

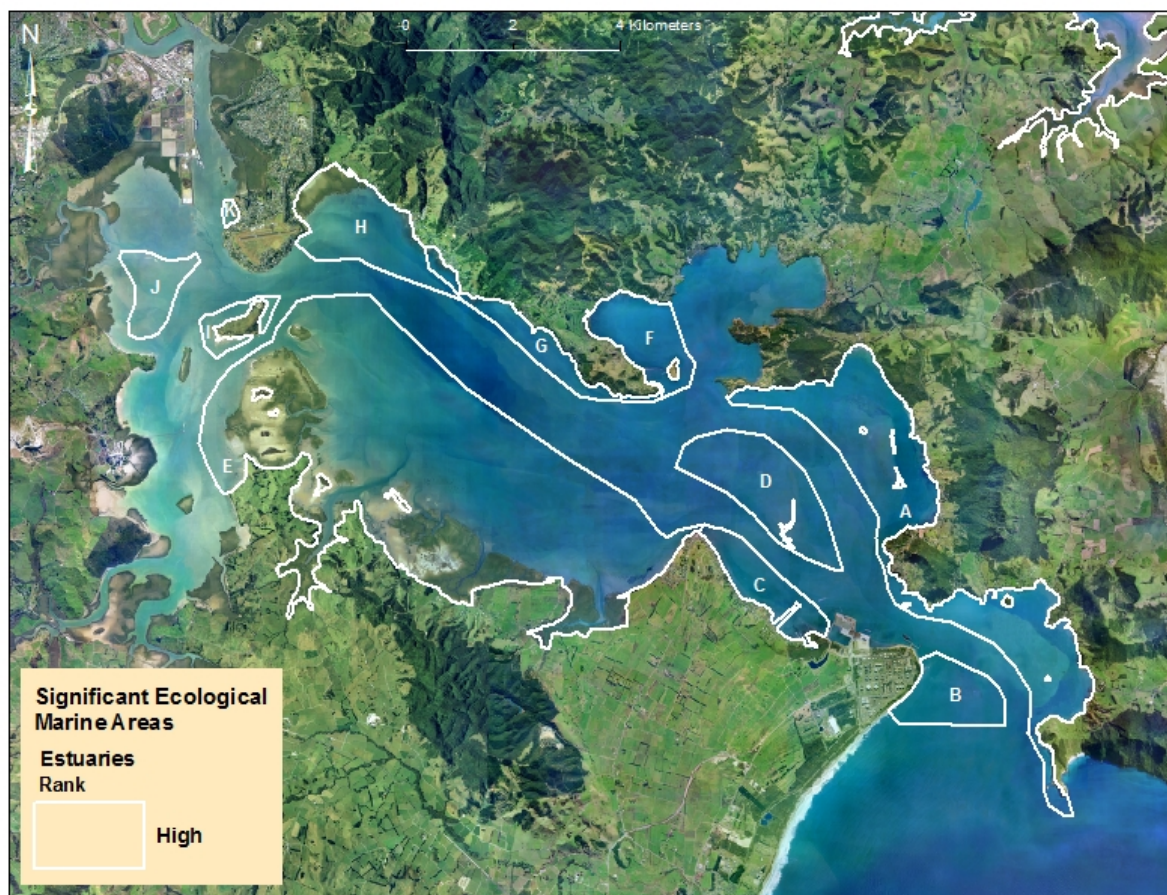
Significant Ecological Marine Area Assessment Sheet

Name: Whangarei Harbour Marine Values

Summary:

Whangarei Harbour as a whole estuarine system has an important array of ecological values. It plays an important role in buffering sediment, nutrient and stormwater inputs from the catchment. It should be noted how important this role is to support the high marine ecological values of Bream Bay, adjacent to the harbour's entrance, and the Bream Head area generally. The harbour supports commercial fisheries for flounder, mullet and trevally and is a significant nursery area for coastal fish species. The harbour is recognised as one of the important feeding areas for Orca in Northland. Several tidal flats and sand bars have significant shellfish communities. Ten areas in the harbour have been scored and mapped as ecologically significant. In this worksheet in the *Ecological Values* section there is a brief description of the special ecological values of these areas. These descriptions provide background to the general assessment of ecological significance for the Harbour system as a whole detailed in Table 1. The ranking criteria and scoring that was used to determine the overall high ranking given to the ecological significance of this area has been adopted from Appendix 5 of the Northland Regional Council Proposed Policy Statement.

Aerial photo of Whangarei Harbour Photo Credit: Apple Maps



Description:

The Whangarei Harbour is 100km² in area and is situated on the east coast extending from the city of Whangarei to the Whangarei Heads and coast. The area drains a relatively diverse catchment area

(29507 ha) of urban development, lifestyle blocks, livestock farming and forestry.

Whangarei Harbour supports important biodiversity values that reflect a wide range of interconnecting marine habitat types. These habitats include saltmarshes, mangroves, intertidal and subtidal flats, seagrass beds *Zostera muelleri*, and extensive channels and islands. Each of these habitats contains distinctive plant and animal communities, which contribute to the ecological values of the harbour and coastal area.

There has been much interest scientifically in the harbours habitats and ecology. A comprehensive review of biological monitoring and survey work done in Whangarei Harbour was completed in 2003 study.¹ Since that time, the Northland Regional Council has initiated an estuarine monitoring programme. A 2012 report reviews previous work on water quality, sediment characteristics and benthic ecological communities in the context of the catchment land uses and the current monitoring.² The marine ecology of the Whangarei Harbour more generally is summarised in the Nearshore Classification produced by the Department of Conservation³. A further review of natural features and ecology was completed by NIWA in 2005.⁴ Both publications have comprehensive references covering previous descriptive work done in Northland. The later report summarises some of the local scale habitat mapping work done in the region. The most recent habitat map of the harbor was produced in 2010.⁵ More recently, Northland Regional Council, NIWA and MPI have been engaged with various monitoring related to state of the environment,² biosecurity⁶ and fisheries management focused on the concerns for the health of the pipi *Paphies australis*, populations on Mair and Marsden Banks.^{7 8}

Interest and support for improving riparian management has been increasing and progress is being made in many areas. Improved riparian protection and reduction of sediments, nutrients and contaminants, storm water discharges and run-off in the catchment will greatly enhance restoration of the harbour's ecological values.⁹

Oceanography

¹ Morrison, M. 2003. A review of the natural marine features and ecology of Whangarei Harbour. Prepared for the Department of Conservation by NIWA, November 2003

² Griffiths, R., 2012. Whāngārei Harbour Estuary Monitoring Programme. A technical report of the Northland Regional Council. Whangarei.

³ Department of Conservation, 2005. Near Shore Marine Classification System. Compiled by Vince Kerr for Northland Conservancy, Department of Conservation. Revised September 6, 2005. http://www.marinenz.org.nz/nml/files/documents/3_northland-mpa.html

⁴ Morrison, M., 2005. An Information Review of the Natural Marine Features and Ecology of Northland. Prepared for the Department of Conservation. NIWA Client Report: AKL 2005-50.

⁵ Kerr, V. 2009. Marine habitat map of Northland: Mangawhai to Ahipara vers. 1. Northland Conservancy, Department of Conservation, Whangarei. 33 p.

⁶ Inglis, G., et al., 2006. Surveillance design for early detection of unwanted exotic marine organisms in New Zealand Biosecurity New Zealand Technical Paper No: 2005-17 Prepared for BNZ Post-clearance Directorate.

⁷ Williams, J.R., Hume, T.M., 2014. Investigation into the decline of pipi at Mair Bank, Whangarei Harbour. Prepared for Northland Regional Council. June 2014 NIWA Client Report No: AKL2014-022

⁸ Pawley, D. M., 2014. *Population and biomass survey of pipi (Paphies australis) on Mair Bank, Whangarei Harbour, 2014. Client Report* prepared for: Northland Regional Council.

⁹ Morrison, M.A.; Lowe, M.L.; Parsons, D.M.; Usmar, N.R.; McLeod, I.M., 2009. A review of land-based effects on coastal fisheries and supporting biodiversity in New Zealand. *New Zealand Aquatic Environment and Biodiversity Report No. 37*. 100 p.

Whangarei Harbour covers 5,200 ha at low spring tide. This leaves an area of 4,600 ha of intertidal mudflats. The flushing time of the upper harbour is around 11 days and the tidal range is around 2.3 m mean spring tide. Salinities and temperature vary significantly depending on tide and season in the upper harbour. Bottom sediments consist of muds and sandy muds in the upper harbour. Salinity and water temperatures in the middle of the harbour are similar to those for Marsden Point. Bottom sediments here are fine to medium sands. The lower harbour is dominated by a deep gorge channel flanked by eddy sand deposits of Mair and Calliope banks. Salinity at Marsden Point varies between 32 and 34.5 parts per thousand. Summer temperatures range from 24-25°C and winter temperatures of 13-14.5°C. The maximum mean spring tidal range is 2.2 m.

Ecological Values

Area A: Northeastern Bays (982 ha)

This area takes in channel subtidal area rocky coast and shallow reefs and the two significant sand banks known as McDonald Bank and Calliope Bank. Shorelines are a mixture of rocky shores and fine gravel and shell beaches. Subtidal soft bottom sandy bottom habitats of the channels and edge areas of the sand banks are productive and clean examples of this habitat. All these habitats are high ranking and contribute to the harbour's marine diversity. These areas have very good tidal mixing and benefits from both the nutrient and plankton laden water masses of the upper harbour mixing and passing by with the outgoing tide and then, alternately, oceanic water masses bathe these areas during incoming tides and high tide periods. The rocky shores have diverse and abundant kelp forests with a vibrant sponge and encrusting invertebrate communities at depths beyond about 8 m deep. Scallops *Pecten novaezelandiae* are common in the subtidal soft bottom areas and there are localised areas of horse mussels *Atrina zelandica*, which form an important biogenic habitat for other marine species. Cockle beds *Austrovenus stutchburyi*, and recovering areas of seagrass, *Zostera muelleri* are present on the two banks. The marine reserve at Motukaroro is an excellent example of harbour entrance rocky shore habitats with some exceptional encrusting sponge communities in the deeper areas of the reef off Motukaroro Island. ^{10 11}

¹⁰ Kerr, V.C., Grace, R.V., 2006. Subtidal and intertidal habitat mapping of Motukaroro Island 2006. For the Department of Conservation, Northland Conservancy, [Download](#)

¹¹ Kerr, V.C., Moretti, J., 2012. [Motukaroro Island, Whangarei Marine Reserve UVC Reef Fish and Crayfish Monitoring](#). Report for the Department of Conservation, Northland Conservancy. [Download](#)

Looking from the shore of Motukaroro Island back towards shore at Reotahi, note the lush shallow kelp forest in foreground. Photo credit: Vince Kerr



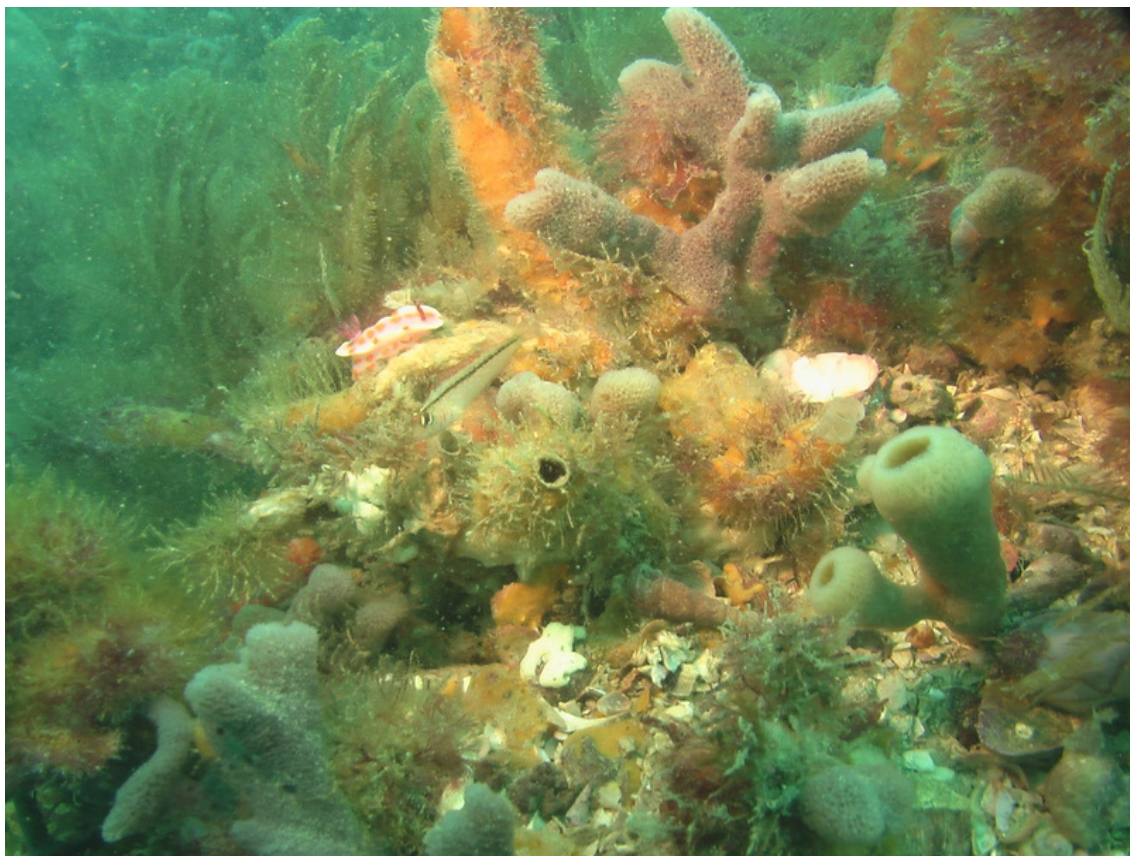
An example of the lush shallow kelp forest growing on the reef that surrounds Motukaroro Island. Photo credit: Vince Kerr



An example of the habitat transition from shallow kelp forest to sponge garden habitat taken at approximately 8 meters depth on the surrounding reef at Motukaroro Island. Photo credit: Roger Grace



A closer view of the abundant and diverse invertebrate community making up the sponge garden habitat on the reefs below 8m at Motukaroro Island. Near the centre of the image a clown nudibranch and a common triplefin can be seen. Photo credit: Vince Kerr



An example of a horse mussel bed in shallow waters between Home Point and the Frenchman Island. Note the diverse range of encrusting invertebrate and algae growing on the horse mussels. Photo credit: Roger Grace



Area B: Mair Bank (201 ha)

Mair Bank and the smaller Marsden Bank are well known as a regionally and nationally significant habitat for shellfish. It has been highly prized by local hapu for centuries. Until recently it supported the largest commercial harvest of pipi in the country. It is distinctive as a result of its location at the harbour entrance where it is swept by the rich and strong currents of the harbour water masses and also influenced by the oceanic influences offshore. In recent years the population of pipis has dramatically reduced and, currently, the many stakeholders are focused on their restoration.⁷⁸ Pipis in such a large estuarine sand bank such as Mair Bank play an important role in filtering plankton and nutrients from the harbour waters. They are also strong indicators of a healthy invertebrate community.



Area C: One Tree Point To Marsden Bay (198 ha)

This area comprises the shallow intertidal and subtidal sandy soft bottom habitats stretching from One Tree Point to Marsden Bay. These habitats are flushed with considerable oceanic waters on incoming tides as well as the nutrients and plankton of the harbour waters. In the subtidal part of this area, in most years, scallops can be found there. Seagrass beds are returning to this area following a trend in the last four years in much of the harbour habitats suitable for seagrass. These shellfish and seagrass communities and associated benthic invertebrates are a major food source for shorebirds and a significant nursery and feeding area for many coastal fish species. ¹²

¹² Morrison, M.A.; Jones, E.G.; Parsons, D.P.; Grant, C.M., 2014. Habitats and areas of particular significance for coastal finfish fisheries management in New Zealand: A review of concepts and life history knowledge, and suggestions for future research. New Zealand Aquatic Environment and Biodiversity Report No. 125. 202 p.

Looking from the boat ramp at One Tree Point to Marsden Bay, note the extensive cockle beds on the tidal flat and a few small seagrass beds, (brown patches). Photo credit: Vince Kerr



Area D: Snake Bank

This area is an extensive fine sand and shell shallow bank with channels of deeper water flowing around each side of it. McDonald Bank has historically been an important shellfish harvesting area with commercial quantities of Cockles being harvested there.^{2 13} The bank is an important feeding area for shorebirds in the harbour.

Area E: Takahiwai To Hewlett Point (2,813 ha)

This area - taking in what is known as the Takahiwai tidal flats combined with the intertidal flats to east of Hewlett Point - contains a number of significant habitats and is also the largest area of seagrass in the Harbour. In total, 651ha of seagrass beds has been mapped recently in this area. There are also very good connections with large areas of mangroves, mangrove channels and fringing salt marsh. The intertidal habitat has extensive cockle beds and the subtidal habitat has horse mussel beds scattered throughout the area. Taken all together this is a very valuable part of the harbour system. The current large extent of the seagrass beds represents a dramatic recovery of this important biogenic habitat that supports a rich benthic invertebrate community and supports early life stages of many coastal fish species.¹¹

¹³ Morrison, M.; Parkinson, D., 2001. Stock assessment of cockles on Snake and McDonald Banks, Whangarei Harbour, 2000. New Zealand Fisheries Assessment Report 2001/19.16 p

A view looking from near One Tree Point towards Takihiwai showing the extensive seagrass bed covering this important tidal flat. Photo credit: Vince Kerr



Area F: Parua Bay West (216 ha)

The Western Bay of Parua Bay has been ranked as ecologically significant, including the shores water around Motukiore Island. This area has been the least affected by the high rates of sedimentation that Parua Bay has experienced historically. There is a large area of intertidal mud flat and shallow subtidal area that has shellfish communities and benthic invertebrates important to shorebirds. These shellfish beds have been described as diverse and healthy in the 2012 Northland Regional Council (NRC) estuarine monitoring report.² This area has generally good mixing of the oceanic water masses coming into the harbour, but to a lesser extent than the tidal flats and banks further out towards the entrance. Small patches of seagrass are starting to re-colonise the intertidal area around Motukiore Island. These extensive shallow areas are important feeding and nursery areas for a range of coastal fish species.¹¹

Area G: Tamaterau to Manganese Point shoreline (163 ha)

This shoreline is distinctive and comprises soft sediment substrates (sand, coarse sand, shell, and fine gravels). There are small tidal flats stretching along the shore from Waikaraka to Tamaterau to Jackson Bay and the tip of Manganese Point. The soft shores further along towards Manganese Point are interesting because the sediments are quite coarse and relatively clean of sedimentation given this position in the harbour. Around Manganese Point there are some small fringing patches of rocky reef adding diversity to the shore habitats. The shellfish and invertebrate communities there are described as diverse and healthy in the 2012 NRC estuarine monitoring report.² Along with other similar areas these habitats play a valuable role as feeding and nursery areas for coastal fish species.¹¹

Area H: Waikaraka Mangrove Area (349 ha)

This area has a combination of muddy tidal flats and shallow channels, a mangrove area and fringing salt marsh habitats and included the Waikaraka marine reserve. The tidal flats and mangrove forest at Waikaraka are representative of this habitat type for an upper harbour tidal flat where mixing of incoming coastal water masses with the upper harbour masses are not complete with each tidal cycle and there is generally presence of sedimentation of fine silts or mud. The Waikaraka mangrove area and small estuary of the Waikaraka Stream are important ecologically because of their marine reserve status and they fulfil a connectivity and buffering role with the Waikaraka stream and catchment.

Waikaraka tidal flat and mangrove area seen at low tide. Photo credit: Vince Kerr



Area I: Matakohe Island (61)

The shores around Matakohe Island are small habitat areas with considerable diversity. These are important feeding areas for shorebirds and serve as feeding and nursery areas for many harbour fish species. The substrates are very diverse and interesting for such a small area. They range from rather coarse limestone and gravel substrates to fine sands and muddy sands. There are small areas of saltmarsh and mangroves associated with the tidal flats on the southern side of the island. It is unusual to have an island of this size in an upper harbour location. The channels which completely encircle Matakohe Island add more complexity and diversity to this unusual suite of upper estuarine habitats. Small shellfish beds exist in some of the intertidal flats.

Area J: Portland Tidal Flats (137 ha) and Area K: Onerahi Flats (12 HA)

These two areas are tidal flats with significant shellfish communities. These areas are mud and sandy soft bottom intertidal habitats. The areas have extensive cockle beds, which have been monitored as part of the Northland Regional Council estuaries monitoring

program.² In this report the cockle community is described as productive and in good health. Cockles are an indicator of a healthy estuarine soft bottom community. They are generally associated with high benthic invertebrate diversity and substrates that are not heavily impacted by sedimentation. These shellfish communities play a key role in filtering nutrients and plankton from the water column. This, in turn, has beneficial effects on water clarity and productivity of various algal communities that make up the biodiversity of the estuary. The shellfish and the other associated benthic invertebrates are also a major food source for shorebirds and a significant nursery and feeding area for many coastal fish species.¹²

Assessment of Ecological Significance

Table 1 Ranking score of ecological significance of Whangarei Harbour

Whangarei Harbour Marine Values: Assessment of Ecological Significance ¹⁴			Rank
Overall Ranking		Notes	High
Representati on	supports most taxa expected for habitat type	Soft bottom communities are generally diverse and include high quality seagrass beds. F fish diversity and abundance is high compared to other estuaries on the East Coast	H
	large example of its type	Is a large example of its type for marines, extent of shellfish habitats and seagrass is significant, large important nursery area for coastal fish species	H
Rarity and Distinctivene ss	supports indigenous species threatened, at risk, or uncommon, nationally or within the relevant ecological scale	Significant feeding area for Orca and dolphin species	H
	supports species endemic to the Northland-Auckland region or at distributional limits within the Northland region	Not Assessed	NA
	distinctive of a naturally restricted occurrence	Only large estuarine system between Auckland and the Far North	H
	developed as a result of unusual environmental factor(s) or is part of an ecological unit that occurs within an originally rare ecosystem	Diverse array of habitat and size	M
	identified as nationally or regionally rare habitat(s) in MPA Plan	Not Assessed	NA
Diversity and Pattern	high diversity of indigenous ecosystem or habitat types	Soft bottom communities are generally diverse and high quality. Seagrass beds, fish diversity and abundance is high compared to other estuaries on East Coast	H
	high diversity of indigenous taxa	Soft bottom communities are generally diverse and include high quality seagrass beds. Fish diversity and abundance is high compared to other	M

¹⁴ Note the comments listed in Table 1 attempt to summarise the ecological contribution of the Harbour as a whole. This assessment is based on a summation of values of the specific habitats in the nine areas mapped. More detail on the scoring of ecological values in the nine identified areas is included in the 'Ecological Values' section above.

		estuaries on East Coast	
	its composition reflects the existence of diverse natural features or ecological gradients	The range of estuarine habitats are well represented and connected	H
	contains intact ecological sequences	Areas identified are all connected as part of the estuarine system.	H
Ecological Context	provides or contributes to ecological linkages, networks, buffering functions	All identified areas are strong contributors to providing ecological connections and the buffering functions generally	H
	supports the natural functioning of freshwater or coastal ecosystems	All identified areas are strong contributors to providing ecological connections and the buffering functions generally	H
	supports life stages of indigenous fauna	Important nursery area for coastal fish species and feeding area for Orca	H
Assessed by: Vince Kerr			Date: September 2015
Information Source(s) <i>see below</i>			1-7
Reliability of Information <i>see below</i>			+++
Rank (overall score) H = high, M = moderate, L = low, DD = data deficient, R = recommended for further investigation			
Information Source(s) 1 = quantitative report, 2 = qualitative report, 3 = habitat map or classification, 4 = expert opinion, 5 = personal communication, 6 = anecdotal information, 7 = visit and observation			
Reliability of Information expressed as a scale of confidence ranging from high (+++) to low confidence (---)			
Criteria Rank - score for each individual criteria) H = high ranking, M = moderate ranking, L = low ranking, DD = data deficient, R = recommended for further investigation, NA = not assessed for this criteria			