Estuaries

Estuaries are semi-enclosed coastal water bodies, which experience changes in salinity (saltiness) with the tides. In addition to providing important habitat to a range of fish, birds and other life, estuaries are sites of significant cultural importance for local iwi and hapū, as well as being valued for recreational activities such as swimming, kayaking and whitebaiting. Although there are a range of estuary types in New Zealand, there is only one type in Taranaki; the tidal river mouth.

The smallest tidal river estuaries in Taranaki experience limited intrusion of seawater, and support little estuarine habitat. In the larger estuaries, the tidal range can extend a considerable way upstream, submerging and exposing mudflats and saltmarsh vegetation over the tidal cycle.

Many of New Zealand's estuaries are under increasing pressure from the effects of land use, including sediment and nutrient run-off. Erosion of fine sediment from land into waterways can lead to excessively muddy estuaries and a loss of natural estuarine habitat. Sedimentation can also lead to changes in infaunal communities (burrowing animals) which can have knock-on effects higher up the food chain. Eutrophication refers to the negative effects of increased growth of phytoplankton and/or macroalgal species driven by increased nutrient availability. Eutrophic conditions interfere with natural ecological processes in estuaries by significantly affecting sediment and water quality. Eutrophication can also detract from the amenity of estuaries due to visual effects and odour issues.

The Council monitored estuaries for a number of years up until 2013, when we reviewed the programme in order to improve our ability to detect changes and identify the potential impacts of sediment and nutrients. As a result, we undertook a region-wide assessment to identify which, if any, estuaries are most under pressure, to prioritise monitoring and management efforts.

In 2019 an **Estuarine Vulnerability Assessment** was carried out at **20** sites

10 **of those** had a vulnerable rating of **moderate to high** or **high**

Taranaki only has **1** **type of estuary:** **tidal river mouth**

Sedimentation was identified as having a **very high** ecological impact in **7** **estuaries**

What we know

Estuary vulnerability assessment

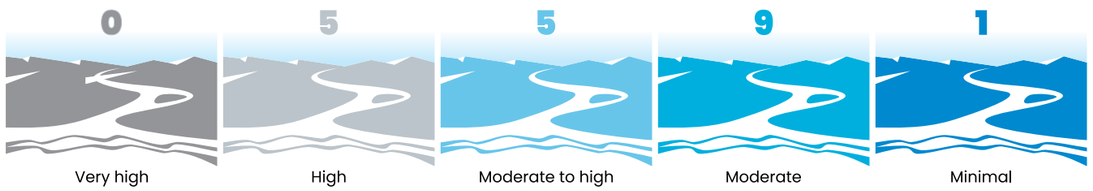
In 2019, an Estuarine Vulnerability Assessment (EVA) was carried out by Robertson Environmental to guide the development of a new estuary monitoring programme. To provide a representative assessment, 20 sites were included. This included the region's larger estuaries north and south of the ring plain, as well as a number of smaller stream mouths where tidal intrusion was marginal but may occasionally occur. Three main outputs were provided for each estuary: a habitat map, a vulnerability rating and recommendations for future monitoring.

Overall vulnerability to the effects of sedimentation and eutrophication was determined to be 'high' in five estuaries, 'moderate to high' in another five, 'moderate' in nine and 'minimal' in one. Where the vulnerability of an estuary was 'high' or 'moderate to high', this was largely due to the effects of sedimentation rather than eutrophication. This was the case for seven of the 20 estuaries assessed, namely. Mōhakatino, Tongaporutu, Urenui, Mimitangiatua, Waitara, Pātea and Waitōtara.

Vulnerability to sedimentation was generally attributed to high sediment loads from the catchment, and the high proportion of soft mud cover in the estuary that was mapped during the condition assessment. Eutrophication was considered less of an issue in these estuaries due to them being well flushed, with no primary symptoms such as macroalgae and/or phytoplankton blooms identified during the condition assessments.

Vulnerability to eutrophication effects was 'moderate to high' for three estuaries, the Whenuakura, Oakura and Katikara. The latter two were the only estuaries where symptoms of eutrophication, in the form of phytoplankton blooms, were recorded. Other estuaries, such as the Whenuakura, were considered susceptible to eutrophication due to large areas of intertidal habitat which can support macroalgal blooms, high catchment nutrient loads, and where they were poorly flushed or restricted at the mouth.

Tunneling mud crabs (Austrohelice crassa) on an intertidal mudflat (top left); a royal spoonbill (Platalea regia).



Estuary	Coastal Stressor				Overall Vulnerability
	Sedimentation		Eutrophication		
	Susceptibility	Current Condition (2019)	Susceptibility	Current Condition (2019)	
Tapuae	Moderate	Moderate	Minimal	Minimal	Moderate
Timaru	Moderate	Moderate	Minimal	Minimal	Moderate
Te Hēnui	Moderate	Moderate	Minimal	Minimal	Moderate
Katikara	Moderate	Moderate	Moderate	High	Moderate-high
Waiongana	Moderate	Moderate	Minimal	Minimal	Moderate
Mimitangiatua	Moderate-high	Very high	Very high	Moderate	High
Manawapou	Moderate	Moderate	Minimal	Minimal	Moderate
Onaero	Moderate	Moderate	Minimal	Moderate	Moderate
Waingongoro	Moderate	Minimal	Minimal	Minimal	Minimal
Kaūpokonui	Moderate	Moderate	Minimal	Minimal	Moderate
Oakura	Moderate	Moderate	Moderate	High	Moderate-high
Tāngāhoe	Moderate	Moderate	Minimal	Minimal	Moderate
Urenui	Moderate-high	Very high	Very high	Moderate	High
Mōhakatino	Moderate-high	Very high	Moderate	Moderate	High
Waitōtara	Moderate-high	Very high	Minimal	Minimal	Moderate-high
Waitara	Moderate-high	Very high	Minimal	Moderate	Moderate-high
Pātea	Moderate-high	Very high	Very high	Moderate	High
Whenuakura	Moderate	Moderate	Very high	Minimal	Moderate-high
Tongaporutu	Moderate-high	Very high	High	Moderate	High
Waiwhakaiho	Moderate	Moderate	Minimal	Minimal	Moderate

Summary of Estuarine Vulnerability Assessment (EVA) ratings for 20 of the region's estuaries, from Robertson (2019).

What we're doing

Developing an estuary monitoring programme

By characterising the region's estuaries and understanding their vulnerability to different stresses, we are better able to tailor our monitoring approach to the needs of each estuary. Recommendations set out in the EVA have been used to guide the development of a new estuary monitoring programme for Taranaki.

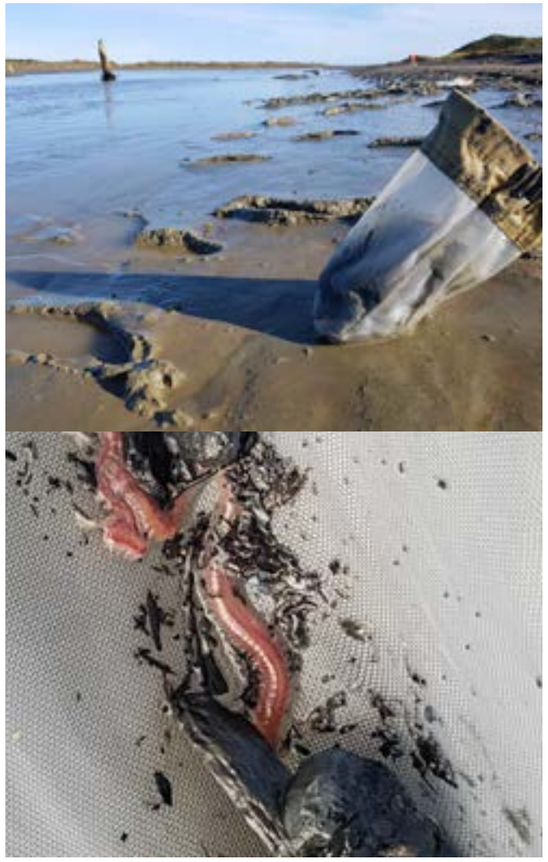
Where an estuary's overall vulnerability was 'minimal' to 'moderate', it was recommended that synoptic (screening level) monitoring be completed every 10 years. This involves a high-level assessment of catchment variables and indicators of estuarine health to determine whether the vulnerability ratings have changed or remain the same.

For estuaries with overall 'moderate to high' or 'high' vulnerability, five yearly 'broad-scale' habitat mapping surveys were recommended to assess changes in dominant estuary features or habitats. Three years of annual 'fine-scale' surveying to assess the baseline condition of intertidal sediment through various physical, chemical and biological indicators was also recommended, except where the primary issue was eutrophication. In those estuaries, eutrophication targeted monitoring, mainly involving water sampling, was recommended over the summer months.

The Council is using these recommendations to guide its monitoring going forward. Fine-scale surveys are underway, beginning in the Tongaporutu and Mōhakatino estuaries. Robust monitoring data will enable the Council to better manage these estuaries, and the factors that may be affecting their health.

Where we're heading

The NPS-FM will require us to monitor relevant estuarine attributes in order to assess whether Council limits and policies are preventing adverse impacts in sensitive downstream receiving environments such as estuaries. Council officers are currently working with Ngāti Mutunga taiao staff to develop attributes that are relevant to the estuaries in North Taranaki, and potentially elsewhere in the region.



Fine-scale monitoring involves collecting sediment cores and washing them through filter mesh bags to find out what's living in the mud (in this case, estuarine worms!).

Te Āhua o Ngā Kūrei Estuary health monitoring

In 2019 Te Rūnanga o Ngāti Mutunga undertook a comprehensive study of the Urenui and Mimitangiatua estuaries, supported by the Taranaki Regional Council.

The project was funded by Curious Minds Taranaki, a Participatory Science Platform designed to bridge the gap between community groups, schools, iwi, businesses and science providers, and to encourage young people to become more involved with science.

Working with Urenui, Uruti, and Mimi Schools the project investigated shellfish abundance and diversity, sediment deposition across time, surface sediment chemistry, storm water testing and estuary water quality analysis, not to mention wider biodiversity surveying and pest species presence.

One of the key findings of the project was confirmation that human sewage was entering the estuary. Possible sewage run-off from Urenui Township had been a concern of the local community and Ngāti Mutunga for more than 50 years. These concerns increased when the population of Urenui and usage of the campground increased along with the aging of the septic tank systems in the township.

This contamination by human sewage has serious cultural, environmental and possible health implications for the awa, estuary and the local community. The testing undertaken during this project was carried out by Council staff (alongside Ngāti Mutunga whānau) and confirmed contamination was taking place.

The Council and New Plymouth District Council (NPDC) have worked together to identify and fix the sources of contamination. Community open days have been held and information packs sent out to residents to raise awareness around the importance of septic tank maintenance. This work is ongoing but is already making a positive impact, with monitoring showing a significant reduction in sewage contaminants entering the estuary.

In more good news, funding was included in the NPDC Long Term Plan in 2021 to design and construct a wastewater treatment facility for Urenui and Onaero. This would mean the septic tanks in these communities would be replaced by a community reticulated system, preventing any more sewage from entering the awa.

Urenui and Mimitangiatua estuaries are incredibly important to their associated communities for their cultural, historical, recreational, and environmental qualities. Te Āhua o Ngā Kūrei will continue to build on the results from the study and work to preserve and enhance the estuarine environments in the Ngāti Mutunga rohe.

Curious Minds Taranaki is a Participatory Science Platform delivered locally by Venture Taranaki in collaboration with Taranaki Regional Council and funded by the Ministry of Business, Innovation and Employment.