

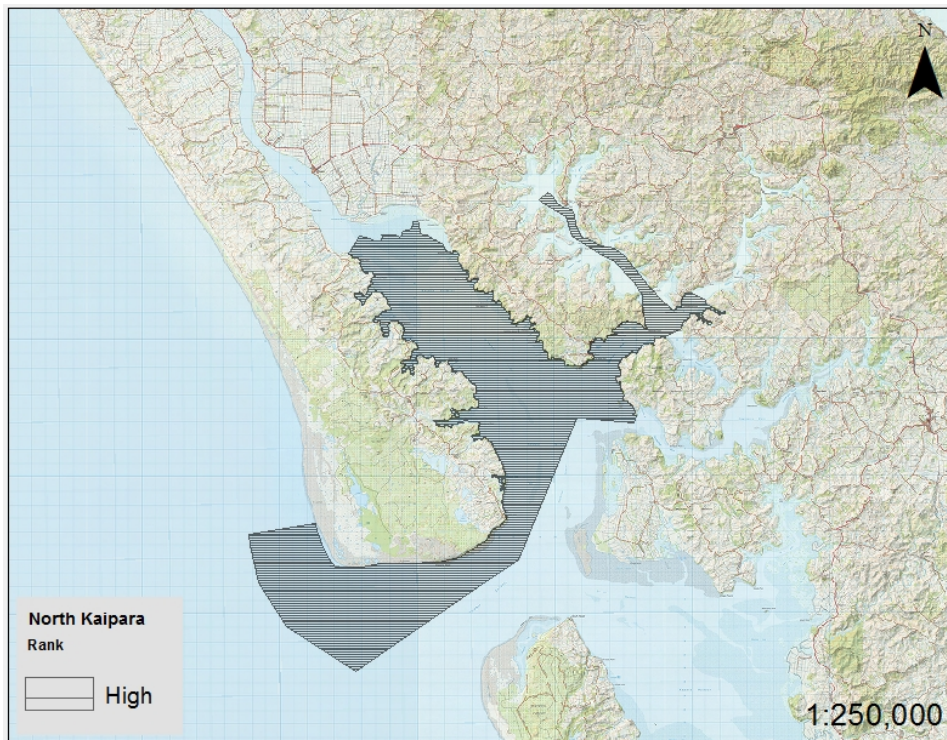
Significant Ecological Marine Area Assessment Sheet

Name: North Kaipara Harbour Marine Values

Summary:

A significant ecological area has been mapped and scored as high ranking which covers the area the harbour entrance area on the north side of the Regional Council boundary line and includes the northern arm of the harbour leading to the Wairoa River. The area includes the main Otamatea channel leading up to Tinopai and the channel and surrounding subtidal area of the Arapaoa River up to Snapper Rocks. This area has a great diversity of habitats ranging from the high current clean sandy areas of the entrance to mud flats, mangrove and saltmarsh sequences. There are significant channel environments and intertidal flats with healthy shellfish communities. These habitats are identified as a significant nursery area for a range of commercial and non-commercial fishes. ¹ For several cases - snapper *Pagrus auratus* and rig *Mustelus lenticulatus* as examples - the area is nationally significant as a nursery. ² These areas of the Kaipara Harbour, especially the channel areas, are important breeding areas for a range of shark species, notably the Great White Shark, *Carcharodon carcharias* which is a protected species under the Wildlife Act and an IUCN red listed species. ³ The harbour is also gazetted as a Marine Mammal Sanctuary under the Marine Mammal Act for the protection of the critically endangered Maui Dolphin.

Map of the North Kaipara Harbour.



¹ 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.

² Morrison, M.A.; Lowe, M.L.; Jones, E.G.; Makey, L.; Shankar, U.; Usmar, N.; Miller, A.; Smith, M.; Middleton, C. (2014). Habitats of particular significance for fisheries management: the Kaipara Harbour. New Zealand Aquatic Environment and Biodiversity Report No. 129. 169 p.

³ Pers.comm. Clinton Duffy, Department of Conservation

Description:

Kaipara Harbour is New Zealand's largest enclosed harbour and protected estuarine area. It is 94,700 ha, with over 800 km of coastline. The northern part of the harbour in the jurisdiction of Northland Regional Council is 2,850 in area. The harbour mouth is approximately 8 km across. In the entrance area there are large areas of what is essential in New Zealand a unique habitat due to the sheer size of the harbour and the velocity of the tidal currents found there. There are channel, channel edge and shoal habitats. The entrance area is described as highly dynamic with great volumes of sands moving in the currents regularly. Large numbers of marine organisms and fish are moving through these entrance habitats on a daily basis affording opportunities for predatory species to forage there. The harbour heads have extensive areas of sandflats, dunes, impounded wetlands and dune lakes. There is substantial sand deposition occurring at the heads. There are various accounts of subtidal tuatua beds and green-lipped mussels being harvested from this area historically. The coastline is deeply indented with sheltered rocky shores and low cliffs. Sand and mudflats are extensive at low tide (43% of the area). The harbour contains highly productive intertidal sand and mud flats joining a mosaic of estuarine habitats including saltmarsh, salt meadows and reed swamps, with about 10% of the area covered with mangroves.

Mud tidal flats and mangrove environments occur mainly in the north and east arms, with areas of white sandy beaches and rocky promontories and shorelines in the central portion. The main inflowing rivers are the Wairoa River from the north and the Arapaoa and Otamatea Rivers from the east. The upper arms are typically very muddy with high sedimentation rates, particularly from the Wairoa River which has flows ten times the combined flows of the other rivers. The Kaipara is also notable for its very large oceanic influence due to the sheer size of the harbour and the tidal flows. This results in much of the central part of the harbor being well flushed of sediments and adds a great deal to the diversity and function of the harbour system. The harbour's inflowing coastal water masses are influenced by the north-flowing Westland Current and occasionally in summer months by the south-flowing West Auckland Current. Because the sheer size of this harbour many coastal species enter the system for the feeding opportunities it offers.

In the last decade there has been considerable scientific effort gone into investigating the marine ecology of the Kaipara Harbour. Northland Regional Council carries out water quality monitoring in the North Kaipara with results reported in their State of the Environment report. ⁴ Northland Regional Council has also carried out benthic community survey work in the North Kaipara as part of its Estuary Monitoring Program. ⁵ Ongoing shark research, particularly on the protected Great White Shark, is being carried out by the Department of Conservation on an opportunistic basis with valuable information being assembled through observations and tagging work. ³

NIWA has been working on a multi-objective research project looking at habitat descriptions, benthic community studies, sedimentation and identification of important 'nursery habitats for coastal fish species'. ⁶ This report is a valuable review

⁴ NRC (2013). Northland Regional Council, State of the Environment Report: Harbour water quality monitoring: Northland Regional Council. www.nrc.govt.nz.

⁵ Griffiths, R. (2014). Kaipara Harbour Estuary Monitoring Programme. Northland. Regional Council technical report.

⁶ Morrison, M.A.; Lowe, M.L.; Jones, E.G.; Makey, L.; Shankar, U.; Usmar, N.; Miller, A.; Smith, M.; Middleton, C. (2014). Habitats of particular significance for fisheries management: the Kaipara Harbour. New Zealand Aquatic Environment and Biodiversity Report No. 129. 169 p.

of past ecological surveys in the Kaipara including reporting on information collected with a 'local ecological knowledge' approach in the community. The study concludes that the Kaipara as a whole is a very important nursery area for a range of non-commercial and commercial fish species. For some species, such as snapper and rig, the Kaipara is believed to be the largest and most significant nursery area in New Zealand. The report discusses individual habitats and their role, as well as commenting on the general use of large areas of the harbour as a nursery area. The NIWA study includes a synoptic habitat map of the Southern Kaipara but unfortunately this work has not been completed to the same detail for the North Kaipara. A draft marine habitat has been prepared for the entire Northland West Coast including the North Kaipara and is useful to aid interpretation of the body of monitoring information available. ⁷

There is an active community catchment management group and programme in the Kaipara. Current focus is on riparian restoration and protection following several years of planning and priority assessment for the catchment and harbour. ⁸ This is an exciting initiative for the Kaipara community. Improving riparian protection in the catchment would greatly enhance the connectivity between the harbour habitats and communities and freshwater wetlands, stream corridors and the bush covered fringes of the estuary. ⁹

A 3D aerial view of the North Kaipara Harbour.



⁷ Kerr, V.C., 2015. Draft Marine Habitat Map of Northland's West Coast Ahipara to Kaipara. Unpublished work in progress Kerr and Associates Marine Conservation Consultants, Whangarei, New Zealand.

⁸ <http://www.kaiparaharbour.net.nz/>

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.

Ecological Values

The challenge of describing the ecology of the Kaipara Harbour resembles a study of a miniature size ocean; it is that big and its ecology is correspondingly complex. The 'ocean analogy' is an important one for the Kaipara and speaks to its special characteristic of having large areas which are regularly flushed by strong coastal water masses. Ecological models for the role of each habitat in relation to species and communities are being developed for the Kaipara but this is a big task. A recent NIWA study documents our past knowledge of what this harbour was like in the form of 'local ecological knowledge' and Maturanga Maori, which describes the beginning of a comprehensive ecological model for the estuary. ⁶ It is stated in this report that the Kaipara Harbour is a good - or possibly the best - place to carry out this ecological work due to its size and complexity and known importance to fisheries and a multitude of bird and marine species. This conclusion highlights the ecological importance of this harbour in general terms.

The main habitats that have been identified as ecologically significant are the harbour entrance channel habitats, the tidal mud and sand flats and the middle and upper harbour channels and subtidal areas and the mangrove saltmarsh sequences occurring where sediment impacts are more minor. The NIWA research project reviews previous localised habitat description and background hydrology and sediment information. ⁶

The suite of habitats making up the entrance of the Kaipara Harbour is considered unique and special; this is due both to the sheer size and amount of oceanic water flowing through the area with each tide cycle, and the significant amount of marine life that is passing through this area regularly or occasionally to spend time in the harbour environment. The high current nature of this area is unusual at a national level and creates opportunities for feeding fish which use the currents to travel in and out of the harbour. Predatory fish also rely on the currents to disturb prey species which are often at the mercy of the strong currents and are unable to protect themselves from predators when passing through this area. The benthic habitats are mainly fine and coarse sand. In the highest current areas the sand areas can be mobile due to the force of currents. Historically green lipped mussel *Perna canaliculus* beds were extensive in some of these areas, but are rare today. Substantial tuatua beds *Paphies subtriangulata* are also found in these areas along with scallops *Pecten novaezelandiae*. ⁶ The extent of the tuatua communities in the entrance area are an indication of the strong oceanic influence of this area.

The tidal flats in the area are extensive and have been studied in the Northland Regional Council estuaries monitoring program. ⁵ Of the areas studied there is a correlation between community diversity, indicator species and the impacts of sedimentation. The tidal flats nearer the entrance and main channels, where sediments are well flushed from the habitat by tidal currents and localised wind waves, are characterised by the more diverse shellfish communities with cockle *Austrovenus stutchburyi* as the dominant species.

Channel and associated subtidal areas are especially important for fish movement and for some species are the most important nursery areas. The Otamatea Channel is a long and relatively deep (> 10 m depth) channel extending to Tinopai and then branching into the Arapaoa River which continues as a significant channel all the way up the estuary to the Pahi Peninsula. The Arapaoa channel has been recognised as having national importance as a rig nursery area and is also a significant nursery area for shark species, notably the school shark *Galeorhinus galeus*, and Great White Shark. In the lower section of the Arapaoa River channel and the Otamatea Channel there are scallop beds and patches of subtidal seagrass reported. ⁶

The NIWA research program ⁶ examined the importance of the full range of estuarine habitats of the North Kaipara and found that 'no one habitat is only used by any of the fish species', and that all habitats studied, including mangrove areas, contribute to the harbour's importance as a nursery area for coastal and estuarine fish species. Seagrass beds overall were one of the most significant nursery habitats and on the other end of the spectrum mangrove areas were important for a lesser group of species while still contributing to the ecology of the harbour. Across the several methods used to catch and count fish in the different habitats up to 35 species of fish were found.

Assessment of Ecological Significance

Table 1 Ranking score of ecological significance of North Kaipara ¹⁰

North Kaipara Harbour Marine Values: Assessment of Ecological Significance			Rank
Overall Ranking		Notes	High
Representati on	supports most taxa expected for habitat type	Soft bottom communities and channel communities are diverse and includes high abundance of shellfish occasional seagrass and mussel beds, juvenile fish diversity and abundance is high – an excellent example	H
	large example of its type	A large example	H
Rarity and Distinctivene ss	supports indigenous species threatened, at risk, or uncommon, nationally or within the relevant ecological scale	Shark species, Maui dolphin are supported by this estuary, significant at national level	H
	supports species endemic to the Northland-Auckland region or at distributional limits within the Northland region	Not Assessed but expected to be significant	NA
	distinctive of a naturally restricted occurrence	Excellent example distinctive due to its large size and complexity of intertidal habitats, very large channel areas with strong oceanic influences	H
	developed as a result of unusual environmental factor(s) or is part of an ecological unit that occurs within an originally rare ecosystem	Excellent example distinctive due to its large size and complexity of intertidal habitats, very large channel areas with strong oceanic influences	H
	identified as nationally or regionally rare habitat(s) in MPA Plan	The size as the country's largest estuary and high current entrance special and unique area would trigger MPA Plan criteria	H
Diversity and Pattern	high diversity of indigenous ecosystem or habitat types	Habitat sequences significant, salt marsh, mangrove, tidal flat and subtidal channels, diverse high current entrance areas are large and complex examples of type	H
	high diversity of indigenous taxa	Soft bottom communities are very diverse and include some biogenic habitats of seagrass beds, mussel beds and juvenile fish diversity and abundance is at the very highest levels compared to other estuaries in New Zealand	H
	its composition reflects the existence of diverse natural features or ecological gradients	The range of estuarine habitats are well represented and large in extent and complexity, full sequence of habitats along gradient of fresh to coastal waters	H

¹⁰ Table 1 details the ranking criteria and scoring that was used to determine the overall high ranking given to the ecological significance of this area. The criteria used have been adopted from Appendix 5 of the Northland Regional Council Proposed Policy Statement. See reference to Methodology report or other council documents to call up

		and current gradients	
	contains intact ecological sequences	Areas identified are all connected as part of the whole estuarine system.	H
Ecological Context	provides or contributes to ecological linkages, networks, buffering functions	All habitats areas are strong contributors to ecological processes providing connections between coastal waters and the harbour habitats, the estuarine buffering functions are significant	H
	supports the natural functioning of freshwater or coastal ecosystems	All habitats areas are strong contributors to ecological processes providing connections between coastal waters and the harbour habitats, the estuarine buffering functions are significant	H
	supports life stages of indigenous fauna	Provides significant support for various life stages for juvenile coastal fish species and benthic invertebrate communities. Maui dolphin supported	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			