
# Te Awarua o Porirua

# Porirua Harbour Scorecard - 2014

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## 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**<br>For current activities | **Good**<br>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<br>Plimmerton Beach at Bath Street | generally suitable for swimming with care |
| 2 | 2 | South Beach at Plimmerton<br>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<br>Porirua Stream @ Glenside |
| 3 | 3 | Porirua Stream at Wall Place<br>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<br>Pauatahanui - intertidal |
| **Ecological Health** of the harbour *Low Density Macroalgal cover* | 3 | 3 | Onepoto Arm – intertidal<br>Pauatahanui - intertidal |
| **Ecological Health** of the harbour *High Density Macroalgal cover* | 3 | 4 | Onepoto Arm – intertidal<br>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**<br>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.**<br>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.<br><br>Separate rating for subtidal and intertidal in each inlet. | **Recreational usage of the Harbour**.<br>Feedback from recreational groups on the quality of the harbour in providing their recreational expectations.<br><br>Separate score for each inlet.<br><br>Water Quality at our beaches using the National Recreational water quality monitoring. | **Regular Testing of ecological health within streams and the Harbour**<br>Uses the Macroinvertebrate Community Index (MCI) for the three main streams.<br><br>Harbour condition based on the GWRC nutrient richness (eutrophication) measures for each inlet. | **Annual Record of waste collected in the intertidal and tidal area**<br>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**<br>Increase of 0 to 1mm for the year. Measure for each estuary. | **Very Good**<br>For all current and anticipated future activities<br><br>**Water Quality Very Good**<br>Suitable for swimming | **MCI - Excellent**<br><br>**Harbour Condition – Very Good** | **Very Good**<br><br>Large items removed <25 |
| 4 | **All** planned actions in the Action Plan funded and **most agreed** outputs and outcomes delivered on. | **Low**<br>Increase of 1 to 2mm for the year. Measure for each estuary | **Good**<br>For current activities<br><br>**Water Quality Good**<br>Suitable for swimming most of the time | **MCI – Good**<br><br>**Harbour Condition - Good** | **Good**<br><br>Large items removed <50 |
| 3 | **Most** planned actions in the Action Plan funded and **most agreed** outputs and outcomes delivered on. | **Moderate**<br>Increase of 2 to 5mm for the year. Measure for each estuary | **Fair**<br>For current activities<br><br>**Water Quality Fair**<br>Generally suitable for swimming | **MCI – Fair**<br><br>**Harbour Condition - Moderate** | **Fair**<br><br>Large items removed <100 |
| 2 | **Most** planned actions in the Action Plan funded and **some agreed** outputs and outcomes delivered on. | **High**<br>Increase of 5 to 10mm for the year. Measure for each estuary | **Poor**<br>For current activities<br><br>**Water Quality Poor**<br>Not always suitable for swimming | **MCI – Poor**<br><br>**Harbour Condition - poor** | **Poor**<br><br>Large items removed <150 |
| 1 | **Some** planned actions in the Action Plan funded and **some agreed** outputs and outcomes delivered on. | **Very High**<br>Greater than 10mm increase for the year. Measured for each estuary. | **Very Poor**<br>For current activities<br><br>**Water Quality Very Poor**<br>Unsuitable for swimming | | **Very Poor**<br><br>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**<br>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.**<br>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.<br><br>Separate rating for subtidal and intertidal in each inlet. | **Recreational Usage of the Harbour**.<br>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….<br><br>Water Quality monitoring of beaches using the national recreational water quality guideline. | **Regular Testing of ecological health within streams and the Harbour**<br>Uses the Macroinvertebrate Community Index (MCI) for the three main streams.<br><br>Harbour condition based on the GWRC nutrient richness (eutrophication) measures for each inlet.<br>. | **Annual Record of waste collected in the intertidal and tidal area**<br>Number of large items collected each November in the Porirua Stream area of Onepoto Arm.<br><br>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.<br><br>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.<br><br>Using the 2008 data as the base where available and a minimum of two years data for each site.<br><br>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.<br><br>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.<br><br>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.<br><br>The Harbour condition rating takes into account nutrient enrichment, (organic and nutrient content, sediment oxygenation, nuisance algae cover).<br><br>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.<br><br>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.<br><br>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**<br>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.**<br>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.<br><br>Separate rating for subtidal and intertidal in each inlet. | | | | **Recreational usage of the Harbour**.<br>Feedback from recreational groups on the quality of the harbour in providing their recreational requirements.<br><br>Separate score for each inlet.<br><br>Water Quality at our beaches using the National Recreational water quality monitoring. | | | | | | **Regular Testing of ecological health within streams and the Harbour**<br>Uses the Macroinvertebrate Community Index (MCI) for the three main streams.<br><br>Harbour condition based on the GWRC nutrient richness (eutrophication) measures for each inlet. | | | | | | | | | | **Annual Record of waste collected in the intertidal and tidal area**<br>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 | | | | | | | | | | | | | | | | | | | | | | | |

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