating. In the late 1970s public health



warning signs started to appear at key locations in both arms of the harbour.

Despite repeated protest by local iwi and reassurances from central government, much of the cultural resources of the harbour were either lost or unusable. Recreational activities such as swimming, waka ama, sailing, rowing, kayaking, windsurfing and speed-boating are also affected by the excessive sediment build-up in the harbour and poor water quality.

Future development – such as the Transmission Gully Motorway, forest harvesting, wind farm development, and Porirua City's own growth within Porirua basin – could further affect the health of the harbour. All of Wellington City's greenfield development (turning pasture into housing) up to 2030 will occur in the Porirua basin.

A harbour to be nurtured and treasured...

Porirua Harbour is a natural treasure – a unique and very beautiful environment that would be the envy of many cities around the world. While rural and urban development and other land uses have already done severe ecological damage, it is not too late to intervene.

What's at stake?

The community has spoken of the values they appreciate and treasure about the harbour. They have expressed to councils a strong desire for the harbour to be better protected and improved where possible. They want to see initiatives put in place to clean up and protect the harbour.

There are a range of significant values at stake that warrant such intervention:

Natural processes – Support of the natural processes within an estuary that ensure maintenance of water quality, habitat and bird and marine life.



A class trip to the harbourside – both fun and educational

Public enjoyment – The enjoyment of the significant recreational, ecological, educational, aesthetic and spiritual resource provided by the harbour.

Economic resource – A resource that attracts new inhabitants and investment, with significant potential to utilise this resource further.

Community identity – The identity of Porirua and suburbs as a coastal city and the significant recreational, aesthetic and economic benefit derived from this perception and reality.

Attractiveness – The coastal outlook and estuary ambience attracts appropriate development and investment.

Reputation – Porirua's reputation as an innovative and future-looking city is at stake. Porirua has a

rare natural resource and opportunity to join the growing number of global 'eco-cities'.

Traditional resource – Local manawhenua, Ngati Toa Rangatira, have been the community most affected by the changes to Porirua Harbour. The iwi are realistic about the likelihood of restoring a pristine harbour, but they still have hopes of harbour conditions being significantly enhanced, with improvement occurring to some kaimoana locations and safer harbour-based activities.

Mana – the mana, cultural standing and kaitiakitanga of Porirua City and its manawhenua continue to be impaired by the condition of the harbour waiora and kaimoana.

The Porirua Harbour + Catchment Strategy and Action Plan

Armed with a strong public mandate for action, Porirua City Council, Greater Wellington Regional Council and Wellington City Council in partnership with Ngati Toa Rangatira, and with the support of other agencies and the community, have developed this Porirua Harbour and Catchment Strategy and Action Plan.

The Vision

The community, the councils and other agencies have been unwavering about the kind of harbour they would like to see – and not see – in the future.

A wide range of uses and values exist and are acknowledged in the Mission Statement for the Porirua Harbour and Catchment Strategy and Action Plan, which can be summarised as:

“A healthy catchment, waterways and harbour, enjoyed and valued by the community”

The Strategy and its stakeholders

The first scientific study of the harbour and harbour issues occurred in the late 1970s in response to proposals to run a motorway across the western end of the Inlet and major development of Pauatahanui.

Neither project proceeded but they stimulated a major research exercise and the 1980 production of the first inventory and assessment of the inlet’s resources, *Pauatahanui Inlet: - an environmental study* by the DSIR. This was a critical baseline for observing future changes in the inlet.

Community groups have had a significant impact in monitoring harbour changes, raising awareness and advocating for the harbour’s protection. Positive progress has been achieved through planting programmes, sediment and stormwater management, reserve development and litter management, particularly in the Pauatahanui Inlet.

The Pauatahanui Inlet Community Trust (PICT) was established in 2002 as an advocate for the inlet and led development of the first multi-agency action document *Pauatahanui Inlet Action Plan: Towards Integrated Management* (PIAP) and also the *Pauatahanui Inlet Restoration Plan*. These were the forerunners to the current strategy and action plan.

PICT has also been instrumental, along with councils, in establishing the recent Porirua Harbour and Catchment Community Trust (PHACCT) in recognition of the need to manage both arms of the harbour. Community groups, particularly PHACCT, have contributed to the Strategy, and will fulfill an important public education role, as well as monitor progress in implementation of the Strategy

In 2006, **Porirua City Council**, through significant funding provisions in its Long-term Council Community Plan, began the current approach to identifying and addressing the underlying issues of the whole harbour.

By 2008 the Porirua Harbour programme was established and support and partnerships were developed with those who have a stake in the harbour and its future.

Greater Wellington Regional Council recognises the significance of Porirua Harbour and the challenges faced. Its recently proposed Regional Policy Statement will influence the direction of the current review of its regional plans and the actions of local authorities. The Council recognises the impact management of the three regional parks in the catchment will have on the harbour and waterways.

Wellington City Council is already addressing sediment, water quality and infrastructure issues in the upper 70% of the Porirua Stream which is within the city’s northern boundary (25% of the total harbour catchment) – especially when most of Wellington City’s future new development will occur in the top of the Porirua Stream.

Porirua City Council, Greater Wellington Regional Council, Wellington City Council and **Ngati Toa Rangatira** formed a partnership as key stakeholders to work together to produce the Porirua Harbour and Catchment Strategy and Action Plan – a comprehensive set of initiatives to address the issues facing the harbour and provide some coordinated prioritisation of remedial action and funding.

These four key stakeholders formed part of an inter-agency advisory group to share information and help inform the development of the Strategy and its

Action Plan. Other agencies included the NZ Transport Agency, the Department of Conservation, the Ministry of Fisheries, Regional Public Health and community groups.

In 2009, a series of public seminars were held, followed by community workshops and release of a public discussion brochure on proposals to protect and improve harbour conditions. These provided background to the current initiative and gained feedback on the values and the kind of actions that the community felt needed to be undertaken to improve the health of Porirua Harbour and its catchment.

Broad priorities

This public and agency consultation formed the foundation for the development of this strategy document and action plan and identified a clear set of broad priorities for strategic action:

- General and targeted education and awareness programmes; and increased enforcement activity, capability and resources.
- Strengthened controls over land management such as urban and rural development, forest harvesting, and planned and improved foreshore and stream litter management programmes.
- Strong inter-agency collaboration and cross-boundary consistency; effective political leadership;
- Infrastructure improvement and innovative or 'best practice' approaches – stormwater, sewerage, landfill and roads.

The Strategy and Action Plan addresses these priorities and the commitment of agencies, particularly the three councils, to the formulation of policies and taking practical action towards cleaning up the harbour.

The Management Principles

The agencies involved have agreed that their actions and involvement will be guided by the following principles:

- 1. Integrated management of harbour and catchment resources**
 - Treat the estuary, streams and catchment as one ecological system
 - Facilitate a multi-agency, cross-boundary and multi-disciplinary approach
 - Coordinate decision-making and ensure consistency
 - Develop targeted solutions that address, resolve and monitor particular issues
- 2. Priority given to restoring, conserving and enhancing the catchment, waterways and estuary values.**
 - The bottom-line for management and resource-use decisions is: "Will this protect or enhance the natural resources of the harbour and catchment?"
 - Protect and enhance species, habitat and ecosystems – marine, freshwater and terrestrial
- 3. Environmental sustainability**
 - Development and use of the natural and physical resources of the harbour and catchment should ensure biological systems are diverse and productive, and the long-term environmental, social and economic wellbeing of the community is maintained or improved
 - Promote environmentally wise infrastructure management, land ownership, use and management
 - "Living well within our environment"
- 4. Evidence-based decision-making and management**
 - Decisions to be based on best credible information available
 - Targeted research and monitoring to fill knowledge gaps
 - Accountable and adaptive management processes
 - Establish and maintain informed management processes
- 5. Effective community, business and agency involvement and stewardship**
 - Develop and maintain effective public information systems
 - Promote community involvement in decision-making processes and restoration activities
 - Reflect the aspirations of the community
 - Develop and maintain active partnerships between agencies and with the community
 - Foster compliance with guidelines and regulatory controls such as resource consent conditions
- 6. Recognise the special relationship of mana whenua Ngati Toa Rangatira with the harbour**
 - Involvement in key decision-making fora
 - Traditional values recognised

These principles also reflect the concerns and contributions of the community and local iwi and have influenced the approach and guided the development of the Strategy and Action Plan.

The 'Big Three' sediment, pollution, ecology



The health of Porirua Harbour has been the subject of extensive research over the last 30 years. Research has intensified since the Porirua Harbour programme began in 2008. This research has identified three key issues facing the harbour: excessive sedimentation rates, pollutants and ecological degradation – the “Big Three”.

1. Excessive sedimentation rates

All estuaries accumulate sediment over time. In healthy estuaries the rate of accumulation is less than 1mm per year. Analysis of bathymetric (sea floor) surveys from 1974 and 2009 indicates sedimentation rates over that 35 year period averaged about 6mm per year in the Onepoto Arm and 9mm per year in the Pauatahanui Inlet (Gibbs & Cox 2009).

The current rates are unknown but are likely to be less than this, though still significantly more than a healthy 1mm per year.

There are two broad sources of sediments affecting the harbour – terrestrial and marine:

- **terrestrial sediment** originating from erosion-prone rural land, streambank erosion, and development earthworks.
- **marine sand** from the outer coast has pushed into the sheltered confines of the inner harbour, where, through tidal currents and the aid of predominantly northerly winds, it has redistributed through the lower reaches of each arm of the harbour. Coastal developments such as the Mana Marina, road and rail bridges and other structures are likely to have impacted this process.

The primary source of excessive sedimentation in Porirua Harbour is from terrestrial sources. Silt is smothering the seabed, affecting the seagrass and shellfish beds and may be depleting the harbour’s ability to attract and sustain fish. Localised reduction in harbour depths is affecting navigability for motor craft, sail boats, waka and kayaks. It is also undermining the harbour’s visual attractiveness.

Reclamation and sedimentation have progressively reduced the amount of water that comes in and out of the harbour with the tide (its ‘tidal prism’) and this affects the harbour’s ability to flush sediments and pollutants.

Sedimentation is considered the greatest threat to the future viability and usability of Porirua Harbour.

2. Pollution levels

Heavy metals, pesticide residue, excess nutrients, vehicle emissions and pathogens make a number of locations in the harbour unsuitable for swimming or other contact with the harbour. Litter is another important contaminant that has visual and ecological impacts.

Chemical pollutants

A small but potent range of chemical pollutants are accumulating at a few key locations in the harbour:

- heavy metals, especially zinc (from sources such as galvanised-iron roofing and vehicle tyre wear), and to a lesser extent copper (from brake pad wear) and lead (leaching from soils following historic use in petrol);
- PAHs (polycyclic aromatic hydrocarbons), from vehicle exhausts, household fires and industry, anything where incomplete combustion occurs; and
- DDT, a pervasive residue from historical use of the now banned pesticide.

High concentrations of heavy metals and PAHs occur in the accumulated sediments around the Porirua Stream mouth with elevated levels also present throughout the sub-tidal basin of the Onepoto Arm; concerning levels of DDT occur throughout both arms of the harbour.

Sources of chemical pollutants include roads, roofing, residential properties, and illegal discharges from business and industrial users. These contaminants concentrate in the stormwater system and discharge into the harbour and streams, particularly following rainfall.

These chemical toxins are high enough to cause concern if continued discharge, accumulation and concentration occurs in the harbour sediments.

Biological pollutants

These are water-borne viruses and bacteria, mostly from human or animal excrement. Sources include:

- broken or illegal sewer connections and sewer overflows
- fouling by livestock, domestic animals and waterfowl into watercourses or via the stormwater system.

Pathogens are the major health-risk to water-based recreational users, particularly between the Porirua Stream mouth and the Onepoto boatsheds, and in Brown's Bay.

They also threaten the edibility of fish and shellfish from parts of the harbour. These areas have 'no take' health warning signage.

Excessive nutrients

The key nutrients affecting the harbour are nitrogen and phosphorus, mostly from sewer cross-connections and livestock effluent.

Nutrient enrichment of the harbour results in excessive growth of oxygen-hungry algae. Oxygen depletion reduces water and sediment quality and their suitability for fish and for organisms living on or in the harbour bottom.

Widespread growth of nuisance algae is highly visible throughout the harbour at low tide in summer – notably the bright green sea lettuce known as *Ulva* and the dark red *Gracilaria*. Their presence causes localised depletion of sediment oxygen, nuisance odour and can deprive native seagrass of light leading to its eventual decline. There are already small but growing patches of uninhabitable, dark, smelly anaerobic sediments in the Onepoto Arm.

Litter

Litter is also a significant contaminant in parts of the harbour. Litter is unsightly and also interferes with the dynamics and ecology of the estuary.

3. Degraded ecology – plant and animal life

Sedimentation, pollution and direct harbour edge modification have significantly destroyed areas of the original estuary habitat and reduced critical sub-tidal, inter-tidal and harbour edge ecologies.

Less than 5% of once extensive saltmarsh remains in the Onepoto Arm. While wetland and saltmarsh are more extensive in the Pauatahanui Inlet, areas of beneficial seagrass are severely reduced in both arms of the harbour.

Estuaries are one of the most productive ecological communities and their loss may have major impacts on offshore and near-shore fisheries. Porirua Harbour is the only estuary in the lower North Island with significant areas of seagrass. The extent of the seagrass beds is significantly reduced throughout the harbour. Seagrass provides habitat important to feeding, spawning, and as a nursery and refuge for marine invertebrates, insects, fish and birds.

Reclamation, modification and sedimentation have resulted in a major loss of habitat for subtidal and

intertidal plants. On-going human-induced changes continue to threaten the harbour environment.

Some areas of remnant saltmarsh are being lost due to significant erosion caused by man-made structures. The growth of nuisance algae, such as *Ulva*, are out-competing the seagrass and contributing to its reduction in the harbour.

Similarly, streams and riparian (streambank) habitat continue to be heavily modified throughout the Porirua Harbour catchment.

A lack of appropriate streambank vegetation increases water temperatures, decreases water quality, reduces spawning, nursery, refuge and food resources, and reduces the nutrient filtering functions of riparian areas.

However, all is not lost. Ecological surveys to date show that both arms of the harbour still have a firm basis for a sound ecology – that is, if we reduce and better manage the impacts of human development in the catchment then improvements in the ecological 'health' of the estuary are possible.

CLIMATE CHANGE & SEA-LEVEL RISE

Changing climate and rising sea-level will impact the Porirua harbour and catchment system.

A sea-level rise of 1.95 mm/year since 1930 has been established for Porirua Harbour. Consistent with national and global trends, this rate likely to increase.

The specific impact of this rise and its interaction with an already complex and dynamic system is unknown. Sedimentation rates in Porirua Harbour currently exceed sea-level rise and will continue to affect the ability of the harbour to flush itself.

Climate change is predicted to increase the magnitude and frequency of rainfall events for western New Zealand, including the Porirua Basin.

Potentially this will increase erosion and consequently terrestrial sediment runoff from both the rural and urban area.

These changes will be recognised in the future planning and management of the harbour and catchment.

The objectives, indicators and targets

Key objectives and actions

The Porirua Harbour and Catchment Strategy sets in place three key objectives:

1. Reduce sediment rates
2. Reduce pollutant inputs
3. Ecological restoration

These are shown in Table 1, together with the general actions in response. The Strategy and Action Plan has a particular and deliberate focus on reducing sediment and pollutants at their *sources*, where ever possible.

Indicators and targets

Table 2 breaks the objectives down into a list of indicators, current condition and target levels, and a date by which the target could realistically be achieved.

For each objective, the best indicators of health or healthy outcome have been chosen. Sampling will occur at multiple sites.

Each indicator has established baseline data from which future progress in improvement can be measured. Where it is difficult to determine specific targets for some indicators at this stage, specific future research or monitoring form part of the Strategy to establish these. Better definition of targets will be incorporated as information becomes available, and included in revised versions of the Strategy.

The actions required to achieve these objectives and their targets are outlined in the Action Plan on pages 14-19.

TABLE 1: KEY OBJECTIVES AND ACTIONS

1. Reduce sedimentation rates	<ul style="list-style-type: none"> • Improve land management and land use practices • Catchment protection and re-vegetation • Localised management of marine sand banks and improved harbour flushings
2. Reduce pollutant inputs	<ul style="list-style-type: none"> • Reduce faecal inputs • Cap nitrogen inputs • Reduce toxicant inputs • Additional litter management <p>The focus is on identifying and stopping pollutants at their source</p>
3. Ecological restoration	<ul style="list-style-type: none"> • Estuary re-vegetation (seagrass and saltmarsh) • Streambank (riparian) re-vegetation and habitat enhancement – note that riparian planting will also help filter and reduce sediment and nutrient inputs



TABLE 2: INDICATORS AND TARGETS

INDICATOR	CURRENT CONDITION	TARGET	DATE	COMMENT
1. Reduce sedimentation rates				
Annual sedimentation rate	Excessive sedimentation rate – exceeding a ‘healthy’ 1mm per year maximum.	Interim: 50% reduction in current sediment inputs from all tributary streams.	2021	Priority sediment sources will be identified for targeting reduction in sediment inputs to the harbour. The target of 1mm per year is appropriate and achievable for this kind of catchment and harbour. Modelling and field measurement over 2011/2012 will refine understanding of current sedimentation rates. Monitoring of sedimentation rates will be done through 5-yearly bathymetric re-survey and analysis and measurements from sediment plates installed at strategic locations in both arms of the harbour. Current research will help establish the feasibility and likely effectiveness of localised dredging aimed at improving flushing of terrestrial and marine sediments from the harbour.
		Long term: 1mm per year average rate for both arms.	2031	
2. Reduce pollutant inputs				
Faecal bacteria counts	Multiple occasions annually where bathing water quality is breached in the harbour, especially the Onepoto Arm.	Recognised high-use recreational spots in the harbour have a ‘Suitability for Recreation Beach Grade’ of at least “Good”. Improved kaimoana safety from existing gathering locations, consistent with public health advice.	2021	Regular water contact should be safer for a range of water sports in both arms of the harbour. Main source of faecal inputs is sewerage/stormwater infrastructure (leaks, cross connections and wet weather overflows). Recognise that there will always be high health risks for kaimoana gathered from any areas subject to urban run-off.
Dissolved nitrogen levels in tributary streams, total nitrogen levels in estuary sediments, and percent cover of nuisance algae in intertidal areas of the harbour	Mild nutrient enrichment in estuary sediments, reflected in nuisance algal cover (eg, sea lettuce) in parts of both arms of the harbour.	Maintain nitrogen at existing levels or better and no net increase in the cover of nuisance algae on the intertidal flats.	2021	Of the two key nutrients – nitrogen and phosphorus – nitrogen is at a level that needs to be managed. The main source is the sewerage network, with some also coming from rural subcatchments.
Toxicants in harbour sediments – especially zinc, copper, lead and polycyclic aromatic hydrocarbons (PAHs)	Some toxicants, zinc in particular, are reaching early warning trigger levels in places in Onepoto Arm sediments. DDT is also present at elevated levels in both arms.	Target significant reduction from Porirua Stream and Semple Street stormwater outfall.	2016	Zinc is the most prevalent heavy metal accumulating in Onepoto Arm. Other toxicants present include copper, lead and PAHs. Porirua Stream and the Semple Street stormwater outfall are the major sources of toxicants.
		Maintain/reduce concentrations of zinc and other toxicants at/below ANZECC ‘low’ sediment quality guidelines.	2021	
Harbour litter amounts	Excessive litter accumulation in southern Onepoto.	Significant reduction in litter accumulations in and around harbour.	2016	The southern end of the Onepoto Arm has the worst litter problem in the harbour
3. Ecological restoration				
Estuarine plant cover	Less than 1% of original saltmarsh coverage remains in Onepoto Arm. Diminished seagrass cover throughout the harbour.	Establish saltmarsh cover in suitable areas of harbour, especially the Onepoto Arm. Significant extension of seagrass beds throughout harbour.	2021	Saltmarsh and seagrass are essential as spawning, nursery, feeding and refuge areas for fish. Saltmarsh and seagrass also act as seabed stabilisers and also sediment and pollutant filters.
Riparian (streambank) plant cover	Limited riparian cover in many streams.	Implement sustainable land use plans that include riparian protection for Whitireia, Battle Hill and Belmont Regional Parks.	2016	Current research is intended to assist determination of location and effective extent of riparian rehabilitation.
		Riparian plant cover over majority of stream length, particularly in Horokiri, Pauatahanui and Porirua streams.	2031	
Stream and harbour bed communities	Poor and stressed sediment communities.	Stream and harbour bed communities improved to accepted ‘healthy’ levels.		Regular monitoring and assessment of stream and estuary bed communities will continue. A planned harbour fish survey will provide a baseline to assess fish community improvement and further remedial activity.

The Action Plan

The tables on pages 14-19 outline the Action Plan – a programme of activities to achieve the Porirua Harbour and Catchment Strategy’s objectives.

There is one table for each objective:

1. **Action Plan to Reduce Sedimentation Rates** page 14
2. **Action Plan to Reduce Pollutant Inputs** page 16
3. **Action Plan for Ecological Restoration** page 18

Each table lists current, immediate and medium-to-longer-term activities and the agency or agencies responsible for taking a lead role.

Activities are set out within four key areas:

- **Regulation** – of the activities adversely affecting the harbour and catchment.

- **Projects** – activities designed to have a direct impact on improving the health of the harbour and catchment environments.
- **Education and awareness** programmes – developing and implementing information and education programmes for the broad Porirua Basin community, and also targeted programmes for specific sectors within the catchment.
- **Research and Monitoring** – ongoing assessment of the state of, and the impact of activities on, the harbour and its catchment.

Each activity is coded (eg, SB5, EC6) reflecting whether it is a sediment (S), pollutant (P) or ecology (E) item, and whether it is a current (A), immediate (B) or medium-to-longer-term (C) activity.

The codes help identify the activity listed in the document **The Porirua Harbour and Catchment Detailed Action Plan**, which provides more information on each of the Action Plan activities.

Current activities

Since the Porirua Harbour programme was established in 2008, a number of activities of direct benefit to the harbour and catchment have begun, and some have already been completed.

The initial focus has been, and will continue to be, on reducing the various sources of sediment, as success in this area will provide the most widespread and effective benefits. These include:

- reducing smothering and other impacts on estuarine plants, aquatic life and habitat
- improving water clarity
- improving feeding opportunities for bird and fish species (related to improved clarity)
- improving harbour flushing capacity and maintenance of or improvement to the tidal prism
- reducing contaminants inputs, many of which adhere to sediments and are transported to the harbour by silt-laden streams and stormwater.
- planned catchment re-vegetation, which will not only reduce erosion and sediment but filter some pollutants and provide some reduction in peak flood flows.



The three-yearly Pauatahanui Inlet cockle count undertaken by volunteers

Agency involvement

Improving Porirua Harbour is a scientific, technical and planning challenge. The Porirua Harbour and Catchment Strategy and Action Plan provides a blueprint for councils and other agencies to work together with a common goal to improve the health of Porirua Harbour and its waterways.

Strategy partners can also use the Strategy to:

- review how work that relates to Porirua Harbour and catchment are being delivered;
- ask whether physical processes within the harbour can be improved;
- look for different or better ways to manage the harbour and catchment; and
- prioritise council and agency resources and effort.

The Strategy and Action Plan is an active document. It is expected that councils will receive ongoing submissions on Porirua Harbour and its catchment through their respective Annual Plan and Long Term Plan processes. The Strategy and Action Plan will help inform and focus decision-making within these processes, so that new activities align with its objectives and become part of its longer term actions and initiatives.



Community and business involvement

Cleaning up the harbour and its catchment is very much a community issue. A significant amount of harbour pollutants, litter and sediment comes from private properties and the actions of businesses and individuals.

A vital contribution to Action Plan initiatives – particularly in the reduction of sediment, contaminant and litter inputs – can come from individual, business and community actions motivated by an increased awareness, appreciation and respect for the harbour and catchment. It is hoped that the *Porirua Harbour and Catchment Strategy and Action Plan* can act as a catalyst for community initiatives and involvement in harbour restoration. There will be opportunities for the community to participate in hands-on projects such as planting and litter removal.

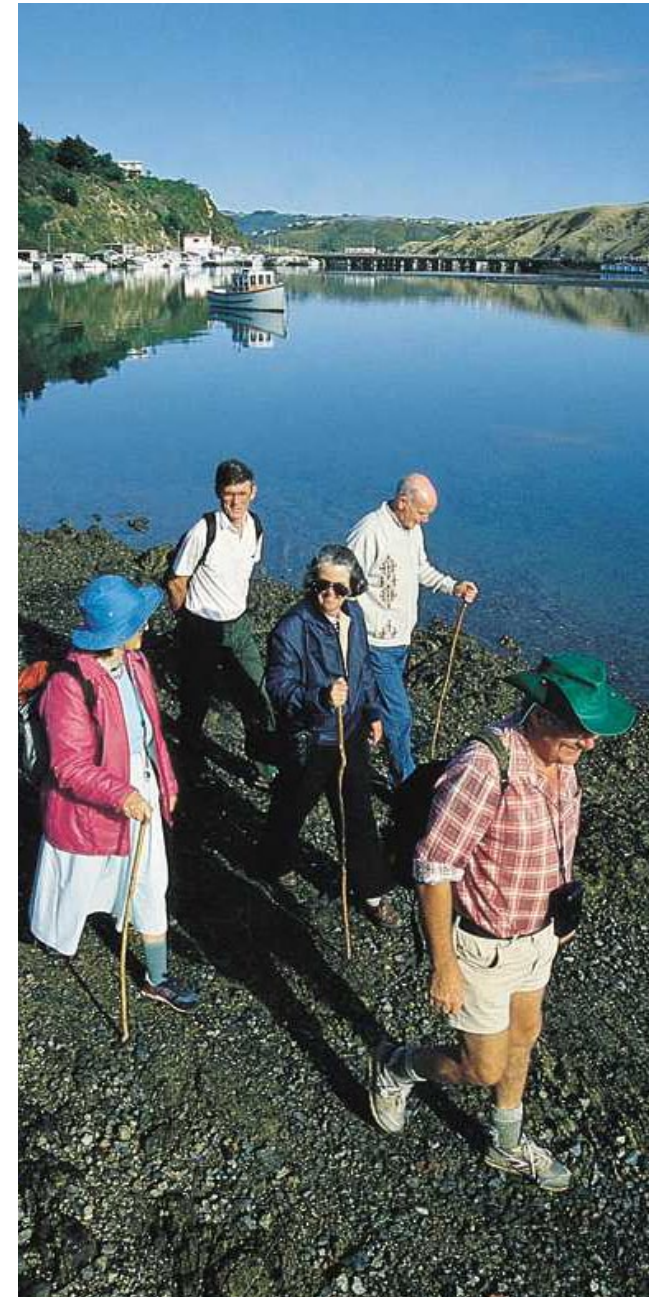
It is anticipated the Strategy and Action Plan will be also used by the community to gauge progress on actions, fulfilling objectives and meeting targets.

The Strategy and Action Plan can act as a catalyst for the community to support or promote future works through requests to the councils' Annual Plans and Ten Year Plans and through input into the processes and systems that govern how development occurs within the Porirua Harbour catchment.

Community groups, particularly the Porirua Harbour and Catchment Community Trust, will fulfill an important role in monitoring strategy progress, providing a coordinated community voice to strategy activities, as well as facilitating public awareness of harbour and catchment issues.

Duck Creek Scenic Reserve is one of the remaining saltmarsh reserves on the Pauatahanui Inlet

A stroll around Golden Gate, Pauatahanui Inlet, at low tide



Action Plan to 1 Reduce Rates of Sedimentation

- VISION**
- To reduce sediment inputs to harbour and waterways to more natural levels.
 - To significantly improve harbour water clarity and harbour flushing capacity.

- CURRENT STATE**
- Excessive sedimentation rates, significantly over a healthy 1mm per year rate

- INTERIM TARGET**
- Reduce sediment inputs from tributary streams by 50% by 2021

- TARGET**
- Reduce sediment accumulation rate to 1mm per year by 2031 (averaged over the whole harbour)

- ISSUES**
- Excessive sedimentation rates are prematurely filling both arms of the harbour, and impairing harbour and stream ecology, affecting recreational use, and contributing to harbour pollution.
 - There is a cumulative impact on harbour sediment from bulk earthworks and building sites within the harbour catchment, and from erosion-prone rural land and streambanks
 - Marine sand banks are reducing the recreational use of some areas and have potentially adverse impacts on the flushing capacity of the harbour
 - There is a cumulative impact of harbour developments and structures on harbour flows, flushing and sediment transport
 - There are gaps in our knowledge of harbour sediment and flushing dynamics
 - Pollutants are also accumulating in harbour sediments.

CURRENT ACTIVITY			LEAD
REGULATION	SA1	Issuing and monitoring compliance of resource consents	Joint
	SA2	Implementing building site earthworks control bylaw	PCC, WCC
	SA3	Implementing Reserves and Vegetation Policy	PCC
	SA4	Implementing codes of practice for land development	WCC, PCC, GW
	SA5	Implementing Plan Change 70 (WCC) & 11 (PCC) to increase earthwork controls	WCC, PCC
PROJECTS	SA6	Implementing Pauatahanui Vegetation Framework's re-vegetation programme	GW, PCC
	SA7	Improved Duck Creek development environmental design	PCC, Developer
	SA8	Coordinating inter-agency cooperation	Various
	SA9	Installing street sump baffles	WCC
	SA10	Ongoing weed control and restoration planting on DOC-managed land	DOC
EDUCATION	SA11	Established Porirua Harbour and Catchment Community Trust	Joint
	SA12	Maintaining the 'Take Care' – community environmental programmes	GW
	SA13	Maintaining the 'Muddy Waters' sedimentation education programme	GW
	SA14	Facilitating public presentations and seminars	PCC
	SA15	Produced education materials	Joint, PICT, GOPI
	SA16	Developing an Erosion and Sediment Control Standard for State Highway Infrastructure	NZTA
RESEARCH	SA17	Established and maintain a Porirua Harbour Science Advisory Group	PCC
	SA18	Established biophysical baselines and a monitoring programme	GW
	SA19	Developed a targeted estuary and catchment modelling programme	Joint
	SA20	Completed a bathymetric survey and analysis	PCC
	SA21	Maintaining research partnerships with NIWA and NZ Transport Agency	Joint
	SA22	Investigating harbour sediment management needs and options	PCC, GW

Note that many actions contribute to more than one outcome – to avoid repetition, these have been listed only once under the outcome where they are likely to make the greatest contribution.

IMMEDIATE PRIORITY – TO ACTIVATE OVER THE NEXT 3 YEARS

LEAD

MEDIUM PRIORITY – OVER THE NEXT 3-10 YEARS

LEAD

REGULATION	SB1	Align planning documents with the Harbour and Catchment Strategy and Action Plan	Joint
	SB2	Improve resource consent conditions	Joint
	SB3	NEW Review building site earthworks, sediment and erosion controls and guidelines	Joint
	SB4	NEW Review rural land management and guidelines	Joint

SC1	Revise codes of practice for land development	Joint
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PROJECTS	SB5	NEW Develop a prioritised whole-of-catchment re-vegetation plan	GW
	SB6	NEW Implement a prioritised whole-of-catchment re-vegetation plan	GW

SC2	NEW Develop and implement a harbour sediment management programme	GW, PCC
SC3	POSSIBLE LONG-TERM OPPORTUNITY Establish and resource a full-time 'catchment ranger' position	GW

EDUCATION	SB7	Facilitate community environmental care programmes for priority locations	GW
	SB8	Council officer training workshops on sediment management and control	Joint
	SB9	Plan and implement a public and industry-specific media programme	Joint
	SB10	Prepare, distribute & promote public & industry guidelines	Joint

SC4	Expand the "Muddy Waters" sediment education programme	GW
SC5	Establish targeted industry partnerships	Joint

RESEARCH	SB11	Prioritised research of resource use and management tools	GW
	SB12	NEW Five-yearly bathymetric survey and analysis	Joint

SB6	Develop partnerships with tertiary and research institutions	Joint, Science Group
SC7	NEW Investigate options to reduce or compensate for the effects of harbour structures and other works on harbour dynamics	GW

PCC – Porirua City Council; WCC – Wellington City Council; GW – Greater Wellington Regional Council; Joint – Collaboration between PCC, WCC and GW; GOPI – The Guardians of Pauatahanui Inlet; PICT – Pauatahanui Inlet Community Trust;

Action Plan to 2 Reduce Pollutant Inputs

VISION • To reduce pollutant inputs to, and sediment contaminants within, Porirua Harbour and tributary streams

CURRENT STATE • Exceeding low trigger levels for zinc, copper and lead and harmful microbes (Onepoto) and nitrogen and pesticides (Onepoto and Pauatahanui)

TARGET • Reduce faecal inputs so that 'Suitability for Recreation' beach grades improve at least "Good"
• Cap nitrogen levels in the harbour (i.e., no increase).
• Reduce toxicant levels in the harbour to ANZECC Sediment Quality Guidelines "Low" thresholds, particularly from the Porirua Stream and Semple Street outfalls.
• Reduce harbour and stream litter

ISSUES • Multiple sources of pollutants – sewer and stormwater infrastructure, industrial, rural and urban.
• Highest immediate impact on cultural, aesthetic and recreational values.
• Particular litter challenges in Onepoto Arm.
• Limitations on kaimoana gathering for areas subject to urban stormwater run-off.

CURRENT ACTIVITY

LEAD

REGULATION

PA1	Implementing a Trade Waste By-Law	PCC, WCC
PA2	Contracted a Trade Waste Officer	PCC, WCC
PA3	Implementing an onsite wastewater treatment bylaw	PCC, WCC
PA4	Implementing Asset Management Plans consistent with the Harbour Strategy	PCC, WCC

PA5	Implementing illegal connection remedial strategy and action plan	PCC, WCC
PA6	Progressive upgrade of domestic stormwater and sewer connections	PCC
PA7	Implementing the Regional Stormwater Action Plan	Joint
PA8	Implementing a 10-year stormwater network upgrade	PCC
PA9	Accelerating a prioritised sewer renewal plan	PCC
PA10	Prepared a regional code of practice for drainage and water	Joint
PA11	Maintaining a sewage pollution elimination programme	WCC
PA12	Maintaining the Pauatahanui Inlet annual foreshore clean-up	GOPI, KP
PA13	Completed a Porirua Stream delta clean-up	PCC
PA14	Maintaining a foreshore litter management programme	PCC
PA15	Installing litter catchers on targeted street sumps	PCC
PA16	Facilitated Low Impact Urban Design and Development workshops	WCC
PA17	Reviewed and improved the street sump maintenance programme	PCC

EDUCATION

RESEARCH

PA18	Implemented targeted pollutant research projects	GW, PCC
PA19	Implementing two-yearly sediment quality survey and other harbour monitoring	GW
PA20	Maintaining a joint recreational water quality monitoring programme	GW, PCC

Note that many actions contribute to more than one outcome – to avoid repetition, these have been listed only once under the outcome where they are likely to make the greatest contribution.

IMMEDIATE PRIORITY – TO ACTIVATE OVER THE NEXT 3 YEARS			LEAD	MEDIUM PRIORITY – OVER THE NEXT 3-10 YEARS			LEAD
REGULATION	PB1	Align Asset Management Plans with the Harbour and Catchment Strategy and Action Plan	GW, PCC, WCC	PC1	Review and enhance the work of Trade Waste Officer	PCC	
	PB2	NEW Review and enhance building controls & guidelines	Joint	PC2	Implement revised set of building controls + guidelines	Joint	
	PB3	NEW Prepare and implement a stormwater bylaw	PCC	PC3	NEW Implement any requirement for resource consents for significant stormwater discharges	PCC, WCC	
PROJECTS	PB4	NEW Prepare and implement a prioritised water quality improvement plan	PCC	PC4	POSSIBLE LONG-TERM OPPORTUNITY Revise and improve non-sumped vehicle-generated road run-off treatment	PCC, WCC	
	PB5	Review harbour and catchment litter management programme	Joint, DOC	PC5	POSSIBLE LONG-TERM OPPORTUNITY Accelerate the illegal stormwater connection remedial action plan	PCC	
	PB6	Review the Regional Storm Water Action Plan	Joint	PC6	POSSIBLE LONG-TERM OPPORTUNITY Accelerate the strategic upgrade programme for sewer connections	PCC, WCC	
	PB7	Adopt the WCC sewage pollution elimination programme within the PCC district	PCC	PC7	NEW Implement any reviewed Regional Storm Water Action Plan	Joint	
	PB8	Increase targeted application of the 'Take Charge' programme to Harbour catchment	GW				
EDUCATION	PB9	Develop and implement an education programme to reduce pollutant disposal into the stormwater system	Joint				
	See also: SB9 and SB10						
RESEARCH	PB10	Investigate sources of toxicants in the Porirua Stream catchment	GW	PC8	NEW Identify and assess the significance of contaminants from the rail network.	GW, Kiwi Rail	

PCC – Porirua City Council; WCC – Wellington City Council; GW – Greater Wellington Regional Council; Joint – Collaboration between PCC, WCC and GW; DOC – Department of Conservation; GOPI – The Guardians of Pauatahanui Inlet; KPB – Keep Porirua Beautiful

Action Plan for 3 Ecological Restoration

VISION Significantly healthier indigenous species habitat and better functioning ecosystems. Greater terrestrial, riparian and estuarine vegetation cover. Enhanced aquatic and avian biodiversity.

CURRENT STATE Minimal estuarine vegetation and impaired estuarine and aquatic ecosystems – less than 1% of the original saltmarsh and reduced seagrass cover in the Onepoto Arm.

- TARGETS**
- Establish saltmarsh cover in all suitable areas of the harbour, especially in the Onepoto Arm.
 - Extend seagrass cover.
 - Increase riparian plant cover.
 - Extensive catchment restoration.

- ISSUES**
- Adverse impacts of numerous hard estuary edges on estuarine plant environment.
 - Unknown ability of seagrass to re-establish.

CURRENT ACTIVITY		LEAD		
REGULATION	EA1	Implementing Pauatahanui Wildlife Management Reserve Management Plan	F&B	
	EA2	Management of the Duck Creek Reserve	DOC	
PROJECTS	EA3	Developing provisions for the protection of significant urban vegetation area	PCC	
	EA4	Implementing the Okowai Lagoon Restoration Project	GW, PCC, DOC, Carrus	
	EA5	Implementing the Lower Porirua Stream Wetland Restoration Plan	GW, PCC	
	EA6	Maintaining financial support for landowner QEII covenants	QEII, GW	
	EA7	Maintaining support for local body native forest covenants	PCC	
	EA8	Implementing the Cannons Creek Lakes Management Plan	PCC	
	EA9	Implementing the Bothamley Park Restoration and Management Plan	PCC	
	EA10	Preparing the Whitireia Park Sustainable Land Use and Restoration Plan	GW	
	EA11	Implementing a Biodiversity Action Plan	WCC	
	EA12	Maintaining the Community Greening programme	WCC	
	EA13	Implementing the Northern Reserve Management Plan	WCC	
	EA14	Prepared the Belmont Regional Park Sustainable Land Use Plan	GW	
	EDUCATION	EA15	Maintaining the 'Take Care' community environmental programme	GW
		EA16	Promoting sustainable farm and forest management	GW, WCC, PCC
RESEARCH	EA17	Undertaking three-yearly cockle surveys in the Pauatahanui Inlet	GOPI, GW	
	EA18	Undertaking regular surveys of estuary sediment communities and habitat	GW	
	EA19	Undertaking a feasibility assessment of seagrass restoration possibilities for Porirua Harbour	GW, PCC	

Note that many actions contribute to more than one outcome – to avoid repetition, these have been listed only once under the outcome where they are likely to make the greatest contribution.

IMMEDIATE PRIORITY – TO ACTIVATE OVER THE NEXT 3 YEARS		MEDIUM PRIORITY – OVER THE NEXT 3-10 YEARS
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LEAD

LEAD

REGULATION

EB1	Align local Asset Management Plans for reserve management with DOC strategies	Joint
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PROJECTS

EB2	NEW Prepare an estuary re-vegetation plan	GW, PCC
EB3	NEW Implement an estuary re-vegetation plan	GW, PCC
EB4	Promote re-vegetation and coast/estuary care groups	GW, DOC
EB5	Implement the Belmont Regional Park Sustainable Land Use Plan	GW
EB6	Complete and implement the Whitireia Park Sustainable Land Use and Restoration Plan	GW

See also: SB5 and SB6 – Development and implementation of a whole-of-catchment re-vegetation plan

EC1	NEW Prepare an aquatic and marine species protection and restoration plan	GW, TROTR
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EDUCATION

See SB9 & SB10

EC2	POSSIBLE LONG-TERM OPPORTUNITY Design and build an estuary interpretation network, centre or kiosk	Joint, TROTR, DOC
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RESEARCH

EB7	NEW Undertake a fish survey of Porirua Harbour	TROTR NIWA
EB8	NEW Expand the three-yearly cockle survey to include Onepoto Arm	GOPI, GW
EB9	NEW Prepare and implement a seagrass restoration plan	GW

PCC – Porirua City Council; WCC – Wellington City Council; GW – Greater Wellington Regional Council; Joint – Collaboration between PCC, WCC and GW; F+B – Forest and Bird; DOC – Department of Conservation; QEII – QEII National Trust; GOPI – The Guardians of Pauatahanui Inlet; Carrus – Carrus Corporation; TROTR – Te Runanga O Toa Rangatira; NIWA – National Institute of Water & Atmospheric Research

Monitoring, reporting and review

Monitoring progress against the Strategy will be by annual reporting against the Strategy's Action Plan by Porirua City Council, Wellington City Council and the Greater Wellington Regional Council. This active monitoring will ensure that areas needing more attention or improvement can be identified.

A network of environmental monitoring sites has been established in and around the harbour and catchment. These will be used to provide baseline information from which progress in harbour health can be measured.

The set of indicators on page 11 will help councils, other agencies and the community to measure progress in meeting Strategy objectives and targets. Progress will be reported through each councils' Annual Plan.

The Strategy and Action Plan will be reviewed every three years in the light of implementation progress, scientific information, observation and 'best practice' development.

The next scheduled review of the action plan is in 2014, prior to the 2015 Long Term Planning round.



What we hope Porirua Harbour will be like in the future

Sediments are no longer rapidly filling the harbour and smothering shellfish beds.

An improved flushing regime is achieved in the harbour.

The harbour and waterways are 'clean' and attractive. Pollutant levels in surface sediments are insignificant and water quality vastly improved. The community is satisfied with this level of improvement.

Human-sourced litter will be minimised in and around the harbour edge.

It will be safe to bathe and engage in other water contact activities throughout the harbour.

Significant areas of seagrass, saltmarsh and other estuarine vegetation are restored to the harbour and are providing enhanced habitat for fish, birds and other animal life.

Significant lengths of riparian (stream-bank) areas are planted and protected within the catchment.

Erosion-prone catchment headwaters are increasingly vegetated and contributing to improved ecology, water flows, and reductions in erosion and sediment run-off.

Improvement in the health of kaimoana resources.

The harbour is recognised, promoted and used as a significant natural, recreational and educational resource and attraction.

Harbour health forms a regular fundamental consideration in all council and agency decision-making on resource and infrastructure development and management.

Environmentally sustainable development is promoted, practiced and recognised.

Estuarine and aquatic ecosystems are healthy, functional and productive.

Harbour hard edges are renovated and are an attractive, widely-used asset to Porirua City, with the CBD recognising and reconnecting to the harbour.

Promotion of Porirua consistently reflects a harbour connection with pride.

At least 90% of Porirua City residents rate the environmental quality of Porirua Harbour as high or very high.

The joint councils are recognised for innovative environmental management.

Things YOU can do now to help...

AT HOME

- Wash your car on the grass
- Dispose of paint, solvents and other chemicals down the sink or onto grass
- Dispose of your rubbish in proper places
- Recycle used motor oil – take it to your local garage or tip
- Paint galvanised roofing
- Plant trees and shrubs
- Join a local environment group, or a planting or clean-up day

GENERAL

- Street drainage goes untreated into streams and the harbour. Drains are a significant source of harbour pollutants. Avoid putting chemicals and sediment into drains or the gutter.
- Unpainted roofs are the major source of the ecotoxin zinc. Roof water drains to the stormwater system and into out streams and harbour. Consider painting any exposed galvanised roofs or using a pre-coated roofing material.

AT WORK

- Develop a 'site management plan' to avoid polluted or sediment-laden run-off and litter issues.
- Avoid vehicle wash water going into drains
- Paint galvanised roofing
- Promote environmental awareness among staff or clients
- Report any pollution or sediment incidents. If you observe or accidentally cause an incident call the **24-Hour Environment Hotline 0800 496 734**. Greater Wellington Regional Council will respond. They have the authority to stop polluters and also have the expertise and equipment to clean up pollutants.



Copies of this document and the Detailed Action Plan are available at your local council library or online.

For news on Porirua Harbour initiatives, visit:

Harbour News:
www.pcc.govt.nz/Community/Community-Projects/Porirua-Harbour-and-Catchment-News

For information and resources, visit:

Harbour Programme and Publications:
www.pcc.govt.nz/Publications/Porirua-Harbour-and-Catchment-Management-Programme

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