5 March 2015

TE AWARUA-O-PORIRUA HARBOUR AND CATCHMENT JOINT COMMITTEE

Notice is hereby given that, commencing at 5.00PM on THURSDAY 12 MARCH 2015 a meeting of TE AWARUA-O-PORIRUA HARBOUR CATCHMENT JOINT COMMITTEE will be held in the COUNCIL CHAMBER, ADMINISTRATION BUILDING, HAGLEY STREET, PORIRUA CITY, to conduct the business set out as under.

PURPOSE

The purpose of the Te Awarua-o-Porirua Harbour and Catchment Joint Committee is to oversee the development, monitoring, review and implementation of the Porirua Harbour and Catchment Strategy (Harbour Strategy).

MEMBERSHIP

Cr B E Kropp *(Chairperson)*	Porirua City Council
Cr A K Baker *(Deputy Chairperson)*	Porirua City Council
Taku Parai	Te Runanga o Toa Rangatira
Cr M Sparrow	Wellington City Council
Cr B Donaldson	Greater Wellington

Gary Simpson
CHIEF EXECUTIVE

Specific Responsibilities

Te Awarua-o-Porirua Harbour and Catchment Joint Committee shall have responsibility for:

1. **Porirua Harbour and Catchment Strategy- monitoring and review:** Overseeing the monitoring and review of the Porirua Harbour and Catchment Strategy and its supporting Action Plan programme.
2. **Monitoring and reporting** to Porirua City, Wellington City and Greater Wellington Regional Council on:
   a. **Progress toward achieving outcomes** specified within the Harbour Strategy;
   b. **Implementation, delivery and effectiveness** of agreed programmes and initiatives;
   c. **Effectiveness and efficiency of interagency coordination** in developing and delivering effective and efficient Harbour Strategy programmes, including options and recommendations for council consideration;
   d. **Issues arising** concerning harbour and catchment health, and related options and recommendations for council consideration.
3. **Strategy Implementation modifications and refinements:** Providing recommendations on programmes and actions (including modifications or refinements to existing or approved programmes) and related funding and timing matters that are required to support and/or give effect to the Harbour Strategy.
4. **Requesting** reports from Porirua City, Wellington City and/or Greater Wellington Regional Council, as appropriate, on projects and programmes that affect the Harbour, including projects and programmes run by Council Controlled Organisations and other business delivery units of the member organisations of the Harbour Committee.
5. **Representing** the interests of its members in the Harbour Strategy.

Delegations

Te Awarua-o-Porirua Harbour and Catchment Joint Committee shall have the following delegated powers and be jointly accountable to its Authorising Bodies (Porirua City Council, Greater Wellington Regional Council and Wellington City Council) for the exercising of these powers.[1]

In exercising the delegated powers, the Te Awarua-o-Porirua Harbour and Catchment Joint Committee will:

- Operate within policies, plans, standards or guidelines that have been established and approved by its Authorising Bodies;
- Operate having regard to the overall priorities of its Authorising Bodies;
- Operate having regard to the needs of local communities; and
- Operate within approved budgets set by its Authorising Bodies.

Te Awarua-o-Porirua Harbour and Catchment Joint Committee shall have delegated authority to:

1. Recommend to its Authorising Bodies an annual programme, and proposed budget, for consideration in the development of any annual and/or long term plan;
2. Recommend to its Authorising Bodies any significant change/s in budget or scope of any approved annual programme;
3. Recommend organisational contribution toward strategy implementation, including timing, budget, and delivery specifications.

The Chairperson of Te Awarua-o-Porirua Harbour and Catchment Joint Committee shall have delegated authority to:

- Represent the Committee to the media on matters related to the Harbour Strategy.

Members of Te Awarua-o-Porirua Harbour and Catchment Joint Committee shall have delegated authority to:

- Represent their Authorising Body in discussions with other agencies on Harbour Strategy delivery
- Represent their Authorising Body on matters relating to the Harbour Strategy to the media.

[1] Local Government Act 2002, Schedule 7, Clause 32

ORDER OF BUSINESS

PAGE

1. MEETING OPENING

2. APOLOGIES

3. CONFLICT OF INTEREST / INTERESTS REGISTER

The Chairperson invites notice from members of:

1. *Any interests that may create a conflict with their role as an elected member relating to the agenda item(s) for the meeting; and*

2. *Any interests in items in which they have a direct or indirect pecuniary interest as provided for in the Local Authorities (Members' Interests) Act 1968.*

3. *Any updates to the Interest Register.*

4. CONFIRMATION OF MINUTES 5

Meeting held 30 October 2014

CHAIRPERSON'S RECOMMENDATION

That the minutes be adopted confirmed as a true and complete record.

5. REVISED TE AWARUA-O-PORIRUA HARBOUR AND CATCHMENT STRATEGY AND ACTION PLAN 8

Report #1080999 of the General Strategy and Planning dated 12 February 2015.

CHAIRPERSON'S RECOMMENDATION

That Te Awarua-o-Porirua Harbour and Catchment Joint Committee recommend that the Council:

1. *Receives the report*

2. *Approve and adopt the revised Te Awarua-o- Porirua Harbour and Catchment Strategy and Action Plan 2015*

3. *Note that the release of the revised Strategy will be arranged for April 2015 in consultation with the Joint Committee Chairperson.*

4. *Delegate the responsibility to the Porirua City Council Chief Executive to correct any errors and approve any minor changes to the Strategy.*

Report #1082219 of the Team Leader Strategy and Advice Biodiversity, Greater Wellington Regional Council dated 19 March 2015.

CHAIRPERSON'S RECOMMENDATION

That Te Awarua-o-Porirua Harbour and Catchment Joint Committee that the Council:

1. Receives the report

2. Approves the final concept plan

3. Approves the Porirua City Council and Greater Wellington Regional Council to commence implementation of the concept plan.

Report #1082221 of the Team Leader Strategy and Advice Biodiversity, Greater Wellington Regional Council dated 19 March 2015.

CHAIRPERSON'S RECOMMENDATION

That Te Awarua-o-Porirua Harbour and Catchment Joint Committee:

1. Receives the report

2. Notes plan content and anticipated timeline for completion subject to Greater Wellington Regional Council Long Term Plan determinations.

3. Endorses Greater Wellington Regional Council developing the plan.

Report #1084335 of the General Strategy and Planning dated 25 October 2014.

CHAIRPERSON'S RECOMMENDATION

That Te Awarua-o-Porirua Harbour and Catchment Joint Committee:

1. Receives the report

2. Note the Porirua Harbour Trust Harbour Scorecard for 2014.

TE AWARUA-O-PORIRUA HARBOUR AND CATCHMENT JOINT COMMITTEE

Minutes of a meeting held in the Council Chambers, Administration Building, Hagley Street, Porirua on Thursday 30 October 2014 at 5.02pm.

PRESENT:	Cr	B E	Kropp	(Chairperson)
	Cr	A K	Baker	
	Mr	T	Parai	
	Cr	B	Donaldson	
	Cr	M	Sparrow	

OFFICERS:

Porirua City Council:	W	Walker	General Manager Strategy and Planning
	M	Trlin	Manager Environment and City Planning
	K	Calder	Porirua Harbour Strategy Coordinator
	S	Mika	Committee Advisor
Te Runanga o Toa Rangatira	R	Solomon	
Greater Wellington	T	Porteous	
Wellington City Council	A	Wilson	

Ms Solomon opened the meeting.

4/14 CONFIRMATION OF MINUTES

Meeting held 26 August 2014

RESOLVED (Cr Kropp / Cr Donaldson)

That the minutes be confirmed as a true and complete record.

CARRIED

Mr Taku Parai joined the meeting at 5.12pm.

5/14 PORIRUA HARBOUR TRUST ANNUAL REPORT – 2013/2014

Report #1038552 of the General Strategy and Planning dated 25 September 2014.

RECOMMENDED (Cr Kropp / Cr Baker)

That the Council receive the Porirua Harbour Trust Annual Report – 2013/2014.

CARRIED

6/14 PRELIMINARY REVIEW – PORIRUA HARBOUR AND CATCHMENT STRATEGY AND ACTION PLAN

Report #1035941 of the General Strategy and Planning dated 1 October 2014.

RECOMMENDED (Cr Kropp / Cr Donaldson)

That the Council:

1. **Receive the report.**

2. **Agree to release the report for consultation with signatory stakeholders.**

3. **That Porirua City Council, Wellington City Council and Greater Wellington Regional Council consider for inclusion in their respective draft 2015-2025 Long Term Plans appropriate additional funding for the Porirua Harbour programme to cover a scheduled 5 year bathymetric survey of the harbour in 2019/20.**

CARRIED

7/14 DRAFT PORIRUA STREAM MOUTH ECOLOGICAL ENHANCEMENT CONCEPT PLAN

Report #1044394 of the Biodiversity Manager, Greater Wellington Regional Council dated 7 October 2014.

RECOMMENDED (Cr Kropp / Cr Sparrow)

That the Council:

1. **Receive the report.**

2. **Approve the release of the draft plan for targeted stakeholder consultation subject to minor amendments and final approval by the Chairperson.**

CARRIED

8/14 SEDIMENT REDUCTION PLAN

Report #1038793 of the General Strategy and Planning dated 25 October 2014.

RECOMMENDED (Cr Kropp / Cr Baker)

That the Council:

1. **Receive the report**

2. **Note progress and plans for completion and implementation of a 'Sediment Reduction Plan' for Porirua Harbour catchment.**

CARRIED

The meeting closed at 6.11pm.

Approved and adopted as a true and correct record.

…… ……..
CHAIRPERSON **DATE**

Strategy & Planning
12 February 2015

REVISED TE AWARUA-O-PORIRUA HARBOUR AND CATCHMENT STRATEGY AND ACTION PLAN

PURPOSE

To provide the final reviewed *Te Awarua-o-Porirua Harbour and Catchment Strategy and Action Plan* 2015 for Committee approval.

SIGNIFICANCE OF DECISION

The Councils' significance policies are not triggered.

RECOMMENDATIONS

That the Te Awarua-o-Porirua Harbour and Catchment Joint Committee:

1. **Receives** the report
2. **Approve** and **adopt** the revised *Te Awarua-o-Porirua Harbour and Catchment Strategy and Action Plan 2015*
3. **Note** that a launch of the revised Strategy will be arranged for April 2015 in consultation with the Joint Committee Chairperson

Report prepared by:

Keith Calder
PORIRUA HARBOUR STRATEGY COORDINATOR

Approved for submission by:

Wendy Walker
GENERAL MANAGER STRATEGY AND PLANNING

1 EXECUTIVE SUMMARY

1.1 Porirua City Council, Te Runanga o Toa Rangatira, Wellington City Council and Greater Wellington Regional Council are committed to achieving a "Healthy harbour and waterways, used and enjoyed by the community." The *Porirua Harbour and Catchment Strategy and Action Plan (2012)* describes how this will be achieved.

1.2 The 2012 'harbour strategy' outlines the history of the harbour, its current condition, a strategy for improving its health and a large suite of strategic and operational actions towards this improvement. The strategy lists actions towards meeting three key objectives:

- Reducing sedimentation rates;
- Reducing pollutant inputs; and
- Ecological restoration.

1.3 The original strategy included a commitment to a review of the strategy and its implementation every three years.

1.4 A preliminary three-year review of the *Porirua Harbour and Catchment Strategy and Action Plan 2012* was completed mid-2014. Draft recommended changes were approved for consultation with signatory stakeholders by the Committee at its 30 October 2014 meeting.

1.5 Consultation with signatory stakeholders has been completed and appropriate changes made to the strategy document.

1.6 This report:

- Outlines the content of submissions;
- Outlines the changes to the strategy document in response to submissions;
- Provides a final *Te Awarua-o-Porirua Harbour and Catchment Strategy and Action Plan 2015* for Committee approval; and
- Outlines 'what next'.

2 CONTRIBUTION TO COUNCIL'S STRATEGIES

Relationship to Council's Strategic Priorities

A City of Villages	A Healthy Harbour	A Growing City	A Great City Experience
✓	✓	✓	✓

3 BACKGROUND

3.1 The *Porirua Harbour and Catchment Strategy and Action Plan 2012* (the harbour strategy) is a multi-party agreement. It was produced and adopted in consultation with the community and key stakeholders. The strategy included a commitment to a review every three years.

3.2 The harbour strategy remains the primary framework for delivery of the Porirua City Council's ***'Healthy harbour and waterways'*** community outcomes and LTP long-term goal for the harbour. The establishment of the Te Awarua-o-Porirua Whaitua Committee and the associated Whaitua process will be significantly guided by the harbour strategy. As such, the Whaitua process will be an important adjunct to delivering the strategy's objectives and community outcomes.

3.3 The objectives and actions of the harbour strategy represent a broad suite of activities to either eliminate or at least minimise the adverse impacts of land uses, land management or development activities within the catchment. The reviewed document maintains the strategic goals but updates the actions to fulfil the strategy objectives. The broad and specific elements supported by the community and stakeholders remain intact.

4 CONSULTATION

4.1 Stakeholder consultation provided comments from the following partner agencies and organisations:

- Te Runanga O Toa Rangatira
- Porirua City Council
- Greater Wellington Regional Council
- Wellington City Council
- New Zealand Transport Agency
- Regional Public Health
- Porirua Harbour Trust
- Guardians of Pauatahanui Inlet

4.2 The following is a summary of substantive submissions and the how they have been incorporated into the revised harbour strategy:

4.2.1 **Update name** – to reflect the new official name of the harbour. **Response** – updated document title, references to the harbour in the text, and updated the programme logo.

4.2.2 **Update key partner leadership** – recognise any change in leadership. **Response** – The Foreword (inside front cover) recognises Taku Parai as the new Chairman of Te Runanga O Toa Rangatira.

4.2.3 **Recognise Whaitua** – need to recognise existence, purpose and relationship of Greater Wellington Regional Council's new Te Awarua-o-Porirua Whaitua Committee. **Response** – the action tables now reflect the existence and proposed impact of the Whaitua, and a brief explanation 'box' for the Whaitua has been inserted in page 22.

4.2.4 **Multi-objective activities** - clarity sought for activities covering all three objectives. **Response** – adding a fourth table for all those activities that contribute to sediment, pollutant and ecological restoration objectives.

4.2.5 **'Completed' versus 'Current' activities** – there has been confusion over which category action items were in. **Response** – to restructure the tables by adding a fourth column and separating completed activities from current ones.

4.2.6 **Tense confusion** – tenses indicate something is complete (when it is not), but tense of an activity relates to what its status will be by the time the new harbour strategy is publicly released. **Response** – No change. Tense has been explained to submitters.

4.2.7 **Priority activities** – requested an indication of activities that are considered critical or a priority for fulfilling harbour strategy objectives. **Response** – now indicating PRIORITY activities with a '**P**' for the appropriate items, and re-designating columns (i.e. the old "Immediate Priority" column now designated "Immediate Term".

4.2.8 **Activity Packages** – request to package activities according to common outcomes (ie. Package all the items that contribute to community education). **Response** – activity packages will be provided in the Detailed Action Plan. This allows retention of the existing logic and structure of the tables in the harbour strategy, while adding another table, but without adding another layer of 'outcomes'.

4.2.9 **Minor factual corrections** – requests for spelling, description or attribution corrections. **Response** – corrected as appropriate

4.2.10 **Limited use of Detailed Action Plan** – very few hard copies of the associated Detail Action Plan were requested (less than 50, compared to 250 for the Strategy document) since the 2012 release. The Detailed Action Plan is mainly used by council officers. **Response** – print a limited number of hard copies of the Detailed Action Plan, and otherwise promote it as available online.

5 OPERATIONAL IMPLICATIONS

5.1 The three Councils and the Runanga are all committed to supporting the harbour strategy. Each has assigned either part-time or full-time staff to the Porirua Harbour programme and implementation of the harbour strategy.

5.2 Porirua City Council (PCC) is committed to maintaining a dedicated, full-time Porirua Harbour Strategy Coordinator to facilitate implementation of the harbour strategy and action plan programmes.

5.3 Te Runanga o Toa Rangatira has taken a lead in the Fish Survey programme with NIWA. The Runanga continues to lead shellfish surveys over the 2014/15 summer. The Runanga has also initiated planning and implementation of restoration work on streams running through Takapuwahia village, as well as harbour edge restoration work as part of the Porirua City Council Village Planning programme. Most recently, the Runanga has been successful in applying to the Ministry of Primary Industries to fund a professional subtidal shellfish survey of the harbour. The fieldwork has already been completed and now awaiting the report from NIWA.

5.4 Greater Wellington Regional Council (GWRC) has now moved its 'Take Charge' business education and monitoring programme into the Porirua Harbour catchment. It is intended that the programme will operate in the catchment for the next three years. GWRC is also considering a draft LTP proposal for a full time Land Management Officer in the Porirua Harbour catchment from 2015/16. The Regional Council's research and monitoring programme is already extensive and regularly reviewed. New programmes continue to be added, including:

- A seagrass condition assessment;
- Investigation of the rail network contribution to contaminants;
- Investigation of toxicant sources within the Porirua Stream; and
- Modelling of contaminant distribution in the harbour from stormwater outlets as possible predictive tool.

5.5 PCC and GWRC have joined Wellington City Council (WCC) in the new entity Wellington Water Limited who is now the sole manager of the three-waters network in the Porirua Harbour catchment. As such, Wellington Water is a key stakeholder in the critical wastewater, sewerage and stormwater challenges facing the harbour and catchment. Wellington Water, and the new Chief Executive, are actively seeking to implement the harbour strategy and contribute to a healthier aquatic and estuarine environment in liaison with the Councils and the Whaitua Committee.

5.6 Officers of the joint Councils and Runanga will continue to oversee and coordinate the day-to-day implementation of strategy and action plan programme working with Te Awarua-o-Porirua Harbour and Catchment Joint Committee (the Committee).

6 FINANCIAL IMPLICATIONS

6.1 Most action plan activities are provided for in Long-term Plans or funded from within existing Councils' or Runanga budgets.

6.2 At the 30 October 2014 meeting, the Committee approved a recommendation that the joint Councils consider additional funding in their 2015-2025 LTPs for an additional $40K to enable the next 5-year bathymetric survey to take place in 2019/2020. Subsequent

discussions between senior officers resulted in GWRC incorporating future bathymetric surveys into its research programme and funding. If required, PCC and WCC could assist funding future bathymetric survey from within existing budgets.

6.3 As mentioned in para 6.5, GWRC are also considering a 2015-2025 LTP proposal for a full time Land Management Officer in the Porirua Harbour catchment from the 2015/16 financial year.

7 STATUTORY REQUIREMENTS

7.1 There are no significant legal implications associated with this decision.

8 CONCLUSION

8.1 The original *Porirua Harbour and Catchment Strategy and Action Plan 2012* is subject to a scheduled 3-year review.

8.2 An updated *Te Awarua-o-Porirua Harbour and Catchment Strategy and Action Plan 2015* has been prepared following liaison and consultation with the harbour strategy partners (**Attachment 1**).

8.3 The Committee is being asked to consider and adopt the updated harbour strategy document for printing and public release.

8.4 An appropriate release event will be arranged in liaison with the Chairwoman of the Committee.

9 ATTACHMENTS:

- **Attachment 1**: Draft final Te Awarua-o-Porirua Harbour and Catchment Strategy and Action Plan 2015. PCC# 1082471.

TE AWARUA-O-PORIRUA HARBOUR & CATCHMENT STRATEGY+ACTION PLAN

A healthy harbour and waterways
He whanga i whakaora ake
i nga wai e rere nei

TE AWARUA-O-PORIRUA HARBOUR AND CATCHMENT

Strategy and Action Plan

Updated March 2015

Contents

Version	Date	Description	Owner	Revision Date
1	*August 2011*	*Draft Version*	*Keith Calder*	*June 2014*
2	*March 2012*	*Final Version*	*Keith Calder*	*June 2014*
2	*March 2015*	*Update*	*Keith Calder*	*June 2019*

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Foreword

Tena koutou katoa. We are pleased to make public this document – the **Te Awarua-o-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 the 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 **Te Awarua-o-Porirua Harbour and Catchment Strategy and Action Plan** is a living document. It is reviewed every three years and new information accommodated within the Action Plan as it becomes available.

Can the 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

Taku Parai
Chairman
Te Rūnanga o Toa Rangatira

From Ngati 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. Ngati Toa Rangatira extends a warm welcome to you all.

The health and sustainability of Te Awarua-o-Porirua Harbour and our natural environment is a matter of vital importance to Ngati 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.

TE AWARUA-O-PORIRUA HARBOUR & CATCHMENT STRATEGY+ACTION PLAN

A healthy harbour and waterways
He whanga i whakaora ake
i nga wai e rere nei

THE TE AWARUA-O-PORIRUA HARBOUR AND CATCHMENT STRATEGY AND ACTION PLAN logo *represents the Porirua community's relationship with its 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 Te Awarua-o-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.

Te Awarua-o-Porirua Harbour and its catchments

Te Awarua-o-Porirua Harbour is an estuary and outer harbour lying 20km north of Wellington City. The 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.

TE AWARUA-O-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 8km^2 and the catchment covers 185km^2 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. It is the only one with any significant seagrass cover and it has one of the largest cockle concentrations in New Zealand. Pauatahanui Inlet is a nationally significant location for wetland bird species: 18 out of 35 (51%) of the wetland bird species recorded in Pauatahanui Inlet have conservation threat rankings of 'Threatened' and 'At Risk'.

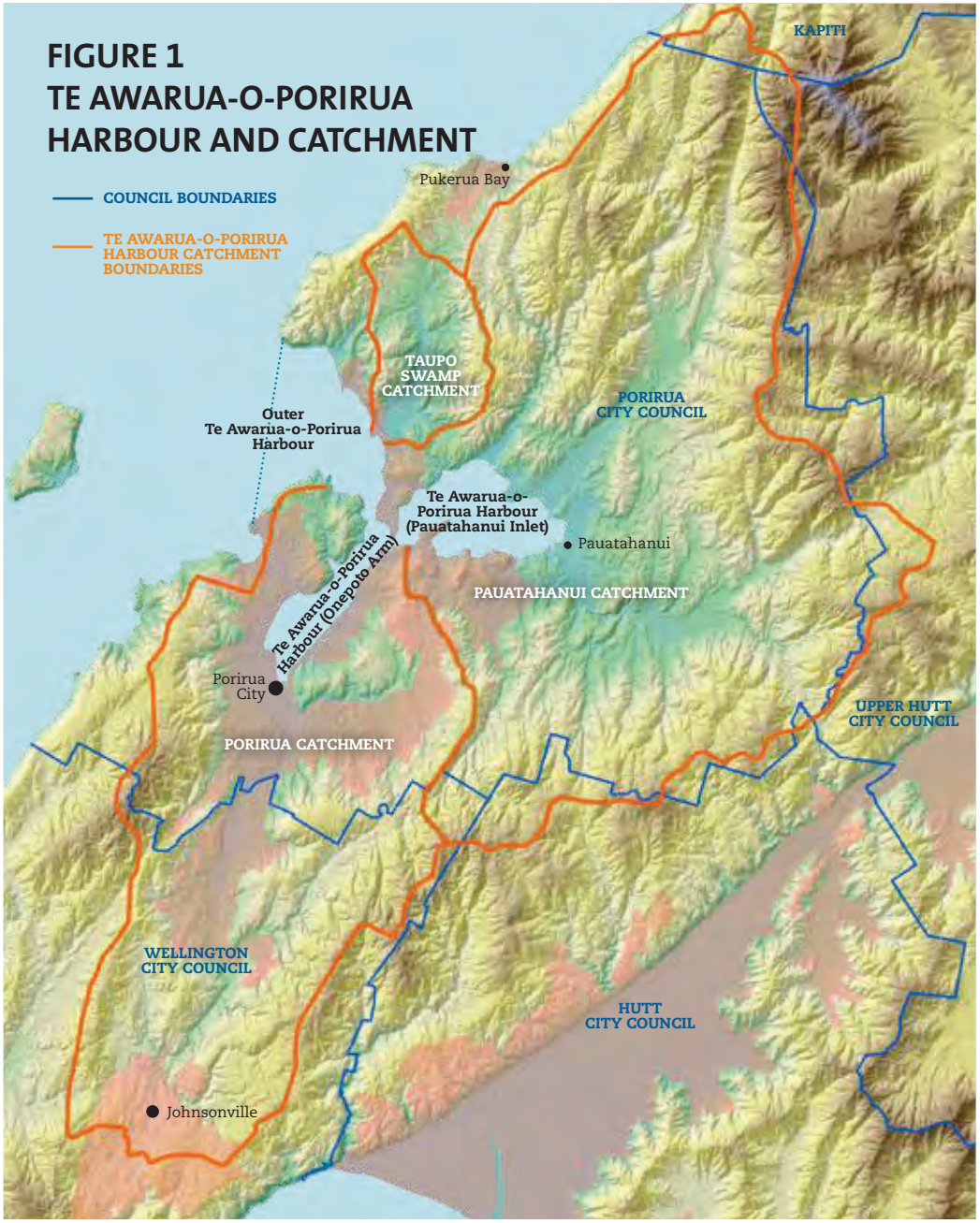
Te Awarua-o-Porirua Harbour has been the home of local iwi and manawhenua **Ngati Toa Rangatira** since the early 1800s. It was once a significant traditional food, plant and recreational resource.

Porirua City has a population of 51,000. A further 30-40,000 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 Te Awarua-o-Porirua Harbour, largely through radical changes to the land use within its catchment 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 throughout the catchment and gradually surrounded the harbour. Further up the catchment, Tawa and Johnsonville similarly developed. Porirua 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.

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

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 the 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 became 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...

Te Awarua-o-Porirua Harbour is a natural treasure – a unique and 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 Te Awarua-o-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 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 *Te Awarua-o-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 *Te Awarua-o-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 Te Awarua-o-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 Te Awarua-o-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 Te Awarua-o-Porirua Harbour and the challenges faced. Its Regional Policy Statement has influenced the direction of the current review of its regional plan 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 within the city's northern boundary (25% of the total harbour catchment). This is important because 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 *Te Awarua-o-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 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 original 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 the harbour and its catchment.

Public consultation on the draft Strategy and Action Plan was held in September 2011.

Broad priorities

This public and agency consultation formed the foundation for the development of this Strategy and Action Plan and identified a clear set of broad priorities for strategic action:

- General and targeted education and awareness programmes.
- 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 intent of the Strategy is increasingly reflected in the respective councils' planning documents, including their Long Term Plans. The councils are also guided by and have regard to the Strategy when considering specific actions and programmes for inclusion within their respective Long Term Plans

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
   - Maintain and, where appropriate, improve the current 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**
   - Involve in key decision-making fora
   - Recognise traditional values

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 Te Awarua-o-Porirua Harbour has been the subject of extensive research over the last 30 years. Research has intensified since the 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 from1974 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*). A 2014 survey has shown that current rates are likely to be less than this, though still significantly more than a healthy 1mm per year.

DREDGING

Dredging could be a tool to manage sediments (such as mud, sand, and gravel) in Te Awarua-o-Porirua Harbour and may help to improve harbour flushing, navigability or beach replenishment.

However, dredging produces a number of challenges, including its impacts on ecology and coastal processes, costs, resource consents, supporting research, and what to do with contaminated sediments. The focus is now on the reduction of sediment entering the harbour.

The Strategy and Action Plan recognises that sand and mud flats are natural features of estuaries, but that excessive sedimentation rates are a problem for the harbour.

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. Research suggests there is now little marine sand entering the harbour.

The primary source of excessive sedimentation in Te Awarua-o-Porirua Harbour is terrestrial. Silt is smothering the seabed, affecting the seagrass and shellfish 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 moves 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 the harbour.

2. Pollutants

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 are collected 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 nutrient affecting the harbour is nitrogen, mostly from sewer cross-connections and livestock effluent.

While nitrogen is a naturally occuring nutrient essential for plant growth, excessive levels inhibit seagrass grwoth and can result in the widespread proliferation of oxygen-hungry algae. Oxygen depletion reduces water and sediment quality and their suitability for fish and invertebrates living on 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. Ecological degradation

Sedimentation, pollution and direct harbour edge modification have significantly destroyed areas of the original estuary habitat and reduced critical subtidal, intertidal and harbour edge ecologies.

Estuaries are one of the most productive ecological communities and their loss may have major impacts on offshore and near-shore fisheries. Te Awarua-o-Porirua Harbour is the only estuary in the lower North Island with significant areas of seagrass. However, 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, fish and birds.

Reclamation, modification and sedimentation have resulted in a major loss of habitat for subtidal and intertidal plants. Ongoing human-induced changes continue to threaten the harbour environment.

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.

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 Te Awarua-o-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 Te Awarua-o-Porirua Harbour and catchment system.

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

The specific impact of this rise and its interaction with an already complex and dynamic system is unknown. Sedimentation rates in the 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 continue to be recognised in the future planning and management of the harbour and catchment.

The objectives, indicators and targets

Key objectives and actions

The Te Awarua-o-Porirua Harbour and Catchment Strategy sets in place three key objectives:

1. Reduce sedimentation rates

2. Reduce pollutant inputs

3. Restore ecological health

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 against which future 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	• Improve land management and land use practices • Catchment protection and re-vegetation • Localised management of marine sand banks and improved harbour flushings, where appropraite	
2. Reduce pollutant inputs	• Reduce faecal inputs • Cap nitrogen inputs • Reduce toxicant inputs • Additional litter management	The focus is on identifying and stopping pollutants at their source.
3. Restore ecological health	• 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	

Youth sailing camp in the Onepoto Arm

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 of bathymetric survey 2011/2012 refined 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. Recent research helped establish doubts over the the feasibility and likely effectiveness of localised dredging.
		Long term: 1mm per year average rate for both arms.	2031	
2. Reduce pollutant inputs				
Faecal indicator 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 selected 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 and stormwater networks, with some also coming from rural subcatchments. Research has shown that excessive nutrient levels are inhibiting sea grass growth in the harbour.
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. Restore ecological health				
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. Significantly expand the distribution 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 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	Research has now assisted the determination of location and effective extent of riparian rehabilitation.
		Establish riparian plant cover along majority of stream length, particularly in Horokiri, Pauatahanui and Porirua streams.	2031	Riparian vegetation improves in-stream conditions for fish and stream insects and other aquatic life. It also provides streamside habitat, reduces streambank erosion, and filters sediments and pollutants.
Stream and harbour bed communities	Poor and stressed sediment communities.	Stream and harbour bed communities improved to accepted 'healthy' levels.	2031	Regular monitoring and assessment of stream and estuary bed communities will continue. A harbour fish survey provided a baseline to assess fish community improvement and further remedial activity.

The Action Plan

The tables on pages 14-21 outline the Action Plan – a programme of activities to achieve the Te Awarua-o-Porirua Harbour and Catchment Strategy's objectives. This has been updated from the 2012 document

There is one table for each objective, plus a table for activities that impact on all three:

Each table lists past, 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. Education activities contribute to improved understanding, value formation and behaviour change
- **Research and monitoring** – ongoing assessment of the state of, and the impact of activities on, the harbour and its catchment.

The three-yearly Pauatahanui Inlet cockle count undertaken by volunteers

Each activity is coded (eg, SB5, EC6) reflecting whether it is a sediment (S), pollutant (P) or ecology (E) activity or one that impacts on all three (T), and whether it is a completed (A), current (B), immediate (C) or medium-to-longer-term (D) activity.

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

Current activities

Since the Te Awarua-o-Porirua Harbour programme was established in 2008, a significant number of activities of direct benefit to the harbour and catchment have begun, and some have already been completed – particularly in the past three years, since the original Strategy was adopted. 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.

Agency involvement

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

Strategy partners can also use the Strategy to:

- review how work that relates to the 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 existing information sharing and coordination inter-agency groups – Porirua Harbour Interagency Advisory Group (PHIAG) and Harbour Science Group – and the key stakeholder (three councils and the Rūnanga) executive oversight group – the Strategy Oversight Team – will be maintained to facilitate coordination of Strategy implementation.

The Strategy and Action Plan is an active document. Councils receive ongoing submissions on the 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.

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

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 *Te Awarua-o-Porirua Harbour and Catchment Strategy and Action Plan* can act as a catalyst for community initiatives and involvement in harbour restoration. There will be increasing 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 harbour catchment.

Community groups, particularly the Porirua Harbour and Catchment Community Trust (PHACCT), 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.

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 sedimentation rates 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
- Gaps in our knowledge of harbour sediment and flushing dynamics
- Pollutants are also accumulating in harbour sediments

P = Priority project

LEAD ROLES: *PCC – Porirua City Council; WCC – Wellington City Council; GWRC – Greater Wellington Regional Council; Joint – Collaboration between PCC, WCC and GWRC; GOPI – The Guardians of Pauatahanui Inlet; PICT – Pauatahanui Inlet Community Trust; PHT – Porirua Harbour Trust*

COMPLETED ACTIVITIES – SINCE 2006

REGULATION

SA1 EX-SC1	Completed revision and update of codes of practice for land development	WCC	

PROJECTS

SA2 EX-SA7	Improved Duck Creek development environmental design	PCC	
SA3 EX-SA16	Completed an Erosion and Sediment Control Standard for State Highway Infrastructure	NZTA	

EDUCATION

RESEARCH

SA4 EX-SA19	Developed preliminary estuary and catchment sediment models	GWRC	P
SA5 EX-SA20	Completed the baseline and first follow-up 5-year bathymetric surveys and analysis	PCC	P
SA6 EX-SA21	Completed partnership with NZ Transport Agency on harbour modelling	PCC	P
SA7 EX-SA22	Investigated harbour sediment management needs and options	PCC, GWRC	
SA8 EX-SB13	Completed prioritised research of resource use and management tools – catchment/estuary modelling	GWRC	
SA9 EX-SC6	Investigated options to dredge access channel through Moorehouse Point sand bank	PCC	

FO

CURRENT AND ONGOING ACTIVITIES				IMMEDIATE TERM – NEXT 3 YEARS				MEDIUM TERM – 3-10 YEARS				
SB1 EX-SB2	Revise erosion and sediment control guidelines for earthworks	GWRC		**SC1** EX-SB3	Review building site earthworks, sediment and erosion controls and guidelines	GWRC?	P					REGULATION
SB2 EX-SA2	Implement building site earthworks control bylaw	PCC		**SC2** EX-SC1	Review and update codes of practice for land development	PCC?	P					
SB3 EX-SA4	Implement codes of practice for land development	WCC, PCC										
SB4 EX-SA5	Implement Plan Change 70 (WCC) & 11 (PCC) to increase earthwork controls	WCC, PCC										
SB5 EX-SA9	Install street sump baffles	WCC		**SC3** EX-SB6	Implement a priortised whole-of-catchment Sediment Reduction Plan	GWRC	P	**SD1** EX-SC2	Develop and implement a harbour sediment management programme, as appropriate	PCC		PROJECTS
SB6 EX-SA10	On-going weed control and restoration planting on DOC-managed land	DOC		**SC4** NEW	Seek to establish and resource a full-time Land Management Officer	GWRC	P					
SB7 EX-SB8	Implement catchment waterway and land management planning related to major infrastructure projects	GWRC										
SB8 EX-SA12	Maintaining community environmental programmes	GWRC, WCC		**SC5** EX-SB10	Maintain Council officer training workshops on sediment management and control	GWRC, WCC						EDUCATION
SB9 EX-SA13	Maintain the 'Muddy Waters' sedimentation education programme	GWRC										
SB10 EX-SB10	Undertake Council officer training workshops on sediment management and control	WCC										
SB11 EX-SA21	Maintain research partnership with NIWA on estuarine/catchment sediment processes	GWRC						**SD2** NEW	Undertake periodic bathymetric survey and analysis	GWRC	P	RESEARCH
SB12 EX-EA17	Undertake regular surveys of estuary sediment communities and habitat	GWRC	P					**SD3** EX-SC6	Investigate options to reduce/compensate for effects of harbour structures and other works on harbour dynamics	PCC		
SB13 NEW	Maintain catchment sediment monitoring programme	GWRC	P									

R BROAD-RANGING ACTIVITIES THAT INCLUDE THE REDUCTION OF RATES OF SEDIMENTATION, SEE PAGES 20-21

Action Plan to 2 Reduce Pollutant Inputs

VISION
- To reduce pollutant inputs to, and sediment contaminants within, Te Awarua-o-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 (that is, 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

P = Priority project

LEAD ROLES: *PCC – Porirua City Council; WCC – Wellington City Council; GWRC – Greater Wellington Regional Council; Joint – Collaboration between PCC, WCC and GWRC; RPH – Regional Public Health; DOC – Department of Conservation; GOPI – The Guardians of Pauatahanui Inlet; KPB – Keep Porirua Beautiful; PHT – Porirua Harbour Trust*

COMPLETED ACTIVITIES – SINCE 2006

REGULATION

PA1 EX-PA2	Contracted a Trade Waste Officer	PCC, WCC	
PA2 EX-PB8	Commenced 'Take Charge' business education and monitoring programme in Porirua catchment	GWRC	P
PA3 EX-PB6 + PC7	Superceded Regional Stormwater Action Plan with Regional rules and Whaitua process	GWRC	
PA4 EX-PB3	Prepared a stormwater bylaw	PCC	P

PROJECTS

PA5 EX-PA10	Prepared a regional code of practice for drainage and water	PCC, WCC	
PA6 EX-PA13	Completed initial Porirua Stream delta clean-up	PCC	P
PA7 EX-PA17	Reviewed and improved the street sump maintenance programme	PCC	
PA8 NEW	Completed reticulation of sewage from Pauatahanui village	PCC	P
PA9 EX-PB4	Prepared a stormwater water quality improvement plan	PCC	P
PA10 EX-PB5	Reviewed harbour and catchment litter management programme	PCC	
PA11 NEW	Established internal litter management working group	PCC	

EDUCATION

RESEARCH

PA12 EX-PA18	Implemented targeted pollutant research projects	GWRC	

CURRENT AND ONGOING ACTIVITIES				IMMEDIATE TERM – NEXT 3 YEARS				MEDIUM TERM – 3-10 YEARS				
PB1 EX-PA1	Implement trade waste bylaws	PCC, WCC		**PC1** EX-PB3	Implement a stormwater bylaw	PCC	P	**PD1** EX-PC1	Review and enhance the work of Trade Waste Officer	PCC, WCC		REGULATION
PB2 EX-PA3	Implement an onsite wastewater treatment bylaw	PCC		**PC2** NEW	Apply for resource consents to discharge from stormwater network to fresh and coastal waters	WCC, PCC	P	**PD2** NEW	Initiate a regional stormwater forum to support the transition to managing waterways for contaminant limits	GWRC	P	
								PD3 NEW	Develop a strategic approach for managing the stormwater network for water quality limits set by Te Awarua-o-Porirua Whaitua Committee	PCC, WCC	P	
PB3 EX-PA5	Implement illegal connection remedial strategy and action plan	PCC, WCC	P									PROJECTS
PB4 EX-PA6	Progressive upgrade of domestic stormwater and sewer connections	PCC, WCC										
PB5 EX-PA8	Implement a 10-year stormwater network upgrade	PCC	P									
PB6 EX-PA9	Accelerate a prioritised sewer network renewal plan	PCC										
PB7 EX-PA11	Maintain a sewage pollution elimination programme	WCC										
PB8 EX-PA12	Maintain the Pauatahanui Inlet annual foreshore clean-up	GOPI	P	**PC3** NEW	Engage Wellington Water Ltd, as the infrastructure leader, within the Harbour Strategy programme	Joint	P	**PD4** EX-PC4	Revise and improve non-sumped vehicle-generated road-runoff treatment	PCC		
PB9 EX-PA14	Maintaining a foreshore litter management programme & community partnership	PCC, PHT	P	**PC4** NEW	Establish partnership with Wellington Water Ltd for environmental outcomes	Joint	P	**PD5** EX-PC5	Accelerate the illegal stormwater connection remedial action plan	WWL		
PB10 EX-PA15	Install litter catchers on targeted street sumps	PCC						**PD6** EX-PC6	Accelerate the strategic upgrade programme for sewer connection	PCC		
PB11 EX-PB4	Implement a prioritised stormwater quality improvement plan	PCC										
PB12 EX-PB7	Commence a WCC sewage pollution elimination-type programme within the PCC district	WWL										
PB13 EX-PC2	Implement a revised set of building controls and guidelines	PCC, WCC										
PB14 EX-PB10	Develop a health risk communication plan for Te Awarua-o-Porirua Harbour	RPH, PCC		**PC5** EX-PB10	Implement a health risk communication plan for Te Awarua-o-Porirua Harbour	RPH, PCC						EDUCATION
PB15 NEW	Install 'Drains to Harbour/Streams' plates on targeted street sumps	PCC, WCC										
PB16 EX-PA19	Undertake regular assessments of sediment contaminants and related harbour or catchment monitoring	GWRC										RESEARCH
PB17 EX-PA20	Maintain a recreational water quality monitoring programme	GWRC, PCC	P									
PB18 EX-EA17	Maintain regular surveys of estuary sediment communities and habitat	GWRC	P	**PC6** NEW	Investigate continuous microbial water quality forecasting in the harbour	GWRC	P					
PB19 EX-PC8	Identify and assess the significance of contaminants from the rail network	GWRC		**PC7** NEW	Establish a long-term water clarity monitoring programme for the harbour	GWRC						
PB20 EX-PB11	Investigate sources of toxicants in the Porirua Stream catchment	GWRC										
PB21 NEW	Collate contaminated site information for the Te Awarua-o-Porirua Harbour catchment	GWRC										

FOR BROAD-RANGING ACTIVITIES THAT INCLUDE THE REDUCTION OF POLLUTANT INPUTS, SEE PAGES 20-21

Action Plan to 3 Restore Ecological Health

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

TARGET
- 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

P = Priority project

LEAD ROLES: *PCC – Porirua City Council; WCC – Wellington City Council; GWRC – Greater Wellington Regional Council; Joint – Collaboration between PCC, WCC and GWRC; F+B – Forest and Bird; DOC – Department of Conservation; QEII – QEII National Trust; GOPI – The Guardians of Pauatahanui Inlet; Carrus – Carrus Corporation; TROTR – Te Rūnanga o Toa Rangatira; NIWA – National Institute of Water & Atmospheric Research; PHT – Porirua Harbour Trust*

COMPLETED ACTIVITIES – SINCE 2006

REGULATION

EA1 EX-EA3	Developed draft provisions for the protection of significant urban vegetation area	PCC	

PROJECTS

EA2 EX-EA4	Completed the Okowai Lagoon Restoration Project	PCC	
EA3 EX-EA8	Completed a Porirua Reserves Management Plan	PCC	
EA4 EX-EB2	Completed an estuary ecological restoration options report	GWRC	
EA5 NEW	Completed a Porirua Stream Mouth & Estuary Enhancement Concept plan	GWRC	P
EA6 NEW	Prepared a Takapuwahia streams restoration plan	TROTR	

EDUCATION

RESEARCH

EA7 EX-EA16	Completed three-yearly cockle survey (2013) for the Pauatahanui Inlet	GOPI	P
EA8 NEW	Completed a feasibility assessment of seagrass restoration possibilities for Te Awarua-o-Porirua Harbour	GWRC	P
EA9 EX-EB5	Completed a fish survey of Te Awarua-o-Porirua Harbour	TROTR	P
EA10 NEW	Completed assessment of existing seagrass condition	GWRC	

REGULATION

CURRENT AND ONGOING ACTIVITIES

EB1 EX-EA1	Implement Pauatahanui Wildlife Management Reserve Management Plan	F&B	
EB2 EX-EA2	Maintain management of the Duck Creek Reserve	DOC	

IMMEDIATE TERM – NEXT 3 YEARS

MEDIUM TERM – 3-10 YEARS

PROJECTS

CURRENT AND ONGOING ACTIVITIES

EB3 EX-EA8	Implement a Porirua Reserves Management Plan	PCC	
EB4 EX-EA6	Maintain financial support for landowners entering in to QEII covenants	QEII	
EB5 EX-EA7	Maintain support for local body native forest covenants	PCC	
EB6 EX-EA9	Implement the Bothamley Park Restoration and Management Plan	PCC	
EB7 EX-EA10	Review and implement the WCC Biodiversity Strategy and Action Plan	WCC	
EB8 EX-EA11	Maintain the Community Greening Programme	WCC	
EB9 EX-EA12	Implement the Northern Reserve Management Plan	WCC	
EB10 EX-EA13	Implement the GWRC Parks Network Plan & the individual regional park operational plans	GWRC	
EB11 EX-SA6	Implement Pauatahanui Vegetation Framework's re-vegetation programme	GWRC	P
EB12 EX-SA10	On-going weed control and restoration planting on DOC-managed land	DOC	
EB13 **NEW**	Implement the Porirua Stream Mouth and Estuary Enhancement Concept plan	GWRC, PCC	P
EB14 **NEW**	Implement the Takapuwahia streams restoration plan	TROTR	

IMMEDIATE TERM – NEXT 3 YEARS

EC1 EX-EB4	Promote re-vegetation and coastal/estuary care groups	GWRC	
EC2 **NEW**	Implement 'Our Capital Spaces' open spaces and recreation framework	WCC	

MEDIUM TERM – 3-10 YEARS

ED1 EX-EA5	Implement the Lower Porirua Stream Wetland Restoration Plan	GWRC
ED2 **NEW**	Prepare a Marine Action Plan	GWRC
ED3 DEFERRED EX-EB7	Prepare and implement a seagrass restoration plan	GWRC

EDUCATION

CURRENT AND ONGOING ACTIVITIES

EB15 EX-EA14	Maintain community environmental programmes	GWRC, WCC	
EB16 **NEW**	Promote biodiversity messages within appropriate education programmes	GWRC, PHT	

IMMEDIATE TERM – NEXT 3 YEARS

EC3 EX-EC2	Design, build and install an estuary interpretation network, centre and/or kiosk	GWRC	P

MEDIUM TERM – 3-10 YEARS

RESEARCH

CURRENT AND ONGOING ACTIVITIES

EB17 EX-EA17	Undertake regular surveys of estuary sediment communities and habitat	GWRC	P
EB18 EX-EB19	Undertake annual intertidal survey	GWRC	P
EB19 EX-EA20	Undertake regular estuary habitat mapping surveys	GWRC	P
EB20 **NEW**	Undertake regular surveys of seagrass cover and condition	GWRC	

IMMEDIATE TERM – NEXT 3 YEARS

EC4 EX-EB6	Undertake inter-tidal shellfish survey of Onepoto Arm	TROTR	P
EC5 **NEW**	Undertake sub-tidal shellfish survey of whole of Te Awarua-o-Porirua Harbour	TROTR	P
EC6 EX-EB16	Undertake three-yearly Shellfish Survey of whole Te Awarua-o-Porirua Harbour	GOPI, TROTR	P
EC7 **NEW**	Undertake experimental transplant trials of seagrass	GWRC	

MEDIUM TERM – 3-10 YEARS

FOR BROAD-RANGING ACTIVITIES THAT INCLUDE THE RESTORATION OF ECOLOGICAL HEALTH, SEE PAGES 20-21

Action Plan for Activities that:

1. Reduce Rates of Sedimentation;

2. Reduce Pollutant Inputs; *and*

3. Restore Ecological Health.

These activities target all three key areas listed above.

The Vision, Current State, Targets and Issues and specifically focused activities in each of these areas can be found on the following pages:

P = Priority project

LEAD ROLES: *PCC – Porirua City Council; WCC – Wellington City Council; GWRC – Greater Wellington Regional Council; Joint – Collaboration between PCC, WCC and GWRC; GOPI – The Guardians of Pauatahanui Inlet; PICT – Pauatahanui Inlet Community Trust; PHT – Porirua Harbour Trust*

COMPLETED ACTIVITIES – SINCE 2006

REGULATION			
TA1 NEW	Established Te Awarua-o-Porirua Harbour and Catchment Joint Committee	PCC	
TA2 NEW	Established Te Awarua-o-Porirua Whaitua Committe	GWRC	
TA3 NEW	Completed draft Regional Plan	GWRC	P
PROJECTS			
TA4 EX-SB5 (PART)	Completed a whole-of-catchment Te Awarua-o-Porirua Harbour and Catchment Sediment Reduction: Issues and Recommendations report	GWRC	
EDUCATION			
TA5 EX-PA16	Facilitated Low Impact Urban Design and Development workshops	WCC	
TA6 NEW	Produced Water Sensitive Urban Design Guide	WCC	P
TA7 EX-SA11	Established Te Awarua-o-Porirua Harbour and Catchment Community Trust	PCC	P
RESEARCH			
TA8 EX-SA17	Established the Te Awarua-o-Porirua Harbour Science Advisory Group	GWRC	P
TA9 EX-SA18	Established biophysical baselines and environmental monitoring programme	GWRC	P

FOR ACTIVITIES THAT FOCUS ON SPECIFIC AREAS,

CURRENT AND ONGOING ACTIVITIES				IMMEDIATE TERM – NEXT 3 YEARS				MEDIUM TERM – 3-10 YEARS			
REGULATION											
TB1 ex-SB1	Issue and monitor compliance of resource consents	PCC, WCC, GWRC						**TD1** ex-SB1	Maintain on-going programme of regulatory alignment, as appropriate	GWRC, PCC, WCC	
TB2 ex-SB2	Maintain and improve resource consent effectiveness	GWRC									
TB3 ex-SB1	Align planning documents with the Harbour and Catchment Strategy	GWRC, PCC, WCC	P								
TB4 ex-PB1	Align Asset Management Plans with the Harbour and Catchment Strategy	GWRC, PCC, WCC	P								
TB5 ex-PB4	Implement Asset Management Plans consistent with the Harbour Strategy	GWRC, PCC, WCC	P								
TB6 NEW	Support and service Te Awarua-o-Porirua Harbour and Catchment Joint Committee	PCC									
TB7 NEW	Support and inform Te Awarua-o-Porirua Whaitua Committee	GWRC									
TB8 NEW	Support setting limits to meet catchment objectives through Te Awarua-o-Porirua Whaitua Committee	GWRC	P								
TB9 ex-EB1	Align Asset Management Plans for Reserve Management with DOC Strategies	PCC, WCC, GWRC									
TB10 ex-SA3	Implement Reserves and Vegetation Policy	PCC									
TB11 NEW	Adopt and implement Water Sensitive Urban Design Guidelines	WCC	P								
				TC1 NEW	Complete Regional Plan and appropriately reflect Harbour Strategy	GWRC	P				
				TC2 NEW	Undertake plan changes in the Regional Plan in accordance with approved recommendations of Te Awarua-o-Porirua Whaitua Committee	GWRC	P				
				TC3 NEW	Review District Plans to appropriately reflect Harbour Strategy	WCC, PCC	P				
				TC4 NEW	Implement non-regulatory methods identified through the Te Awarua-o-Porirua Whaitua Implementation Plan	GWRC, PCC, WCC	P				
PROJECTS											
TB12 NEW	Complete Long-term Plans for 2015-25 to ensure provision for implementing Harbour Strategy	GWRC, PCC, WCC	P								
TB13 ex-SA8	Coordinate inter-agency cooperation	PCC	P								
TB14 ex-SA6	Implement Pauatahanui Vegetation Framework's re-vegetation programme	GWRC	P					**TD2** ex-SC4	Establish targeted industry partnerships	PCC, WCC	
TB15 NEW	Develop a reporting indicator framework for implementation of Harbour Strategy	PCC	P								
TB16 ex-SB5	Completed a whole-of-catchment Te Awarua-o- Porirua Harbour and Catchment Sediment Reduction Plan	GWRC	P								
EDUCATION											
TB17 ex-PB2	Review, enhance and implement building site guidelines	PCC, WCC									
TB18 ex-SA14	Facilitate public presentations and seminars	PCC									
TB19 ex-SA15	Produce environmental education materials	GWRC, PHT									
TB20 NEW	Resource and support school environmental educators	PHT, GWRC	P								
TB21 ex-SB11 ex-PB9	Implement community environmental engagement and education programmes	GWRC	P								
TB22 NEW	Undertake regular Community Environmental Perception Surveys	PCC									
TB23 ex-EA15	Promote sustainable farm and forest management.	GWRC									
				TC5 ex-SB4	Complete Rural Guidelines	PCC	P	**TD3** NEW	Design and install State Highway signage at three entrances to the Te Awarua-o-Porirua Harbour catchment	PCC, Sponsor	
				TC6 ex-SB9	Support community environmental care programmes for priority locations	GWRC, WCC		**TD4** ex-SB11	Maintain on-going community and business engagement and environmental education programmes	GWRC	
				TC7 ex-SB12	Prepare, distribute & promote relevant commercial and industry guidelines	PCC					
RESEARCH											
TB24 ex-SA17	Maintain the Te Awarua-o-Porirua Harbour Science Advisory Group	GWRC									
TB25 ex-SA18	Develop and maintain environmental research and monitoring programmes	GWRC									
TB26 ex-SC5	Develop partnerships with tertiary and research institutes and other relevant organisations	GWRC, PCC						**TD5** ex-SC4	Continue establishing targeted industry partnerships	PCC, WCC, GWRC	
TB27 ex-EA17	Undertake regular surveys of estuary sediment quality and benthic community health	GWRC						**TD6** ex-SA18	Continue on-going research and monitoring programmes	GWRC	

SEE: REDUCTION OF SEDIMENTATION (PAGES 14-15), REDUCTION OF POLLUTANT INPUTS (PAGES 16-17), RESTORATION OF ECOLOGICAL HEALTH (PAGES 18-19)

Monitoring, reporting and review

Monitoring progress against the Strategy will be by regular reporting to the Te Awarua-o-Porirua Harbour and Catchment Joint Committee, and 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 provide information from which progress in harbour health can be measured.

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

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

The next scheduled review of the Action Plan is in 2019, prior to the 2020 Long Term Planning round.

WHAITUA COMMITTEE

Greater Wellington Regional Council has recently established the Te Awarua-o-Porirua Whaitua Committee.

The Whaitua will work to collect and relay environmental, mana whenua, economic and technical information and community knowledge about the harbour, streams and catchment.

The Whaitua will then develop a specific chapter on Porirua Harbour for inclusion in the Regional Plan that will identify a range of prioritised regulatory and non-regulatory actions that will be reflected in future implementation plans.

The Whaitua process will provide statutory backing for elements of the Harbour Strategy and additional guidance towards improving harbour health.

What Te Awarua-o-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 is minimised in and around the harbour edge.

It is 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 Te Awarua-o-Porirua Harbour as high or very high.

Te Awarua-o-Porirua Harbour is used and enjoyed by an increasing proportion of the Wellington region's community.

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.

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 amongst staff or clients.

GENERAL

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

TE AWARUA-O-PORIRUA HARBOUR & CATCHMENT STRATEGY+ACTION PLAN

A healthy harbour and waterways
He whanga i whakaora ake
i nga wai e rere nei

Copies of the Strategy and supporting Detailed Action Plan supplement can be viewed or downloaded from:
www.pcc.govt.nz,
keyword: **harbourstrategy**

Or contact:

Keith Calder
Te Awarua-o-Porirua Harbour Strategy Coordinator
Phone **04 237 3598**
Email **kcalder@pcc.govt.nz**

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Report	Final Porirua Stream Mouth and Estuary Enhancement Concept Plan and beginning implementation.
Date	19 March 2015
Committee	Te Awarua-o-Porirua Harbour and Catchment Joint Committee
Author	Jennie Marks

1. Purpose

The purpose of this report is to seek approval from the Joint Committee to release the final Porirua Stream Mouth and Estuary Enhancement Concept Plan (attached).

The concept plan provides direction to improve ecological, visual and recreational qualities of the public land at the Southern end of the Onepoto arm of the harbour including the Porirua Stream Mouth.

Approval is also sought to commence implementation as outlined.

2. Recommendations

That the Te Awarua-o-Porirua Harbour and Catchment Joint Committee:

1. **Receives** the report.
2. **Approves** the final concept plan
3. **Approves** PCC and GWRC to commence implementation of the concept plan

3. Background

The Porirua Harbour Estuary Restoration Options Report was commissioned to identify opportunities to enhance the harbour[1] in 2013. The report highlighted the Porirua Stream mouth as a priority for restoration and enhancement. Strategy partners[2] and community stakeholders[3] agreed that the Porirua Stream mouth was high priority and a restoration plan should be developed.

The Porirua Harbour and Catchment Strategy and Action Plan (the Strategy) identifies GWRC and PCC as the lead agencies in developing an 'estuary restoration plan'. Blaschke and

[1] Boffa Miskell, (*2013). Porirua Harbour Estuary Restoration Options.* Prepared for Greater Wellington Regional Council.
[2] Porirua City Council, Wellington City Council, Greater Wellington Regional Council and Te Runanga o Toa Rangatira
[3] Porirua Harbour Trust, Guardians of the Pauatahanui Inlet and Pauatahanui Inlet Community Trust

Rutherford Environmental Consultants together with PAOS Limited Landscape Architects were engaged to produce a Porirua Stream Mouth and Estuary Enhancement Plan. The draft concept plan has been reviewed by strategy partners and key stakeholders and was endorsed to be finalised by the Joint-Committee in December 2014.

4. The final plan

Following the endorsement by the Joint Committee in December 2014, minor editorial amendments were made and the plan has now been finalised and awaits approval from the Te Awarua-o-Porirua Harbour and Catchment joint-committee meeting.

The final version of the concept plan is attached.

5. Implementing the plan

The Strategy partners have started planning for the implementation of the concept plan. A visible improvement of the Porirua Stream mouth is considered of immediate benefit to the community and would demonstrate financial commitment and follow-through of the Strategy.

The Plan has six Activity Areas (see Appendix I), with projects of varying complexity. Some involve largely planting, while others will require careful planning and resource consents.

Overall implementation planning has commenced, and PCC and GWRC continue to work collaboratively to plan how the various complex projects will be staged and implemented. A project team comprising staff from PCC and GWRC has been established with the overall implementation process managed by a project manager from PCC with operational funding from PCC and GWRC. Implementation will be staged across a number of years depending on available funding and staff resources to manage projects.

Under the over-all project, implementation plans will be developed as required and can be small discrete projects or larger projects which encompass a number of projects across activity areas. It may be beneficial to bundle some activities across several activity areas to reduce costs of consent applications and operations.

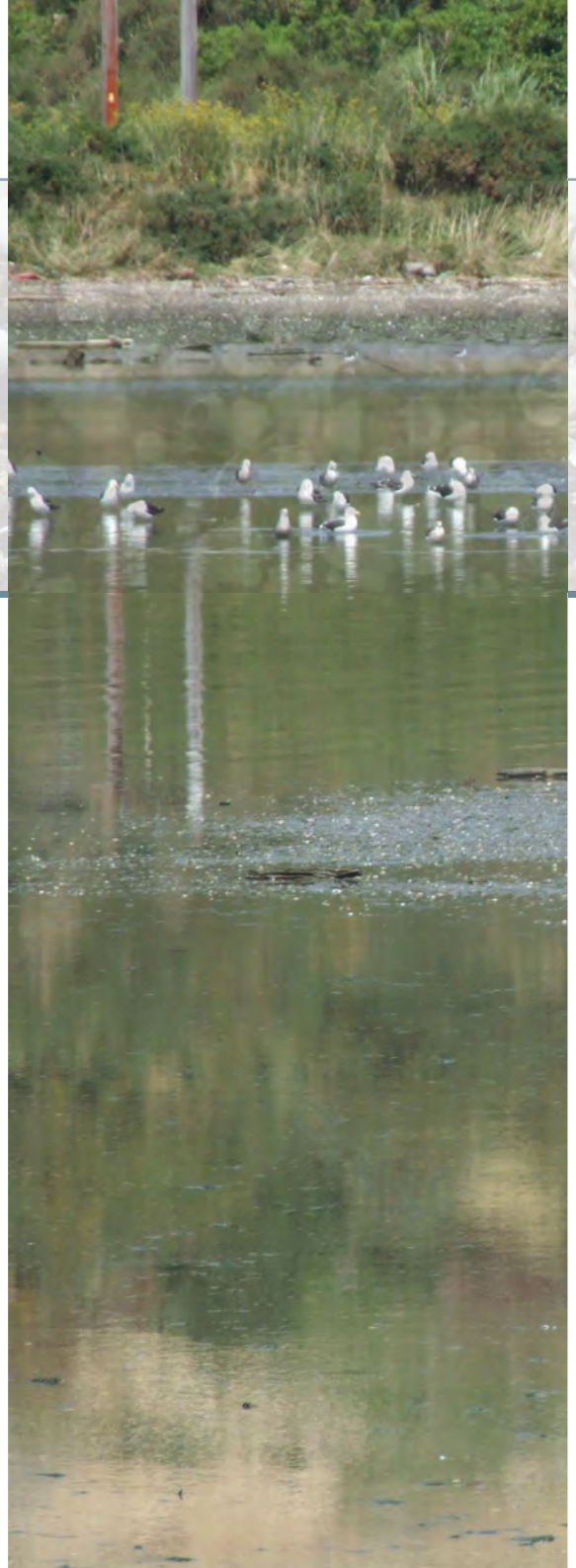
Implementation of projects which can be undertaken this financial year are currently being planned, this may include removal of debris from the harbour edge, planting of native vegetation as well as commissioning detailed plans for sites which require expertise from coastal management experts.

Attachments:

FINAL *Porirua Stream Mouth Estuary Enhancement Concept Plan*. [PCC#1082441]

Appendix I.

Map of the Southern end of the Onepoto arm showing the six activity areas referred to in the draft *Porirua Stream Mouth Estuary Enhancement Concept Plan*.



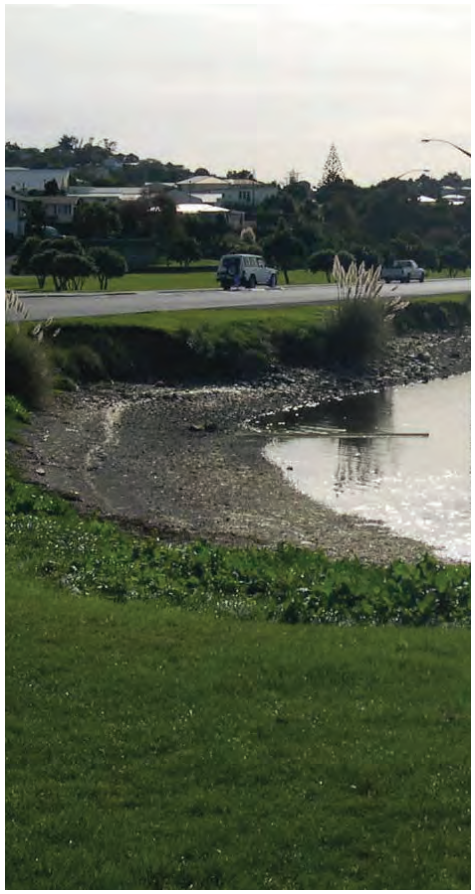
Porirua Stream Mouth and Estuary Enhancement Concept

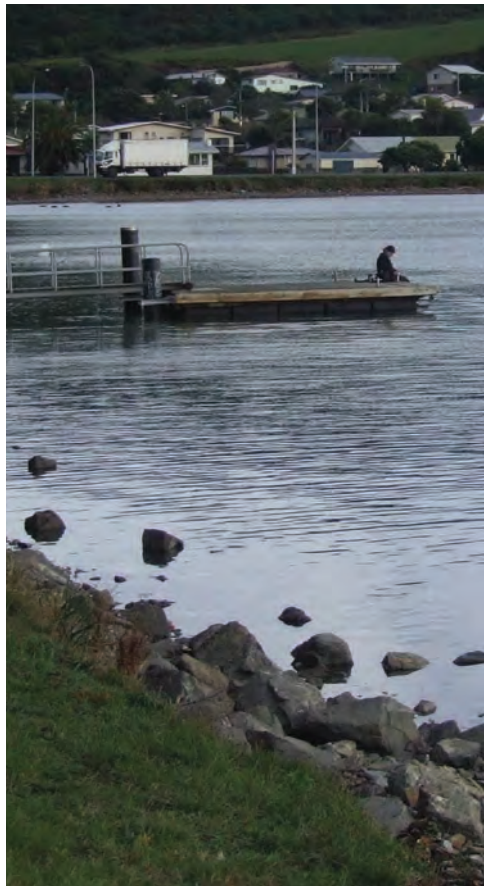
Final

Prepared For:
Greater Wellington Regional Council
Porirua City Council

A collaboration between:
Blaschke & Rutherford Environmental Consultants
PAOS Limited Landscape Architects

December 2014





CONTENTS

Images from Porirua Library Stock

1. Introduction

Although fringing the Porirua CBD and seen daily by thousands of commuters and Porirua residents, the estuary at the mouth of Porirua Stream until recently has received scant affection or even attention This is a sad reality, given the huge potential of this area for the remnants of nature still remaining, the wider environment and the amenity of residents and visitors alike. It is a key area in the whole of the Porirua Harbour catchment and Porirua City.

The potential for restoration and enhancement of amenity has been recognised by a number of studies and more recently as a prominent project in the Porirua Harbour and Catchment Strategy and Action Plan. Restoration of key missing estuarine habitat such as salt marsh and sea grass communities, although ambitious, would be of particular ecological value. Revegetation of riparian areas on the lower Porirua Stream will be technically easier and have immediate amenity benefits. Flood control requirements and water quality constraints will, however, need to be carefully factored into restoration plans and cost estimates.

Most of the area is highly modified and some is currently polluted and unappealing visually. But vivid stories of kaimoana gathering, swimming and fishing on expansive tidal flats are well within the memory of people still living, so these stories should inspire the vision for what the area can become in the future, even when located right beside a vibrant city centre.

The Porirua City Centre Revitalisation project and strategic framework identified the site as part of the Harbour Quarter. Adjacent land has great opportunity for mixed use and is potentially the most valuable land in the city centre. We view this project as “setting the scene”, establishing a context for development that recognises the importance of the site for estuarine ecology and weaving within an ecological framework attractive connected places and settings for harbourside recreational activities.

The restoration project has been described as complex and ambitious but if successful will greatly enhance the ecological values of this key part of the Onepoto Arm. Furthermore it will greatly enhance visual amenity for residents and commuters, cultural values for tangata whenua, and environmental awareness and recreation benefits for all who come into the area. Parts of the area are highly accessible now, or can readily be made more accessible, while the inaccessibility of other parts offers opportunities for pest control and restoration of sensitive animal habitat. Most of the area has security of tenure under public ownership and current broad planning provisions that allow for restoration and enhancement of amenity and other values to be successfully realised.

The following pages summarise our analysis of the site, identify opportunities and six activity areas, outline design principles and concepts, and present draft restoration and implementation concepts for discussion.

Project Purpose

Enhancement of Porirua Stream mouth and estuary edge that:

- Increases public awareness and appreciation of the estuary edge
- Provides habitat for estuarine fauna
- Improves local biodiversity
- Provides for cycling, walking and picnicking
- Is an ‘attractive window to the harbour’.

Objectives

1. Attract public interest in the harbour and its habitat and use of harbourside Wi Neera Reserve.
2. Visual and ecological enhancement of the Porirua Stream mouth and associated estuary with an emphasis on development of a self-sustaining ecosystem, and at the same time retaining flood management.
3. Establish salt marsh habitat where feasible.
4. Opportunities for community participation in plan implementation.
5. Develop maintenance plans for vegetation.
6. Develop plans for natural debris maintenance and rubbish cleanup.
7. Implement in stages.

Key Benefits

- An attractive window to the harbour with positive changes that will continue to reshape public attitudes to the harbour
- Increased biodiversity, bird habitat and ecosystem services (e.g. shoreline stabilisation, sediment capture)
- Increased public use with informal recreation such as walking, cycling, and family friendly activities
- Increased public interest and potential for public engagement.

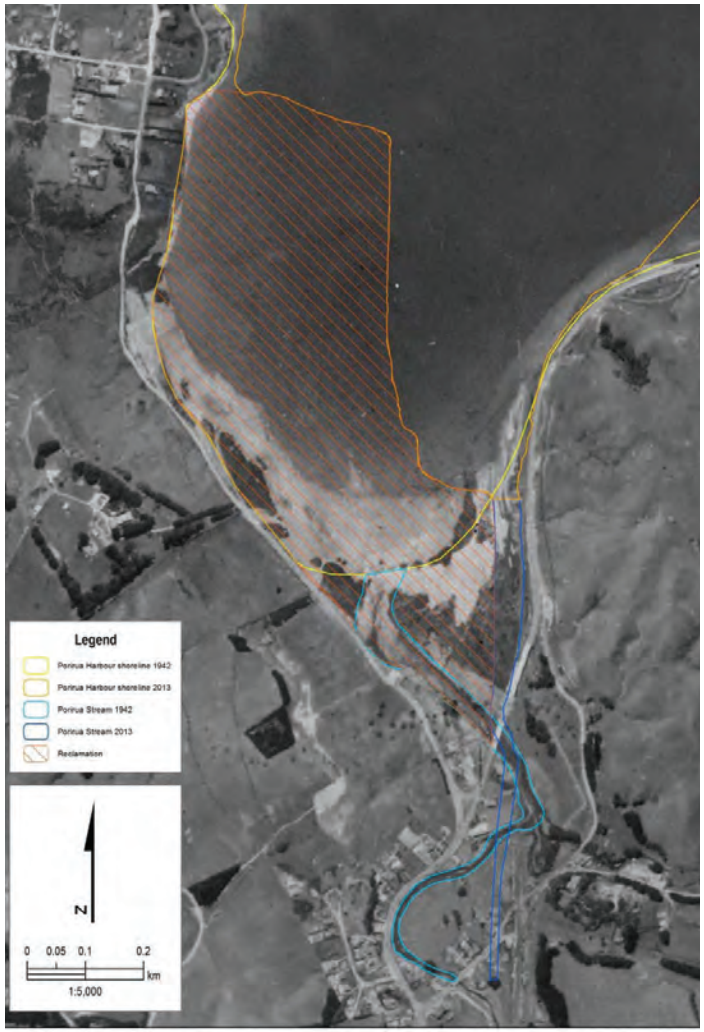
Project Scope

While the site has great potential, at this time resources are limited. At this stage the focus is on:

- Re-contouring of the harbour edge for physical and visual links and a transition between intertidal flats and vegetation
- Use of native plants
- Removal of debris from the harbour edges
- Development of areas for public use
- Options for stormwater outfall modification so that they are consistent with plan objectives
- Liaison with GWRC flood protection regarding flood management requirements
- Liaison with Porirua City Council to achieve consistency with visions and plans for the harbour edge.

View from Parumoana Street to the harbour

Changes to the harbour[1]



South Onepoto Arm of Porirua Harbour before Porirua Stream was straightened (in 1961) and the western edge of the harbour filled (from the late 1950s and early 1960s).

KEY

- Porirua Harbour shoreline 1942
- Porirua Harbour shoreline 2013
- Porirua Stream 1942
- Porirua Stream 2013
- Reclamation

The same area today with the straightened Porirua Stream and extensive reclamation between Parumoana Street, Norrie Street, and Titahi Bay Road.

The land that forms the harbour edge within the project area was once part of the Onepoto Arm of Porirua Harbour. The mouth of Porirua Stream flowed into the tidal mudflats and saltmarsh edges of the gently sloping estuary margins. The area was an important source of seafood and had extensive cockle shell banks; one of the reasons Ngati Toa Rangatira settled around the harbour.

Modifications began in the early 1850s with forest clearance, drainage of wetlands and harbour edge roading. Railway line construction in the 1880s followed the natural curves of the bays along the eastern harbour edge but in the 1940s the track was realigned and an embankment and causeway encroached into the harbour.

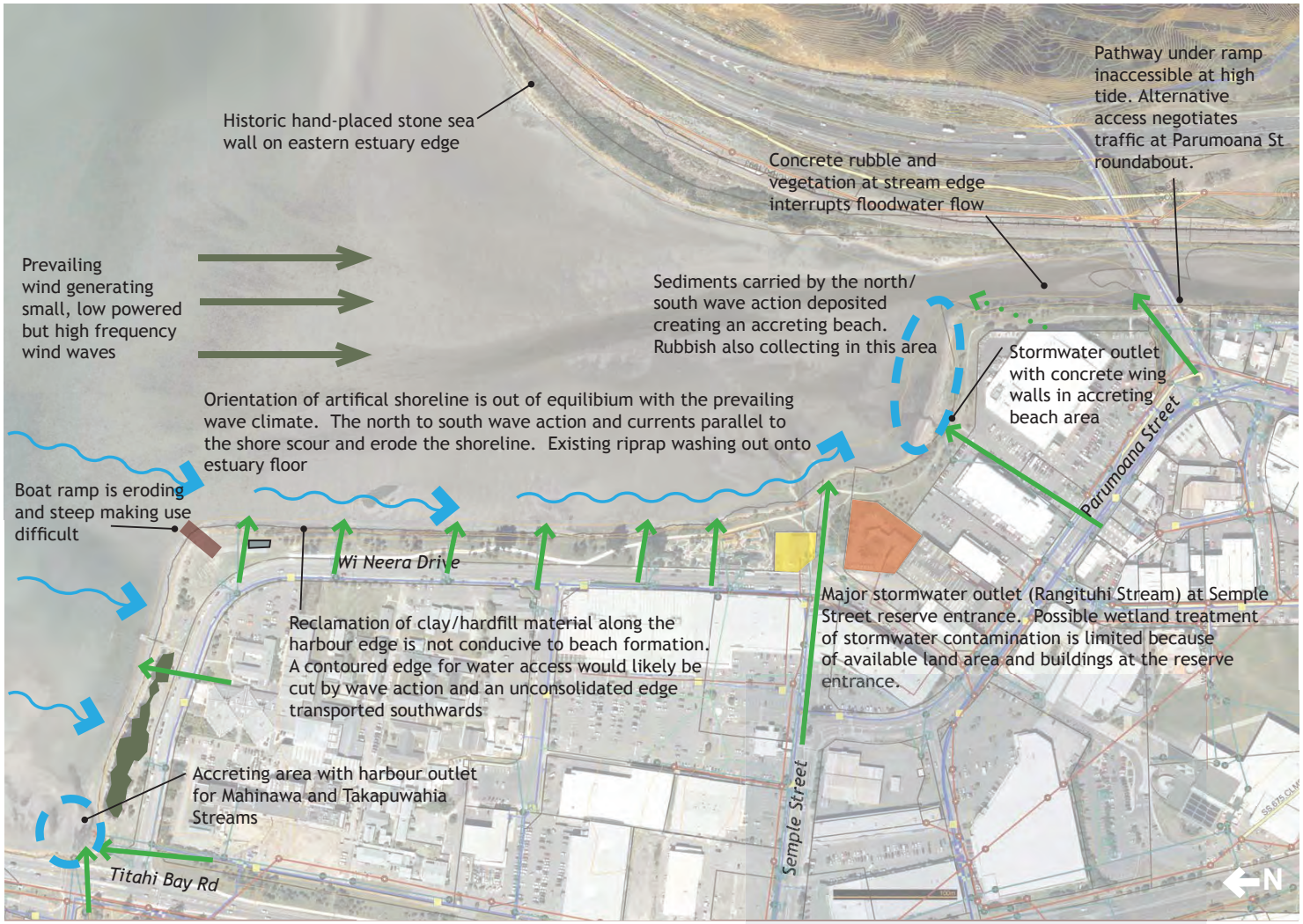
In the 1940s land pressure in the Wellington urban area led to new housing in Porirua. Porirua Stream was straightened and the first earthworks began in the summer of 1959/60 to fill in the southern area of Onepoto Arm for the Porirua shopping centre. Flat land was created for Todd Motors and other industrial development in the 1970s and the spoil was used to create a further seven hectares of land at the southern tip of Porirua Harbour.

The consequence was loss of intertidal flats and the accompanying habitats, and the city turning away from its estuary and harbour. The clay spoil and rock armouring of the harbour edge displaced saltmarsh and vegetation on the harbour edges. The artificial shoreline is out of equilibrium with the prevailing wave climate and wave energy is no longer absorbed. This has led to scouring and eroding of the shoreline and a steep harbour edge, which makes access to the water difficult. The rock armouring has also washed onto the harbour floor.

[1]Maps developed by Ian Dawe, Greater Wellington Regional Council

2. Issues and Opportunities

2.1 Coastal Processes[2] and Stormwater



[2]Based on information from Iain Dawe, Greater Wellington Regional Council

Key

- Wind and wave action
- Accreting areas with potential for saltwater wetlands and habitat
- Redundant stormwater outlet
- Sheltering Pines/Macrocarpa
- Stormwater outlets
- Waka ama ramp
- Brass band facility on leased reserve land
- CCDHB on privately owned land
- Waka ama

Predicted sea level rise

The implications of environmental changes resulting from greenhouse gas emissions and human-induced climate change need to be considered. The most significant likely effects for this project are rising sea levels. Current Ministry for the Environment guidelines suggest that a sea level rise of at least 0.50m in the next 50 years should be factored into coastal planning. More recent projections suggest potential sea level rise of more than one metre in the next century.

Recent analysis of the long term sea level trends for the Wellington region shows that since records began in the 1890s, sea level has been rising consistently at a rate of 2.1 mm/yr. This equates to a 0.26 m rise in sea level over the past 125 years. In other words, sea level rise is already impacting on the Porirua shoreline and is set to continue. The effects will lead to increased incidences of coastal flooding, especially during storm events, greater pressure on coastal infrastructure and impeded drainage of stormwater.

Other likely effects include a greater frequency of damaging storms, more frequent exceedence of stormwater systems' capacity, and possibly drier summers.

It is important the project design adds to the resilience of the Porirua foreshore to accommodate the expected sea level rise and impacts this will have on the shoreline.

Early ninetenth century hand-placed stone along stream and estuary edge

Concrete debris along Porirua Stream

Reclamation material eroded by wave action creates a barrier to water access

Riprap edge washing out into the harbour floor

Rangituhi Stream outfall, Semple St

Accreting area with harbour outlet, Mahinawa and Takapuwahia Streams

Opportunities

1. East/west aligned shorelines from waka ama to Titahi Bay Rd and from Semple St to Porirua Stream mouth face the prevailing waves and are suitable for wide terraces or contouring to MHWS. A soft edge of sand, shell or gravel would absorb wave energy and avoid erosion of reclamation fill material and allow water access.

2. The beach accreting area at the Porirua Stream mouth and the corner of Titahi Bay Rd and Wi Neera Drive are suitable for restoration planting and habitat restoration.

3. Small wetland treatment areas at stormwater outlets on accreting beaches near the Harbourside Centre, Semple St and the corner of Titahi Bay Rd and Wi Neera Drive.

4. Decreasing the slope at the estuary edge along Wi Neera Drive from Semple St/Rangitituhi Stream outlet to the waka ama area would enable future ecological restoration options. An attractive and robust finish would reduce erosion and scouring. Use of natural stone would repeat historic stone work at the eastern estuary edge and with careful design could be conducive to establishing plant species. Terraces and steps would allow access to the water.

   A leisurely harbour promenade or potentially a boardwalk between steps would bring people to the estuary edge, complementing the existing concrete pathway. Treatment of the estuary edge will need additional technical evaluation (see Activity Area 4 for proposed approaches).

5. Wetland species planting on small available areas around the Semple St stormwater outlet would raise public awareness of harbour sedimentation and contamination. Creating space for a treatment area is a future option. Additional treatment could include rain gardens in retail area carparks and other locations further up the catchment.

6. Design throughout for higher coastal water tables, increased storm effects on coastal infrastructure and drier summers e.g. planting in raised beds in well-prepared soils with high organic matter and water-holding capacity.

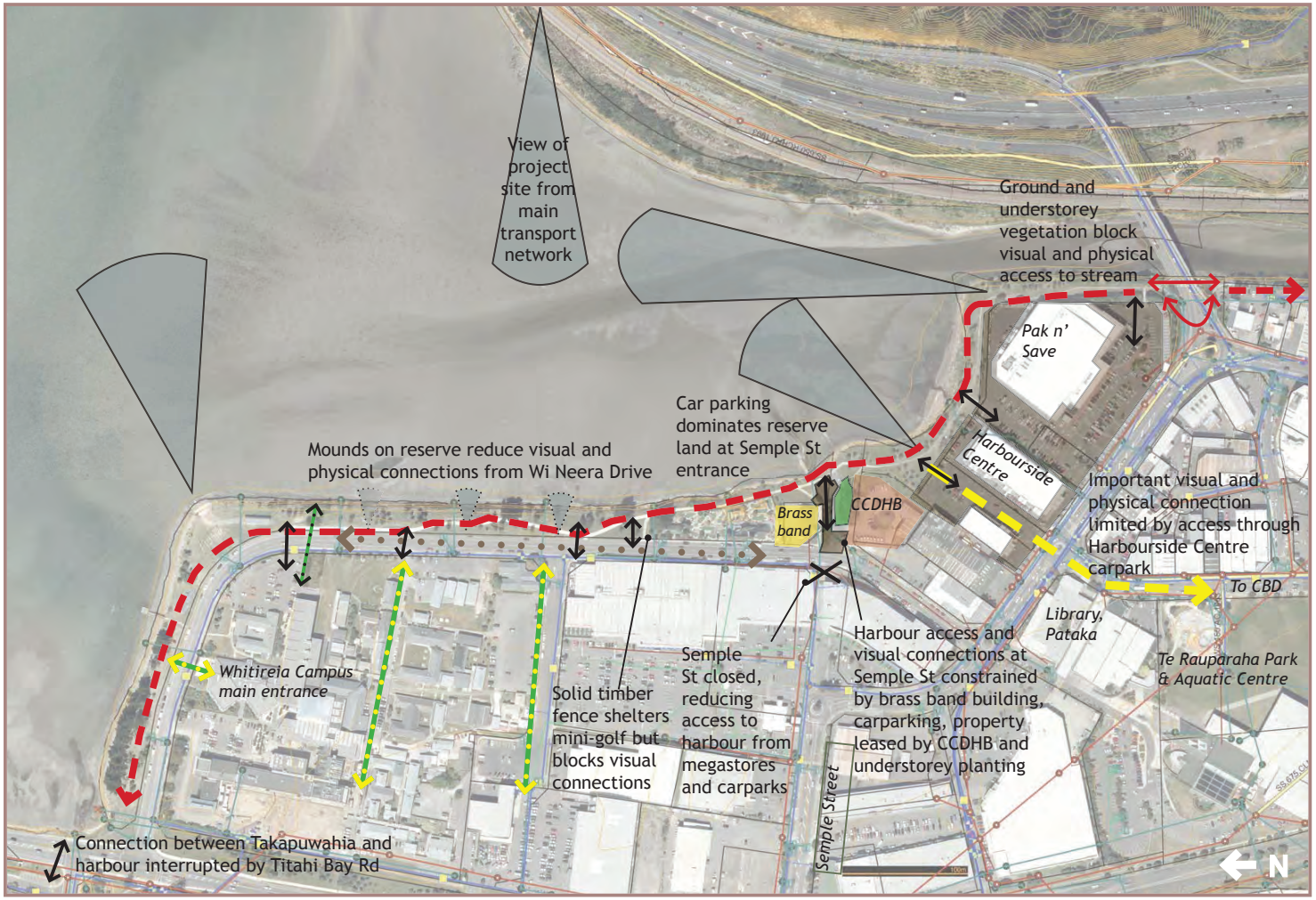
Historic stonework along the estuary edge

Estuary edge with boardwalk access at Pauatahanui

Boulder wall being colonised by planting, with promenade and steps - Wellington Harbour Greta Point

Grass terracing to water's edge - New Plymouth

2.2 Connections - Visual and Physical



Key

- Visual connections
- Visual connections and access restricted by mid level shrubs and trees and dominated by vehicle entrance to CCDHB carpark and carpark on harbour edge
- Pedestrian/cycle harbourside path
- Pedestrian access over/under vehicle ramp to SH1
- Brass band building and carpark on Local Purpose Reserve
- CCDHB leased property
- Four reserve entrances from the CBD are through carparks (two large carparks are privately owned, one on reserve land)
- Important visual and physical connection from CBD Library, Pataka, Te Rauparaha Park, Aquatic centre
- Boulevard proposed in Porirua City Centre Revitalisation - Strategic Implementation Framework (Porirua Harbour Revitalisation)
- Potential harbour connection for constructed wetland
- Connections from Whitirea
- Pohutukawa and understorey vegetation block views and access into reserve

Narrow public path on reserve land with vegetation limiting views

Access south through private supermarket car park

Visual clutter in key viewshaft connecting the CBD to the harbour

Restricted access/views at Semple St entrance with emphasis on vehicles

Grass mounds and vegetation limit harbour views and access

Disconnection between Takapuwahia and the harbour edge

Opportunities

Viewshaft and physical easement through the Harbourside Centre to connect to the harbour and the CBD, Pataka, aquatic centre etc.

Easement through Harbourside Centre carpark develops a safer pedestrian connection to harbour.

Remove selected trees and understorey vegetation to restore physical and visual connections to stream side.

Open up entrance to the harbour and reserve at the Semple St entrance and reduce the dominance of carparking.

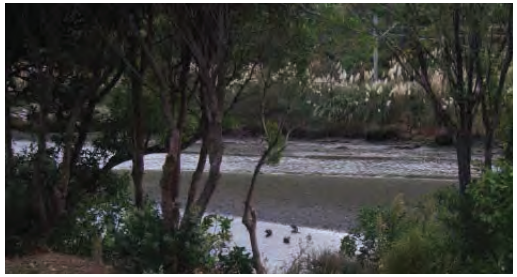
Open up views and improve safety by removing mid-level shrubs at Semple St entrance.

Design treatment of Wi Neera Drive to develop a safer environemnt for pedestrians, reduce dominance of roading and improve access to the reserve and harbour. Boulevard proposed in Porirua City Centre Revitalisation - Strategic Implementation Framework (Porirua Harbour Revitalisation)

Harbourside Centre easement opportunity for access

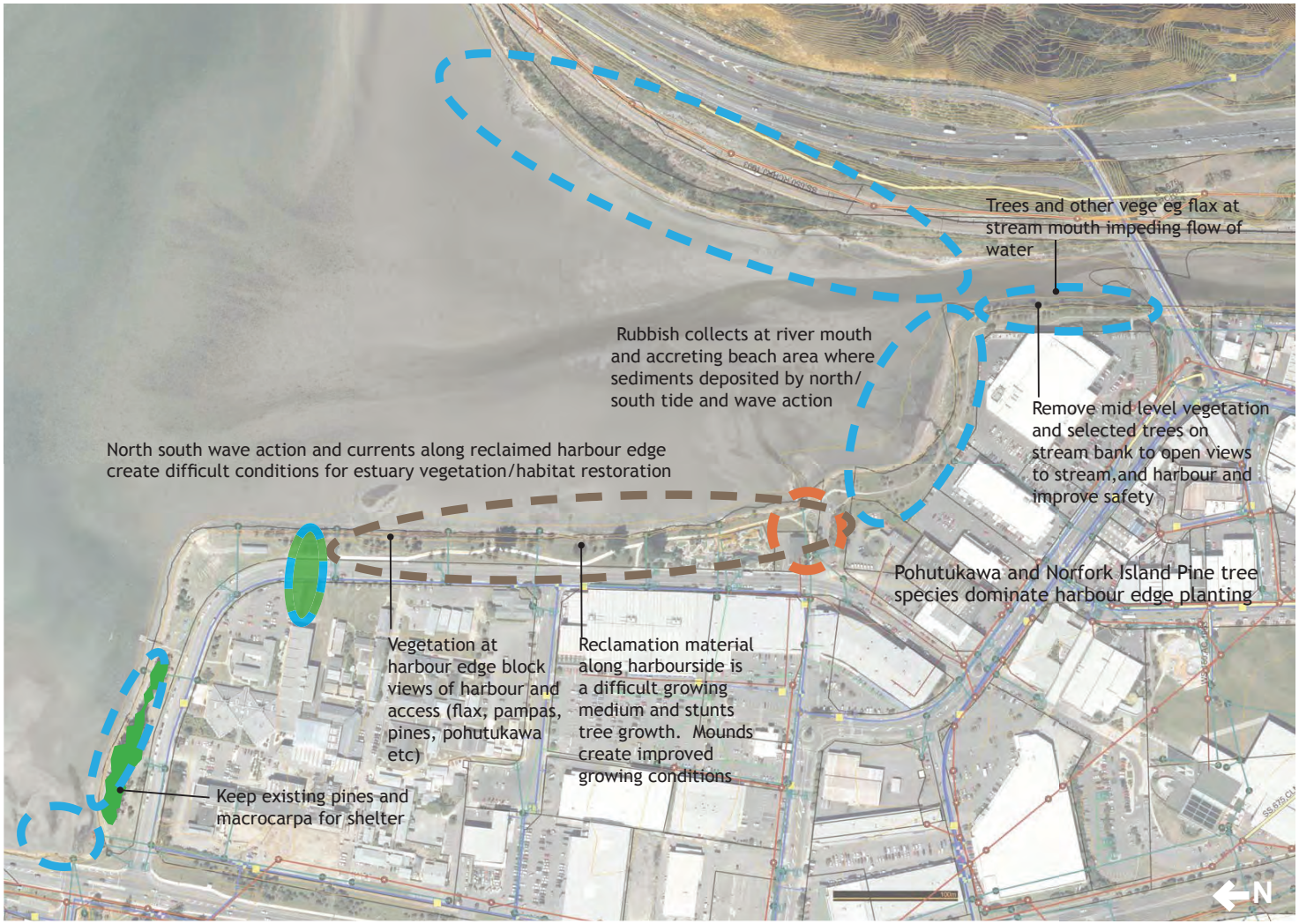
Unattractive fencing on reserve boundary

Semple Street closed at Mega Store preventing access to harbour



Visual connections at stream edge where less understorey

2.3 Ecology, Vegetation and Habitat



Key

Areas for ecological enhancement, to increase biodiversity, habitat restoration and interpretation

Primarily amenity planting areas with increased biodiversity and habitat restoration where ground conditions and wind allows

Proposed future stormwater treatment wetland

Possible extension of constructed wetland

APPROACH TO ECOLOGICAL RESTORATION

Constraints

- Reclamation
- Heavily modified environment
- Lack of natural intertidal or riparian habitats
- Sometimes degraded water quality
- Strongly modified stream flow characteristics
- Significant access limitations to parts of the site
- Requirements for flood and erosion control and other infrastructure provision.

Opportunities

- Maintenance and restoration of natural ecological processes (albeit modified) in the interface between riparian, freshwater and estuarine environments.

On the eastern bank:

- Ecological restoration of vegetation and habitat for birds, reptiles, insects and fish
- Intensive control of plant and animal pests.

On the more modified western bank:

- Work with the few natural features and stream edges that while heavily modified are intact
- Keep structural streambank modification simple
- Maintain consistency with flood control
- Alteration of bank contours where possible in order to allow a greater variety of habitats.

On both sides of the stream:

- Carefully staged restoration of intertidal salt marsh habitats (water quality and surface sediment pollution are additional constraints in this habitat)
- Trials of techniques and feasibility (easily accessible eastern bank areas are a likely first stage).

Western Stream Mouth and estuary edge:

- Planting of small areas with coastal wetland species
- Planting species that attract native birds and moths to help develop a wider range of quasi-natural habitats and public appreciation
- Good quality interpretation of the natural and human history of the site.

Dominance of Pohutukawa, Norfolk Island Pine, Macrocarpa and pine

Recent tree thinning and shrub clearance for safety

Location for saltwater wetland on foreshore behind driftwood

Selected streamside trees to retain, limb up or remove for views and access

Rubbish accumulated on eastern embankment

Opportunities

Remove vegetation on stream banks that impedes water flow.

Remove selected trees and mid level planting at streamside to open up views and allow stream access.

Select pohutukawa and Nolfork Island pines for removal where they are struggling due to poor ground conditions and drainage and/or block views to reserve and harbour views.

Open up views by clearing understorey vegetation and medium to large shrubs at the harbour edge between the waka ama and Semple St.

Increase biodiversity and habitat by planting a wider range of indigenous tree and plant species suited to the conditions.

When planting, improve growing conditions and provide shelter to help vegetation establish where necessary.

Develop estuary shore habitat/wetlands in accreting areas.

Develop saltmarsh rushland habitat in suitable intertidal areas, principally through planting searush (*Juncus kraussii*). Associated species such as makaka (saltmarsh ribbonwood, *Plagianthus divaricatus*) and oioi (jointed wire rush, *Apodasmia similis*) may also be suitable in places.

Utilise eastern harbourside where human/predator access is difficult to develop habitat for terrestrial fauna.

Create a butterfly/moth garden - with habitat supporting the life

Copper butterfly, *Lycaena salustius*

Salt marsh ribbonwood, *Plagianthus divaricatus*

Grove of karaka and cabbage tree (Ivey Bay)

Sea rush, *Juncus kraussii*

2.4 Destinations and Activities

Key

- Destinations
- Activities
- Linear recreation: walking, cycling
- Carparking: viewing estuary
- Brass band practice
- Mini golf
- Waka ama and ramp
- Children's play area
- Fishing from pontoon

Successful linear harbourside public space usually links destinations and provides activities that attract users. In Porirua City, the CBD estuary edge has few activities and is mostly passive one-dimensional open space. It is also separated from many destinations by buildings, carparks and roading and has limited access to and interaction with the harbour.

The Porirua City Centre Revitalisation is likely to improve linkages, develop destinations and bring diversity to the harbourside area. This would mean a more populated CBD, a wider community of interest, and a more active harbour edge at different times of the day.

Currently, the streamside and harbour edge pathways link destinations Takapuwahia and Titahi Bay beyond, Whitireia campus, Mana College, Pataka, the library, aquatic centre, skatepark, Te Rauparaha Arena and the railway station. Current key activities that attract people to the harbour edge are the pathway, mini golf and the waka ama.

Additional activities will bring more people to the harbour edge: observation of harbour activities, birdlife, boardwalks, estuary edge planting and habitat, interpretive displays, picnic areas, play opportunities that reflect the harbour setting, interaction with the water and a wide pathway linking activities and leading to destinations. The tidal mudflats mean that water access is not always possible, and access to another type of water experience that relates to the setting is an option.

Cycling and other linear activities, with places to stop and linger

Waka ama and other water sports

Brass band clubrooms at Semple St

Mini golf

Children's play area

Pontoon for float plane and fishing

The harbour edge as a lunch venue for Whitireia students and staff

Existing seating

Opportunities

Water access in selected locations with open views of stream, estuary and birdlife.

Interpretation and experiencing estuary and stream habitat.

Butterfly/moth garden and supporting habitat.

Estuary boardwalk to more closely experience estuary and birdlife.

Informal recreation - picnicking, barbeque facilities, seating/tables, viewing, informal kick-a-ball type activities, beach volleyball and similar types of activities.

Flexible open space for events and temporary activities.

Walking, cycling, jogging, dog walking.

Toilets and outdoor shower facilities for water sports.

Food outlets/cafe.

Children's playground and other play opportunities to reflect harbour character.

Play opportunities that reflect the harbour setting

Picnic and BBQ facilities bring a setting alive

Water experience options

Flexible open space for casual use

2.5 Land Ownership

Key

- Porirua City Council owned lands
- Wi Neera Esplanade Reserve - classified Recreation Reserve under the Reserves Act and managed according to policies in the Porirua City Reserves Management Plan
- Local Purpose Reserve (Community) - part of Wi Neera Reserve and managed according to policies in the Porirua City Reserves Management Plan
- Porirua Stream Esplanade Reserve - classified Local Purpose Reserve (Environment) under the Reserves Act and managed according to policies in the Porirua City Reserves Management Plan
- Road network land - managed as part of Wi Neera Reserve
- This area is made up of a number of land parcels owned either by Kiwi Rail or Land Transport NZ
- Viewshaft and pedestrian right of way easement (approximately 105 x 20 metres)

Most of the lands directly on the western harbour edge are Porirua City owned. They are reserve lands and classified for specific purposes under the Reserves Act. This means that they are managed according to the policies of the Porirua City Reserves Management Plan (2013).

Land at the Semple Street entrance is part of the road network. Neighbouring properties are fenced for security but actual boundaries extend further into the reserve.

Parts of the land on the eastern side of the estuary are owned by Kiwi rail and others by NZ land Transport.

The carpark at Harbourside Centre has an easement for the purpose of a pedestrian right of way and viewshaft - length 105 metres, width 20 metres and an upper height level of 6.15 metres.

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3. Design Principles and Core Projects

The project area is divided into 6 activity areas. Development of each area is guided by design principles and core projects. The six activity areas are:

1. Eastern Estuarine edge
2. Streamside
3. Harbourside Hub
4. Wi Neera Promenade
5. Waka Ama Recreation
6. Takapuwahia/Whitireia Connections

Given the budgetry limits at this stage of the project, development of activity areas and core project implementation were prioritised in collaboration with key stakeholders. Areas to be developed in the first instance are:

- Activity Area 1
- Activity Area 2
- Activity Area 3
- Estuary restoration planting, habitat restoration and amenity at the corner of Wi Neera Drive and Titahi Bay Road in Activity Area 6.

Activity Area 4 requires further investigation and development. Activity Area 5 and the balance of Activity Area 6 require collaboration among a broad group of interested parties.

The following section establishes principles and core projects for the activity areas. Projects are coded in three groups of priority:

1 - High priority and immediate
2 - High priority but needs more planning and resources to implement
3 - Medium priority.

Projects suitable for community participation are identified for each activity area. Many of the projects are suitable for corporate sponsorship.

Activity Areas to be developed in the first instance are circled in red.

3.1. EASTERN ESTUARINE EDGE

Design Principles

1. Low levels of public use provides an opportunity for more “pure” ecological restoration of vegetation and habitat for birds, reptiles, insects and fish.
2. Extensive areas of intertidal habitat – potential for restoration with significant ecological benefits, but needs to be carefully staged and water quality and sediment pollution likely to be constraints in intertidal zone.
3. Safe basic access needed for pest control and restoration work.
4. **Manage public access in the short to medium term.** Long term potential for public visitation once safe access has been established (given proximity to train tracks).

Core projects in order of implementation, potential for community participation and sponsorship

(see Section 4 for details)

Priority	Project	Community Participation	Sponsorship
1	Safe basic access track for pest control and restoration projects with public access managed for safety		
1	Weed control of priority species starting at southern end	■	
1	Litter removal	■	
1	Planting Muehlenbeckia vineland habitat and coastal rock edge, including planting for moth and lizard habitat	■	
1	Trial techniques and feasibility of salt marsh community restoration on estuary edge, trialing combinations of depth, substrate and tidal flow	■	■

Activity Area 1 - Eastern Esturine Edge

3.2. STREAMSIDE

Design principles

1. Open up views to the stream and harbour.
2. Avoid protrusions into the existing stream edge that would impede and slow water flow.
3. Improve stream side habitat.
4. Improve people's experience of the stream environment.
5. Improve the linear pathway – this is already used by a range of pedestrians and cyclists for recreation and commuting, and use is likely to increase with development of the Streamside Quarter and implementation of Porirua City Centre Revitalisation.
6. Sedges, rushes and other riparian species planted in streamside locations to improve habitat but do not impede stream flow.
7. Design and locate new structures such as steps so that they are built back from the existing stream edge.
8. Keep the area open for safety, avoiding understory vegetation that creates spaces between the Pak n Save wall and vegetation.
9. Improve safety for users by opening up sightlines and widening the path for multiple users.
10. Interpret streamside environments.

Core projects in order of implementation, potential for community participation and sponsorship (see Section 4)

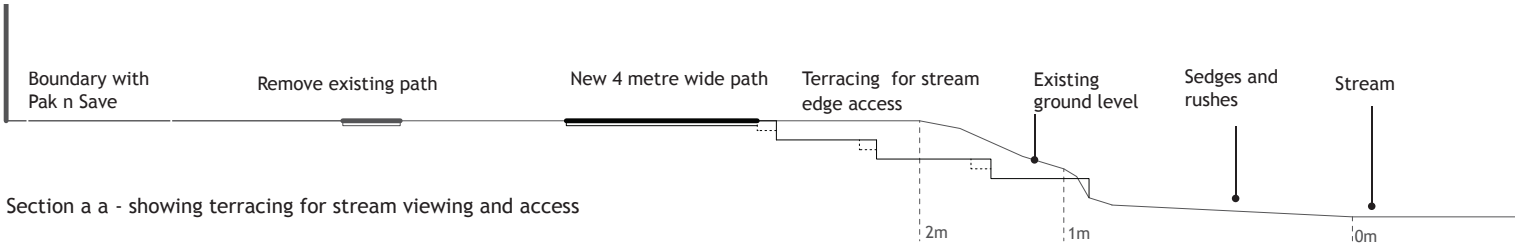
Priority	Project	Community Participation	Sponsorship
1	Open up stream views and views to the harbour by clearing understorey vegetation, removing selected trees and large shrubs, and lifting canopies of remaining trees		
1	Remove existing narrow path and replace with wider path for multiple users (cyclists, walkers, joggers, wheelchairs, pushchairs etc)		
3	Remove debris from stream edge (concrete, dead and damaged vegetation etc)		
3	Improve streamside habitat with sedges, rushes and other riparian species		
2	Improve stream access in selected location via terracing and steps with seating		

Further projects

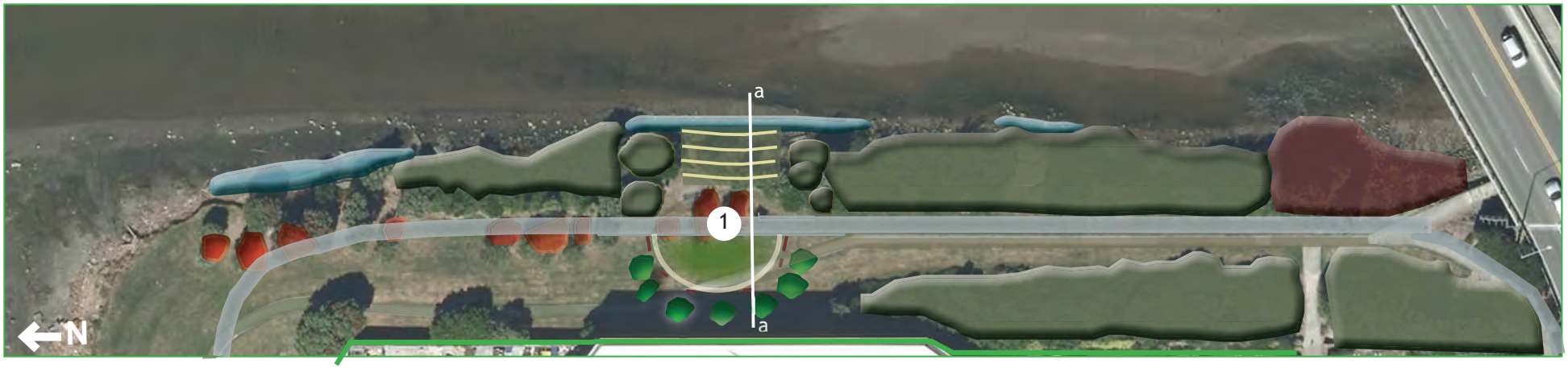
- Redesign streamside pathway under vehicle ramp for accessibility at high tides.

Key

- Wider and relocated pathway for multiple users replaces existing narrow path
- Remove trees that block views to harbour
- Remove vegetation and lift tree crowns for sightlines to the stream
- Keep existing vegetation to block views to underside of the vehicle ramp
- Remove streamside debris and plant sedges and rushes
- (1) Create 'node' e.g. terracing with stream viewing and access, planting, seating
- Treat wall to deter graffiti (self clinging plants) Until plants cover walls, an appropriately themed mural will deter graffiti and an opportunity to involve local artists.



Section a a - showing terracing for stream viewing and access



3.3. HARBOURSIDE HUB

Design principles

1. Restore estuary edge vegetation and habitats and highlight intertidal mudflat and estuary ecology for public interest and enjoyment and for their intrinsic ecological values.
2. Reduce erosion of reclamation fill material at the estuary edge.
3. Improve the relationship and access between the reserve, the CBD and neighbouring built edge.
4. Create estuary entranceways that reflect the importance of the harbour to Porirua City.
5. Create a public open space that is attractive, has flexible open space, is inviting and interesting.

Core projects in order of implementation, potential for community participation and sponsorship

(see Section 4 for details)

Priority	Project	Community Participation	Sponsorship
1	Re-contour the estuary edge and CBD side of the stream mouth to remove the 'lip' where reclamation fill material has been eroded by wave action and replace with a soft wave energy absorbing area of shells, sand or gravel to allow a greater variety of habitats. This allows direct access to the harbour edge		
1	Develop a coastal wetland at the estuary edge and around the stormwater outfall in front of the Harbourside Centre. Stormwater is redireected through the wetland and rat population controlled		
1	Widen the linear pathway		
1	Create a native 'garden' which supports the lifecycle of NZ butterflies and moths and interpret to highlight an estuary edge ecosystem		
2	Improve the Semple Street reserve entrance to make it more prominent, inviting and safer, moving the focus from vehicles and carparking to pedestrians and cyclists		
2	Work with the owner and businesses of Harbourside Centre to use the easement through the carpark to develop safer pedestrian access from Paraumoana Street and an attractive reserve entrance		
3	Remove selected pohutukawa and Norfork Island Pine where they are struggling due to poor drainage and ground conditions or block harbour views and access and improve growing conditions and drainage for new planting		
3	Develop a flexible grassed open space with facilities for picnicking and events and space for activity development		
3	Develop facilities to attract use. Ideas include a fitness trail, canoe and small dinghy storage, BBQs, water play		
2	Construct a pier out into the intertidal area to enhance a visual and physical connection with the harbour and to better observe estuary birdlife		
2	Interpretation of butterfly and moth garden and wetland		

Further projects and considerations

- Work with property owners at reserve boundaries to develop more attractive boundaries, connections and potentially open up buildings to activate the reserve and better integrate the built edge with the harbour
- Work with the Harbourside Centre to develop facilities that activate the harbour edge and improve access, connections and the reserve entrance
- Develop the Semple Street entrance to improve access and its profile as a significant reserve entrance. Review waterfront reserve land use on expiry of the Brass Band lease in 2020
- Consider acquiring or negotiating boundary adjustments between the Harbourside Centre and the Semple Street entrance
- Consider acquiring or negotiating boundary adjustments between reserve land and the property occupied by CCDHB on the southern side of the Semple Street entrance. This would create space for a viable stormwater treatment area (reducing harbour sediment and contamination) and linkages between the CBD and the harbour edge.

Key

- Estuary edge recontoured for access to the estuary edge
- Remove redundant stormwater outlet and other debris
- (1) Coastal wetland with stormwater redirected through the wetland, with appropriate control of rats
- Native butterfly and moth garden is raised to improve growing conditions with concrete edging doubling as seating. Path of 'stepping stones' through garden. Native plant species with rocks and shingle to provide warm sunning spots to support butterflies and moths. The planting would graduate from ground covers no more than .5 metres high to protect the viewshaft (2a), to low growing shrubs and trees (2b) - see Appendix 1 for species list
- (3) Native coastal trees to support the lifecycle of moths and butterflies. Trees planted in groves with ground level raised to improve growing conditions and grassed sloping edges for sitting and sunning
- (4) Path is relocated in some sections and wider for pedestrians and cyclists to share
- (5) Indicative pedestrian link through harbourside utilising viewshaft and pedestrian right of way easement (approximately 105 x 20 metres), and working with Harbourside owners and businesses
- (6) Pier into intertidal area with interpretation (dimensions, length and location to be determined)
- (7) Grassed open space for activities e.g. picnicking, BBQ, events, fitness trail with soft surface path, trees and drainage as necessary
- (8) Open up views and access at Semple Street entrance by selecting pohutukawa for removal, limbing up others and removing shrubs, moving the emphasis from vehicles to pedestrians, widening and adding to entrance pathways, reconfiguring vehicle entrance and parking
- (9) Low growing coastal species
- (10) Platform at Rangituhi Stream outfall with leaner
- Existing pohutukawa to stay
- Cables on Pak n Save wall to support *Tecomanthe speciosa* (Three Kings climber)

Activity Area 3 - Harbourside Hub

3.4. Wi NEERA PROMENADE - NB This activity area requires further investigation and resourcing

Design Principles

1. A linear parkland for informal recreation such as walking, cycling, dog walking, picnicking, relaxing etc.
2. A water's edge that reduces scouring and erosion of the reclaimed harbour edge and decreases the slope to the estuary edge. This would enable future ecological restoration and better access. Use of natural stone would repeat historic stone work at the eastern estuary edge and with careful design could be conducive to establishing plant species. Terraces and steps would allow access to the water. A leisurely harbour promenade or potentially a boardwalk between steps would bring people to the estuary edge, complementing the existing concrete pathway.
3. Improved visual connections and access to the estuary edge.

Key

Remove vegetation and debris at the water's edge. In the longer term decrease the slope at the estuary edge for future ecological restoration options and harbour edge access.

Wide terraces with water access

Develop picnic areas with BBQ facilities among pohutukawa

Investigate making changes to Wi Neera Drive for safety with traffic calming, increased parking capacity and improved pedestrian connections

Core projects in order of implementation, potential for community participation and sponsorship

(see Section 4 for details)

Priority	Project	Community Participation	Sponsorship
1	Open up views by clearing understorey vegetation and medium to large shrubs at the harbour edge		
1	Remove debris such as concrete from the estuary edge		
3	Construct the first of an intended suite of wide terraces in a selected location		
3	Remove trees where they are struggling with poor drainage and ground conditions		
3	Develop picnic areas with BBQ facilities among pohutukawa groves on mounds for shelter and shade		
3	Develop changes to roading and parking along Wi Neera Drive in line with Boulevard proposed in Porirua City centre Revitalisation to reduce speed, develop parking capacity and safer connections for pedestrians and a road environment that reflects the harbour character and setting		

Further projects

The following requires further investigation and resourcing but are critical to the long term success of the harbourside improvements:

- Investigate land/water edge treatment options to reduce scouring and erosion
- Investigate options or a combination of the two to link terraces to access the water edge:
  - A boardwalk running parallel to the shoreline to allow more extensive estuary access and to observe estuary birdlife
  - A promenade with a permeable surface at the harbour edge for pedestrians. This promenade would be for leisurely pedestrians and complement the existing concrete pathway which would be used by cyclists/pedestrian commuters

Activity Area 4 - Wi Neera Promenade

3.5. WAKA AMA RECREATION[3]

NB This activity area requires further investigation in collaboration with waka ama clubs, Takapuwahia Village Plan and other potential water sports. Only initial enhancement is included at this stage

Design Principles

1. Develop primarily for waka ama with potential for other water sport involvement and development.
2. Develop in collaboration with waka ama club and Takapuwahia Village Plan.
3. Improve water access for recreation.
4. Allow for future development as a potential hub for regional and national waka ama events and wider water sports.
5. Retain open space for waka ama, other water sports events and associated recreational activities and facilities.

Core projects in order of implementation, potential for community participation and sponsorship

(see Section 4 for details)

Priority	Project	Community Participation	Sponsorship
1	Relocate the boat ramp to the adjacent north facing beach where it will be less exposed to erosion and scouring and has a gentle grade for waka launching and remove the exsisting ramp		
1	Re-contour the north facing beach to remove the 'lip' where reclamation fill material has been eroded by wave action and replace with a soft wave energy absorbing area of shells, sand or gravel		
3	Upgrade the children's playground		

Further projects

The following requires further investigation and resourcing but are critical to the success of the harbourside improvements:

- Work with waka ama club and other water sports users to improve facilities and develop the sport, which is a feature of the harbour with potential to grow
- Design and construct toilets and an outdoor shower to support water sport activities.

Activity Area 5 - Waka Ama Recreation

3.6. TAKAPUWAHIA/WHITIREIA HUB

Design Principles

1. Estuary restoration planting, habitat restoration and amenity that integrates with the Takapuwahia Village Plan.
2. Integrate development of the area with the Takapuwahia Village Plan, improving visual connections and access between the harbour edge and Takapuwahia.
3. Focus resources in the first instance on the corner of Wi Neera Drive and Titahi Bay Road for estuary restoration planting, habitat restoration and amenity.

Core projects in order of implementation, potential for community participation and sponsorship

(see Section 4 for details)

Priority	Project	Takapuwahia Participation	Sponsorship
1	Remove concrete, other debris and riprap that has been washed from the estuary edge	■	
1	Trial intertidal salt marsh community restoration in conjunction with Takapuwahia community and Ngati Toa	■	
1	Small coastal wetland above the estuary edge around the Stream outlets	■	
1	Coastal species planting at the corner of Wi Neera Drive and Titahi Bay Road	■	
2	Platform above stream mouths with a leaner and seating for viewing		
1	Re-contour the grassed area where a shell beach is forming and remove the 'lip' where reclamation fill material has been eroded and form wide terraces with concrete edges for seating and steps		
2	Interpretation of estuarine environments	■	
3	Estuary edge species 'garden' with karaka and cabbage trees spaced to allow clear sightlines and integrated play opportunities along the pathway		■

Further projects and considerations

The following requires further investigation and resourcing:

- Allow for integration with proposed walkway/ boardwalk around Onepoto Inlet
- Remove the pines and macrocarpa. Any development/enhancement should consider the effects of the loss of shelter they are providing.

Activity Area 6 - Takapuwahia/Whitireia Hub

Key

Improved connections with Tapuwahia:

Trial intertidal habitat restoration - indicative location

Coastal wetland

Coastal species planting

Platform above the outlets of Mahinawa and Takapuwahia Streams with leaner and seat for viewing

Steps from viewing platform, path at wetland edge with seat leading to terraces and beach access

Wide terraces to access beach with seating at terrace edge

Recontour grass edge for beach access

Improved access and connections to Whitereia: traffic calming across Wi Neera Drive, gathering/entry area, seating, tree planting e.g. karaka and cabbage trees

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4. Implementation Plan for Key Projects

Introduction

This table has implementation details for high priority and immediate projects (identified in Section 3 Design Principles and Key Projects as priority projects 1 and 2). The projects are listed in the table by Activity Area.

However, this does not exclude projects identified in Section 3 as medium priority projects or as 'further projects' in high priority Activity Areas 1,2,3 and the western end of Area 6, or projects that receive external support or funding (which may be identified as have higher priority).

Projects needing more planning and resources

Projects in italics are high priority but need more planning and resources to implement.

Implementation agencies

The table shows Councils as the primary implementation agencies. This does not exclude Ngati Toa iwi, community or private stakeholders who may also be key players in implementation of specific projects.

Sponsorship

The table also suggests projects that are suitable for community partnership and sponsorship by private and corporate sectors.

Project name	Primary Implementation agency	Suits Community Partnership	Suits Sponsorship	Comments
Activity Area 1: EASTERN ESTUARINE EDGE				
1.1. Safe basic access track for pest control and restoration projects.	GWRC			Track formation. Use gated and unobtrusive western entrance to avoid attracting public use. Possibly could be undertaken in collaboration with Treescape (KiwiRail contractor).
1.2. Weed control of priority species starting at southern end.	GWRC	✓		Partially undertaken in June 2014. Initial priority species fennel, holly-leaved senecio, wandering willie (hand-pulled), followed by buckthorn, gorse, broom, karo; finally blackberry, pampas, all vine spp (likely to need herbicide). Undertake in conjunction with Porirua Stream Mouth Wetland Restoration Plan 2010.
1.3. Litter removal.	PCC	✓		Can be undertaken by supervised volunteers, but not until access is more secure. To be repeated 2-yearly.
1.4. Planting Muehlenbeckia vineland habitat and coastal rock edge, including planting for moth and lizard habitat.	GWRC	✓		Planting to follow weeding (project 1.2) within 12 months of weeding. See "suitable species" lists in Appendix.
1.5 Salt marsh community restoration trial on estuary edge	GWRC			Trial of techniques and feasibility with different combinations of depth, substrate and tidal floor. Unlikely to be suitable for volunteers unless safe access is assured (project 1.1).
Activity Area 2: STREAMSIDE				
2.1. Open up stream views and views to the harbour by clearing understorey vegetation, removing selected trees and large shrubs, and lifting canopies of remaining trees.	PCC			Principles and details as in recent understorey vegetation clearance against Pak n Save wall.
2.2. Remove existing path, relocate and replace with wider pathway for multiple users.	PCC			3-4m wide concrete path. Construction details as for recent PCC streamside paths.
2.5. Improve stream access in selected location via terracing and steps with seating.	PCC		✓	Detailed design required. See restoration plan for indicative profile.
Activity Area 3: HARBOURSIDE HUB				
3.1. Re-contour the estuary edge and CBD side of the stream mouth to remove the 'lip'.	GWRC /PCC			Detailed design required, including GW Flood Control involvement. Likely to require resource consents.
3.2. Develop a coastal wetland at the estuary edge and around the stormwater outfall.	GWRC / PCC	✓	✓	Detailed design required. May require resource consent if end of stormwater pipe needs re-location or re-engineering, e.g. small meander loop inserted to create larger wetland environment. Ideally projects 3.2 and 6.3 should be planned and implemented together. See "suitable species" lists in the Appendix.

Project name	Primary Implementation agency	Suits Community Partnership	Suits Sponsorship	Comments
3.3. Re-locate and widen the linear pathway.	PCC			As for project 2.2.
3.4. Create a native 'garden' which supports the lifecycle of NZ moths and butterflies.	GWRC / PCC		✓	Detailed design and planting plan required. See "suitable species" lists in Appendix. Likely to need ground preparation, drainage and raised planting area because of nature of fill material and need to address rising water table on coastal fringe. Raised concrete edge can be used for seating. Complemented by project 3.11.
3.5. Improve the Semple Street reserve entrance to make it more prominent, inviting and safe.	PCC			Detailed design required. Planning with private stakeholders /property owners required. Involves relocation/reconfiguration of car parking spaces.
3.6. Use the easement through Harbourside Centre carpark to construct a pathway from Paraumoana Street and develop an attractive and high profile reserve entrance.	PCC			Detailed design required. Extensive planning with private stakeholders /property owners required. Relocation or reconfiguration of car parking spaces may be required.
3.10. Construct a pier out into the intertidal area to enhance a visual and physical connection with the harbour and to better observe estuary birdlife.	PCC		✓	More detailed design required including location, length and dimensions of pier. Likely to require resource consents.
3.11. Interpretation of moth and butterfly garden and wetland.	GWRC / PCC		✓	To be complemented by interpretation of Activity Areas 1 (from western side of stream), 2 and 6 (projects 1.6, 2.6 and 6.7). Highlight an estuary edge ecosystem in this area More detailed design required for integrated interpretation/signage project for whole plan area.
Activity Area 4: WI NEERA PROMENADE				
4.1. Remove vegetation at the water's edge for harbour views.	PCC			As for project 2.1. May be undertaken at the same time as 2.1.
4.2. Remove debris such as concrete from the estuary edge.	GWRC PCC			Some riprap may be able to be placed to retain edge but other items will need to be removed to clean fill. Removal of estuary edge debris or rip rap repair in all Activity Areas over whole site, including those that are not priority projects, could be planned and consented as one project.
Activity Area 5: WAKA AMA RECREATION				
5.1. Relocate the boat ramp to the adjacent north facing beach, and remove existing ramp.	PCC		✓	Detailed design required (some already undertaken). Likely to require resource consents.
5.2. Re-contour the north facing beach to remove the 'lip'.	GWRC			Detailed design required. Likely to require resource consents.
Activity Area 6: TAKAPUWAHIA/WHITIREIA HUB				
6.1. Remove concrete, other debris and riprap that has been washed from the estuary edge.	GWRC/ PCC	✓		As for project 4.2.
6.2. Trial intertidal seagrass community restoration in conjunction with Takapuwahia community and Ngati Toa.	GWRC	✓		Trial of establishment and growth at different intertidal positions and distance from the stream outlet.
6.3. Small coastal wetland above the estuary edge around the stream outlets.	GWRC / PCC	✓	✓	As for project 3.2, with similar species used. Ideally these two projects should be planned and implemented together. See "suitable species" lists in Appendix.

Project name	Primary Implementation agency	Suits Community Partnership	Suits Sponsorship	Comments
6.4. Coastal species planting at the corner of Wi Neera Drive and Titahi Bay Road.	PCC	✓	✓	Planting plan required. Plant height limitations for traffic visibility. May include pathway to viewing platform.
6.5. Platform above stream mouths with a leaning rail and seating for viewing.	PCC		✓	Detailed design required.
6.6. Re-contour the grassed area where a shell beach is forming, remove the 'lip', and form wide terraces with concrete edges for seating and steps.	PCC			Detailed design required.
6.7. Interpretation of estuarine environments.	GWRC / PCC		✓	To be complemented by interpretation of Activity Areas 1 (from western side of stream), 2 and 3 (projects 1.6, 2.6 and 3.11).

Summary of projects and costs by activity area

Name of activity area	Number of high-priority projects (priority 1 and 2)	Estimated total cost range of high priority projects	Number of other projects (priority 3 and 'further projects')
1: EASTERN ESTUARINE EDGE	4	$25K- 50K	2
2: STREAMSIDE	3	$50K- 100K	3
3: HARBOURSIDE HUB	8	$280K- 550K	3
4: WI NEERA PROMENADE	2	$12K- 25K	4
5: WAKA AMA RECREATION	2	$50K- 100K	1
6: TAKAPUWAHIA/WHITIREIA HUB	7	$70K- 120K	1
TOTAL	**26**	**$487K- 945K**	**14**

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Appendix 1 - Proposed plant species

Activity Area 1

Plantings for moths and butterflies

Abundant plantings of pohuehue *(Muehlenbeckia complexa)* and koromiko *(Hebe stricta)*.

Note that these two species should be planted widely across the activity area (and beyond), the former as a food plant for the caterpillars of coastal copper butterflies, the latter as a source of nectar for the adults of a range of butterflies.

NZ tree nettle (*Urtica ferox*) and swamp nettle (*Urtica linearifolia)* as larval food plants for red and yellow admirals.

Aciphylla squarrosa as food plant for speargrass weevil

Manuka / Kanuka as nectar sources for adults

Senecio lautus and *Calystegia soldanella* on shingle shores as larval food plants for magpie moth and kumara moth respectively.

Coastal Wetland plant species for Activity Areas 3 and 6

The following can be used in the planting plan for these areas. They have been adapted from *Porirua Stream Mouth Coastal Wetland Restoration Plan* (KB Ecology for GWRC and PCC, 2010) and 'Best Bets' species list for restoration planting in the Porirua catchment (Blaschke et al 2009 Ecological Restoration priorities for the Porirua Stream and its catchment).

Scientific name	Common name
Carex flagellifera	
Carex geminata	Rautahi
Carex secta	Purei
Carex virgata	Pukio
Coprosma propinqua	Mingimingi
Coprosma robusta	Karamu
Cordyline australis	Ti kouka /Cabbage tree
Cortaderia toetoe	Toetoe
Disphyma australe	Horokaka/NZ ice plant
Leptinella squalida subsp. *squalida*	
Lobelia anceps	Punakuru/NZ lobelia
Phormium cookianum	Harakeke
Samolus repens	Sea primrose
Selliera radicans	Remuremu
Sophora malloyi	Cook Strait kowhai

Moths and butterfly garden in Activity Area 3

Scientific name	Common name	Notes
Ground cover and herb layer amongst rocks and shingle:		
Pimelea prostrata (subsp: *prostrata* and/or *seismica*)	Pinatoro / Prostrate daphne	Notoreas moths (day-flying and endangered)
Raoulia hookeri	Vegetable sheep	Associated with rocky headlands and scree slopes
Senecio lautus	Shore groundsel	
Parietaria debilis	NZ Pellitory	Magpie moth (day-flying)
Muehlenbeckia axillaris	Creeping pohuehue	Red admiral and yellow admiral butterflies
Calystegia soldanella		Copper butterflies
Coprosma propinqua		
Dichondra spp		
Haloragis erecta		
Helichrysum lanceolatum		
Leptinella nana	Pygmy Button Daisy	
Plantago spp.		
Plantago maritima		
Plantago raoulii		
Sonchus kirkii	Shore puha	
Shrub layer - these should be carefully placed so as to not to block views and allow clear lines of sight:		
Muehlenbeckia complexa	Pohuehue	Copper butterflies
Hebe stricta	Koromiko	Nectar source
Sophora molloyi	Cook Strait kowhai	Kowhai moth
Phormium sp.	Flax	Flax notch-cutter moth
Bracyglottis greyii		
Ozothamnus leptiphyllus	Tauhini	
Trees - these grown in groves in raised planting areas to improve growing conditions		
Cordyline australis	Cabbage tree	Cabbage tree moth
Hoheria sexstylosa	Lace bark	Nectar sources
Kunzea ericoides	Kanuka	
Leptospermum scoparium	Manuka	
Myoporum laetum	Ngaio	
Sophora molloyi	Cook Strait kowahi	

Other species for amenity and habitat areas

Scientific name	Common name
Aciphylla squarrosa var flaccida	Taramea,Speargrass,Spaniard
*Apodasmia similis**	Oioi/Jointed wire brush
Carex cf. testacea	Speckled sedge
Carmichaelia australis	Common broom
Clematis forsteri	Small white clematis
Corynocarpus laevigatus	Karaka
Discaria toumatou	Matagouri, Wild Irishman
Euphorbia glauca	Waiu-atua/Shore spurge
*Juncus kraussii**	Searush
Melicytus aff. obovatus	Koromiko

* saltmarsh species

Scientific name	Common name
Melicytus crassifolius	Thick-leaved mahoe
Muehlenbeckia astonii	Tororaro
Olearia paniculata	Akiraho, Golden akeake
Olearia solandri	Coastal tree daisy
Phormium cookianum	Mountain flax
Pimelea prostrata subsp prostrata	Pinatoro/NZ daphne,
Pimelea prostrata subsp seismica	Pinatoro
*Plagianthus divaricatus**	Makaka/Saltmarsh ribbonwood
Poa billardierei	Hinarepe/Sand tussock,
Poa cita	Silver tussock
Tetragonia tetragonioides	Kokihi/NZ spinach/Tutae-ikamoana

Appendix 2 - Notes on butterflies, moths and associated plants

This appendix summarises information about moths and butterflies considered native to the general Porirua district and with potential for eco-restoration at Porirua Harbour. It also summarises information on suitable plant species for the activity areas in the Enhancement Plan.

Moths and butterflies with potential for eco-restoration

Note that more than 200 native Lepidotera have been recorded in coastal Wellington between Cape Palliser to Sinclair Head (Brian Patrick, unpublished information).

Common Copper, Lycaena salustius, Pepe Para Riki

This species is already abundant in Activity Area 1 and could most likely be encouraged to other Activity Areas by planting appropriate food plants.

Food plants: They prefer the three types of Muehlenbeckia: Wire Vine, Pohuehue (*Muehlenbeckia complexa*), Large-leafed Pohuehue (*Muehlenbeckia australis)* and Creeping Pohuehue (*Muehlenbeckia axillaris*). There are records of eggs on Sheep's Sorrel (*Rumex acetosella*) and Broad-leaved Dock (*Rumex obtusifolius*).

Rauparaha's Copper, Lycaena rauparaha, Mokarakare

(Named after Te Rauparaha because the butterfly is found up and down the Kapiti coast, the stronghold of Maori chief, Te Rauparaha, of Ngāti Toa.)
Not recently recorded within the PSEEP area, but the species has been recorded via NatureWatch at Titahi Bay and Pukerua Bay. It prefers coastal dunes with mixed vegetation. It can also be found in other coastal areas if their larval food plant is present.

Food plants: Only recorded on Pohuehue (*Muehlenbeckia complexa*) and Creeping Pohuehue (*Muehlenbeckia axillaris*), but it is suspected that it would also use Large-leafed Pohuehue (*Muehlenbeckia australis*).

Yellow Admiral, Vanessa itea, Kahu Kowhai

An open country and garden butterfly that is seen in most types of habitat since its food plants grow in most habitats from the foothills to city gardens. Often seen sunning itself on rocks and paths, especially in the afternoon.

Food plants: It will feed on any of the Nettle species (*Urtica* spp), but prefers the softer leaved varieties like Small and Scrub Nettle (*Urtica urens* [introduced] and *Urtica incisa* [native]. It will eat the introduced Perennial Nettle (*Urtica dioica*). It has been recorded on New Zealand pellitory *(Parietaria debilis*), a stingless plant of the Nettle family found in coastal dunes, lowland scrub and rocky places. *Urtica linearifolia*, swamp nettle [native] may be appropriate for river margins in association with flax but it has a vicious sting.

New Zealand Red Admiral, Vanessa gonerilla

Food plants: Thought to be similar to yellow admiral. Its favourite is the introduced perennial nettle (*Urtica dioica*), and the native favourite is nettle tree - onga onga, (*Urtica ferox*); however; it will feed on any of the nettle species (*Urtica* spp). Food plant = nettles *Urtica* spp. (Source = http://nzbutterfly.info) *Urtica linearifolia*, swamp nettle [native] is appropriate for river margins in association with flax – it has a vicious sting.

Kumara Moth *Agrius convolvuli*

Food plants: Shore bindweed (*Calystegia soldanella*) and kumara

Magpie Moth - *Nyctemera annulata* - Mokarakara

Day-flying moth
Food plant: Any *Senecio* spp. e.g. *Senecio lautus*

Cabbage tree moth - *Epiphryne verriculata*

Food plant: Cordyline

Flax notch cutter moth - *Tmetolophota steropastis*

Food plant: Phormium spp

Kowhai moth - *Uresiphita polygonalis maorialis*

Food plant: *Sophora* spp

Notoreas spp. moths

Coastal Notoreas moths are conspicuous, but rare, day-flying moths, whose larval food plant is sand daphne and other Pimelea spp.

Location of the nearest confirmed populations of Notoreas spp. are probably north of Levin and near Cape Palliser / Onoke Spit, and maybe Pencarrow. There are old records of a new Notoreas species from Makara. The PSEEP area is likely to be sub-optimal. Recommendation is to plant Pimelea, but not to expect too much in the way of a natural colonisation (approval to translocated is unlikely, at least initially).

Food plant: *Pimelea* spp.
Sand daphne (*Pimelea aff. arenaria*) is normally associated with sand dunes rather than the types of habitats present at this site, but nonetheless it could be planted as an ornamental ground cover that is not completely out-of-place for a coastal site. *Pimelea prostrata* might be more suited to rocky/shingle habitats. Nomenclature of Pimelea species is confusing with *P. urvilleana* and *P. villosa* also used synonymously with Sand Daphne / prostrate daphne.

There are three *Pimelea* coastal species (taxonomy and nomenclature of the genus is complex and changing):

1. *Pimelea villosa* (was *P. arenaria*) sand daphne, autetaranga, toroheke, sand pimelea. Conservation status = At risk, declining. *Pimelea aff. arenaria* (Sand Daphne) has been recorded from Hongoeka /Karehana Bay just north of Porirua (Milne & Sawyer 2002). Has been planted in semi-stable mid-dune at Onehunga Bay in 2011.

2. *Pimelea prostrata* (with 5 subspecies), pinatoro. The subspecies local to the Wellington region is *P. prostrata seismica* and perhaps also *P. prostrata* subsp *prostrata* (see photo below). *Pimelea prostrata seismica*, was recorded at northern head of Whiteria Park by Robyn Smith. This sprawling plant may be a good option for ground cover. Habitat: coastal to slightly inland, open sites, grassy site, rocky outcrops.

3. *Pimelea durvilleana* (with 2 subspecies). A prostrate plant very similar to *P. prostrata*.


Copper butterfly, Lycaena salustius

greater WELLINGTON
REGIONAL COUNCIL
Te Pane Matua Taiao

Report	Te Awarua o Porirua Sediment Reduction Plan
Date	19 February 2015
Committee	Te Awarua-o-Porirua Harbour and Catchment Joint Committee
Author	Jennie Marks

1. Purpose

The purpose of this report is to update the Committee members on the development of a Sediment Reduction Plan and associated timeframes. This plan will summarise the activities aimed at reducing the amount of sediment entering the harbour in line with actions detailed in the Porirua Harbour and Catchment Strategy and Action Plan (the Strategy).

2. Recommendations

That the Te Awarua-o-Porirua Harbour and Catchment Joint Committee:

1. **Receives** the report.
2. **Notes** plan content and anticipated timeline for completion
3. **Endorses** GWRC developing the plan

3. Background

To address high sedimentation rates in the harbour, the *Porirua Harbour and Catchment Strategy and Action Plan* sets an action that stipulates the development of re-vegetation plan for the whole catchment. However, recognising that revegetation is only one of many options to reduce sediment, this was later extended to include a range of other possible activities that could be undertaken to reduce the amount of sediment entering the harbour.

External contractor GroundTruth was commissioned by GWRC to produce the summary document *Sediment Reduction in Te Awarua o Porirua Harbour and Catchment: Issues and Recommendations*. This document summarises key issues and causes of sedimentation and provides advice regarding actions that Strategy partners can undertake to further reduce sediment resulting from land-use activities around the catchment.

The Strategy partners agreed to develop a Sediment Reduction Plan to outline and prioritise the range of activities planned to reduce sediment inputs to the harbour from primarily rural areas, but also from urban development. GWRC will lead this process.

4. Plan development

Although compiled by GWRC staff, the plan will summarise existing and planned activities from all four key Strategy partners that contribute to the reduction of sediment entering the harbour. This will demonstrate how different agency projects and programmes contribute to an overall comprehensive approach. The target audience is the Joint Committee, Strategy partners, stakeholders and the interested public.

The following timeline summarises the process leading to plan finalisation:

Activity	**Date**
Draft submitted to Joint Committee for approval to release to targeted stakeholder for feedback	May 2015
Final plan submitted to Joint Committee for approval. Formatting and publication of Final Plan (electronic only)	August 2015

Stakeholders engaged in the review of the plan will include Guardians of the Pauatahanui Inlet, Pauatahanui Inlet Community Trust, Porirua Harbour Trust and the Department of Conservation.

Strategy & Planning
24 February 2015

HARBOUR SCORECARD - PORIRUA HARBOUR TRUST

PURPOSE

To summarise the recently released 2nd annual 'Scorecard' from the Porirua Harbour Trust on the state of Porirua Harbour.

SIGNIFICANCE OF DECISION

The Council's significance policy is not triggered.

RECOMMENDATIONS

That the Te Awarua-o-Porirua Harbour and Catchment Joint Committee:

1. **Receive** the report
2. **Note** the Porirua Harbour Trust Harbour Scorecard for 2014

Report prepared by:

Keith Calder
PORIRUA HARBOUR STRATEGY COORDINATOR

Approved for submission by:

Wendy Walker
GENERAL MANAGER STRATEGY AND PLANNING

1 EXECUTIVE SUMMARY

1.1 The 2nd annual 'Scorecard' on the state of Porirua Harbour from the Porirua Harbour Trust (**Attached**) concludes that there is a general improvement from the previous 2013 report.

2 CONTRIBUTION TO COUNCIL'S STRATEGIES

Relationship to Council's Strategic Priorities

A City of Villages	A Healthy Harbour	A Growing City	A Great City Experience
✓	✓	✓	✓

2.1 One of the Council's long term objectives is *"A healthy and protected harbour"*. The scorecard provides an independent general assessment on trends in some key aspects of the state of Porirua Harbour, and how well agencies, including the Council, are implementing the *Porirua Harbour and Catchment Strategy and Action Plan 2012*.

3 BACKGROUND

3.1 The Porirua Harbour Trust (the Trust) has completed its second "State of the Harbour" scorecard which reports on progress against the *Porirua Harbour and Catchment Strategy and Action Plan* and toward arresting the decline in harbour condition and returning it to a healthy and resilient state.

3.2 The Trust established the scorecard system in 2013 after consultation with the four key strategy partners. This was intended to provide some measure of accountability for success or otherwise of implementation of the harbour strategy while also assisting with the Trust's community profile.

3.3 A four person panel produces the yearly assessment based principally on data provided by Greater Wellington Regional Council. The panel comprises two Trust representatives and two independent members. The current panel is made up of the following members:

- Grant Baker – Trust Chair;
- Lyndsey Gow – Trust member;
- Dr John McKoy – Marine scientist;
- Clive Anstey – Landscape and resource planner

3.4 The scorecard is based on the following five indicators:

Indicator	Description
Agency Action	Reviewing local authority and agency progress with implementing the *Porirua Harbour and Catchment Strategy and Action Plan*
Sedimentation	A summary of data from the Greater Wellington Regional Council's sedimentation records from 18 recording plates in both the Onepoto Arm and Pauatahanui Inlet
Recreational Use	Feedback from recreational groups using the harbour waters and water quality records from key beaches
Ecological Health	A summary of data from Greater Wellington's records on the quality of major streams entering both arms of the harbour and on harbour quality
Waste	Recording the changing volumes of large rubbish items collected from the harbour at the Porirua Stream mouth by the Trust

3.5 The scorecard ratings for 2014 are as follows:

Indicator	Overall Rating	Trust Comments
Agency Action	Good	Most agency actions delivered on and continuing funding provisions in long term planning.
Sedimentation	Excellent	The rate of sedimentation of the Onepoto Arm (subtidal) and Pauatahanui Inlet (intertidal) is low and the same as 2013.
Recreational Use	Good	The majority of recreational clubs surveyed consider that the water quality has continued to improve over the last few years, with all rating their 'on water' experience as good.
Ecological Health	Relatively Good	Overall improvement from the baseline harbour and stream health established in 2013.
Waste	Fair	Large items of rubbish in the mouth of the Porirua Stream on the Onepoto Arm showing steady improvement over the "very poor" rating in 2013.

3.6 The Trust's conclusion is that, "Overall the second 'State of the Harbour' report is encouraging with the recent actions by agencies starting to indicate progress toward restoring the harbour to a healthy state... with three notable exceptions:

- Significantly increasing amounts of soft mud in the subtidal areas;
- Generally poor water quality for swimming at the beaches and shellfish gathering areas; and
- Many large items of rubbish continue to find their way into the Porirua Stream mouth."

4 DISCUSSION

4.1 There is significantly greater variation in the detailed scorecard. A full reading is instructive and provides a more accurate picture of the kinds of variability the Scorecard seeks to analyse, rate and summarise. However, the overall positive observations are consistent with others, including the most recent cockle count, bathymetric survey, and general harbour litter observations.

4.2 The five indicators used for the scorecard are considered by scientists at Greater Wellington Regional Council (and PHT) as inherently simplistic for what are complex biophysical measurements and processes. However, they still provide some indication of health trends for the harbour, particularly when accompanied by an explanation.

4.3 The harbour strategy includes a set of more specific indicators developed by a science advisory group and agreed in consultation with agencies and community. Each of these indicators also has a specific target to achieve for successful implementation of the strategy.

4.4 Strategy partners anticipate that all of PHT's five indicators will be maintained or progressively improved as the objectives of the strategy are realised.

4.5 Outstanding PHT concerns about poor swimming quality at Plimmerton Beach may be resolved by the recent discovery of a broken sewer pipe adjacent the Taupo Stream and remedial action. Steady improvement in reducing litter in and around the harbour is expected to continue through the joint efforts of Council officers, Guardians of Pauatahanui Inlet, Keep Porirua Beautiful, Porirua harbour Trust and increasing assistance from the broader Porirua community. Reducing sedimentation rates is a longer term project and requires a suite of actions to better control sediment run-off from the catchment – a critical objective of the harbour strategy.

5 CONCLUSION

5.1 The Porirua Harbour Trust has released its second annual "State of the Harbour" scorecard. The Trust report concludes that, while there are important exceptions, the overall condition of the harbour and progress toward restoring it to a healthier state is positive.

6 ATTACHMENTS:

- PCC#1084096 – Porirua Harbour Trust – Harbour Scorecard 2014
- PCC#1084100 – Porirua Harbour Trust – Scorecard Press Release

Te Awarua o Porirua

Porirua Harbour Scorecard - 2014

Prepared by:
Grant Baker
Lindsay Gow
John McKoy
Clive Anstey

Te Awarua O Porirua
Porirua Harbour Scorecard - 2014

Background

The two water systems of the harbour (the Pauatahanui Inlet and the Onepoto Arm) once supported a bountiful supply of fish and shellfish. In addition to the marine species, rich forests surrounded the harbour and were the source of many birds. Flax was abundant in the swamps.

From the 1820s Europeans began to settle in Porirua. From the 1850s onwards, major impacts on the harbour system were caused by forest clearance propelled initially by an increasing demand for timber. Forest clearance proceeded rapidly so that within some 40 years lowland Porirua was transformed from a mostly forested into a mostly pastoral landscape. Interestingly, there is more vegetation around the harbour system now than there was at the end of the 19th Century.

The progressive clearance for pasture resulted in a massive increase in sediment, which started filling the harbours at a rate of 2 – 4mm/year from a pre European background inflow of 1mm/yr.

The next big effect was urban development. This increased sediment movement and deposition and, together with the effects of roads, railways and reclamations, dramatically altered the shoreline and the tidal prism (the amount of tidal water that could move in and out of the harbour system). Sediment rates increased substantially so that by the mid 70s the average rate was estimated to be between 6 and 9mm/yr. In parts of the Pauatahanui Inlet it may have reached up to 10-15mm/yr. If continued, these rates would result in the Inlet being in filled and becoming a swamp in 145 - 195 years and the Onepoto Arm in 290 – 390 years. (Gibb, 2009, 2011).

In addition to sediment, urban development added chemical and biological contaminants and nutrients, together with toxins from urban run off. Agricultural chemicals and industrial run off in the post Second World War era added further pollution which is now embedded in harbour sediments and affects its shellfish and fish stocks.

Fortunately, this legacy of contamination is now being addressed by the three authorities responsible for the harbour and it catchments – Porirua City, Wellington City, and Greater Wellington Regional Council. Together with Ngati Toa and other organisations and agencies, these authorities have drawn up a Porirua Harbour and Catchment Strategy and Action Plan. This sets out directions, actions and targets designed to arrest the decline in harbour condition and return it to a healthy and resilient state. The Action Plan is the touchstone and guide towards a brighter future for the two arms of the harbour – the Onepoto and the Pauatahanui.

Te Awarua O Porirua Harbour and the water catchment of its two arms are significant to the people of Porirua City as well as those across the Wellington region.

- It is the focal point and defining feature of Porirua City
- It is a gateway to Wellington City from the Kapiti Coast and points north.
- It is a much valued recreational playground for the city and the region
- It is a regionally significant bird and fish habitat and includes a wildlife reserve of national importance
- It is a significant resource for local iwi, Ngati Toa.

This scorecard serves to raise awareness and report on long term progress in meeting the objective of a healthy and protected harbour.

The Porirua Harbour Trust

The Trust (Porirua Harbour and Catchment Community Trust but marketed as the Porirua Harbour Trust) was established in 2011 with representation from the three councils, Ngati Toa and community members. Two of our key objectives are to:

- Advocate for the sustainable management of the harbour and its catchment; and
- Foster an understanding of ecological and environmental issues within the harbour and its catchment through research, education and community awareness.

The Trust has undertaken to report annually with reference to a set of "State of the Harbour" indicators with the aim of tracking progress towards a healthy harbour. To this end a review panel of two Trust members and two independent observers has been established. The panel considers data available from the Councils as well as the Trust's own surveys and projects and uses this to report on five key indicators of the health of the harbour.

The review panel comprises:

Grant Baker, Chairperson of the Porirua Harbour Trust
Lindsay Gow, Trustee of the Porirua Harbour Trust
Dr John McKoy, Marine Scientist
Clive Anstey, Landscape and Resource Planner.

The annual scorecard on the health of the Porirua Harbour will be available each February.

The Scorecard for 2014

The Porirua Harbour Trust (PHT) has an important role in supporting the community, the councils, Ngati Toa and agency action to make positive changes to the ecosystems of the catchment and harbour, ensuring the Porirua Harbour and Catchment *Strategy and Action Plan* is implemented.

This scorecard for the 2014 year is the second in an annual series that PHT will produce every February. The scorecard maps and assesses five indicators related to the harbour and catchment using a five point scale for each one. (5 being excellent and 1 being poor).

The scores are designed to highlight changes in key aspects of harbour and catchment quality, to sample users' views on harbour condition, and to give an indication each year of progress on the *Strategy and Action Plan*.

The five indicators are:

1. Agency Action – a review of local authority and agency progress with implementing the *Strategy and Action Plan*;
2. Sedimentation – a summary of data from the Greater Wellington Regional Council's sedimentation records from 18 recording plates in both the Onepoto Arm and Pauatahanui Inlet;
3. Recreational Useage – feedback from recreational groups using the harbour waters and water quality records from key beaches;
4. Ecological Health – a summary of data from Greater Wellington's records on the quality of major streams entering both arms of the harbour and on harbour quality.
5. Waste – recording the changing volumes of large rubbish items collected from the harbour at the Porirua Stream mouth by the Trust.

The review panel recognizes that data collection in the harbour and catchment has been underway for many years, but that it is only recently that a more comprehensive set of data has started to be collected. The review panel has taken the approach of only reporting on matters with at least three years data available. This is because data gathered for just one or two years might result in one off events becoming too dominant and overly influencing the longer term average.

The review team acknowledges the strong and helpful support received from the monitoring team at Greater Wellington Regional Council in making the data available.

The criteria for each indicator being measured, the five point scale explanation and the full results are included in Appendix 1.

The 2014 Results

The 2014 "State of the Harbour" scorecard is the second for the Trust and reports against the baseline established for each of the five indicators being measured in our first report.

Out of the five indicators being measured, Sedimentation of the Onepoto Arm (subtidal) and Pauatahanui Inlet (intertidal) are the only ones which receive a rating of Excellent - the same as in 2013.

Recreational Usage in both the Onepoto Arm and the Pauatahanui Inlet along with Recreational Water Quality at the Paremata Bridge of Pauatahanui Inlet continued to receive a rating of Good.

The result for Waste, large rubbish items collected from the Porirua Stream area of the Onepoto Arm has improved from a rating of Very Poor to a Fair.

Overall, when considering the longer term data available to the review team, the results show a generally positive and progressive actions and related improvement in harbour quality and condition over the last decade – with three notable exceptions:

- significantly increasing amounts of soft mud in the subtidal areas,
- generally poor water quality for swimming at the beaches and shellfish gathering areas and
- many large items of rubbish continuing to find their way into the Porirua Stream mouth.

There remains for the panel, some confusion over the origin of the sediment within the harbour, as it is still not clear which streams and what activities contribute to the sediment build up in each of the areas. This may be clarified as more data becomes available in the years ahead.

Reported below are the full results and the commentary for the five indicators.

1. AGENCY ACTION

What is being measured:

An Annual Review of progress by all agencies against the Porirua Harbour Detailed Action Plan

This includes a comparison of what was stated in the Detailed Action Plan with what was funded and planned and achieved through outputs and outcomes.

Rating 2013	Rating 2014	Comment
3	3	Most planned actions delivered on.

Comment:

The *Strategy and Action Plan* has been in place since March 2012 and councils have continued to include in their annual and long term planning the funding required to carry out the work identified in the plan.

Councils have completed reports on actions achieved and have concluded that "most planned actions have been delivered on". Deliveries from the past year include on-going upgrades of the city's sewer and stormwater networks, in particular the reticulation of Pauatahanui Village; plans to reduce sediment across the catchment; an ongoing planting and fencing programme; an improved litter removal programme; commencement of plans for estuary restoration and catchment erosion control; installation of an extensive monitoring network; and an ongoing environmental survey programme.

In addition, we note some other important initiatives:

1 The establishment of a multi agency Harbour Committee, with representation from the three councils and Ngati Toa: this committee has important governance and related direction and priority setting functions for the Harbour Strategy and Action Plan and its review.

2 The establishment by Greater Wellington Regional Council of a catchment based "Whaitua" Committee. This committee will work to collect and relay environmental, mana whenua, economic and technical information and community knowledge between the community, Porirua and Wellington Cities, and the Regional Council. The committee is made up of local community, tangata whenua, expert and council representatives. Its overriding purpose is to develop a specific chapter on Porirua's land and harbour management for inclusion in the regional plan.

3 The establishment by the Greater Wellington Regional Council of an education coordinator.

Notwithstanding these initiatives, it is still difficult to identify what results, affecting the harbour, have been achieved. Given the forthcoming review of the Strategy and Detailed Action Plan, we consider that some of the delivery dates in the Action Plan are very distant and need to be revised. To us, they don't seem like real drivers for outcomes in the near term, and certainly wouldn't excite public interest or commitment. We consider the reviewed Detailed Action Plan

should look to include more shorter term targets, should include a limited number of important priorities and related deliverables for the next three years, and should set a series of progressive targets which would set out achievement times and outcomes for particular interim results.

Suffice to say we are seeing generally strong commitment from agencies for the programme.

The Trust will continue to engage with the councils, the Harbour Committee and other agencies to ensure work is planned and implemented as per the *Strategy and Action Plan*.

2. SEDIMENTATION

What is being measured:

Harbour Sedimentation. Utilises the Mean Annual sedimentation data from the 18 sedimentation plates, (9 in the intertidal and 9 in the sub tidal) in the Onepoto Arm and Pauatahanui Inlet. A separate rating is shown for subtidal and intertidal in each inlet.

Rating 2013	Rating 2014	Comment
5	5	Pauatahanui Inlet intertidal
5	5	Onepoto Arm subtidal
3	4	Onepoto Arm intertidal

This is the first year for data in the Pauatahanui Inlet subtidal area and hence no rating has been included at this stage.

Data used:

To measure sedimentation rates from now into the future, Greater Wellington Regional Council (GWRC) has buried concrete plates at 18 sites throughout Porirua Harbour. The most recent of these plates (8 subtidal, 1 intertidal) were installed in February 2012 and were measured for the first time in early 2014. These measurements are included in this report for the first time. (Sub tidal means harbour areas always covered with water but which are still shallow and close to the shore; intertidal means areas that are exposed at low tide but covered with water at high tide)

It is important to note that GWRC are still in the data collection phase and the sedimentation rate in any single year does not necessarily reflect the overall pattern of sedimentation in the harbour. For this reason the review panel has taken the approach of only using data where a minimum of three years is available to ensure that one off events do not overly influence long term trends. For example, the sedimentation rate at site 1 on the intertidal flats of Onepoto Arm was 14.3 mm in 2012 –13 (Table 1) and for 2013 – 14 was a negative 4.3 mm. However, there are five years of sedimentation rate measurements for this site and these measurements range from -4.5 to 14.3 mm (mean=1.4 mm/yr), indicating that there can be large inter-annual variation.

Table 1: Sedimentation rate data for selected locations in Porirua Harbour
(Source: Stevens & Robertson 2014a)

Indicator	Onepoto Arm							Pauatahanui Arm										
	Intertidal			*Subtidal*				*Intertidal*						*Subtidal*				
Site no.	1	2	3	S6	S7	S8	S9	6	7	8	9	10	11	S1	S2	S3	S4	S5
Sedimentation rate (mm) (2012/13)	14.3	12.3	4.3	-	-	-	-14	3.5	9.3	2.0	-0.8	-3.0	-	-	-	-	-	-
Sedimentation rate (mm) (2013/14)	-4.3	-0.3	1.8	0.0	-6.0	-8.0	0.0	-2.0	-4.0	-2.5	4.5	14.8	-30.0	6.6	26.4	8.0	11.0	9.2
Mean annual sedimentation rate (mm/yr)	1.4	6.0**	2.3	0.0	-6.0*	-8.0*	-2.7**	0.3	2.6**	0.3**	0.8	5.9**	-30.0*	6.6*	26.4*	8.0*	11.0*	9.2*

*These annual sedimentation rates are based on one year of data only and should be used with caution.
** These annual sedimentation rates are based on two years data and are not used in the overall summary result.

Our Comment:
The review panel has taken the long term mean annual sedimentation rates for the sites for intertidal and subtidal locations in each Arm of the harbour and arrived at an average rate for each Arm. As mentioned above, we have only included rates with at least three years data available.

Based on this approach the sedimentation rate for the Onepoto Arm (subtidal) and Pauatahanui Inlet (intertidal) are rated as Excellent, meaning an increase over the period on average of less than 1mm per year.

The Onepoto Arm subtidal measurement shows a favourable decline of 2.7mm per year over the last five years and Pauatahanui Inlet intertidal has only increased 0.55mm per year in the same period. Again, these are favourable results.

The Onepoto Arm intertidal has increased on average 1.85mm per year which is a one rating improvement from our first report where it was an average of 2.35mm per year.

The new measurements in the subtidal areas of the Pauatahanui Arm show a marked increase in sedimentation. However, with only the first year's data collected, it is too early to say what the longer term trend will be. The predicted land disturbance, particularly from Transmission Gully construction, forest harvesting and urban development is likely to have further impacts on the harbour in the years ahead.

The Horokiri and Kakaho rates are probably caused by wave dominated re-deposition of sediment from other parts of the inlet and are not necessarily indicative of average sedimentation inflows from these particular catchments into the harbour.

While sandy sediments dominate the intertidal sites with a mean mud content of 5.8% in the Pauatahanui Arm and 7.2% in the Onepoto Arm, there is increasing concern in the subtidal sites which show increasing and significant deposits of soft muds. Mud content ranged from 8 -46% in the Onepoto Arm, with a mean of 18% and 20-66% in the Pauatahanui Arm with a mean of 49%. Mud causes problems for harbour life as it creates conditions where oxygen and nutrients are reduced. The result is a smelly, unhealthy layer that reduces diversity of plants and sea life. Soft mud also gets moved around the harbour and causes noticeable reduction in water clarity and quality.

The Harbour Committee is working on a Sediment Management Plan for the catchment which will address ways to keep the sediment inflows to reduced amounts and to work on achieving the target set in the Harbour Strategy of less than 1mm/year on average. Reducing the fine grained mud component from sediment based run off is important, and this will be a particular challenge given the potential impact of the predicted land disturbances that will occur in the immediate years ahead.

RECREATIONAL USAGE

What is being measured:

Recreational usage of the Harbour.

Feedback from recreational groups on the quality of the harbour in satisfying their recreational expectations. A separate score for each inlet.

Rating 2013	Rating 2014	Onepoto Arm	Pauatahanui
4	4	**Good** For current activities	**Good** For current activities

Comment:

A survey of recreational users of the Porirua Harbour was carried out in December 2014. Surveys were sent to the yachting, boating, rowing, outrigger canoeing and kayak clubs.

The responding clubs provided information on their membership, the area of harbour they use, water depth and quality relevant to their activities, and an overall rating of the quality of the harbour from their perspective.

Relative to last year there has been some deterioration in the perceived amenity value of the Harbour for recreational users. Users have reported incidences of water quality impacting their activities and there is a broadly based concern amongst those responding that sedimentation or the movement and/or growth of sandbanks is reducing the navigable water available for some activities.

There was comment on the need to time activities relative to the tide or accept a reduced area of water. Both these actions reduce the amenity value provided to recreational user groups. However, the overall average score was the same as for 2013.

What is being measured:

Recreational Water Quality

Water Quality at our beaches using the National Recreational water quality monitoring.

Rating 2013	Rating 2014	Sites	Comment
4	4	Pauatahanui Inlet at Paremata Bridge	suitable for swimming for most of the time
3	3	Pauatahanui Inlet at Water ski club Plimmerton Beach at Bath Street	generally suitable for swimming with care
2	2	South Beach at Plimmerton Porirua Harbour at Rowing Club	water quality is not always suitable for swimming

Data Used:

GWRC and PCC jointly monitor microbiological water quality at 10 coastal sites in Porirua, six of which are located either within the harbour or on its outer margins. The monitoring programme comprises weekly water sampling for 20 weeks between mid-November and the end of March (monthly sampling also occurs outside of this period).

Table 2 below lists a summary of compliance with the surveillance, alert and action levels of the national microbiological water quality guidelines for recreational waters (MfE/MoH 2003) for data collected over summer 2013/14, as reported by Morar and Greenfield (2014). It also lists the current Suitability for Recreation Grade (SFRG) assigned to each site. This grade describes the general condition of the water at any given time from a public health perspective.

Table 2: Summary of microbiological water quality data for the 2013/14 summer at selected coastal monitoring sites in Porirua
(Source: Morar & Greenfield 2014)

Bathing site	*n*	No. sample results (Enterococci/100mL)			Beach grading (2008/09–2013/14 data)		
		Surveillance (≤ 140)	Alert (141–280)	Action (>280)	SIC Grade	MAC Grade (95th%-ile value)	SFRG
Karehana Bay at Cluny Rd	20	19	0	1	Moderate	C (285)	Fair
Plimmerton Beach at Bath St	20	17	2	1	Moderate	C (230)	Fair
South Beach at Plimmerton	20	18	0	2	Moderate	C (895)	Poor
Pauatahanui Inlet at Water Ski Club	20	19	0	1	Moderate	C (270)	Fair
Pauatahanui Inlet at Paremata Bridge	20	18	1	1	Moderate	A (27)	Good
Porirua Harbour at Rowing Club	20	15	2	3	Moderate	D (870)	Poor

Comment:
The results from the sampling leave much to be desired and there is little to no improvement since the first report in 2013. As is shown in the table above, most sites sampled rate only a "fair" or, in two cases, a "poor". One of these is South Beach at Plimmerton – which is popular as a swimming beach. Effectively, this rating means it is not always suitable for swimming. The cause of the problem is faecal contamination on the beach and outflows from the Taupo Stream.

Faecal source tracking investigations undertaken at the two coastal sites graded 'poor' in the 2013/14 bathing season suggested a range of faecal contamination sources including human sewage and wildfowl at both sites, and dog faeces at South Beach, Plimmerton.

There are no sites that rate "very good". The only "good" rating is for the Paremata Bridge area near the entrance to the Pauatahanui Inlet. This is because the water is regularly renewed by tidal inflows.

One site (near the Porirua Rowing Club) was sampled for shellfish gathering. The result shows that shellfish collected from this area should not be eaten.

3. ECOLOGICAL HEALTH

What is being measured:

Regular Testing of ecological health of streams

Uses the Macroinvertebrate Community Index (MCI) for the three main streams with the mean score for the last three years.

Rating 2013	Rating 2014	Sites
4	4	Horikiri Stream at Snodgrass Porirua Stream @ Glenside
3	3	Porirua Stream at Wall Place Pauatahanui Stream @Elmwood Bridge

Data Used:

The indicator we have used for stream health is the Macroinvertebrate Community Index (MCI) which measures the abundance of organisms like worms, insects, flies, beetles and snails. It is a nationally accepted index of macroinvertebrate health that is sensitive to a range of environmental variables.

Macroinvertebrate sampling was undertaken at four sites in the Porirua Harbour catchment in early 2014 as part of GWRC's Rivers State of the Environment (RSoE) monitoring programme. The MCI scores derived from this sampling are listed in Table 3. Under the RSoE programme a single macroinvertebrate sample is collected at or adjacent to each RSoE water sampling site during late summer/early autumn. The timing of sampling is determined at random, although macroinvertebrate sampling is, where practicable, avoided within two weeks of any flood event (ie, flows greater than three times the median river flow).

We have also included the MCI mean score for the last three years and have used this rolling three year mean in determining the MCI Mean Quality Class.

Table 3: MCI scores for RSoE sites in the Porirua Harbour catchment sampled during 2014

(2013 scores in brackets) (Source: Heath MW, Perrie A and Morar SR 2014)

Site no.	Site name	MCI score 2014	MCI Mean Score 2012 -14	MCI Mean quality class
RS13	Horokiri S at Snodgrass	115 (116.5)	113.1	Good
RS14	Pauatahanui S at Elmwood Bridge	105.6 (100.0)	99.8	Fair
RS15	Porirua S at Glenside	104.4 (118.6)	107.3	Good
RS16	Porirua S at Wall Park (Milk Depot)	87 (93.7)	90.7	Fair

Key to quality classes (Stark & Maxted 2007): Excellent ≥ 120, Good 100–119, Fair 80–99, Poor <80

Comment:

Overall, stream health is a relatively good news story. Stream condition was sampled for three streams: the Porirua stream entering into the Onepoto Arm, and the Horokiri and Pauatahanui streams entering into the Pauatahanui Inlet.

All three streams score a "good" rating for the 2014 year, with only the lower Porirua stream recording a "fair" result at Wall Park. However, looking over the last three years, only the Horokiri and Porirua Stream at Glenside achieve a "good" rating, with both the Pauatahanui and Porirua Stream at Wall Park being

"fair". Pauatahanui Stream has shown improvement in the last two years, whereas Porirua Stream continues to slowly decline.

What is being measured:

Regular Testing of ecological health of the Harbour

Harbour condition based on the GWRC nutrient richness (eutrophication) measures for each inlet.

What is being Measured	Rating 2013	Rating 2014	Sites
Ecological Health of the harbour *RPD*	3	3	Onepoto Arm – intertidal Pauatahanui - intertidal
Ecological Health of the harbour *Low Density Macroalgal cover*	3	3	Onepoto Arm – intertidal Pauatahanui - intertidal
Ecological Health of the harbour *High Density Macroalgal cover*	3	4	Onepoto Arm – intertidal Pauatahanui - intertidal

Data Used:

GWRC assesses the ecological condition of the intertidal habitat within each arm of Porirua Harbour using a combination of broad and fine scale measures that target the common estuarine issues of sedimentation, eutrophication (nutrient enrichment) and toxic contamination. As sedimentation is already included separately in our scorecard, the review team has based the harbour estuarine health assessment on measures relating to eutrophication.

Increased nutrient richness (eutrophication) in estuaries can stimulate the abundance of fast growing green and red macroalgae. The resulting blooms can have significant effects on water and sediment quality. Annual indicators of eutrophication include a broad scale assessment of the change in the area of nuisance macroalgal growth and measurements of sediment oxygenation (as determined by the depth of the redox potential discontinuity (RPD) layer)*. This is the layer below which oxygen is severely reduced, as a result of which the diversity of life reduces.

Table 4: Eutrophication indicator results for selected locations in Porirua Harbour assessed in early 2014 (subtidal RPD data also included for completeness). RPD cells shaded in yellow and amber equate to rankings of moderate and poor, respectively

(Source: Stevens & Robertson 2014b & 2014c)

Indicator	Onepoto Arm							Pauatahanui Arm										
	Intertidal			*Subtidal*				*Intertidal*						*Subtidal*				
Site no.	1	2	3	S6	S7	S8	S9	6	7	8	9	10	11	S1	S2	S3	S4	S5
RPD (cm) 2014	1.5	3	1	1	3	5	5	3	2	1	1.5	3	3	1	1	1	3	3
Low density macroalgal cover	Moderate			Not assessed				Moderate						Not assessed				
High density macroalgal cover	Low			Not assessed				Low						Not assessed				

Comment:
Based on the condition ratings of Stevens and Robertson (2014b), the low density macroalgal growth cover was rated as moderate for 2014 - reflecting widespread low growth across much of the harbour (Table 3). The high density macroalgal cover for 2014 was rated as low with 3.5% of the estuary experiencing dense (>50%) growths compared with 8% in 2013. Assuming this continues, it is good news.

In relation to the Porirua Harbour, the RPD results for 2014 show that the sediments were generally well to moderately oxygenated despite their often muddy nature. Throughout the estuary, sediment was relatively well oxygenated, had a low total organic carbon and sulphur content, and did not support nuisance macroalgal growths. These results provide a preliminary indication that Porirua Harbour sediments were in the "low" to "moderate", rather than "high" (or poorly oxygenated) category, and likely reflect the combined influence of relatively low organic content, and the process of currents or wave action pumping oxygenated water into the sediments. Overall, the sand-dominated habitats appeared to be in good (healthy) ecological condition.

The muddy habitats have a very high mud content but do not exhibit symptoms of excessive eutrophication. The dominant stressor, and therefore a key management priority, is considered to be reducing the excessive fine sediment within the subtidal estuary settling basins. As the movement of sediment within the two arms of the harbour makes it difficult to determine the origin there is a need to monitor sediment levels for each of the streams entering the harbour.

4. WASTE

What is being measured:

Record of large items of waste collected in the intertidal and tidal area

Number of large items of rubbish collected each November in the Porirua Stream area of Onepoto Arm.

Rating 2013	Rating 2014	Comment
3	4	85 – 90 large items identified

Data Used:

Information collected by the Trust during the two November clean ups at low tide of the area from the mouth of the Porirua Stream across the harbour from Wineera Point to the railway line on the east. For 2014 the weather prevented removal of large items from the area. However, an inspection of the area in late December was used to identify the number of items and these are planned to be removed during this summer.

Comment:

The Porirua Stream mouth at the south end of the Onepoto Arm is a collection point for refuse coming down the Porirua and Kenepuru Streams. Over the years there has been a concentrated effort to remove large items from the tidal area of the stream bed. Some 400 plus tyres, road cones, shopping trolleys and other material was taken out of this part of Onepoto Arm by the Porirua City Council in 2009.

In the last two years the Trust, in conjunction with Keep Porirua Beautiful, has carried out a tidal and intertidal clean up of the Onepoto Arm each November with the emphasis on removal of large rubbish material. In November 2013, 172 large items, mainly car tyres (132) and road cones (35), were removed from the harbour mouth of the Porirua Stream. This compares with over 260 removed in 2012.

The number of large items identified in December 2014 was again tyres (80 -85) with a small number of road cones (3) and 1 shopping cart. While the trend is a reduction each year, it is still of major concern that tyres continue to find their way into the stream and harbour rather than being disposed of in an appropriate manner.

Acknowledgements:
The Porirua Harbour Trust acknowledges the strong support from the officers of Greater Wellington Regional Council, Porirua City Council and Wellington City Council in the provision of data and reports to assist the review team in preparing this scorecard.

The review team recognize that in supplying the environmental information Greater Wellington Regional Council has exercised all reasonable skill and care in compiling the contents of the information provided.

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Appendix One

	Agency Action	Sedimentation	Recreational Usage	Ecological Health	Waste
	An Annual Review of progress by all agencies against the Porirua Harbour Detailed Action Plan This includes a comparison of what was stated in the Detailed Action Plan vs what was funded and planned and achieved through outputs and outcomes.	**Harbour Sedimentation.** Utilising the Mean Annual sedimentation data from the 18 sedimentation plates, (9 in the intertidal and 9 in the sub tidal) in the Onepoto Arm and Pauatahanui Inlet. Separate rating for subtidal and intertidal in each inlet.	**Recreational usage of the Harbour**. Feedback from recreational groups on the quality of the harbour in providing their recreational expectations. Separate score for each inlet. Water Quality at our beaches using the National Recreational water quality monitoring.	**Regular Testing of ecological health within streams and the Harbour** Uses the Macroinvertebrate Community Index (MCI) for the three main streams. Harbour condition based on the GWRC nutrient richness (eutrophication) measures for each inlet.	**Annual Record of waste collected in the intertidal and tidal area** Number of large items of rubbish collected each November in the Porirua Stream area of Onepoto Arm.
5	**All** planned actions in the Action Plan funded and **all agreed** outputs and outcomes achieved and delivered on.	**Very Low** Increase of 0 to 1mm for the year. Measure for each estuary.	**Very Good** For all current and anticipated future activities **Water Quality Very Good** Suitable for swimming	**MCI - Excellent** **Harbour Condition – Very Good**	**Very Good** Large items removed <25
4	**All** planned actions in the Action Plan funded and **most agreed** outputs and outcomes delivered on.	**Low** Increase of 1 to 2mm for the year. Measure for each estuary	**Good** For current activities **Water Quality Good** Suitable for swimming most of the time	**MCI – Good** **Harbour Condition - Good**	**Good** Large items removed <50
3	**Most** planned actions in the Action Plan funded and **most agreed** outputs and outcomes delivered on.	**Moderate** Increase of 2 to 5mm for the year. Measure for each estuary	**Fair** For current activities **Water Quality Fair** Generally suitable for swimming	**MCI – Fair** **Harbour Condition - Moderate**	**Fair** Large items removed <100
2	**Most** planned actions in the Action Plan funded and **some agreed** outputs and outcomes delivered on.	**High** Increase of 5 to 10mm for the year. Measure for each estuary	**Poor** For current activities **Water Quality Poor** Not always suitable for swimming	**MCI – Poor** **Harbour Condition - poor**	**Poor** Large items removed <150
1	**Some** planned actions in the Action Plan funded and **some agreed** outputs and outcomes delivered on.	**Very High** Greater than 10mm increase for the year. Measured for each estuary.	**Very Poor** For current activities **Water Quality Very Poor** Unsuitable for swimming		**Very Poor** Large items removed >150

Appendix One

	Agency Action	Sedimentation	Recreational Use	Ecological health	Waste
	An Annual Review of progress by all agencies against the Porirua Harbour Detailed Action Plan This includes a comparison of what was stated in the Detailed Action Plan vs what was funded and planned and achieved through outputs and outcomes.	**Harbour Sedimentation.** Utilising the Mean Annual sedimentation data from the 18 sedimentation plates, (9 in the intertidal and 9 in the sub tidal) in the Onepoto Arm and Pauatahanui Inlet. Separate rating for subtidal and intertidal in each inlet.	**Recreational Usage of the Harbour**. Obtain feedback from the recreational User group made up of all recreational users of the harbour, Includes yachting, boating, waka ama, rowing, jet skiing, jet boating etc…. Water Quality monitoring of beaches using the national recreational water quality guideline.	**Regular Testing of ecological health within streams and the Harbour** Uses the Macroinvertebrate Community Index (MCI) for the three main streams. Harbour condition based on the GWRC nutrient richness (eutrophication) measures for each inlet. .	**Annual Record of waste collected in the intertidal and tidal area** Number of large items collected each November in the Porirua Stream area of Onepoto Arm. This would include a count of large items tyres, road cones and shopping trolleys to indicate the trend toward less rubbish entering the harbour.
	Assessment of the work carried out against the Detailed Action Plan taking into account the annual report provided to the three councils on the Porirua Harbour Action Plan, the annual plans and budgets for the next year and the long term plan commitments of the councils and agencies compared to the Strategy. Will require a pre and post discussion with the Harbour Co-ordinator to ensure full understanding of what is included and excluded from the Detailed Action plan each year.	Utilising the Annual GWRC Porirua Harbour Intertidal Sediment Monitoring report. Using the 2008 data as the base where available and a minimum of two years data for each site. Information to be averaged separately for the Onepoto Arms and Pauatahanui Inlet for both sub tidal and inter tidal zones and each inlet to be reported separately. The result to include commentary on each estuary and granular size as well as mud impacts.	Survey once a year in December of the Harbour recreation user group. Use weekly summer monitoring as provided by GWRC of indicator bacteria levels at harbour beaches and measure against the national recreation grade.	Fresh water in the Wellington region is highly valued for a variety of uses, including water supply, irrigation, recreation and aquatic ecosystem health. The Macroinvertebrate Community index measures the health of the streams through an assessment of the health of the macro invertebrate community in each stream. The Harbour condition rating takes into account nutrient enrichment, (organic and nutrient content, sediment oxygenation, nuisance algae cover). There will be separate scores for each estuary.	Each year in November as part of the Love your Coast campaign the PHT will carry out intertidal and sub tidal clean ups around the Porirua Harbour. The Porirua Stream mouth is the main collection point for rubbish in the Onepoto Arm and will be used as the key indicator of rubbish in the harbour. The number of large items removed in the month (tyres, road cones, trolleys bikes etc) will give the annual measure of rubbish.

Appendix One

	RESULTS FOR 2014																							
	Agency Action	**Sedimentation**				**Recreational Usage**						**Ecological Health**											**Waste**
	An Annual Review of progress by all agencies against the Porirua Harbour Detailed Action Plan This includes a comparison of what was stated in the Detailed Action Plan vs what was funded and planned and achieved through outputs and outcomes.	**Harbour Sedimentation.** Utilising the Mean Annual sedimentation data from the 18 sedimentation plates, (9 in the intertidal and 9 in the subtidal) in the Onepoto Arm and Pauatahanui Inlet. Separate rating for subtidal and intertidal in each inlet.				**Recreational usage of the Harbour**. Feedback from recreational groups on the quality of the harbour in providing their recreational requirements. Separate score for each inlet. Water Quality at our beaches using the National Recreational water quality monitoring.						**Regular Testing of ecological health within streams and the Harbour** Uses the Macroinvertebrate Community Index (MCI) for the three main streams. Harbour condition based on the GWRC nutrient richness (eutrophication) measures for each inlet.										**Annual Record of waste collected in the intertidal and tidal area** Number of large items collected each November in the Porirua Stream area of Onepoto Arm.
		Onepoto		**Pauatahanui**		**Usage**		**Water Quality**					**Stream Health**				**Harbour Condition**						
		Inter tidal	**Sub tidal**	**Inter tidal**	**Sub tidal**	**Onepoto**	**Pauatahanui**	**South Beach Plimmerton**	**Plimmerton Beach at Bath St**	**Water Ski Clun Pauatahanui Inlet**	**Paremata Bridge Pauatahanui Inlet**	**Porirua Harbour Rowing Club**	**Horikiri**	**Pauatahanui**	**Porirua at Glenside**	**Porirua at Wall Place**	**Onepoto Intertidal**	**Onepoto Low density macroalgal**	**Onepoto High density macroalgal**	**Pauatahanui Intertidal**	**Pauatahanui Low density macroalgal**	**Pauatahanui High density macroalgal**	
5			-2.7 mm	0.55 mm																			
4		1.85 mm																					
3	Most planned actions delivered on.																						85 large items
2																							
1																							

Draft Version – February 2015

Press Release : Te Awarua o Porirua Harbour Scorecard - 2014

Annual Scorecard on Te Awarua o Porirua Harbour

The Porirua Harbour trust has completed it's second comprehensive "State of the Harbour" scorecard which reports on progress toward arresting the decline in harbour condition and returning it to a healthy and resilient state

In releasing the second annual scorecard the Chairperson of the Porirua Harbour Trust, Grant Baker mentioned the important role the Trust has in supporting the community, the councils, Ngati Toa and agency action to make positive changes to the ecosystems of the catchment and harbour.

Mr Baker said that the scorecard maps and assesses five indicators related to the harbour and catchment using a five point scale for each one. (5 being excellent and 1 being very poor). The scores are designed to highlight changes in key aspects of harbour and catchment quality, to sample recreational users' views on harbour condition, and to give an indication each year of progress against the *Porirua Harbour and Catchment Strategy and Action Plan*.

The five indicators reported on in the "State of the Harbour" scorecard are: Agency Action; Sedimentation; Recreational Use; Ecological Health and Waste

Mr Baker said it was pleasing to see a rating of Excellent for the rate of sedimentation of the Onepoto Arm (subtidal) and Pauatahanui Inlet (intertidal). He was also pleased to see the majority of recreational clubs surveyed consider that the water quality has continued to improve over the last few years, with all rating their 'on water' experience as good. The Fair rating for large items of rubbish in the mouth of the Porirua Stream on the Onepoto Arm shows steady improvement over the Very Poor rating last year.

The Annual Scorecard is extremely important said Mr Baker; over the last 20 years the harbour has become increasingly recognised for the wide range of values it has. The harbour is beautiful and more and more people want to live on its edges, or have views across the water to the surrounding hills. Many drive, cycle, and walk around the harbour while others enjoy recreational activities on the water as well as in the surrounding hills. The historic development and use of land around the harbour has however resulted in the steady degradation of values that make the harbour special.

The purpose of the scorecard said Mr Baker is to inform and engage with an ever widening range of interest groups and members of the community. The benchmarks are

in place and this scorecard starts to show a small amount of progress from the first report to restoring the health of the harbour said Mr Baker.

Overall, when considering the longer term data available to the review team, the results show generally positive and progressive actions and improvement in harbour quality and condition over the last decade – with three notable exceptions:

- significantly increasing amounts of soft mud in the subtidal areas,
- generally poor water quality for swimming at the beaches and shellfish gathering areas and
- many large items of rubbish continuing to find their way into the Porirua Stream mouth.

The Trust uses a review panel to consider data available from the Councils as well as the Trust's own surveys and projects comprising Grant Baker, Chairperson of the Porirua Harbour Trust; Lindsay Gow, Trustee of the Porirua Harbour Trust; Dr John McKoy, Marine Scientist and Clive Anstey, Landscape and Resource Planner.

Overall the second "State of the Harbour" report is encouraging with the recent actions by agencies starting to indicate progress toward restoring the harbour to a healthy state.

The full report is available on the Porirua Harbour website
www.poriruaharbourtrust.org.nz

Released by:
Grant Baker, Chairperson
Contact 027 241 7732
February 2015

A summary of the 2014 Results

What is Being Measured	Rating	Comment
Agency Action.	**3**	Most planned actions in the Harbour Strategy and Action Plan delivered on.

The *Strategy and Action Plan* has been in place since March 2012 and councils have included in their annual and long term planning the funding required to carry out the work identified in the action plan. Councils have established a Harbour Committee and a Whaitua Committee and an Education Coordinator has been employed.

For some medium and longer term actions it is too early to indicate progress against the *Strategy and Action Plan.*

Suffice to say we are seeing generally strong commitment from agencies. However, and given the *Strategy and Action Plan* is currently under review, we would like to see more shorter term targets, and some priority deliverables to be achieved in the next three to five years.

What Is Being Measured:	Rating 2013	Rating 2014	Comment
Harbour Sedimentation	**5**	**5**	Pauatahanui Inlet intertidal
Harbour Sedimentation	**5**	**5**	Onepoto Arm subtidal
Harbour Sedimentation	**3**	**4**	Onepoto Arm intertidal

The sedimentation rate for the Onepoto Arm (subtidal) and Pauatahanui Inlet (intertidal) are rated as Excellent, meaning an increase in sediment over the period of less than 1mm per year. The Onepoto Arm intertidal rating has improved from 2013 with an average increase in sediment of 1.85mm per year which is a one rating improvement from our first report where it was an average of 2.35mm per year.

Of some concern, though, are increasing and significant deposits of soft muds. Mud causes problems for harbour life as it creates conditions where oxygen and nutrients are reduced. The result is a smelly, unhealthy layer which reduces diversity of plants and sea life. Soft mud also gets moved around the harbour and causes noticeable reduction in water clarity and quality.

Early indications are that further work needs to continue to keep the sediment inflows to reduced amounts and to work on achieving the target set in the Harbour Strategy of less than 1mm/year on average. Reducing the fine grained mud component from sediment based run off is particularly important, and this will be a challenge over the next six years as the Transmission Gully project is completed.

What is being Measured	Rating 2013	Rating 2014	Onepoto Arm	Pauatahanui
Recreational Usage of the Harbour	**4**	**4**	**Good** For current activities	**Good** For current activities

A survey of recreational users of the Porirua Harbour was carried out over the Christmas period of 2014. Surveys were sent to the yachting, boating, rowing, outrigger canoeing and kayak clubs. The responding clubs provided information on their membership, the area of harbour they use,

water depth and quality relevant to their activities with an overall rating of the quality of the harbour from their perspective. Most of the responding clubs indicate growth in activities over the last few years with all commenting that the water quality appears to be improving each year.

Relative to last year there has been some deterioration in the perceived amenity value of the Harbour for recreational. Users have reported incidences of water quality impacting their activities and there is a broadly based concern amongst those responding that sedimentation or the movement and/or growth of sandbanks is reducing the navigable water available for some activities.

All respondents rated the harbour as providing a "good" opportunity for their club to pursue their activities.

What is being Measured	Rating 2013	Rating 2014	Sites	Comment
Recreational Water Quality	**4**	**4**	Pauatahanui Inlet at Paremata Bridge	suitable for swimming for most of the time
Recreational Water Quality	**3**	**3**	Pauatahanui Inlet at Water ski club Plimmerton Beach at Bath Street	generally suitable for swimming with care
Recreational Water Quality	**2**	**2**	South Beach at Plimmerton Porirua Harbour at Rowing Club	water quality is not always suitable for swimming

The results from the Water Quality at our beaches using the National Recreational water quality monitoring sampling leave much to be desired. One of these is the popular swimming spot at South Beach, Plimmerton. Effectively, this rating means it is not always suitable for swimming. The cause of the problem is faecal contamination in outflows from the Taupo Stream and from dog faeces on the beach.

There are no sites that rate "very good". The only "good" rating is for the Paremata Bridge area near the entrance to the Pauatahanui Inlet. This is because the water is regularly renewed by tidal inflows.

What is being Measured	Rating 2013	Rating 2014	Sites
Ecological Health of Streams	**4**	**4**	Horikiri Stream at Snodgrass Porirua Stream @ Glenside
Ecological Health of Streams	**3**	**3**	Porirua Stream at Wall Place Pauatahanui Stream @Elmwood Bridge

The indicator we have used for stream health is the Macroinvertebrate Community Index (MCI) which measures the abundance of organisms like worms, insects, flies, beetles and snails. It is a nationally accepted index of macroinvertebrate health that is sensitive to a range of environmental variables.

Overall, stream health is a relatively good news story. Looking over the last three years, the Horokiri and Porirua Stream at Glenside achieve a "good" rating, with both the Pauatahanui and Porirua Stream at Wall Park being "fair". Pauatahanui Stream has shown improvement in the last two years, whereas Porirua Stream continues to slowly decline.

What is being Measured	Rating 2013	Rating 2014	Sites
Ecological Health of the harbour *RPD*	3	3	Onepoto Arm – intertidal Pauatahanui - intertidal
Ecological Health of the harbour *Low Density Macroalgal cover*	3	3	Onepoto Arm – intertidal Pauatahanui - intertidal
Ecological Health of the harbour *High Density Macroalgal cover*	3	4	Onepoto Arm – intertidal Pauatahanui - intertidal

As sedimentation is already included separately in our scorecard, the review team has based the harbour estuarine health on measures relating to eutrophication.

The low density macroalgal growth cover was rated as moderate for 2014 - reflecting widespread low growth across much of the harbour. The high density macroalgal cover for 2014 was rated as low with 3.5% of the estuary experiencing dense (>50%) growths compared with 8% in 2013. Assuming this continues, it is good news.

Increased nutrient richness (eutrophication) in estuaries can stimulate the abundance of fast growing macroalgae. The resulting blooms can have significant effects on water and sediment quality. Annual indicators of eutrophication include a broad scale assessment of the change in the area of nuisance macroalgal growth and measurements of sediment oxygenation (as determined by the depth of the redox potential discontinuity (RPD) layer). This is the layer below which oxygen is severely reduced and the diversity of life also reduces.

What is being Measured	Rating 2013	Rating 2014	Comment
Waste collected from the harbour	5	3	85 – 90 large items identified

The Porirua Stream mouth at the south end of the Onepoto Arm is a collection point for refuse coming down the Porirua and Kenepuru Streams. Over the years there has been a concentrated effort to remove large items from the tidal area of the stream bed. Some 400 plus tyres, road cones, shopping trolleys and other material was taken out of this part of Onepoto Arm by the Porirua City Council in 2009. In the last four years the Trust in conjunction with Keep Porirua Beautiful has carried out a tidal and intertidal clean up of the Onepoto Arm at the end of each year with the emphasis on removal of large rubbish material. The trend over the last three years has seen a decline in large items, mainly car tyres from 260 in 2012 to 172 in 2013 and 85 in 2014.

While this is a reduction it is of major concern that tyres and road cones continue to be thrown into the stream and harbour rather than being disposed of in an appropriate manner.