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Committee **Environment**
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Porirua marine sediment quality investigation

1. Purpose

To inform the Committee of the completion of an investigation into the quality of marine sediments in Porirua Harbour and to summarise its key findings.

2. Strategic context

Clean and healthy rivers, streams, and coasts are an objective of Greater Wellington's strategic plan. Urban stormwater discharges appear to represent a major impediment to the achievement of this objective.

3. Background

Stormwater investigations undertaken over the past three years have provided evidence that there are a number of chemical contaminants in the Region's urban stormwater and in runoff from agricultural land which are having, or through long-term accumulation, will eventually have, significant adverse effects on receiving environments.

Greater Wellington Regional Council (GW) has undertaken an investigation in the Porirua Harbour to identify the concentrations of key contaminants in marine sediments and to determine the likely impacts of stormwater discharges on this important receiving environment.

The investigation links to the GW study of chemical contaminants in stormwater systems and urban streams.

A progress report on the stormwater and stream study was presented to the Environment Committee in February 2004.

4. Methodology

The survey was carried out in May 2004 at two sub-tidal sites in each arm of the Porirua Harbour (Fig. 1). The sites were selected to be:

1. representative of the area of concern;
2. likely to accumulate contaminants in a manner that reflects accumulation over the area;
3. unlikely to change markedly, particularly in their sediment texture, over time periods of decades; and
4. likely to have a relatively high proportion of mud in the sediment.

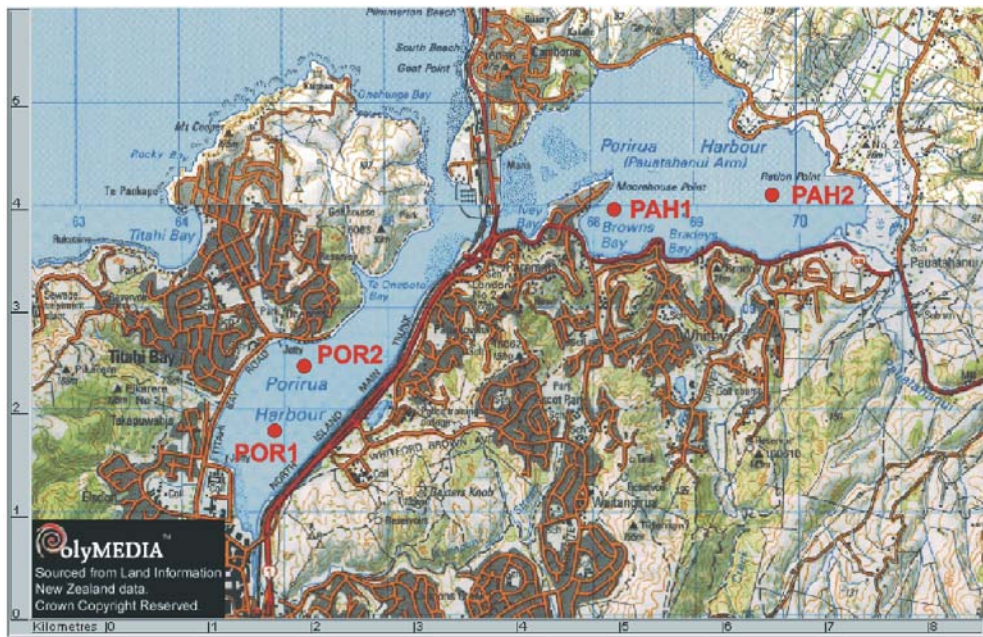


Fig. 1: Map of Porirua Harbour showing the positions of the sites for GWRC's investigation of marine sediment quality.

5. Summary of results

The heavy metals copper, lead, and zinc have already accumulated in the sub-tidal sediments of the Onepoto Arm to concentrations where impacts on aquatic life may begin to occur. Mercury is approaching ecologically significant concentrations in the sub-tidal sediments of the Onepoto Arm, as is copper in the sub-tidal sediments of Browns Bay in the Pauatahanui Arm. Inputs of heavy metals to the harbour sediments are on-going. This has been confirmed by studies of urban stormwater in the catchments.

DDT has accumulated in the sub-tidal sediments of both arms of the Porirua Harbour to concentrations where impacts on aquatic life may begin to occur. Inputs of DDT to the harbour sediments are on-going. This has been confirmed by studies of stream bed sediments and urban stormwater in the catchments.

At the present time adverse effects on aquatic life are unlikely to occur as a result of PAH or organotin contamination of sub-tidal sediments. The use of butyltins as antifoulants on small boats was banned in 1989, but inputs of

PAHs to the harbour sediments are on-going. This has been confirmed by studies of stream bed sediments and urban stormwater in the catchments.

6. Conclusions

The marine sediments in both arms of the Porirua Harbour have been contaminated with toxic substances derived from the surrounding catchments, and some of these substances have accumulated to concentrations likely to result in adverse effects on aquatic life.

The survey has provided a valuable dataset which, with repeated monitoring, can be used to assess future trends in contaminant concentrations. The variability in the results is generally low, especially for the key metals (zinc and copper), which means that with further sampling, it should be easy to detect trends.

The results suggest that the permitted activity rules for stormwater in the Regional Freshwater Plan and Regional Coastal Plan, are likely to be being breached since contaminants in the discharges clearly have the potential to cause significant adverse effects on the aquatic ecology of the receiving environment.

7. Next steps

We now have a measure of the level of contamination in the marine sediments in Porirua Harbour. Further monitoring will be necessary if we are wanting to determine whether the concentration of chemical contaminants in sediments are increasing, static or decreasing.

Further monitoring will also enable us to identify a rate at which contamination is changing and, if an increasing trend is identified, to estimate when critical levels will be reached (e.g. when contaminants will have significant ecosystem effects).

If some form of management response is set in motion to address the sources of contamination, then further monitoring will allow us to assess the effectiveness of this response.

The following programme of immediate on-going investigation is proposed:

1. Analyse the biological collections taken in October 2004 adjacent to the sediment chemistry monitoring sites in order to define the current status of sub-tidal benthic communities in relation to sediment chemistry.
2. Repeat the sediment chemistry and biological sampling in October 2005. Analysis of these samples will begin trend detection for the key contaminants and help define inter-annual variability in sub-tidal benthic communities, a prerequisite for detecting changes which may be associated with changes in contaminant concentrations in the future.

3. Repeat the sediment chemistry sampling in May 2007. Analysis of these samples will continue trend detection for the key contaminants, and possibly provide the first clear indication of the direction and rate of change.

Some of this work can be funded from existing budgets. However, on-going monitoring of marine sediment quality in significant receiving environments across the Region will need to be considered as part of the next LTCCP process. While no similar monitoring of marine sediments has yet been undertaken in Wellington Harbour, the nature and extent of the urban area surrounding this harbour suggests that a similar effect is likely.

While it is probably not feasible to do anything about the existing contamination in these sediments, it is possible to try and reduce the inputs of contaminants into Porirua Harbour.

To this end, Greater Wellington staff are currently working with territorial authorities to develop a Regional Action Plan for Stormwater Management. It is intended that the Action Plan will identify ways that territorial authorities can manage stormwater infrastructure to mitigate the adverse effects of discharges and how we will regulate stormwater discharges in the future.

8. Communications

Copies of this report and the technical report will be sent to Porirua City Council, Wellington City Council, Regional Public Health and Ngāti Toa. Greater Wellington staff will also be available to make presentations to these groups outlining the findings of the investigation.

9. Recommendations

It is recommended that the Committee:

1. *receive the report;*
2. *note its contents; and.*
3. *note that staff will be raising this issue as part of the 2006 LTCCP process.*

Report approved by:

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Attachment 1: Key results for the Porirua Harbour Marine Sediment Quality Investigation