

**Marsden Point Refinery:** A Resource Consent Application to Renew 20 Resource Consents from the Northland Regional Council



**enspire**

**Prepared for:** ChanceryGreen on behalf of The New Zealand Refining Company Limited, trading as 'Refining NZ'

**Prepared by:** Gavin Kemble, *Director*  
Bridgette Munro, *Chairperson*  
Blair McLean, *Senior Planner*  
George Sariak, *Planner*

**Date Finalised:** July 2020

**Volume 3h:  
Recreation and Tourism**

August 2017

**Rob Greenaway & Associates**

**Refining NZ Crude Shipping Project  
Recreation and Tourism Effects  
Assessment**

**Prepared for ChanceryGreen  
on behalf of Refining NZ**



# **Refining NZ Crude Shipping Project Recreation and Tourism Effects Assessment**

**Prepared for ChanceryGreen on behalf of  
Refining NZ**

**by Rob Greenaway & Associates**

**[www.greenaway.co.nz](http://www.greenaway.co.nz)**

**August 2017**

**Version status:**

Final – 11 August 2017

# Contents

<b>1</b>	<b>Summary .....</b>	<b>5</b>
1.1	Method .....	6
1.2	Recreation activity summaries .....	6
1.3	Potential adverse effects .....	14
1.4	Summary of effects .....	14
1.5	Conclusion .....	16
<b>2</b>	<b>National and regional marine recreation participation .....</b>	<b>17</b>
<b>3</b>	<b>Regional recreation planning and policy .....</b>	<b>19</b>
3.1	Department of Conservation .....	19
3.2	Northland Regional Council .....	23
3.3	Whangarei District Council .....	28
3.4	Northland Harbour Board .....	28
<b>4</b>	<b>Activity reviews.....</b>	<b>30</b>
4.1	Swimming and beach use .....	30
4.2	Fishing .....	34
4.3	Shellfishing.....	37
4.4	Diving .....	41
4.5	Boating.....	43
4.6	Surfing.....	46
4.7	Tourism and commercial marine recreation .....	49
4.8	Hunting.....	51
4.9	Terrestrial recreation and access .....	51
<b>5</b>	<b>Assessment of effects .....</b>	<b>53</b>
5.1	Potential adverse effects .....	53
5.2	Technical review findings .....	54
5.2.1	Turbidity .....	54
5.2.2	Waves .....	55
5.2.3	Tides .....	56
5.2.4	Beaches .....	56
5.2.5	Marine ecology.....	57
5.2.6	Contaminants.....	58
5.2.7	Dredge activity .....	58
5.3	Nav aids .....	60
5.4	Cumulative effects.....	61
<b>6</b>	<b>Conclusion .....</b>	<b>62</b>
<b>7</b>	<b>References .....</b>	<b>63</b>
	<b>Appendix 1: Project activity maps.....</b>	<b>65</b>
	<b>Appendix 2: Northland Regional Council Regional Coastal Plan maps.....</b>	<b>66</b>
	<b>Appendix 3: Spot X fishing guide recommendations .....</b>	<b>68</b>

## List of Figures

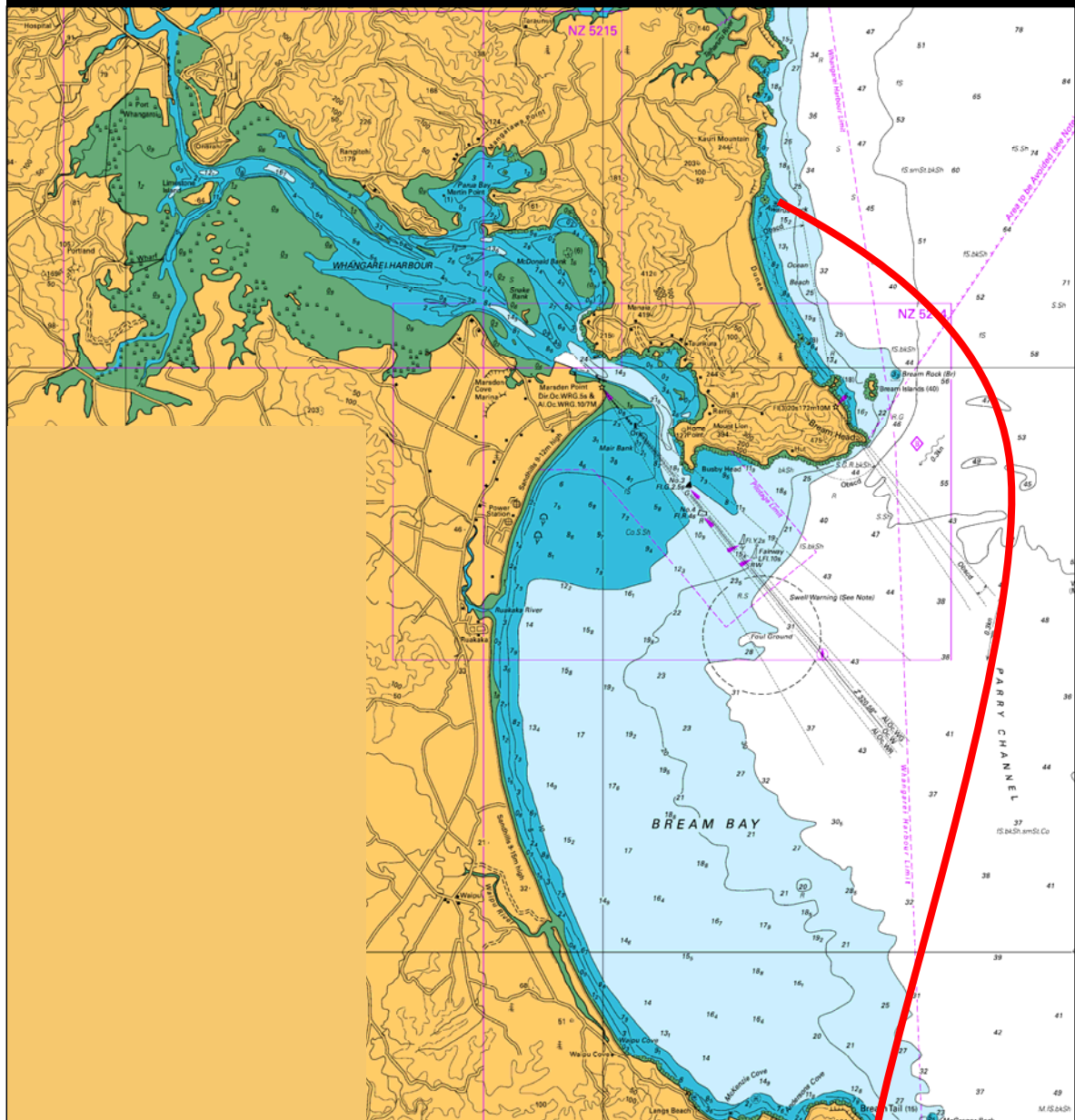
Figure 1: Study area: inshore from the red line spanning Awarua Rock to Bream Tail .....	5
Figure 2: Swimming / beach activity – main areas .....	7
Figure 3: Fishing activity - main areas .....	8
Figure 4: Shell fishing main areas – shore based (not scallops) .....	9
Figure 5: Diving and snorkelling main sites – craysfish, scallops, spear fishing, scenic .....	10
Figure 6: Boating, including sailing – main sites .....	11
Figure 7: Summary recreation activity – high use areas .....	12
Figure 8: Summary recreation activity – moderate use areas .....	13
Figure 9: National sport and recreation activities with the highest participation levels (SPARC 2009b) .	17
Figure 10: Public Conservation areas in the study area. DOC CMS 2014 .....	19
Figure 11: Bream Head / Te Whara Scenic Reserve and Peach Cove location .....	21
Figure 12: Excerpt from CMS Appendix 8 - Marine habitats .....	22
Figure 13: Coastal water quality classification zones, Whāngārei Harbour – NRC 2012 .....	25
Figure 14: ‘Common uses of the Harbour’ – NRC 2012.....	26
Figure 15: Proposed Marine Park boundary in blue – from Hampson et al 2013.....	27
Figure 16: Recreation activities in Whangarei Harbour (NHB 1989) .....	29
Figure 17: NRC monitored marine bathing sites in and around Whangarei Harbour 2013/14 .....	30
Figure 18: Surf Lifesaving NZ recommended beaches .....	31
Figure 19: Beaches showing number of carparking spaces 1997 (Allen et al 2009).....	32
Figure 20: Recreation fishing effort Matauri Bay to Whangamata. MPI NABIS data .....	34
Figure 21: Recreational fishing effort in the study area. MPI NABIS data.....	35
Figure 22: Surfcasting guide recommendation, Draper & Airey (2012).....	36
Figure 23: Recreational line fishing locations and fishing clubs from Allen et al 2009 .....	37
Figure 24: NRC water quality monitoring sites 2016/17, Whangarei Harbour .....	38
Figure 25: Recreational shellfishing locations from Allen et al 2009 .....	39
Figure 26: Sites assessed for suitability of future shellfish reseeding in Cummings and Hatton (2003)..	39
Figure 27: Diving recommendations near Bream Head, Enderby & Enderby (2007) .....	41
Figure 28: Diving recommendations near Bream Tail, Enderby & Enderby (2007).....	42
Figure 29: Anchorages, boat clubs and boat launching around Whangarei Harbour .....	43
Figure 30: Draft Regional Plan regionally significant moorings .....	44
Figure 31: Windsurf sites .....	45
Figure 32: Kitesurf sites (Ruakaka Kite Sports) .....	45
Figure 33: Whangarei area surf breaks (Morse & Brunskill 2004).....	46
Figure 34: Surf break details (Morse & Brunskill 2004).....	47
Figure 35: Surf break details (Morse & Brunskill 2004).....	48
Figure 36: Regionally significant surf breaks – Draft Regional Plan for Northland .....	49
Figure 37: Crown Land (yellow) around Whangarei Harbour. Source: WAMS .....	51
Figure 38: Public access around Whangarei Harbour and Bream Bay excluding legal roads .....	52
Figure 39: Commercial Vessel Route, Whangarei Harbour – cyan. NRC data .....	59

## 1 Summary

This report reviews the potential effects of Refining New Zealand Ltd's (RNZ) Crude Shipping Project ('the Project') on recreation and tourism values. This involves dredging the Whangarei Harbour entrance to allow the transit of deep-draught large crude carrier vessels (Suezmax vessels). RNZ is applying for resource consents to:

- partially realign the access channel to provide safe navigational access for fully loaded Suezmax ships,
- modify the placement of navigational aids along the new channel alignment,
- carry out capital and maintenance dredging to achieve and maintain a minimum depth to support 16.6m ship draught in the access channel, and
- dispose of dredged materials. Most of this material (up to 97.5%) will be placed more than 7km off Busby Head in approximately 45m of water depth (directly south east of the foul ground shown Figure 1). The remainder will be deposited south of the ebb tide

**Figure 1: Study area: inshore from the red line spanning Awarua Rock to Bream Tail**



shoal which borders Mair Bank in water depths of between 7 and 15m to supplement the coastal sand supply.

The location of these activities are illustrated in the figures in Appendix 1 of this report.

The study area is defined by the recreation settings potentially affected by the proposal and includes the inshore area from Awarua Rock to Bream Head as shown in Figure 1.

## **1.1 Method**

---

This report is based on:

- A preliminary literature review completed in 2015 to identify regional marine recreation values and direct research required to identify the potential effects of the Project on these values,
- Community consultation carried out by RNZ through 2015 and 2016 (a full summary of consultation undertaken in connection with the project is provided separately),
- Team meetings between independent experts contracted by RNZ to undertake research activities for the Project and author parallel technical reports,
- An updated literature review in 2017,
- Reference to relevant technical reports commissioned by RNZ, and in particular those for marine ecology and coastal processes, and discussions with the authors of those reports,
- The release of a consultation draft of this report in early 2017, and revisions based on feedback from the consultation process, including attendance at public information days in April 2017.

## **1.2 Recreation activity summaries**

---

The data indicate that the study area, and especially Whangarei Harbour, the Harbour entrance, and the marine and coastal marine settings between Marsden Point and Bream Head, are intensely-used recreation settings, and are popular for a wide range of different activity groups.

No data reviewed indicate the scale of significance of the setting for recreation and tourism (that is, state whether it is nationally, regionally or locally significant). The scale and variety of activities suggests the setting is of at least regional significance.

The following figures show summary data based on the literature reviewed in this report, and consultation findings from public open days held by Refining New Zealand – and attended by the author of this document – in March 2015 and April 2017 – and further feedback received by RNZ directly or via its website feedback form. The final two figures in this summary section (Figure 7, Figure 8) use the base data to identify moderate and high recreation activity areas.

Figure 2: Swimming / beach activity – main areas

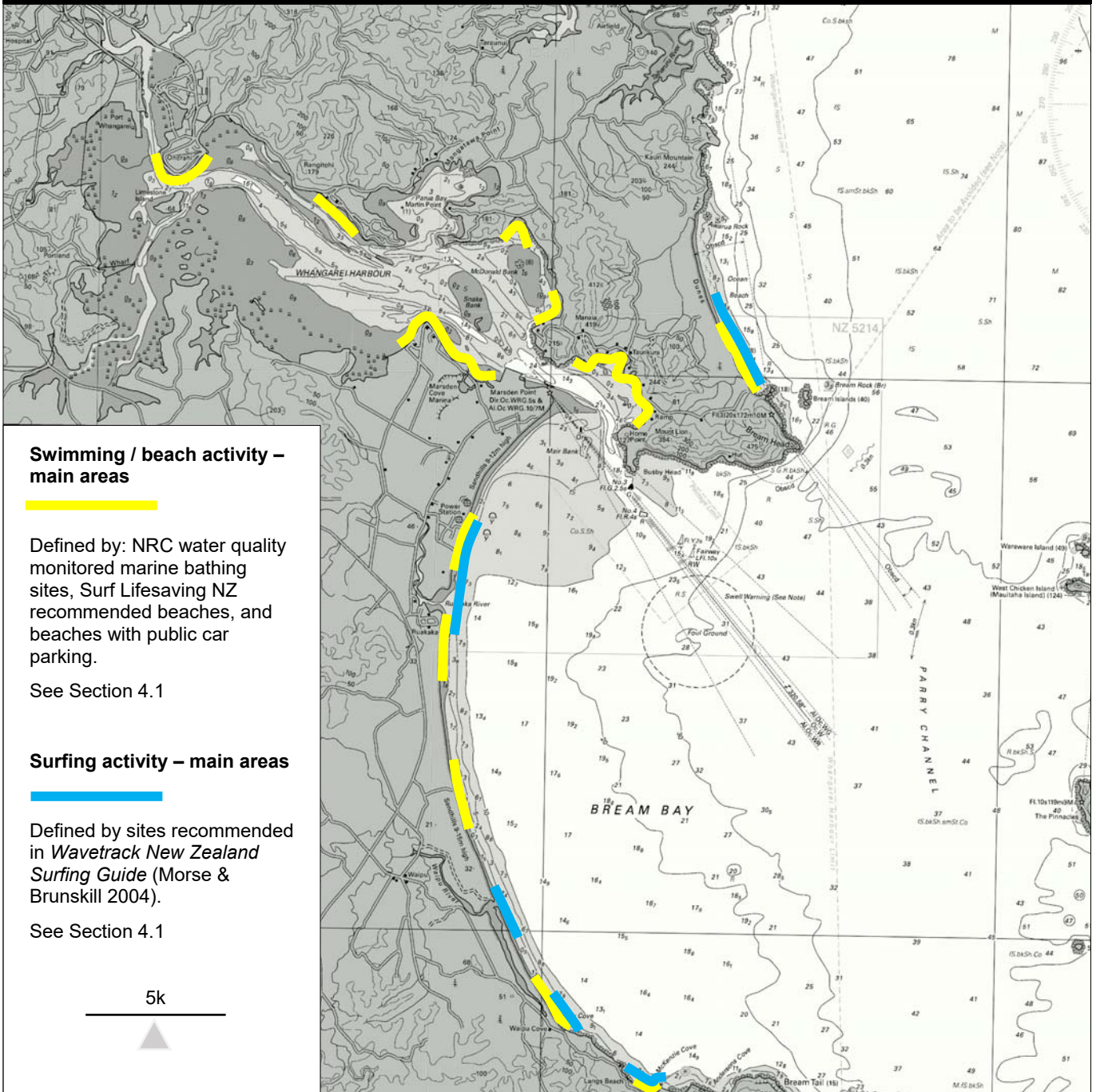




Figure 3: Fishing activity - main areas

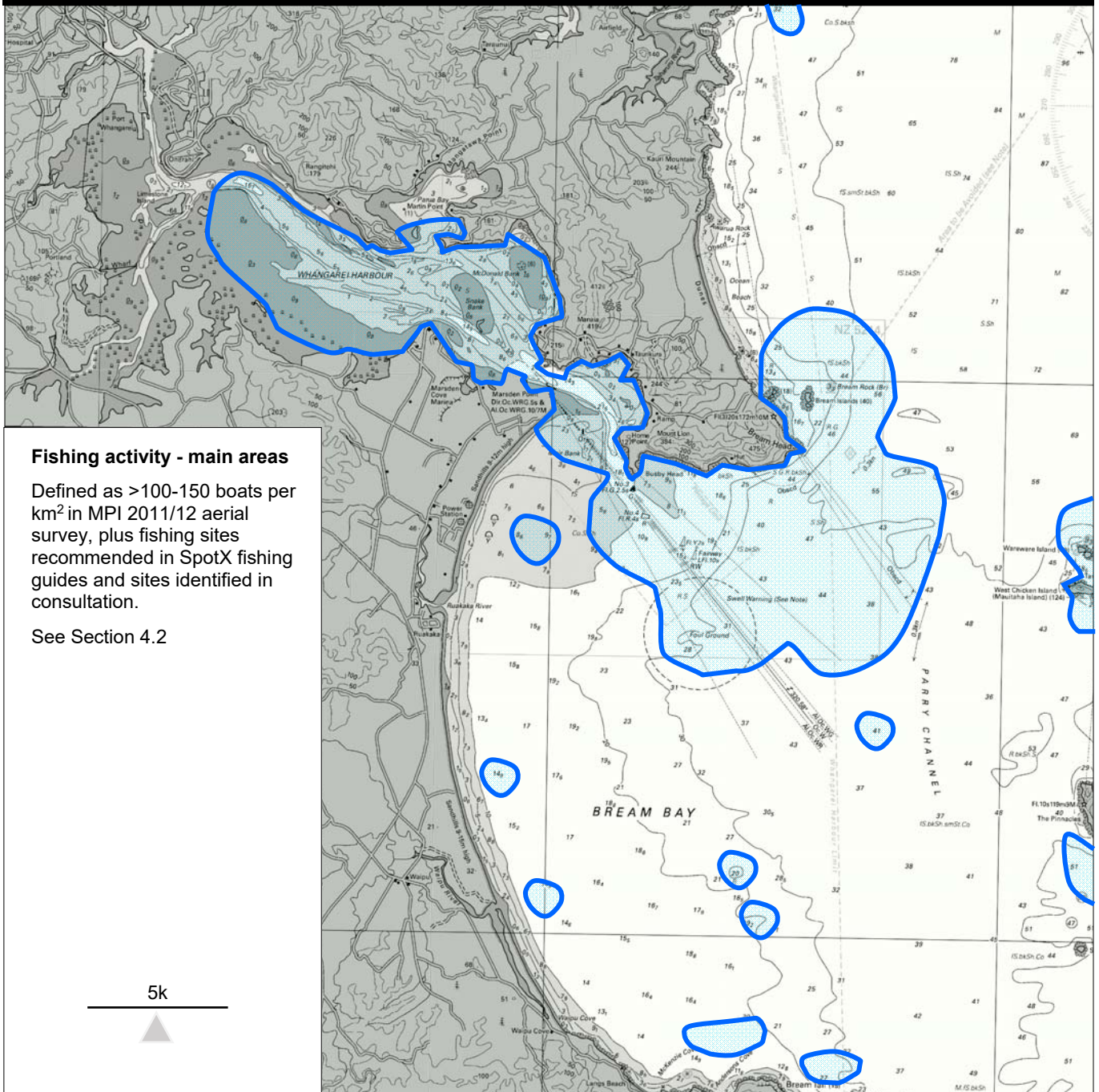
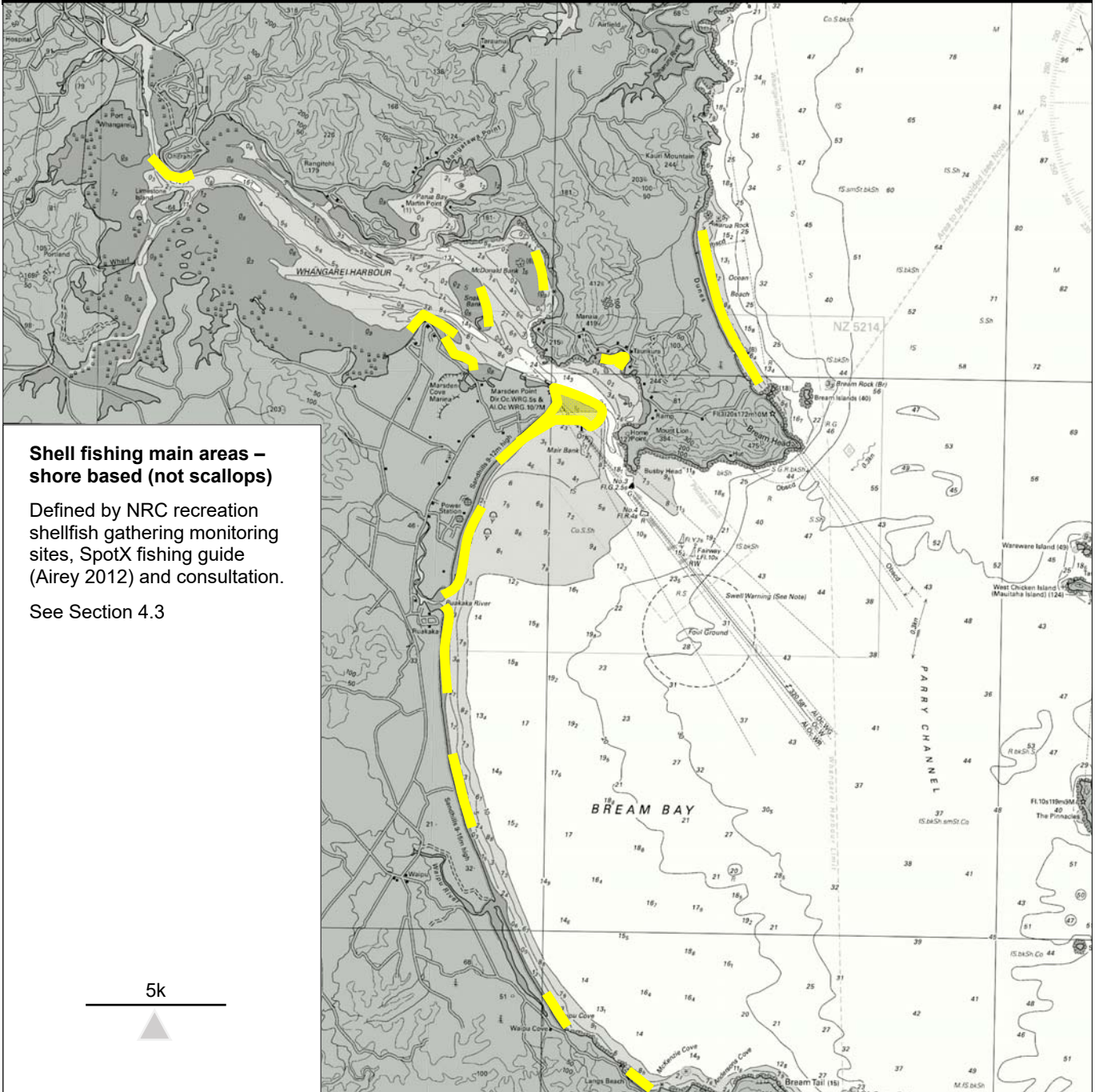


Figure 4: Shell fishing main areas – shore based (not scallops)



**Shell fishing main areas – shore based (not scallops)**

Defined by NRC recreation shellfish gathering monitoring sites, SpotX fishing guide (Airey 2012) and consultation.

See Section 4.3

5k



Figure 5: Diving and snorkelling main sites – craysfish, scallops, spear fishing, scenic

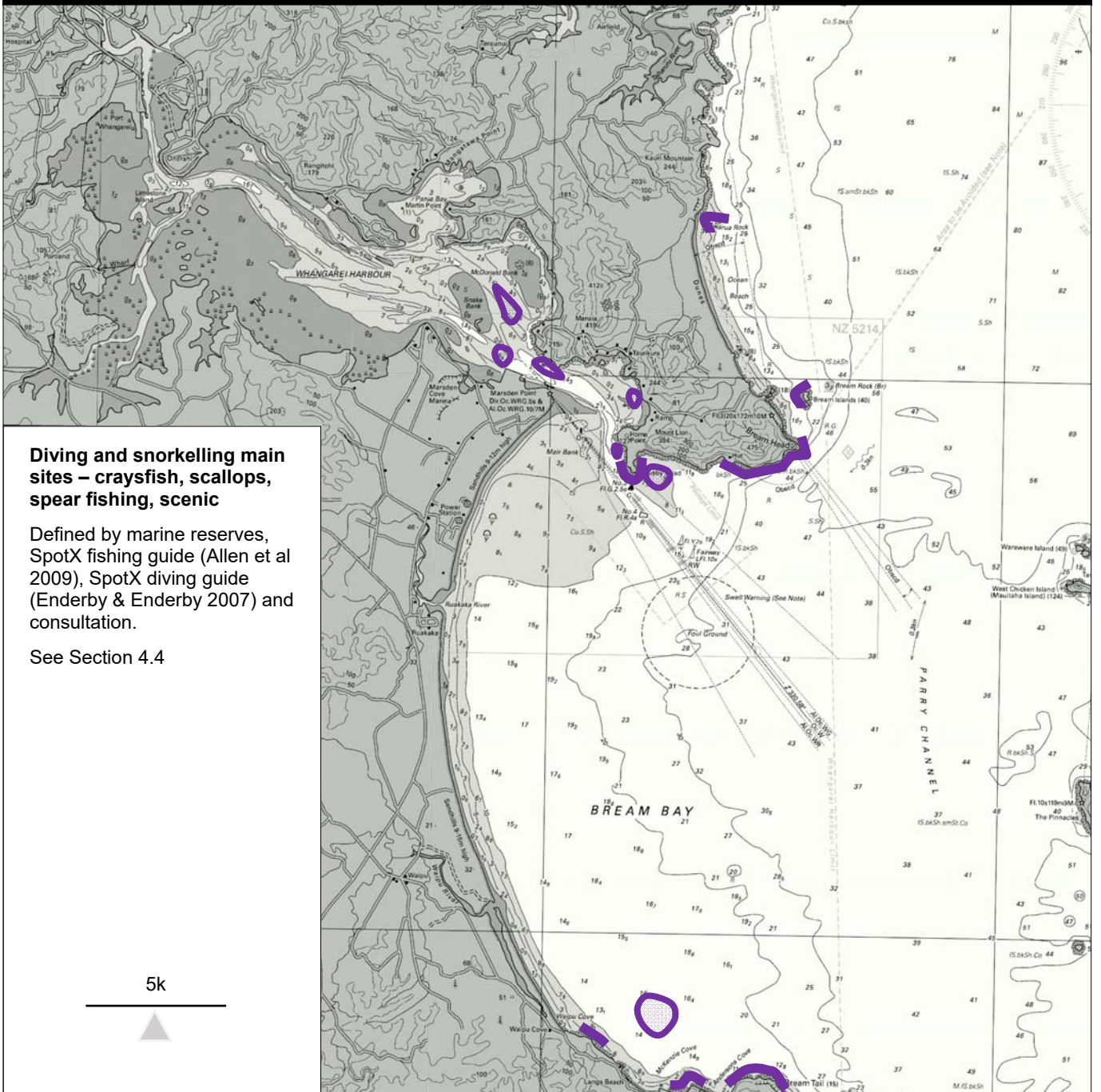


Figure 6: Boating, including sailing – main sites

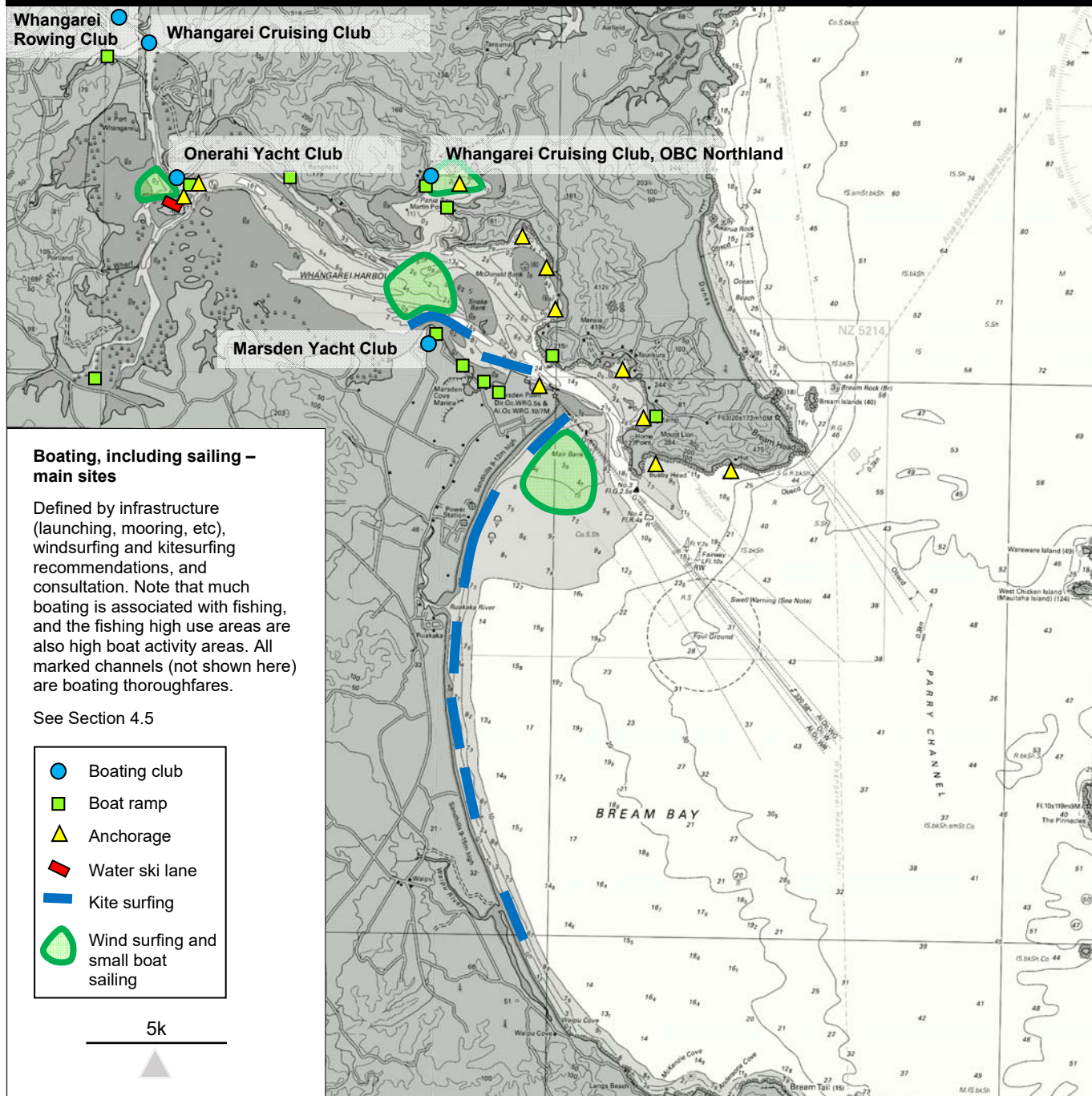


Figure 7: Summary recreation activity – high use areas

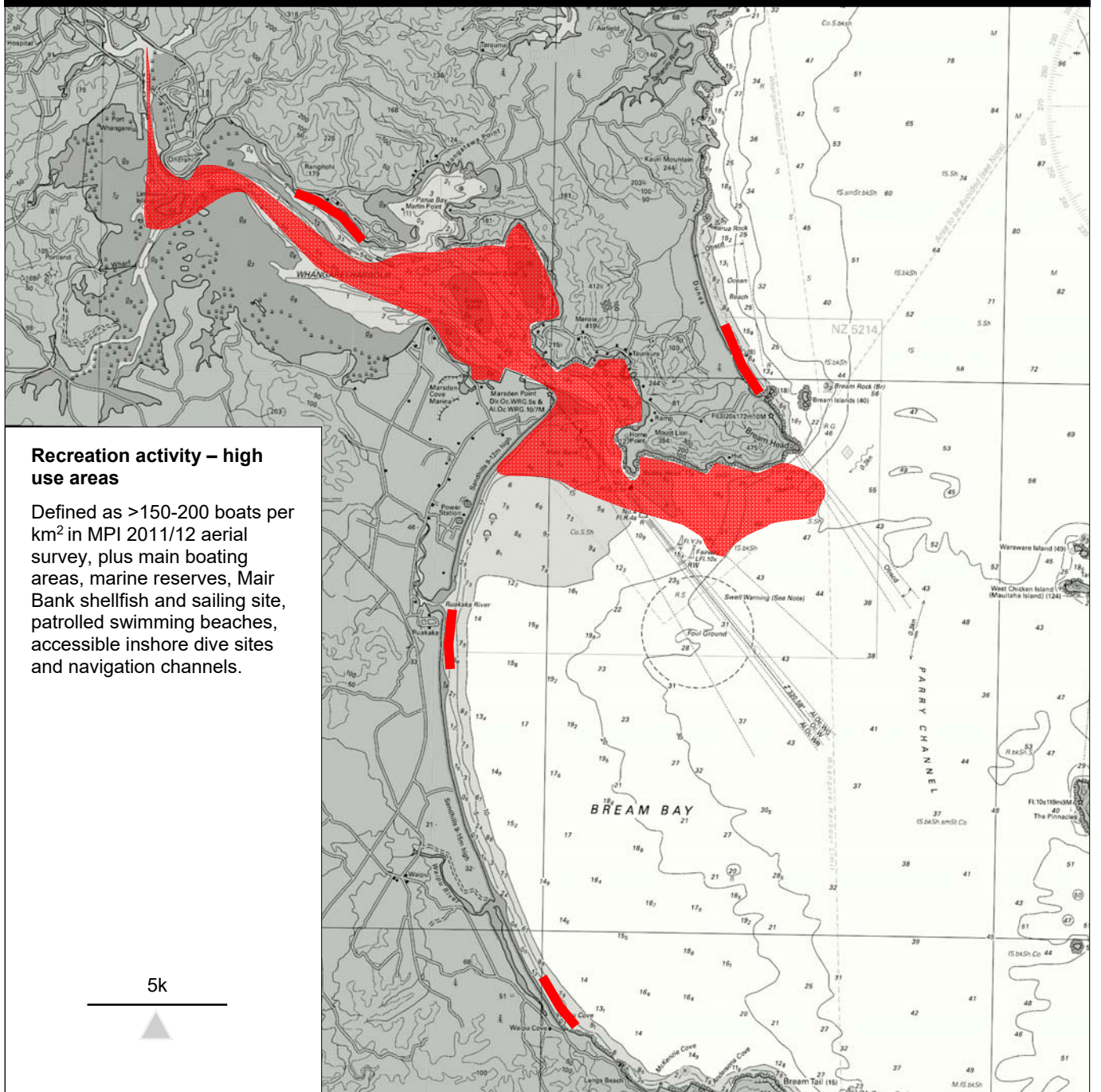
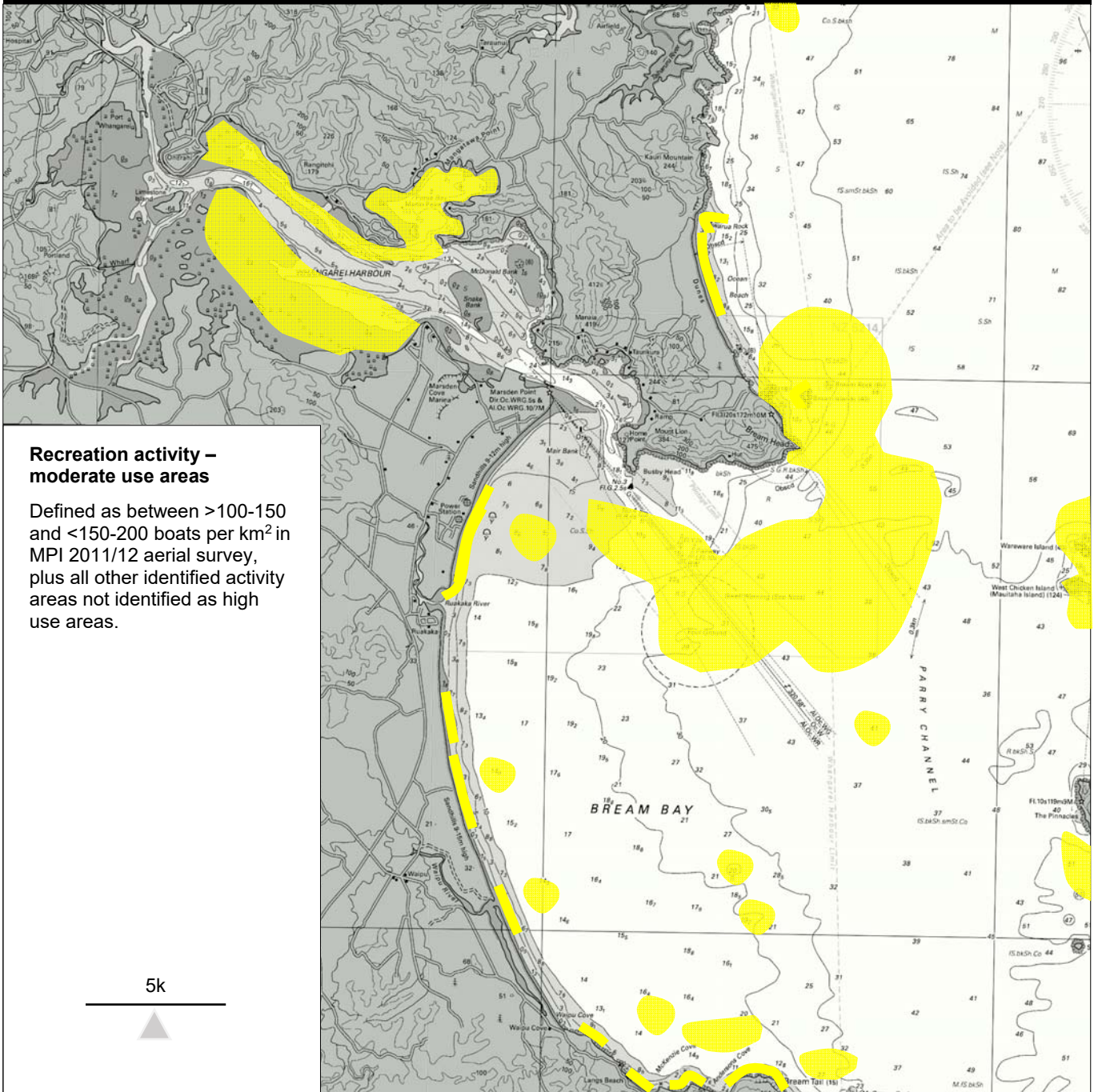


Figure 8: Summary recreation activity – moderate use areas



### 1.3 Potential adverse effects

---

The following potential effects of the proposal are of interest to recreation.

#### Construction and maintenance

- Turbidity effects on recreation settings (particularly swimming and diving areas) and visual amenity at and near the Harbour entrance,
- Mobilisation of contaminants and potential effects on shellfish and other seafood, and for water-contact recreation,
- Effects on marine ecology and the quality, abundance and catchability of marine species, in and around the entrance and at and near the spoil dumping site offshore during the dredging period/s, and
- Occupation of marine settings by dredges working or in transit and the creation of hazards for, especially, boaters.

#### Operation

- Changes to tides, currents and wave patterns resulting from altered bathymetry,
- Changes to beach and foreshore profiles resulting from changes to wave patterns, including remobilisation of dumped material,
- Effects on wave energy as a result of the passage of larger vessels,
- Effects associated with the location and operation of aids to navigation, such as navigation buoys and markers (*Nav aids*).

Effects on birds, from noise, and navigation risk are separately assessed, but, in a recreation context, those effects are considered to be not relevant, nil or too low to be reviewed further. Similarly, the increased harbour depth or alignment is not considered to offer any advantage to recreational boaters due to their shallow draught.

### 1.4 Summary of effects

---

#### Turbidity

The dispersal of sediment from the dredging activity is likely to be strongly confined to the dredge channel and has a low chance of dispersal to any contact recreation setting. However, real-time monitoring is planned to ensure there are no effects on important marine ecosystems near the dredge channel. There is likely to be very little if any adverse effect on recreational dive and swimming sites, including on the marine life that attracts most divers.

#### Waves

Preferred wave heights for surfing range between 1 and 3m. Changes which might be noted by surfers only accrue during storm events with wave heights around 5m and only at the northern end of the Marsden Point surf break at Mair Bank. This is unlikely to affect surfing amenity.

Increases in wave energy could have adverse effects on diving and swimming, but effects (as small as they are modelled to be) only occur when there is little natural amenity for recreation due to natural wave action (that is, there needs to be waves in action for there to be an effect on them, and the smaller the wave, the less effect).

#### Tides

An acceleration in tidal strength could pose a hazard for boaters in the harbour channel. However, by deepening the channel, tidal speed generally decreases, albeit by a very small

amount. There are therefore no adverse effects resulting from changes in tidal speed. There is the potential for a minor change in timing of high and low tides, which will not affect recreation participation (timing of tides change every day).

### **Beaches**

The potential for changes to beach profiles is confined to Mair Bank, which, for recreation values, is predominantly a shellfish gathering setting. Mitigation options are proposed and a monitoring programme would be implemented. Any changes of relevance to recreation are confined and managed.

### **Marine ecology**

Coffey (2017) indicates that the scale of effect on benthic biomass (food sources for recreationally taken fish) are expected to be 'minor to moderate', short-term, and to progressively ameliorate within 6 to 12 months in the dredged channel and inshore/ebb tide shoal disposal area, and within 12 to 24 months in the offshore disposal area, although at the latter an 'ecologically constructive benthic community' (one able to provide feeding grounds for fish) is expected to re-establish within 12 months (meaning all affected areas will be supporting recreational fish species within 6 to 12 months). This is likely to similarly result in some local displacement of fishing activity from the dredge and disposal footprints during the recovery period. However, due to the scale of the local fishing resource, the mobility of finfish, the lack of effect on biota beyond the activity footprints, the progressive recovery of the benthos and the temporary nature of the effect, the net outcome for recreational fishing from capital dredging is likely to be adverse but also minor. Maintenance dredging will have a lower scale of effect during each event, but due to its frequency (2 to 5 yearly) its net effect will also be adverse but minor. There is likely to be some temporary increase in local finfish activity as the dredging activity exposes food sources, but this is not considered to be a mitigating effect.

### **Contaminants**

Coffey (2017) states that the material to be dredged is not contaminated with any toxins and also has very low levels of organic matter (which, if present, could lead to a drop in dissolved oxygen levels due to spikes in algal growth). This means there are no water quality issues associated with the activity.

### **Dredge activity**

Any recreation skipper operating in or near the harbour entrance would expect to encounter large ships and to comply with harbour navigation rules. While the presence of a dredge is an additional navigational issue, it should not limit recreation participation by large and small recreational vessels. Eighty-percent of dredge activity will be in the outer channel beyond Home Point, outside recreational diving, snorkelling and swimming areas, and where there is ample navigation space. However, it is recommended that RNZ place on its website information about dredge activities (location and duration of activity) and advise the regional harbourmaster who can then make judgements about the importance of additional maritime notifications – including whether it warrants a Notice to Mariners (via LINZ). Required maritime practice means the dredge will be appropriately lit at night and will obey all marine navigation rules. The net effect on recreation participation is likely to be minor or less.

### **Nav aids**

Nav aids are required structures for safe navigation. They are used by both recreational and commercial craft and need to be in the right locations. The recommendations for their placement as part of the Project are made by Royal Haskoning DHV (2016) for the purposes of navigation safety. This is a necessary response to the Project. However, if it was required due to natural changes in channel alignment, it would not be considered an adverse effect on



recreation participation. Local boaters will rapidly adjust to very obvious changes in beacon location, which should be considered a pre-requisite skill for operating watercraft in a navigation channel. The proposed navaid developments are not considered to be adverse effects on recreation, and any safety improvement in navigation is likely to have a positive effect. They will require a Notice to Mariners and updates to marine charts via LINZ.

### **Cumulative effects**

For recreation, the effects of the proposal are sufficiently slight to make it unlikely for cumulative adverse effects to arise. There are no locally consented activities identified which have not been implemented which would increase the potential for adverse effects from the proposal. There has been no identified mechanism by which the proposed activity would affect pipi beds on Mair Bank, and the relocation of sand to the ebb tide shoal will support the maintenance of habitat.

## **1.5 Conclusion**

---

Whangarei Harbour, its margins and the surrounding coast are intensely used marine recreation resources, with a variety of different recreation values and almost no corner that is not used for some leisure activity. The dredging activity is proposed to be undertaken within an area used extensively and intensively for fishing and boating (although fishing and anchoring directly in the navigation channel is not prudent). Nearby settings support diving, snorkelling, swimming, surfing, kite surfing, shellfishing, beach activities, and more boating and fishing.

The main potential effects of concern for recreation relate to changes in the abundance and location of fin and shellfish, changes to water clarity and quality, changes to wave patterns and effects on shoreline processes. Navigating near an operating dredge is also of interest, but a normal part of boating near an existing commercial port.

Potential effects on water clarity and quality are minor or less for recreation values, with a real-time monitoring programme proposed to avoid any sedimentation affecting important benthic communities outside the dredge and disposal footprints. This is the result of the quality of the dredge material and the pattern of currents which confine sediment plumes to within the navigation channel.

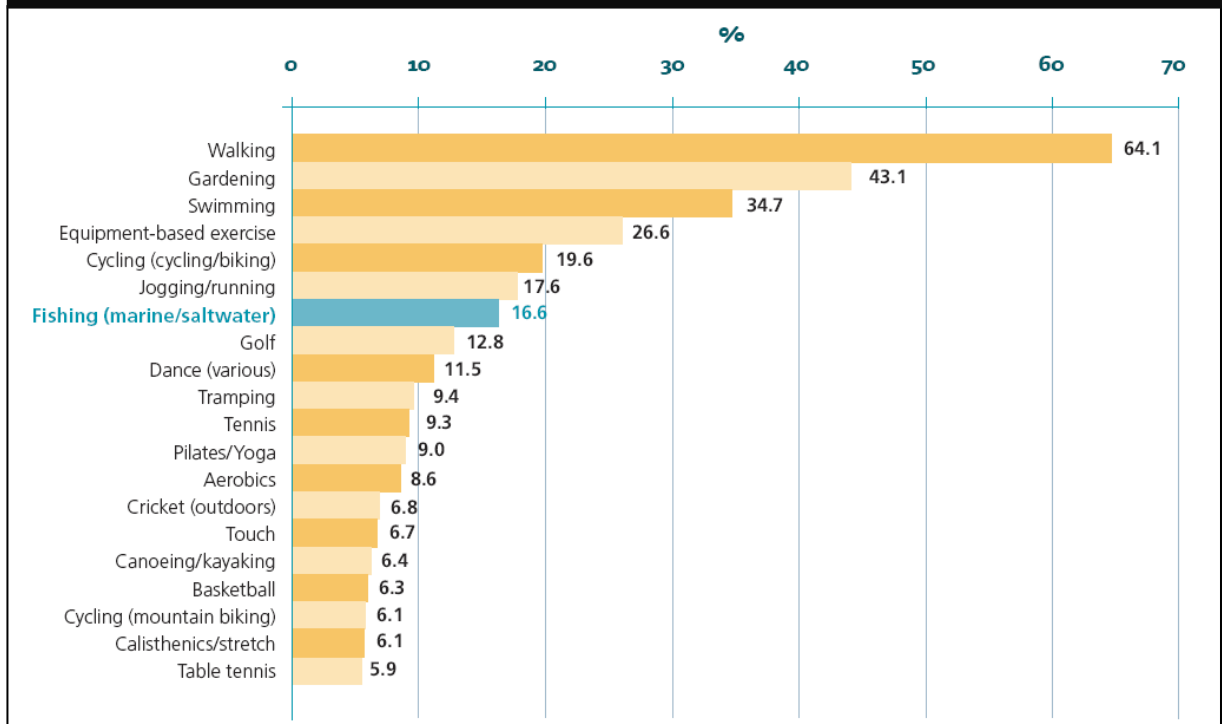
Changes to wave heights are small and variable depending on swell direction, and are unlikely to be discernible by surfers and other beach users. Changes to beach profiles are consequently unaffected by the capital dredge programme, and a sand augmentation and monitoring programme is proposed for the Mair Bank area to mitigate potential long term effects from maintenance dredging and to potentially contribute to reducing the effects of existing coastal change processes.

The main effect of interest to recreation is likely to be a temporary displacement of some fishing activity from near the dredged channel and the disposal site as they recover from bed disturbance. This effect is predicted to last for 6 to 12 months for capital dredging (the recovery time for 'constructive benthic communities' in all affected sites). Due to: the scale of the local fishing resource, the mobility of finfish, the lack of effect on biota beyond the activity footprints, the progressive recovery of the benthos, and the temporary nature of the effect, the net outcome for recreational fishing from capital dredging is likely to be adverse but also minor and represented by fishers choosing an alternative fishing site nearby. Maintenance dredging will have a lower scale of effect during each event, but will occur repeatedly and over time, and thus also have an adverse effect which is likely to be minor. The use of berley to attract fish is normal practice when boat-fishing, and Brian Coffey (author of Coffey (2017), pers comm) notes that using this method in a disturbed area will remain effective in attracting finfish.

## 2 National and regional marine recreation participation

SPARC (now Sport NZ) (2009a and 2009b) reported via the Active NZ survey that fishing, both freshwater and marine, was the seventh most important 'active leisure' pursuit in New Zealand with, in 2007/08, 19.5% of the national population participating, and 16.6% fishing in marine settings (approximately 540,000 people). This makes fishing more popular as a participation activity than, for example, golf, tramping, cricket, tennis and rugby (Figure 9). Almost 30% of men fished in 2007/08, and 9.7% of women. Sport NZ (2015) indicates that participation in fishing grew between 2007/08 and 2013/14 for both men and women (from 18.8% to 19.5% of the population, and 27.5% for Maori), and it was one of the main activities where additional participation was desired.

**Figure 9: National sport and recreation activities with the highest participation levels (SPARC 2009b)**



The level of participation in fishing (marine and freshwater) in the Northland Region is far higher than the national average with 40.2% of the region's population fishing (59.8% of men and 26.2% of women) in 2007/08 and 37.8% in 2013/14, making it the second-most popular active recreation or sport pursuit in the region after walking (and excluding gardening, which was not reported in 2013/14). Regionally, it was the most popular activity for men and the fifth-most popular activity for women (SPARC 2009c, Sport NZ 2015a). Other research completed for Sport NZ indicates that in Northland almost all those reporting fishing as an activity are marine fishers, while a small percent are also fresh-water anglers (Sport NZ 2013).

At the national level, 3.8% of the population reported going diving in 2007/8 and 3.4% in 2013/14; and 2.4% went sailing or yachting in 2007/08 and 2.1% in 2013/14 (SPARC 2009d & Sport NZ 2015b). The Active New Zealand survey only considered physically active, non-motorised pursuits and so did not review motor boating participation. In contrast, 13.5% of adults in Northland went scuba diving in 2007/08 and 7.6% in 2013/14 (SPARC 2009c and Sport NZ 2015a), and participation in yachting was also relatively high at 3.5% (Sport NZ 2015a). The Northland Regional Council reported one permanent boat mooring for every 45 permanent Northland residents, as well as five marinas in 2002 (NRC 2002).

Kalafatelis & Magill (2013) completed a national survey of recreational boating activity for Maritime NZ with 1500 respondents. The results do not appear to have been filtered for marine activity only. This indicated, at the national level, that:

- 24% of New Zealanders aged over 18 own or use a vessel for recreation boating purposes (57% male and 43% female):
  - 15% own or use a canoe or kayak,
  - 9% own or use a power boat under 6m,
  - 9% own or use a dinghy,
  - 5% own or use a power boat over 6m,
  - 3% own or use a sail boat under 6m,
  - 2% own or use a sail boat over 6m,
  - 2% own or use a jet ski.
- During periods when boaties are 'most active', such as over summer, 24% of users of power boats under 6m go out at least weekly, and another 25% go out once every couple of weeks. Similar levels of activity are evident for other vessels, and power boats under 6m are the most frequently used.
- The average number of years of boating experience was 12.9 years, with those owning or using kayaks and canoes the least experienced.

Kalafatelis & Magill (2013) reported the number of respondents based in Northland, but as the figure is quite low (n=24) there is limited reliability in the data from this sub-group.

Vance (2014) used the data gathered by Kalafatelis & Magill (2013) and older information to review trends in boat ownership. Eight Colmar Brunton surveys completed between 2002 and 2011 gave a range of 16% to 19% of households owning at least one boat in New Zealand; or 641,000 people and 727,000 vessels. Kalafatelis & Magill (2013) gave an estimate of 900,000 vessels. Vance (2014) estimates that between 30% and 50% of boat users go out at least every couple of weeks; and that levels of ownership have been reasonably consistent since at least 2006, but with possible increases in the ownership of trailer power boats and canoes and kayaks. However, the use of different survey methods means these trends are not certain.

### 3 Regional recreation planning and policy

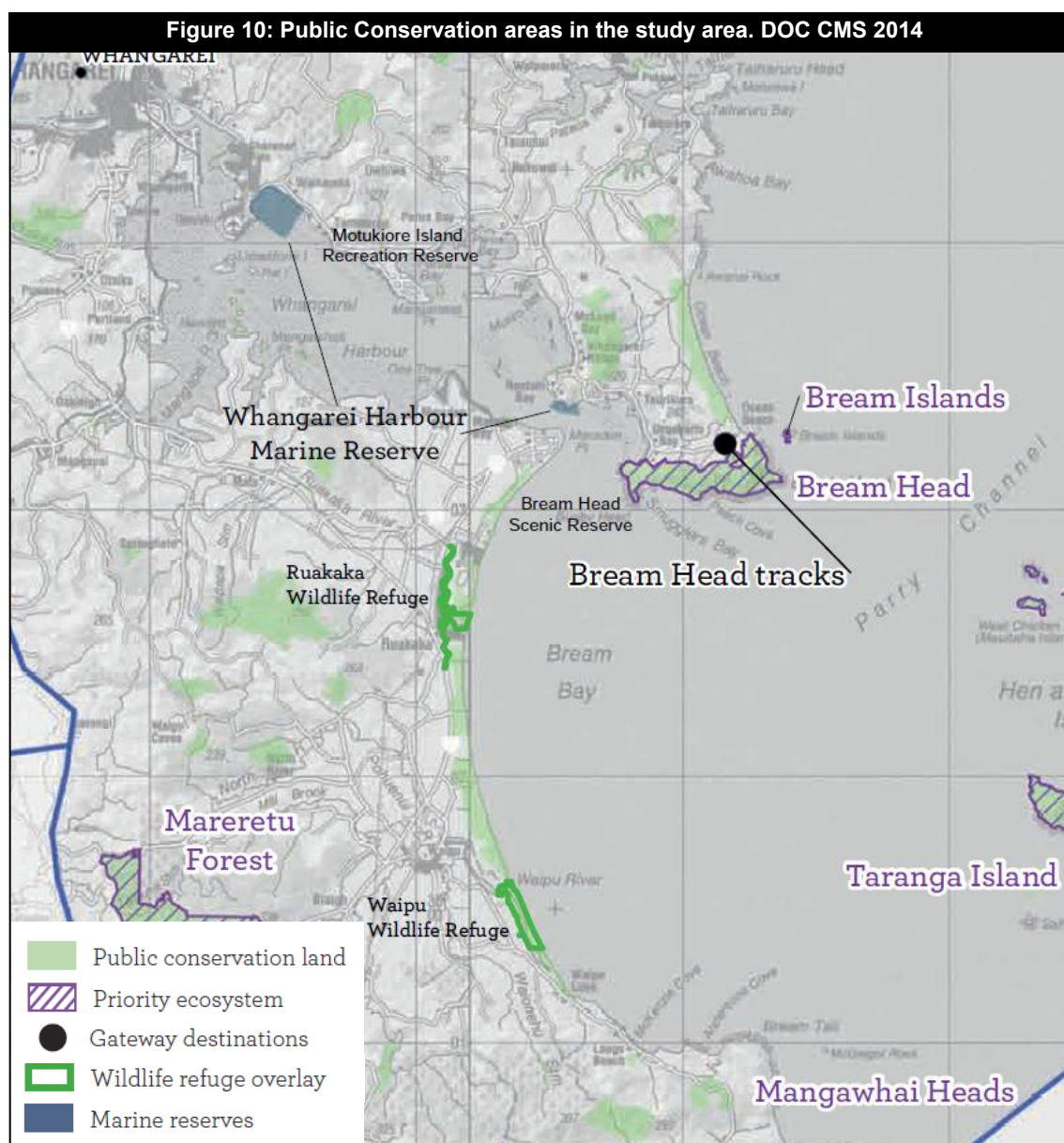
This section reviews references to the management of recreation values in the study area from planning literature published by, or about, the Department of Conservation (DOC), the Northland Regional Council (NRC), the Whangarei District Council (WDC) and the disestablished Northland Harbour Board (NHB).

#### 3.1 Department of Conservation

The Department of Conservation’s Conservation Management Strategy (CMS) for Northland 2014-2024 (DOC 2014a) locates the study area in the ‘Whangaruru–Mangawhai Coast Place’. The public conservation areas within this place and the study area are shown in Figure 10. The Bream Head tracks are identified as a ‘gateway destination’ (one of eight in the Northland Conservancy).<sup>1</sup>

The CMS describes the recreation setting as (p89):

*Whangarei Harbour has some significant harbour features and estuarine habitats,*



<sup>1</sup> ‘Gateways’ are places that the Department will promote as suitable for people’s first adventures in the outdoors, or repeat adventures of a gentle nature. (DOC 2104a, p10)

*ranging from upper harbour mud and sand flats to deep channels, islands, extensive shellfish sand banks and deep holes near the harbour entrance. Whangarei Harbour Marine Reserve comprises two sites — Waikaraka and around Motukaroro (Passage) Island at Reotahi.*

*The establishment of a marine recreational park between Cape Brett, Poor Knights Islands Marine Reserve and Bream Head has been proposed as a means of making the most of the spectacular coastline to provide multiple sustainable economic benefits for Northland. The intention of a marine recreational park is to align Māori values of long term sustainability and kaitiakitanga with enhanced conservation outcomes and recreation opportunities.*

*Visitor use is moderate to high in this Place, especially in summer when camping and boating are very popular, along with the active use of the many sandy beaches for fishing, swimming and surfing. Snorkelling and scuba diving are also popular along the coast, particularly at the Poor Knights Islands Marine Reserve. There are four camping grounds administered by the Department, all of which are heavily used over the height of the summer months, especially since many private camps have been converted into coastal subdivisions. Tracks and walkways through many of the reserves supplement those provided by the local authority. The Te Araroa Trail follows close to the coast for its entire length through this Place. The attractions and activities are primarily used by locals, but domestic and international tourism is increasing.....*

*Whangarei, the major urban area and administrative centre for the Northland region, is the location for principal sites of industrial processing. It includes the only oil refinery in New Zealand, a large forestry port, cement and fertiliser works, transport systems, and other planned or existing activities adjacent to Whangarei Harbour such as at Marsden Point and lower Port Road. All of these have the potential to cause adverse impacts on natural and historic values if not closely monitored. Three pipelines carrying gas and petroleum products from the Marsden Point Oil Refinery pass through land administered by the Department, and require ongoing inspection and maintenance. The Marsden Point Oil Refinery, deep water export port and new manufacturing plants lie immediately adjacent to recreation areas, kiwi and shorebird habitat, sites important for biodiversity, historical and archaeological sites, and marine reserves. Extensive flat land and improved transport links with Auckland are creating opportunities for economic growth that are increasing pressure on natural values and the types of visitor experience.*

The following outcomes for the Whangaruru–Mangawhai Coast Place are sought (p90):

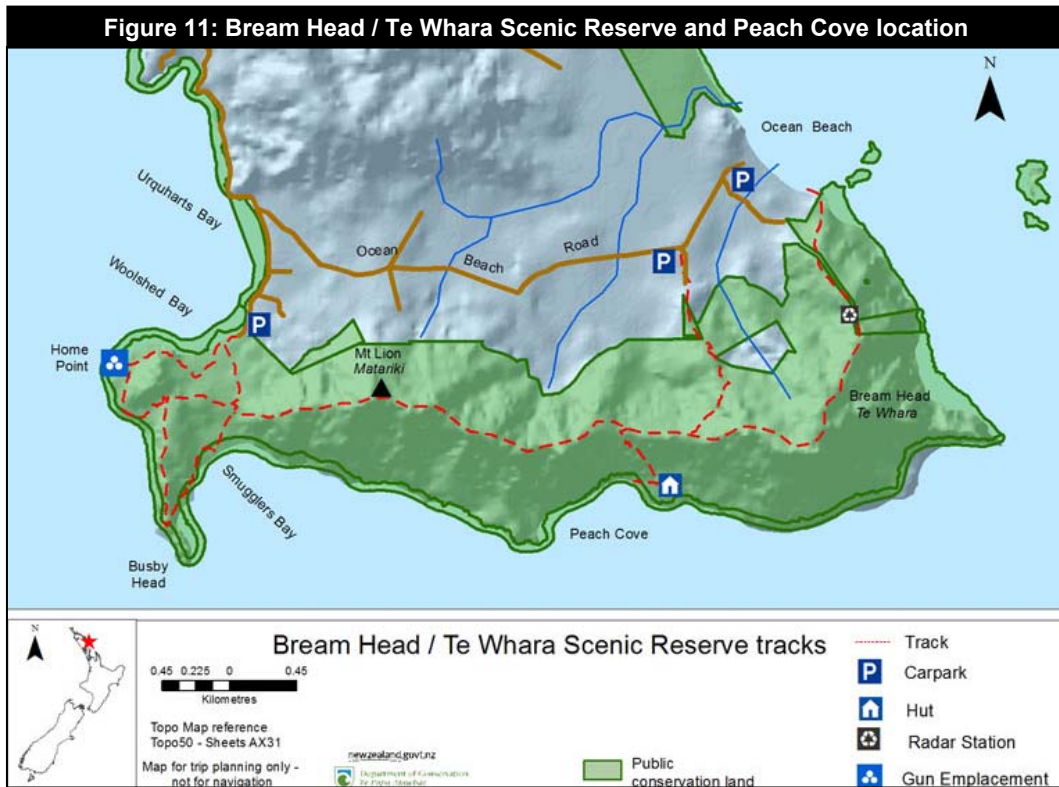
*The Whangaruru–Mangawhai Coast Place is a diverse and highly used coastline centred on Whangarei, where the population and industrial and economic activity in Northland are concentrated. The Department works collaboratively with tangata whenua, other agencies, business interests and the community to achieve a net conservation benefit wherever possible....*

Whangarei Heads

*The Bream Head and Manaia Ridge Scenic Reserves are ecological gems where visitors get a real feel for what the nearby offshore islands are like without accessing them....*

*Bream Head Scenic Reserve is a Gateway Destination where visitors also enjoy coastal vistas, coastal defence historic features and pā sites from a network of*

generally easy-grade walking tracks. The secluded Peach Cove Hut [Figure 11]<sup>2</sup> enables a special experience of coastal biodiversity. Opportunities for visitors to participate in education, research and restoration programmes are provided by a community trust, community groups and concessionaires. In these reserves, as well as at Bream Islands Scenic Reserve and Ocean Beach, the community and tangata whenua are working together with the Department to restore and manage natural, cultural, recreational and historic values.



### Bream Bay and Mangawhai

*The Te Araroa Trail and another popular walkway pass near/through it, providing spectacular views of the islands of the Hauraki Gulf, Bream Bay and Bream Head...*

*Public access to the beaches is via access points managed in collaboration with Whangarei District Council and Northland Regional Council to protect the foredunes. New recreation opportunities have been developed to enable increasing numbers of visitors to enjoy basic-facility campgrounds, walking and cycle trails, bird-watching hides, and guided tours. There is a collaborative approach between the Department, tangata whenua, local authorities and communities to ensure that recreational, residential and industrial expansion does not compromise and, wherever possible, enhances the natural, cultural and already established recreational values of the area. The long, unbroken stretch of white sandy beach at Bream Bay and Mangawhai, and the vista across the water to the islands and Bream Head are valued, enjoyed and appreciated by all.*

### Marine Protected Areas

*The ecosystems at the internationally ranked diving destination at the Poor Knights Islands Marine Reserve and the Whangarei Harbour Marine Reserve have recovered,*

<sup>2</sup> <http://www.doc.govt.nz/parks-and-recreation/tracks-and-walks/northland/whangarei-area/bream-head-peach-cove-track/#map> retrieved 13 Nov 2014

and both sites are enjoyed by many who strongly defend their values. The marine reserves sustain diverse populations of native plants and animals. Their conservation values are recognised and valued for their contribution to the biodiversity of the wider marine environment. Visitors leave the reserves with an enhanced understanding and appreciation of the value of no-take reserves and long-term protection of the marine environment. Public enjoyment and scientific research are encouraged in marine reserves.

Human activities in marine reserves and on adjoining public conservation lands are not detrimental to scientific study or conservation values, and do not detract from the visitor experience. The Department continues to advocate for the appropriate use of land within marine reserve catchments to reduce land-based effects on marine reserves. Biosecurity measures are established where practicable and maintained to prevent the establishment of viable populations of new marine pests within marine reserves.

...Further areas on the Whangarei coastline have been identified for marine conservation initiatives and everyone enjoys a restored food-basket as a result. In conjunction with regional and district councils, tangata whenua, the community and tourism organisations, a marine recreational park is investigated to protect, enhance and increase sustainable coastal and marine tourism and recreation opportunities.

**Figure 12: Excerpt from CMS Appendix 8 - Marine habitats**

Ecosystem	Habitat type	Significant values	Pressures/threats	Protected areas
Whangarei Harbour	Saltmarsh Mānawa/mangroves Karepō/seagrass Intertidal sand and mudflats Estuarine beach Estuarine sand Estuarine reef High-current shallow sand High-current shallow reef	Diverse benthic invertebrate and fish assemblages.  Diverse high-current assemblages at Motukaroro.  Productive customary, commercial (fin and shell fish) and recreational fisheries.  Important coastal and wading bird habitat.  Kera wēra/killer whale foraging habitat.	Significant historic and ongoing anthropogenic impacts resulting in environmental degradation, including loss of shellfish beds and extensive karepō/seagrass meadows (and their associated fishery and biodiversity values). Overfishing. Chronic disturbance and underwater noise pollution.	Whangarei Harbour Marine Reserve— Motukaroro, Waikaraka.
Bream Bay / outer Hauraki Gulf	Saltmarsh Mānawa/mangroves Intertidal sand and mudflats Estuarine sand Moderate beach Moderate rocky shore Moderate shallow sand Moderate shallow reef Deep sand Deep mud Deep reef	Waipu, Ruakaka and Mangawhai Government Purpose Wildlife Refuge Reserve estuaries contain important coastal and wading bird habitat.  Relatively pristine inshore benthic invertebrate assemblages.  Productive reef systems, particularly around islands, supporting diverse invertebrate and reef fish fauna. Algal forests are an important source of nutrients to surrounding soft sediments.  High natural character values.	Habitat loss due to coastal development. Sand mining. Overfishing. Disturbance to nesting shorebirds by domestic animals, people and vehicles. Removal of epifauna and habitat homogenisation by mobile fishing gear. Invasive marine species. Toxic algal blooms.	

The DOC CMS refers in the preceding quote to the investigation of a ‘marine recreational park’ in the Whangaruru–Mangawhai Coast Place. A scoping report has been prepared on this concept for the Northland Regional Council and is discussed in section 3.2 below.

Whangarei Harbour and Bream Bay are identified as marine habitats with recreation values (fisheries, high natural character and marine and avian wildlife), as well as adverse effects from overfishing and fishing gear (Appendix 8, p198) (Figure 12).

The recreation values of the Whangarei Harbour Marine Reserve (see Figure 10) are described in a DOC pamphlet, with the following introduction and activity description (DOC 2014b):

*The reserve was established in October 2006 and is located on the east coast of Northland. The reserve is the result of over 16 years of hard work, supported by marine experts and initiated by Kamo High School students of Whangarei. Whangarei Harbour Marine Reserve comprises two sites: an intertidal mudflat/mangrove environment at Waikaraka, which is approximately 8km from Whangarei town; and a mix of sandy beach, rocky reef and small high-current outcrops at Motukaroro/Passage Island, approximately 30km from Whangarei. It protects a combined area of 253.7 hectares of shore and sea providing a safe haven where the region’s marine life can flourish.*

*Visitors to the marine reserve are welcome and activities like boating, snorkelling, scuba diving, picnicking and canoeing are encouraged. We hope you enjoy your visit.*

### 3.2 Northland Regional Council

The *Operative Regional Policy Statement for Northland* (RPS) (NRC, May 2016) states (p91):

*Northland’s unique coastal environment has a range of landscape, seascape and recreational qualities that make it a popular place for development. Most of our existing settlements are located in the coastal environment and this is also where most development in Northland is occurring. The coastal environment is of huge economic importance to the region (for example, tourism and aquaculture) and our coast is an attribute that sets us apart from other regions. Northland has one of the longest coastlines of any region in the country.*

The RPS does not quantify or describe regional coastal recreation values in any detail. Objective 3.2 (d) and (c) of the RPS are to:

*Improve the overall quality of Northland’s fresh and coastal water with a particular focus on: ...*

*(c) Reducing sedimentation rates in the region’s estuaries and harbours;*

*(d) Improving microbiological water quality at popular contact recreation sites, recreational and cultural shellfish gathering sites, and commercial shellfish growing areas to minimise risk to human health.*

Policy 4.4.1 (2) (b) refers to “maintaining and protecting significant ecological areas and habitats” that of are importance to recreation:

*(2) In the coastal environment, avoid significant adverse effects and avoid, remedy, or mitigate other adverse effects of subdivision, use and development on:...*

*(b) Habitats of indigenous species that are important for recreational, commercial, traditional or cultural purposes;*

Part 9 of the RPS states the ‘environmental results anticipated’ and, with reference to Objective 3.2 (as above), expects:



4.2. Regional-wide water quality management...

5. Compliance rates for contact recreation at popular swimming sites are maintained or improved with respect to the relevant guidelines.

The RPS does not define or refer to specific guidelines – these are stated in the *Northland Regional Council Regional Coastal Plan (RCP)*. Appendix 2 includes the RCP maps for Whangarei Harbour and Bream Bay. These show the dominant management zones as Marine 1 (Protection) and Marine 2 (Conservation) Management Areas. Mooring Zones are shown in Urquharts Bay, Taurikura Bay, McLeod Bay, Parau Bay and west and east of One Tree Point. A ski lane is shown on the north-west corner of Limestone Island. Port Facilities Management Areas are also indicated.

The RCP describes regional coastal recreation values (p111):

*Northland's warm climate, multitude of harbours and sandy beaches, often dramatic coastal scenery and high coastal water quality make its coast attractive for outdoor recreational pursuits. The diversity of recreational opportunities provided within Northland's coastal marine area is a major reason for its popularity both with Northlanders and visitors to the region and as a result, additional demands are placed on the coastal environment.*

*The region's coastline is extensively used for swimming, boating and fishing. It also contains numerous areas which are suitable for a wide range of other activities such as scuba diving, snorkelling, water skiing, surfing, windsurfing, sailing, jet-skiing, canoeing, sunbathing, horse riding, picnicking and tramping. In terms of the Resource Management Act, the coast has very high amenity value.*

*Recreational activity occurs mainly in Marine 1 and Marine 2 Management Areas and, to a lesser extent, in Marine 4 (Mooring) Management Areas.*

*Management of recreation around Northland's coast is generally only necessary where there are large numbers of recreational users and/or there are competing demands for the use of coastal space. In Northland, such situations generally occur over the summer period when large numbers of people "head for the coast" for their holidays.*

The recreation section (16) of the RCP focuses on avoiding adverse effects caused by recreation and adopts a 'permissive approach' (Policy 16.4) to recreational activities in the Marine 1 and 2 Management Areas, and applies rules to limit adverse effects on environmental and amenity values and public health and safety.

Section 22 of the RCP considers capital and maintenance dredging and, although it does not refer to potential adverse effects on recreation, it considers effects on ecological values and the potential release of contaminants, and siltation.

Section 13 of the RCP reviews water quality and identifies as an issue (13.2 (2)):

*The importance of water quality to safe contact recreation, shellfish gathering and other significant uses of Northland's coastal marine area, and the consequent need to provide an effective management framework for maintaining and enhancing water quality for the benefit of future generations.*

With a subsequent policy (13.4 (1)):

1. *To classify the waters within Northland's coastal marine area as a means of clearly identifying the water quality management aims for individual areas of coastal water, and in a manner which recognises:*

(a) the high standard of existing water quality of the majority of Northland's coastal waters;

(b) existing detailed information on the quality of the waters of the Whangarei Harbour and the Bay of Islands;

(c) the importance of water quality to safe contact recreation and the quality of naturally occurring and commercially-grown edible shellfish resources;....

Water quality classifications referred to in the RCP are as stated in the NRC *Whāngārei Harbour Water Quality Plan 1990* (NRC 1990), most recently illustrated in the NRC *Whāngārei Harbour Water Quality Improvement Strategy* (NRC 2012). This relies on classes for contact recreation and general water quality including shellfish, with defined mixing zones where the relevant water quality standards may be exceeded (Figure 13, provided by NRC based on data shown in a low resolution image in NRC (2012)).

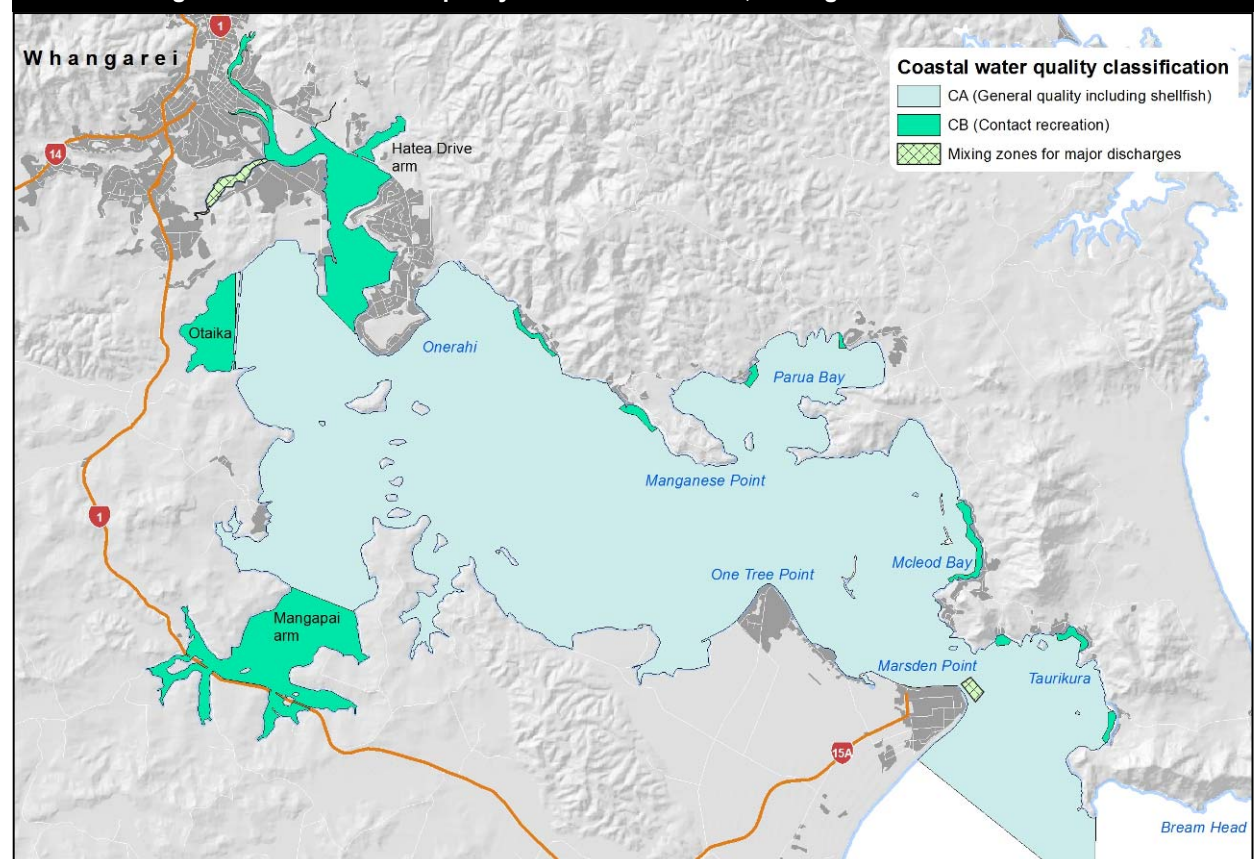
The Contact Recreation standard (CB) provides for “contact recreation and shellfish collection but not for marine ecosystems” (NRC 2012, p31). The *Water Quality Improvement Strategy* notes (NRC 2012, p31):

*It is also important to note that as a result of a consent process under the Resource Management Act, a direct discharge to the harbour does not necessarily have to meet the relevant classifications and standards after reasonable mixing. However, it would be unlikely in today's environment that consent would be granted for discharges that would result in large departures from the water quality classifications and standards.*

The standards are defined in Appendix 4 of the RCP, and are considered in sections 5.2.1 and 5.2.6 of this report.

The Water Quality Improvement Strategy briefly describes the recreation values of the Harbour (NRC 2012, p25):

**Figure 13: Coastal water quality classification zones, Whāngārei Harbour – NRC 2012**



*The harbour is a place of great bounty and enjoyment. Water-based recreation in the harbour includes fishing, seafood gathering, sailing, waka ama, windsurfing, kayaking, rowing, stand-up paddle boarding, snorkelling, diving, and swimming.*

*Most of these activities are undertaken in the middle and lower harbour. Muddy intertidal flats, water quality issues (including poor water clarity), and limited public access (due to urban and industrial development) discourage primary contact recreation in the upper harbour. However, secondary contact uses such as waka ama (outrigger canoes), rowing, kayaking, and stand-up paddle boarding are common....*

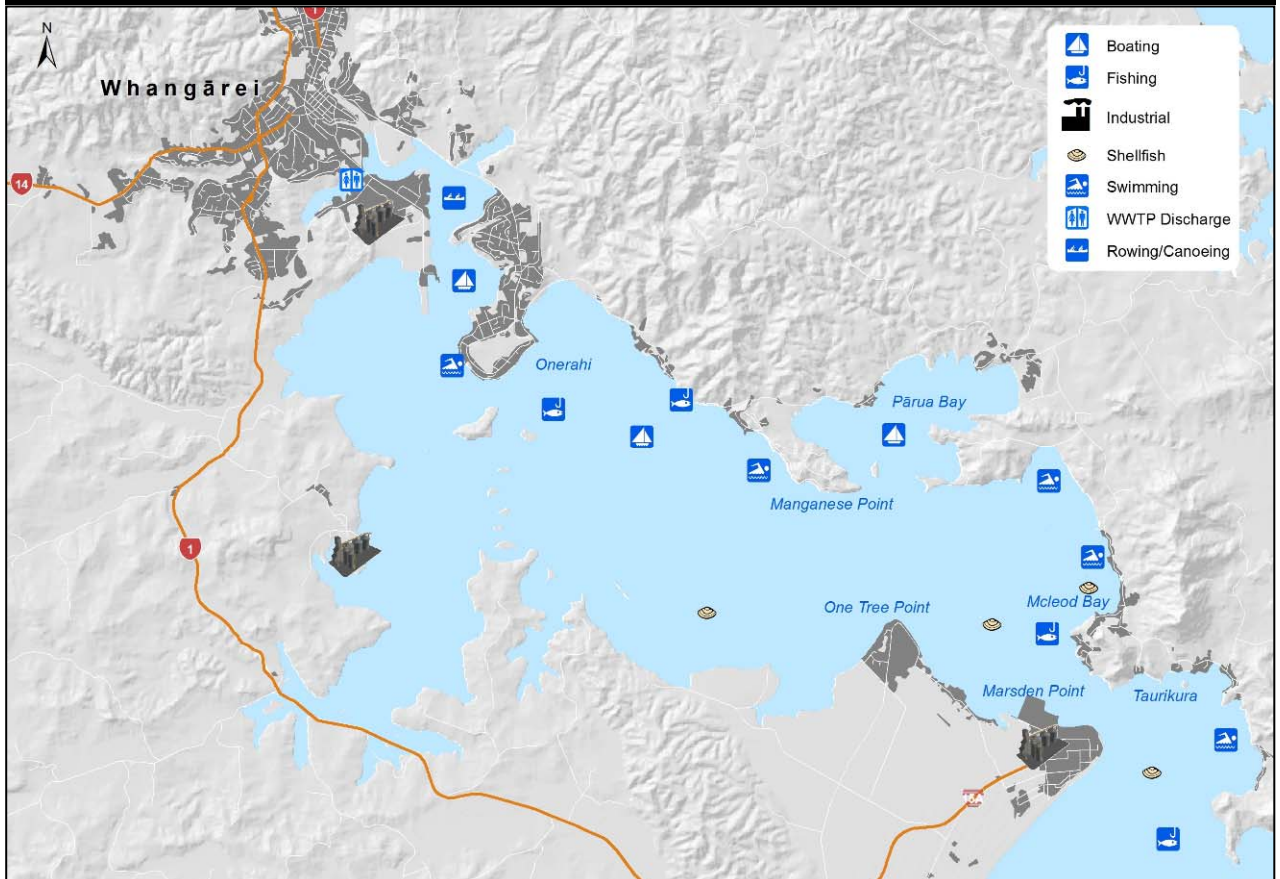
*The harbour is a popular destination for domestic and overseas sailors, and is often the home of a number of international users. There are approximately 350 moorings and 430 marine berths in the harbour. Most of these are found in the Hātea River arm of the upper harbour and in the lower harbour at One Tree Point and Marsden Cove. There are also a small number of private jetties used for permanent mooring, most of which are in the Waiarohia Canal (the lower estuarine reach of the Waiarohia Stream)....*

A graphic summary of 'common uses' of the Harbour is also provided (Figure 14).

The *Draft Regional Plan for Northland* (August 2016) identifies several relevant recreation settings which are described in section 4 of this report.

At the 18 March 2014 NRC Council meeting, a proposal to establish a 'national marine park' in Northland was considered. The idea was to implement a set of restrictions on commercial take, reductions in recreation catch limits, and to establish some 'no take' marine reserves, over approximately 1800km<sup>2</sup> extending from Cape Brett to the Whangarei Heads, and including the Poor Knights Islands (Figure 15). A 'scoping and review' report for the proposal had been prepared for NRC in 2013 (Hampson *et al* 2013 – the 'ME Report') and a review of

**Figure 14: 'Common uses of the Harbour' – NRC 2012**

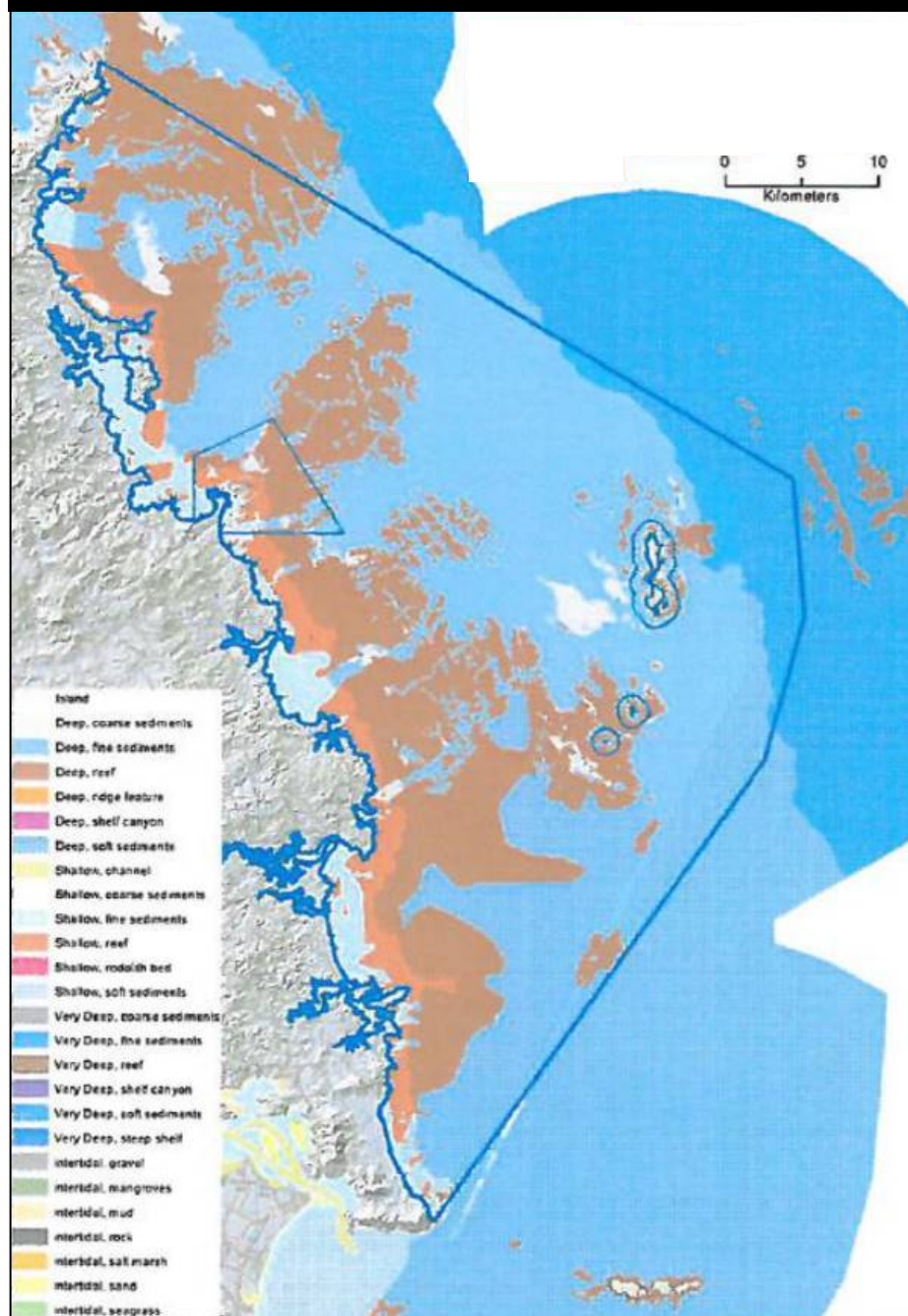


that report and a recommendation to not proceed with the idea was presented at the Council meeting (Murfit 2014). Minutes of the meeting are not available online. The report concluded:

*Council will be aware that there are other community groups in the region looking to progress marine park/reserve proposals (Bay of Islands and Whangaroa for example), which individually may have more chance of success than the larger marine park concept (i.e. these proposals might have a higher chance of success on ecological grounds which is the primary driver behind the Marine Reserves Act). It is considered that we do not have enough evidence that this marine park proposal is better than others in the region to justify exclusively pursuing this one over others. In addition the development of a network of smaller marine protected areas under the Marine Reserves Act could encompass the community aspirations of these other groups.*

The ME report did not quantify or assess recreation activity in the proposed marine park area.

**Figure 15: Proposed Marine Park boundary in blue – from Hampson *et al* 2013**



### 3.3 Whangarei District Council

---

The WDC released an Open Space Strategy in 2001 (WDC 2001). This described the recreation values of the Whangarei Harbour and its shoreline as a “a popular destination for aquatic activities, including swimming and fishing, sailing and boating, water skiing and kayaking” (p34). Identified ‘threats and issues’ for recreation and other values included (p34):

- *Abandoned islands, such as Matakohe/Limestone Island, have been left in a degraded state.*
- *Derelict structures litter the foreshore. Of particular concern are the jetties that are unsafe for the public to use.*
- *Boat access facilities to the harbour need upgrading and assessing.*
- *Runoff, erosion and siltation threaten the water quality of the harbour.*
- *The community is promoting a vision for marine reserves in the Whangarei Harbour.*
- *There are illegal structures, including boat sheds and baches, on coastal reserve land.*

Strengths and opportunities for the Harbour and shoreline included (p35):

- *Support community efforts to assist in protecting cultural sites and in restoring wildlife habitat, public access and understanding on Matakohe/Limestone Island.*
- *Acquire other islands in the harbour as the opportunity arises subject to funding.*
- *Assess coastal structures in the harbour and implement a removal or maintenance programme, as appropriate.*
- *Assess the boat access facilities to ensure they meet the needs of the community.*
- *Continue to plant the riparian margins to assist with stormwater filtration, bank stability and siltation. Where possible control the land-based activities that contribute to a reduction in water quality.*
- *Support the establishment of marine reserves in the Whangarei Harbour.*

Development priorities for recreation in coastal and marine settings identified in the Open Space Strategy focused primarily on improving coastal access, including in Bream Bay and throughout the Whangarei Harbour.

The Whangarei District Plan 2007 has no information on marine recreation and focuses on the terrestrial environment.

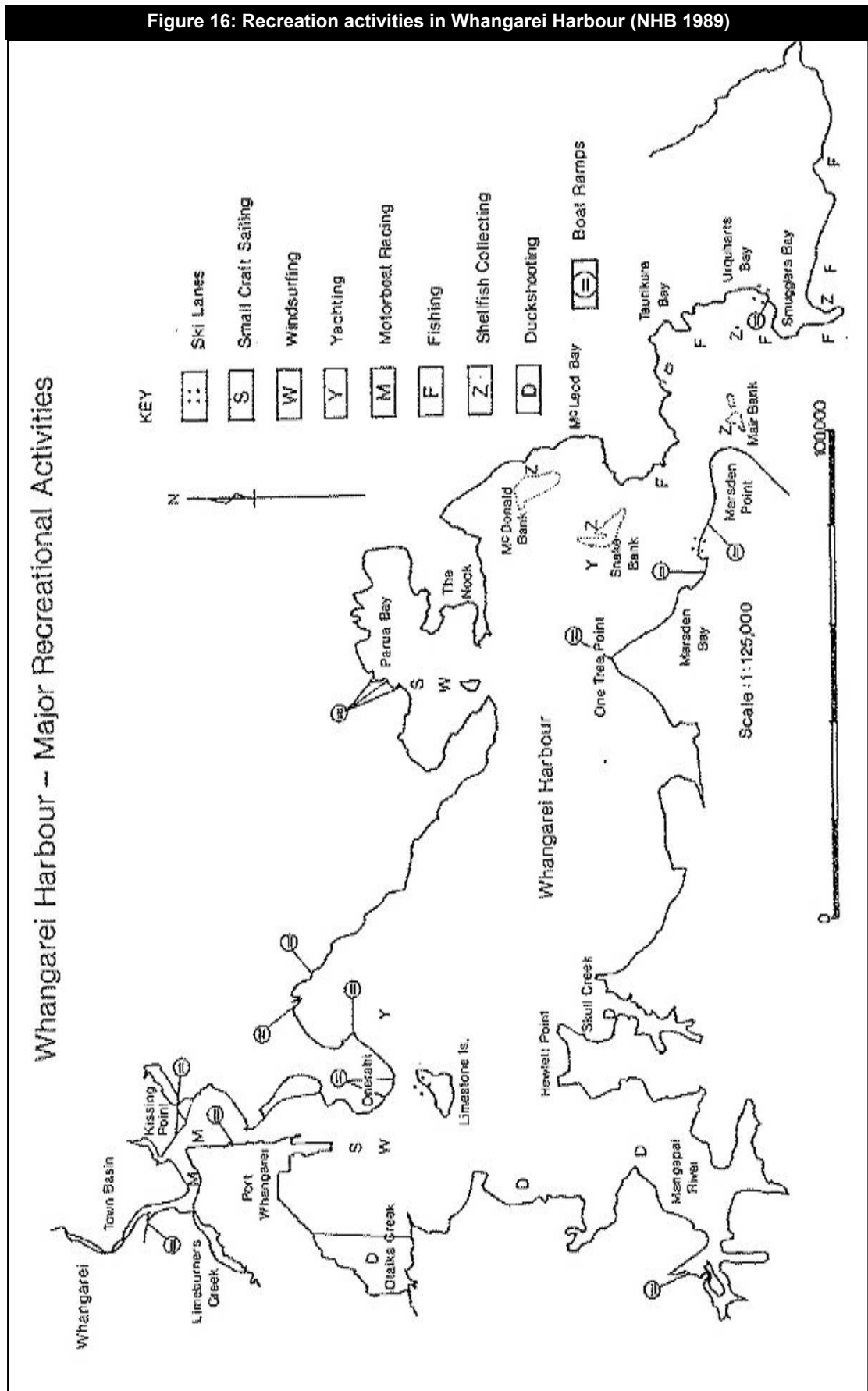
Other recreation information provided by the WDC is discussed in the activity-specific sections of this report (in section 4) .

### 3.4 Northland Harbour Board

---

The role of the Northland Harbour Board (NHB) is now carried about by the NRC. In the late 1980s the NHB completed a review of the uses and values of the Whangarei Harbour, and included a summary of recreation values relying on a telephone survey of “all the recreational user groups and clubs known to use the harbour and the harbour shore line.” (NHB 1989, p113).

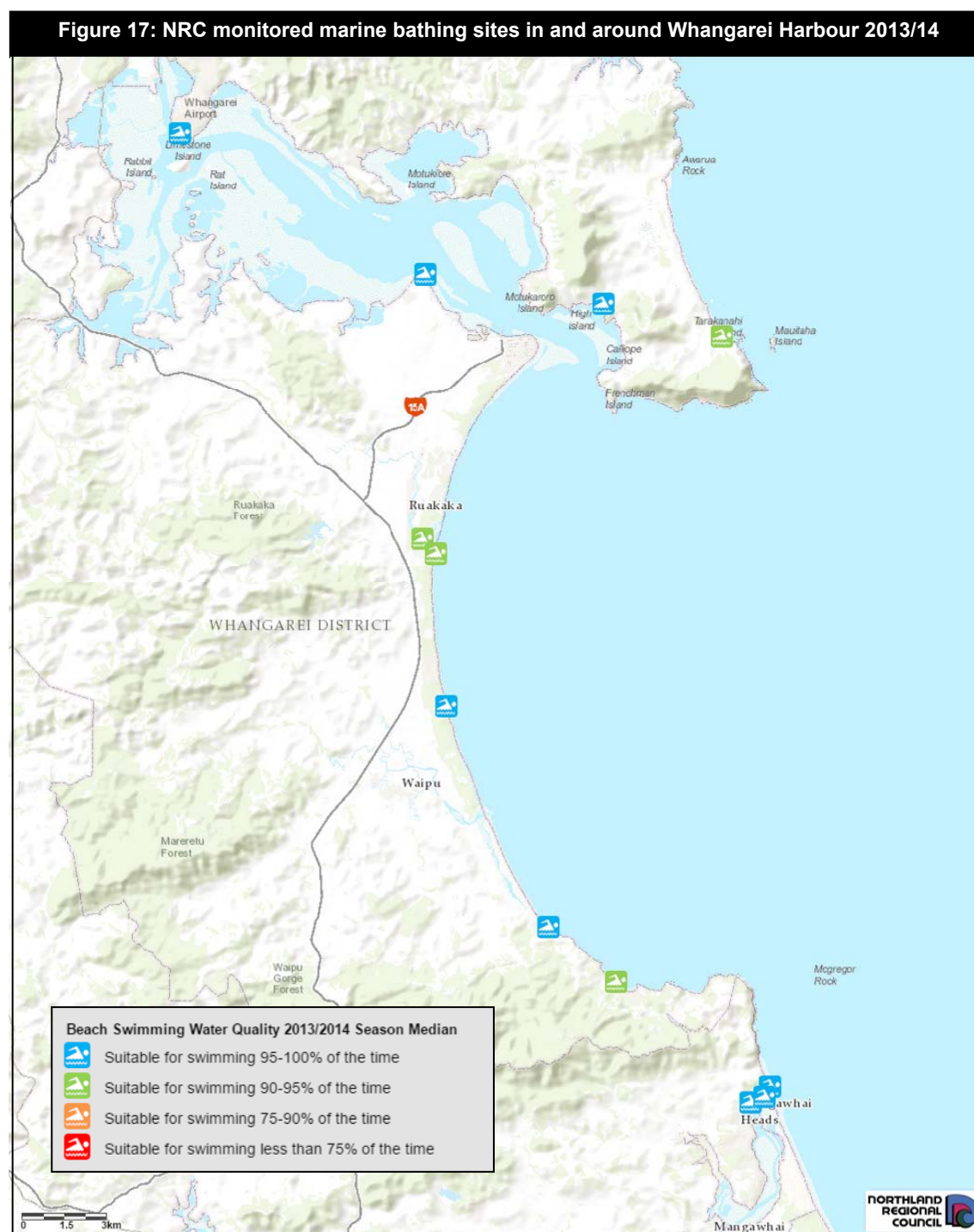
References to this document are made in section 4 of this report about specific activities that were identified in the late 1980s, and are updated where necessary. Figure 16 shows the main findings of NHB (1989) for the location of recreational activities in the Harbour. This report will provide some basis for trend analysis and discussions with stakeholders.



## 4 Activity reviews

### 4.1 Swimming and beach use

The NRC monitors water quality at nine popular swimming sites within the study area (Figure 17) – of 47 coastal sites throughout the region.<sup>3</sup> Data for the 2013/14 summer season showed bathing water quality to be generally good or very good. Results for the 2015/16 season were the same. Monitored swimming sites in the study area are shown in Figure 17 and listed below. Figure 17 shows data for the 2013/14 season. Results from the 2015/16 season onwards are presented on the LAWA national database<sup>4</sup>.



<sup>3</sup> <http://www.nrc.govt.nz/Living-in-Northland/At-the-beach/Swimming-water-quality/Swimming-water-quality-results/> retrieved November 2014

<sup>4</sup> <https://www.lawa.org.nz/explore-data/northland-region/swimming/> retrieved January 2017

- Ocean Beach
- Taurikura Beach
- Onerahi Playground
- One Tree Point
- Ruakaka Beach and River
- Uretiti Beach
- Waipu Cove
- Lang's Beach (mid)

Other swimming sites identified by the NRC are shown in Figure 14 on page 26.

The Whangarei District Council states:

*Whangarei has a reputation as the city with 100 beaches, and offers a range of picturesque and safe places to swim, from the grand scale ocean beaches to small sandy bays along both edges of the harbour. ...*

*Surfing beaches at Ocean Beach and Waipu are patrolled by Surf Life Saving NZ at weekends during the summer months, generally from the end of October until early April and throughout the week during the summer school holiday in December and January.*<sup>5</sup>

Surf Lifesaving NZ identifies popular swimming beaches nationally on its 'Find a Beach' website, as well as beach activities popular at each site (Figure 18 for the four identified beaches in the study area).<sup>6</sup> All but Langs Beach is patrolled. Recommended beach activities at each are:

#### Ocean Beach

- Canoeing/kayaking
- Dog walking
- Scuba diving
- Snorkelling
- Wind/kite surfing

#### Ruakaka Beach

- Canoeing/kayaking
- Dog walking
- Horse riding
- Wind/kite surfing
- Wind-powered vehicles

#### Waipu Cove

- Dog walking
- Horse riding
- Snorkelling



<sup>5</sup> <http://www.wdc.govt.nz/FacilitiesandRecreation/Beaches-and-Coastal-Facilities/Pages/Default.aspx>

<sup>6</sup> <http://www.findabeach.co.nz/>



- Wind-powered vehicles

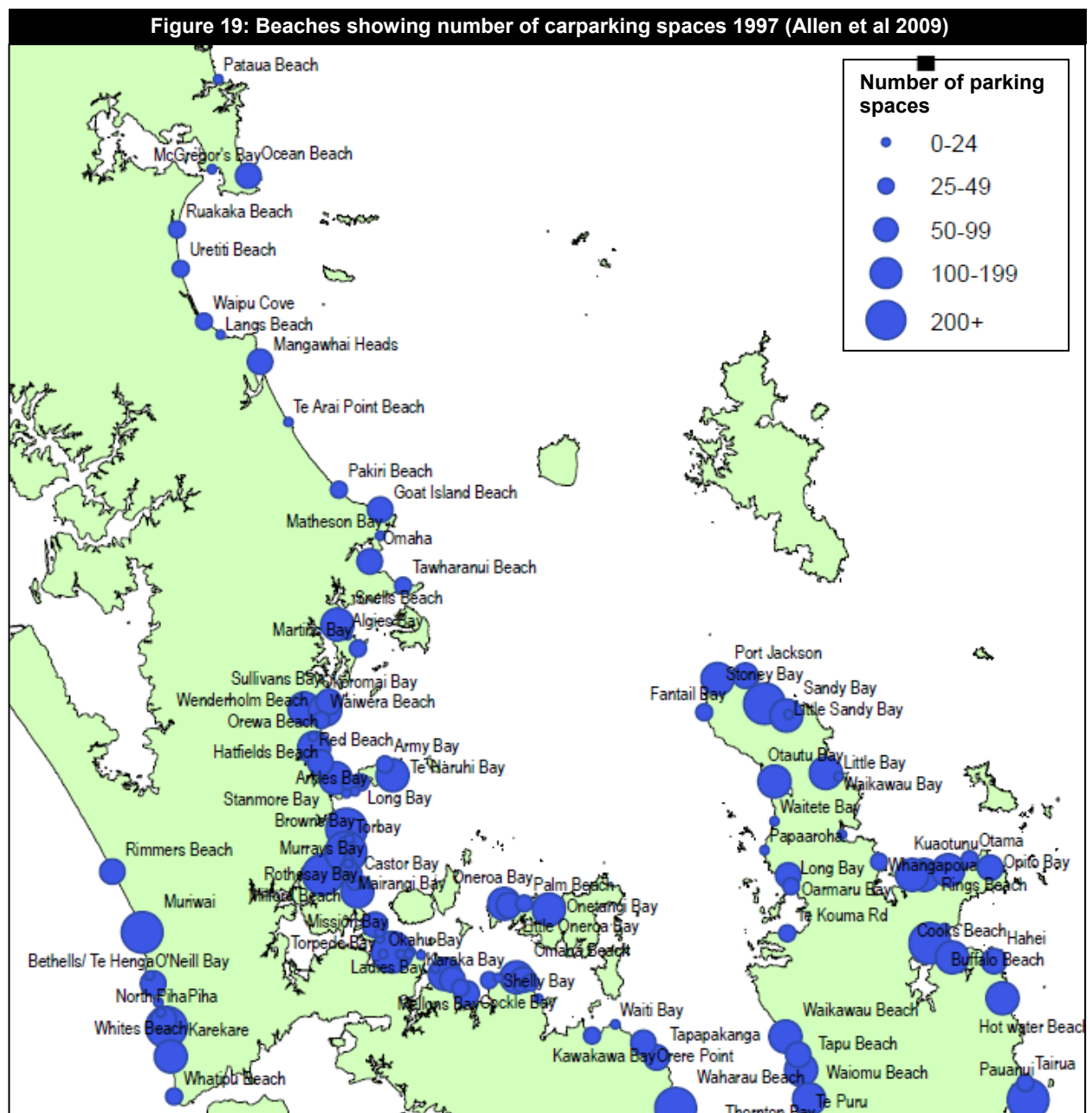
Langs Beach

- Dog walking
- Horse riding
- Motorbikes/4WD's
- Scuba diving

Surf clubs are located Ruakaka, Waipu Cove and Ocean Beach (Whangarei Heads).<sup>7</sup>

The Northland Harbour Board (1989) noted (p114):

*Swimming is not at present a widely popular pastime within the Whangarei Harbour. With the exception of the Marsden Point to One Tree Point area, the southern harbour shores contain large areas of tidal flats and mangroves. In*



<sup>7</sup> <http://www.nrc.govt.nz/Living-in-Northland/At-the-beach/Surf-clubs-and-safe-swimming/#surf>

*contrast, the northern shores consist mainly of rocky shorelines and stony beaches in the vicinity of Whangarei Heads and Bream Head, with tidal mudflats in McLeod Bay, Parua Bay and from Tamaterau to Onerahi. Due to the lower water quality in the upper harbour, the harbour above Onerahi and the Hatea River is currently not considered to be suitable for swimming. It is anticipated that future water quality in the upper harbour will improve, consistent with the Northland Regional Council's Water Quality Management Statement, and that swimming will be safe in the upper harbour by 1989.*

Biosecurity New Zealand released a review of coastal social values in 2009 (Allen *et al* 2009). This indicated that, at the national level, there is only a very coarse understanding of the distribution of marine recreation. The study considered beach recreation, surfing, diving, boating and seafood gathering. However, in the main, only proxy information was used to identify where these activities occur – such as the presence of a surf living saving club to identify swimming locations or a yacht club for sailing. This resulted in broad descriptions of activity patterns which are better described using more specific data sources (such as those discussed elsewhere in this report). Figure 19 shows proxy data for swimming site popularity around Coromandel, Auckland and some of Northland – the number of parking spaces provided at beach access areas – reported in Allen *et al* (2009) based on a 1997 Surf Lifesaving NZ count. Coromandel beaches – even in quite remote areas near Cape Colville – had higher provision than the beaches in the study area.

## 4.2 Fishing

The National Aquatic Biodiversity Information System (NABIS) provided by the Ministry for Primary Industry provides results from aerial surveys of recreational fishing effort undertaken over 2011 and 2012 (Figure 20).<sup>8</sup> Boats recorded include those scuba diving and so show 'fishing' effort within, for example, the marine reserve around The Poor Knight Islands. The data show the Whangarei Harbour area to be a relatively heavily fished setting, with similar vessel densities to the Bay of Islands and the inner Hauraki Gulf – although the latter has several areas with two to three times the density of vessels.

Figure 21 shows the vessel density data for the study area, with a peak of 100 to 150 vessels per km<sup>2</sup> immediately south of Peach Cove and a heavy concentration of activity in the main part of Whangarei Harbour and around Bream Head.

Consultation indicated that the channel boundary just outside Motukaroro Marine Reserve is a particularly good site for jigging for kingfish. Crab fishing was also identified as an activity in many harbour bays. Other preferred fishing sites identified by individuals were Three Mile Reef (approximately 5km due south of Peach Cove), and navigation buoy 9.

The Spot X national surfcasting (Draper & Airey 2012) and boat fishing (Airey 2012) guides identify many fishing opportunities in and around the study area. Relevant figures from Airey (2012) are shown in Appendix 3. These indicate diverse fishing opportunities within the study

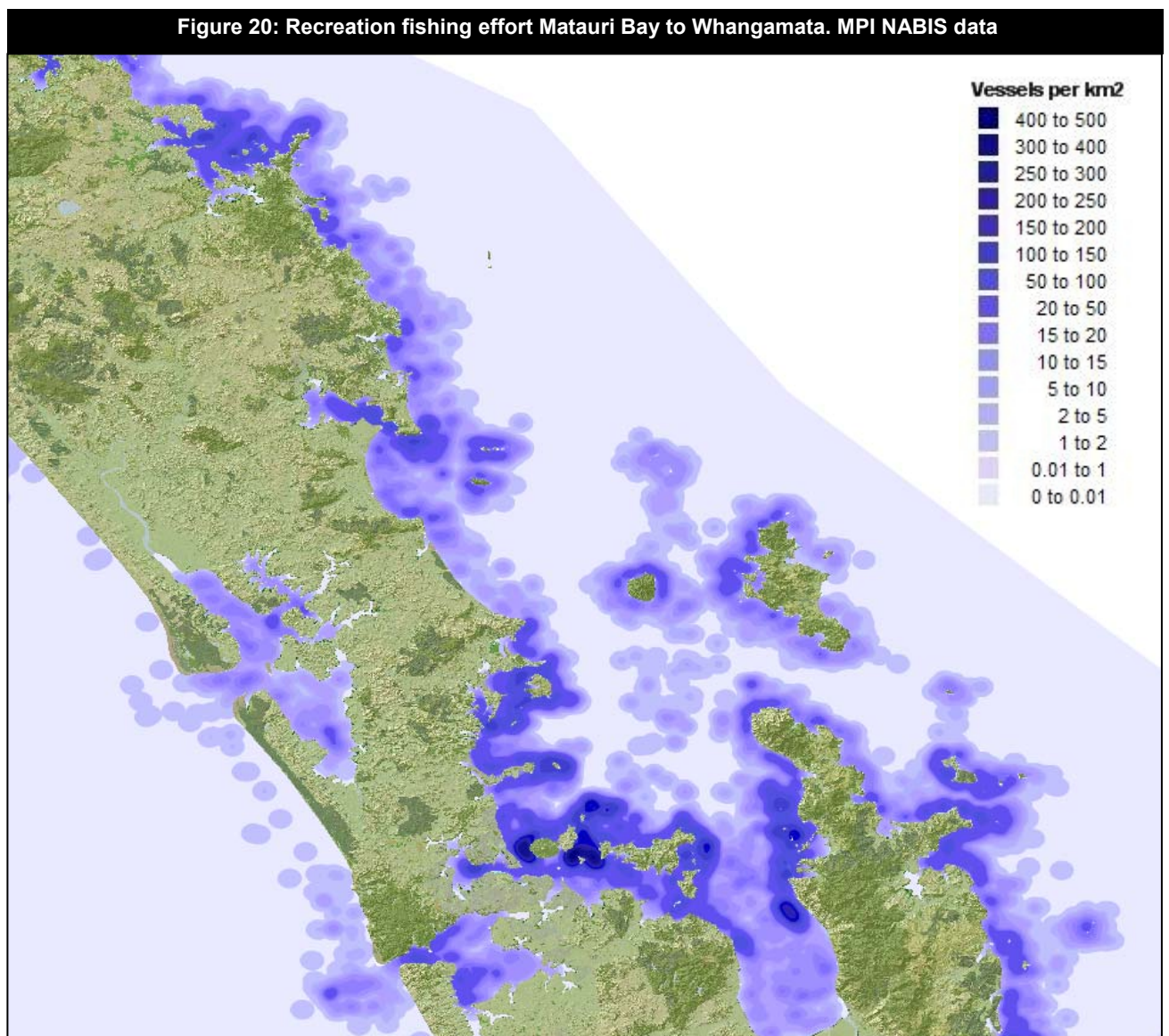
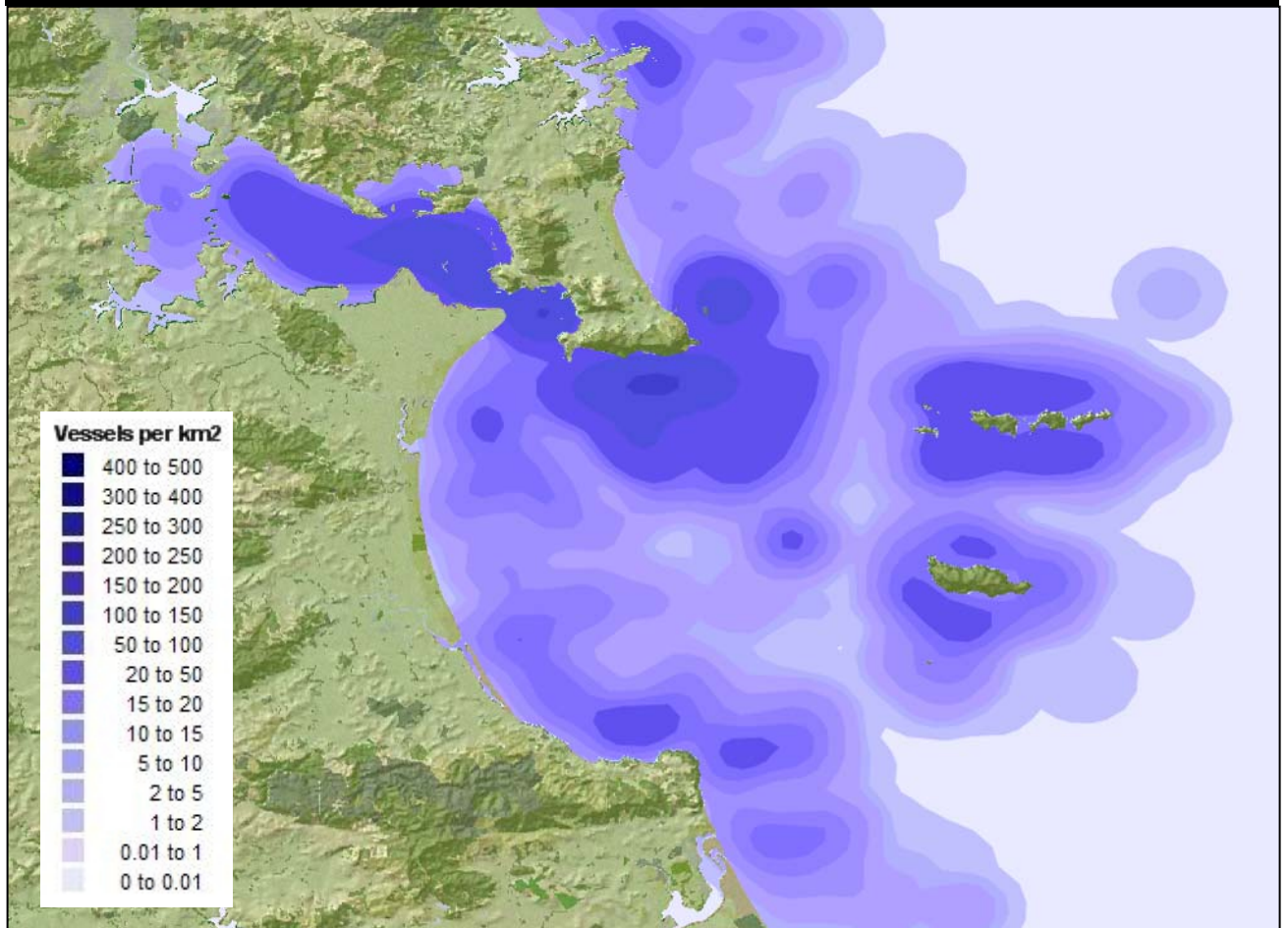


Figure 21: Recreational fishing effort in the study area. MPI NABIS data

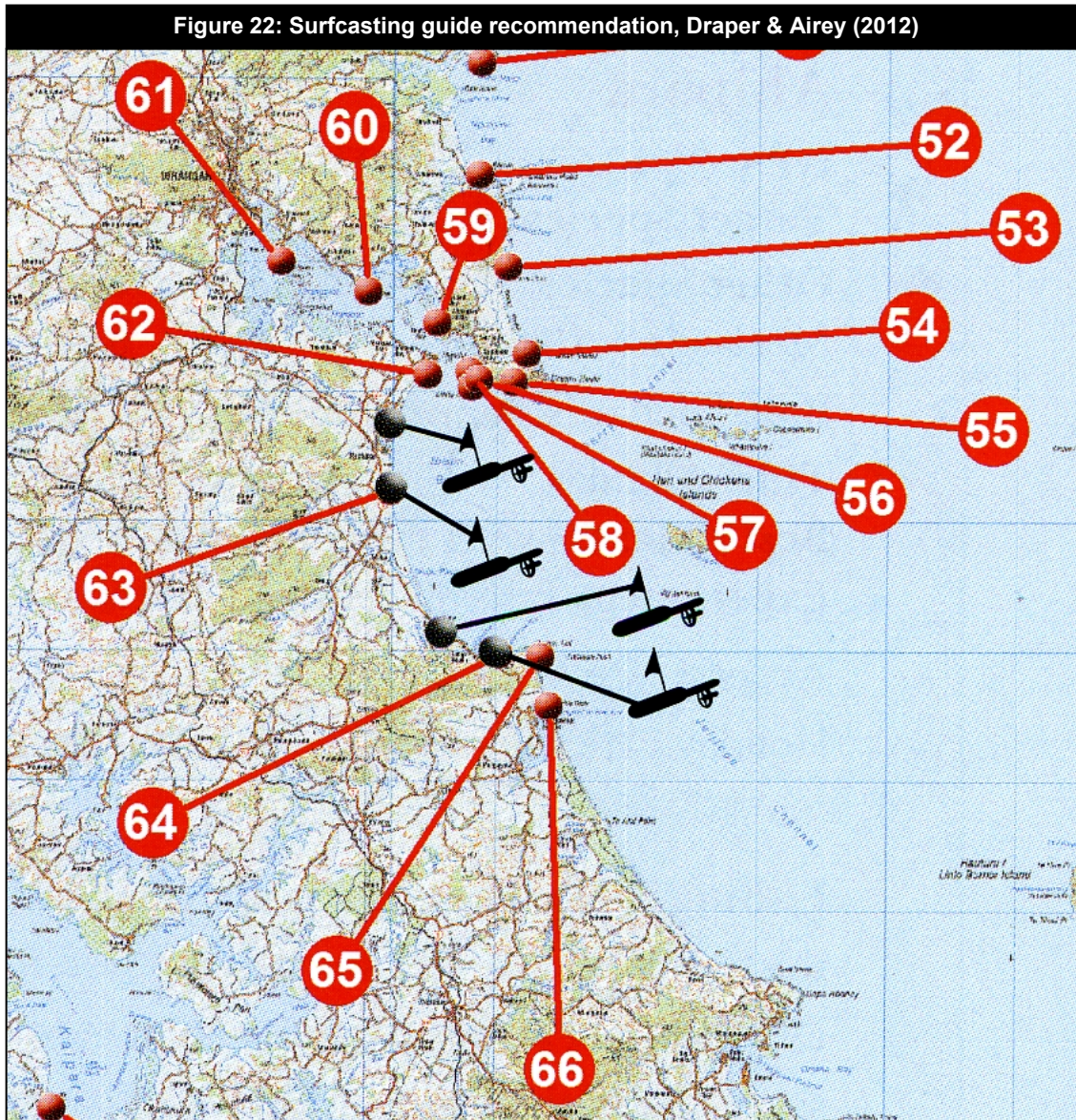


area for snapper, john dory, kingfish, trevally, kahawai and baitfish. Airey (2012) notes (p59):

*Whangarei, Tutu kaka and the surrounding districts are noteworthy for being extraordinary fishing destinations, including excellent harbour fishing (particularly Whangarei Harbour) along with surf, rick, boat and big-game fishing.*

Reviewed sites 8 (Snake Bank Channel) and 9 (Bream Islands) in Appendix 3 are described as best fished in November and 'all year' respectively.

Figure 22 shows surf casting opportunities at (by marked number): 54 – Ocean Beach (snapper, kahawai, kingfish and trevally, autumn and winter); 55 – Peach Cove (snapper, john dory, kahawai, kingfish and trevally, autumn and winter); 56 – Smugglers Bay (snapper, kahawai and trevally, all year); 57 – Busby Head (snapper, kahawai and trevally, all year); 58 – Home Point (kingfish, kahawai, mackerel snapper and trevally, autumn and summer); 59 – McLeod Bay Jetty (baitfish, kahawai, kingfish, snapper and trevally, all year); 60 – Manganese Point (snapper, mackerel and trevally, all year); 61 – Onerahi Wharf (kahawai, john dory, kingfish snapper and trevally, all year); 62 – Marsden Point (Snapper, kahawai and trevally, autumn); 63 – Uretiti Beach (snapper, gurnard, kahawai and trevally, autumn and summer); 64 – Langs Beach (snapper, kahawai, kingfish and trevally, all year).



Fishing competitions in the study area include:

- Beach and Boat – February – based out of the Marsden Cove Marina<sup>9</sup>
- Orton Events New Zealand Northland Cove to Cape Kayak Fishing Challenge out of Whangarei Harbour – August<sup>10</sup>
- Funky Fishing Family Fishing and Diving Competition at Whangarei Heads – March<sup>11</sup>
- Tutukaka Light Tackle Yellowtail Kingfish Tournament – June<sup>12</sup>

Eight fishing clubs are identified on the 2CU online database, each of which is likely to operate fishing competitions.<sup>13</sup>

Allen *et al* (2009) identified in-shore and off-shore line fishing in the study area, but no surf-casting (Figure 23).

<sup>9</sup> <http://www.beachandboat.co.nz/info/>

<sup>10</sup> <http://ortoneventsnz.co.nz/2015/cove-to-cape/index.php>

<sup>11</sup> <http://funkyfishing.co.nz/>

<sup>12</sup> <http://www.sportfishing.co.nz/Dynamic.aspx?id=11900>

<sup>13</sup> <http://2cu.co.nz/northland/listings/find/fishing%20clubs/whangarei>



### 4.3 Shellfishing

Airey (2012) shows in the charts in Appendix 3 many shellfish gathering sites in the study area. These include pipi and scallops around Snake Bank, pipi at Marsden Point and at Mair Bank, and scallops to the north of Urquharts Bay, south of Home Point, in Smugglers Bay and offshore from Langs Beach. Additional diving sites for scallops are identified in Enderby & Enderby (2007) (see section 4.4), including: Bream Head Boulder Bank; Peach Cove; Smugglers Cove; within Whangarei Harbour; and Bream Bay.

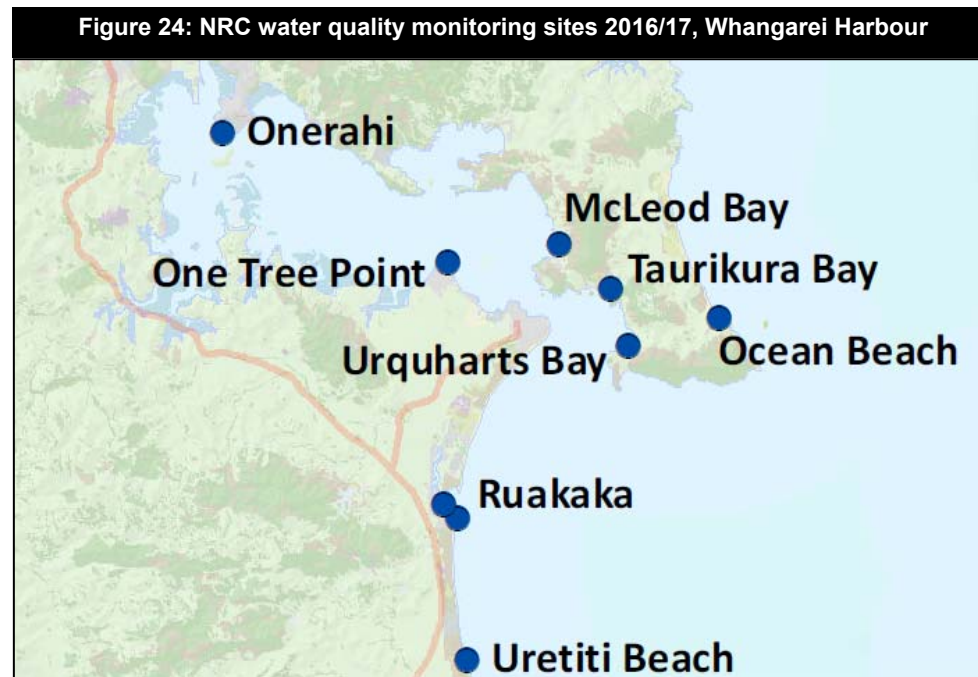
The NRC carries out an annual faecal coliform testing regime for recreational shellfish gathering at 23 sites in the Whangarei District. The sites within the study area are listed below and for the Harbour in Figure 24<sup>14</sup>, with an indication of whether they passed or failed the relevant MfE water quality standards over the 2015/16 season:<sup>15</sup>

- Langs Beach (fail)
- McLeod Bay (pass)
- One Tree Point (pass)
- Onerahi (pass)
- Ruakaka Beach near surfclub (pass)
- Taurikura Beach (pass)
- Uretiti Beach (pass)
- Urquharts Bay (pass)
- Waipu Cove (pass)

<sup>14</sup> <http://www.nrc.govt.nz/contentassets/76e6569bd9524f2b96558dd186f941b1/swimming-sites-map-2016-2017.pdf> retrieved January 2017

<sup>15</sup> <http://www.nrc.govt.nz/contentassets/a5411dade42c494cafbac094e186efab/summary-of-shellfish-gathering-results-2015-16.pdf> retrieved January 2017

Ocean Beach was monitored prior to the 2015/16 season. Species gathered at these sites are not identified. Other shellfishing sites identified by the NRC are shown in Figure 14 on page 26.



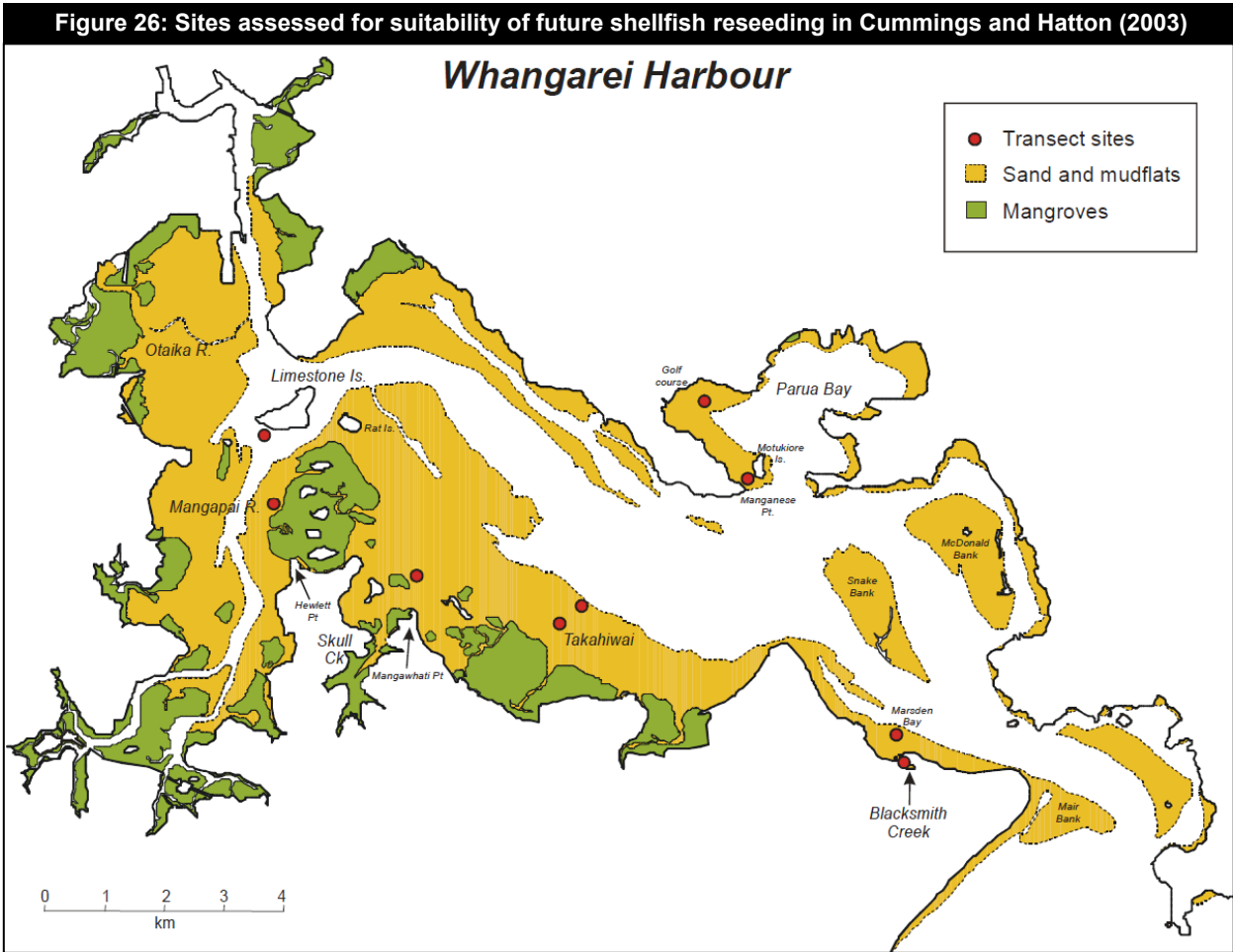
The Northland Harbour Board (1989) noted (p113):

*A variety of shellfish are gathered recreationally within the harbour. Cockles are scattered throughout the lower harbour and beds are found at Snake Bank, McLeod Bay and to a lesser extent in Parua Bay. Small beds of pipi also occur in harbour bays but the most popular area for gathering pipi is Mair Bank where large pipi are found in high densities.*

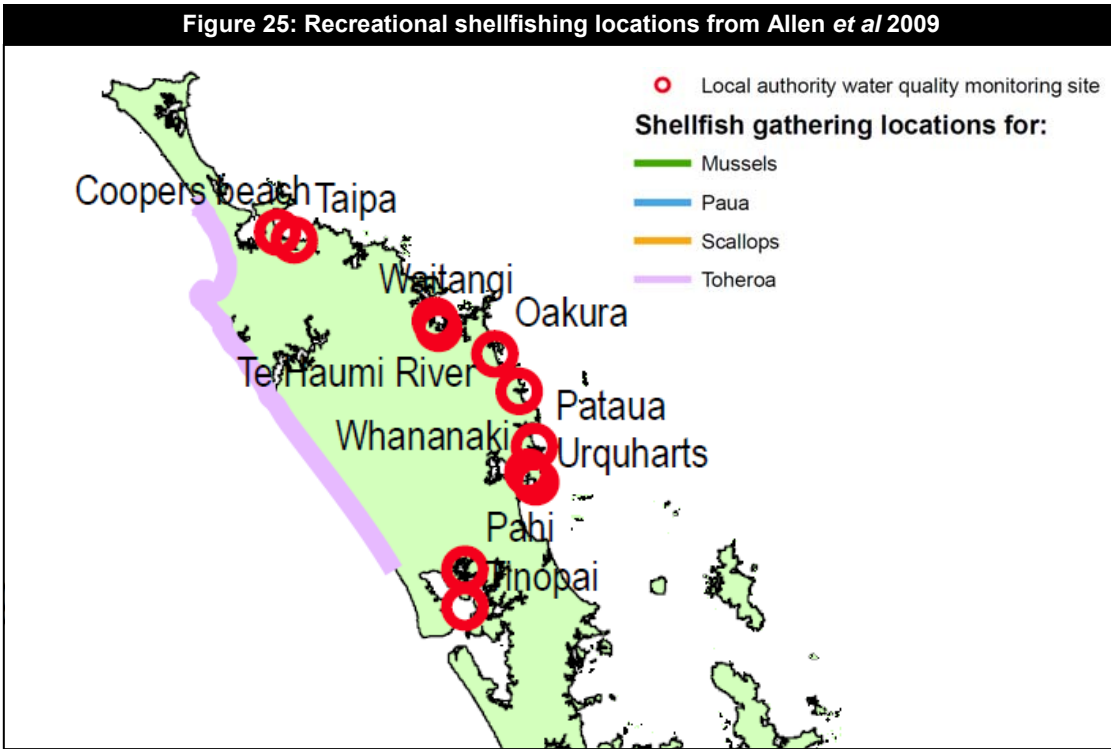
Cummings and Hatton (2003) of NIWA report on a reseeding assessment for pipi and cockles in Whangarei Harbour for the NRC. Figure 26 shows the sites considered suitable in their assessment for shellfish reseeding (the transect sites). The NIWA assessment identified two sites for cockles (Skull Creek and the Takahiwai mid-shore area) and a potential site for pipi (outer Skull Creek).

The authors noted (p iv):

*The areas visited are good examples of their present habitat type, with a good diversity and abundance of shellfish and other fauna present, and an abundance of bird life. However, old reports and discussions had during the course of this study indicate that some areas now have very different habitats compared to that of many years ago. Unfortunately, these habitat changes mean that cockles and pipi are unlikely to grow as large or be as abundant in these places as they were in the past.*



Allen et al (2009) identifies no shellfish gathering sites on the east coast of Northland (Figure 25).





Coffey (2017) reports the most recent data on shellfish abundance on Mair Bank and the Harbour (p27):

*The most recent study commissioned by RNZ is by Pawley (2016) who reported that:*

- *the bathymetry of Mair Bank appears to have changed since the 2010 and 2014 surveys. Mair Bank is no longer separated from neighbouring Marsden Bank by a channel, and the northern edge now extends further (compared to 2014). This view is supported by Williams and Hume (2014),*
- *both the total abundance and biomass of pipis have reduced significantly since his 2010 survey. The total population has declined from around 460 million (2010) to around 4.95 million individuals, and the 2016 estimate of absolute biomass, 44.7 t, is around only 1% of the 2010 estimate (4,450 t) and less than 1% of the 2005 estimate (10,542 t).*

*Between 1986 and 2010, the average commercial landings of pipi from Whangarei Harbour was 176.6 tonnes per annum (Report from the Fisheries Assessment Plenary, May 2014). It is now non-existent (Pawley, 2016). This report did not consider cockle populations.*

*In recent years, an expanding bed of green-lipped mussels (*Perna canaliculus*) has established on Mair Bank (Pawley, 2016 and pers. comm. Riaan Elliot, Refining NZ).*

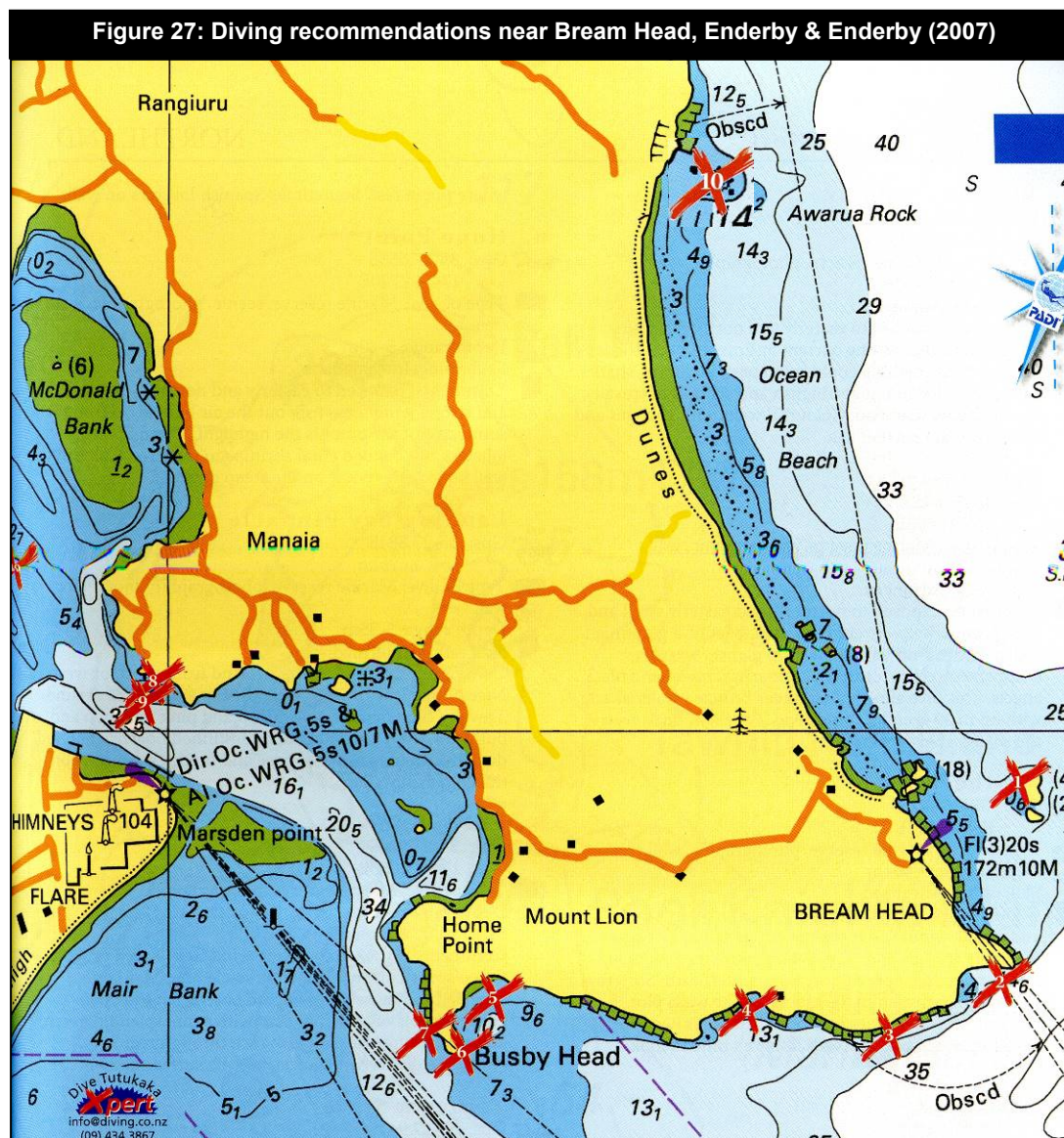
*Moreover, seagrass beds at One Tree Point are currently recovering from a former dieback event (NIWA, 2004, 2005), so it is important to benchmark these changes that are not associated with the proposed dredging programme.*

#### 4.4 Diving

Figure 27 shows the recommendations for diving in and around the Whangarei Heads from Enderby & Enderby (2007). The numbered sites are, from the north and then anti-clockwise: 10 – Awarua Rock (crayfish, snorkelling, wall); 1 – Bream Islands (crayfish, spearfishing, wall); 2 – Bream Head (crayfish, wall); 3 – Bream Head Boulder Bank (crayfish, scallops, snorkelling); 4 – Peach Cove (crayfish, scallops, snorkelling); 5 – Smugglers Cove (crayfish, scallops, snorkelling); 6 – Busby Head (crayfish, spearfishing, wall); 7 – The Frenchman (crayfish, scenic, wall); 8 – Motukaroro South (marine reserve, photographic, wall, snorkelling); 9 – Motukaroro Northeast (marine reserve, photographic, snorkelling); 10 (hard left of figure, in page binding) – Whangarei Harbour (scallops). No sites are shown in the Harbour west of those shown in Figure 27. Dive depth ranges from zero to 30 metres. Water clarity issues are only identified for site 10 within Whangarei Harbour (“Strong current and poor visibility”). Boat traffic warnings are given for sites 4 to 10 (Whangarei Harbour).

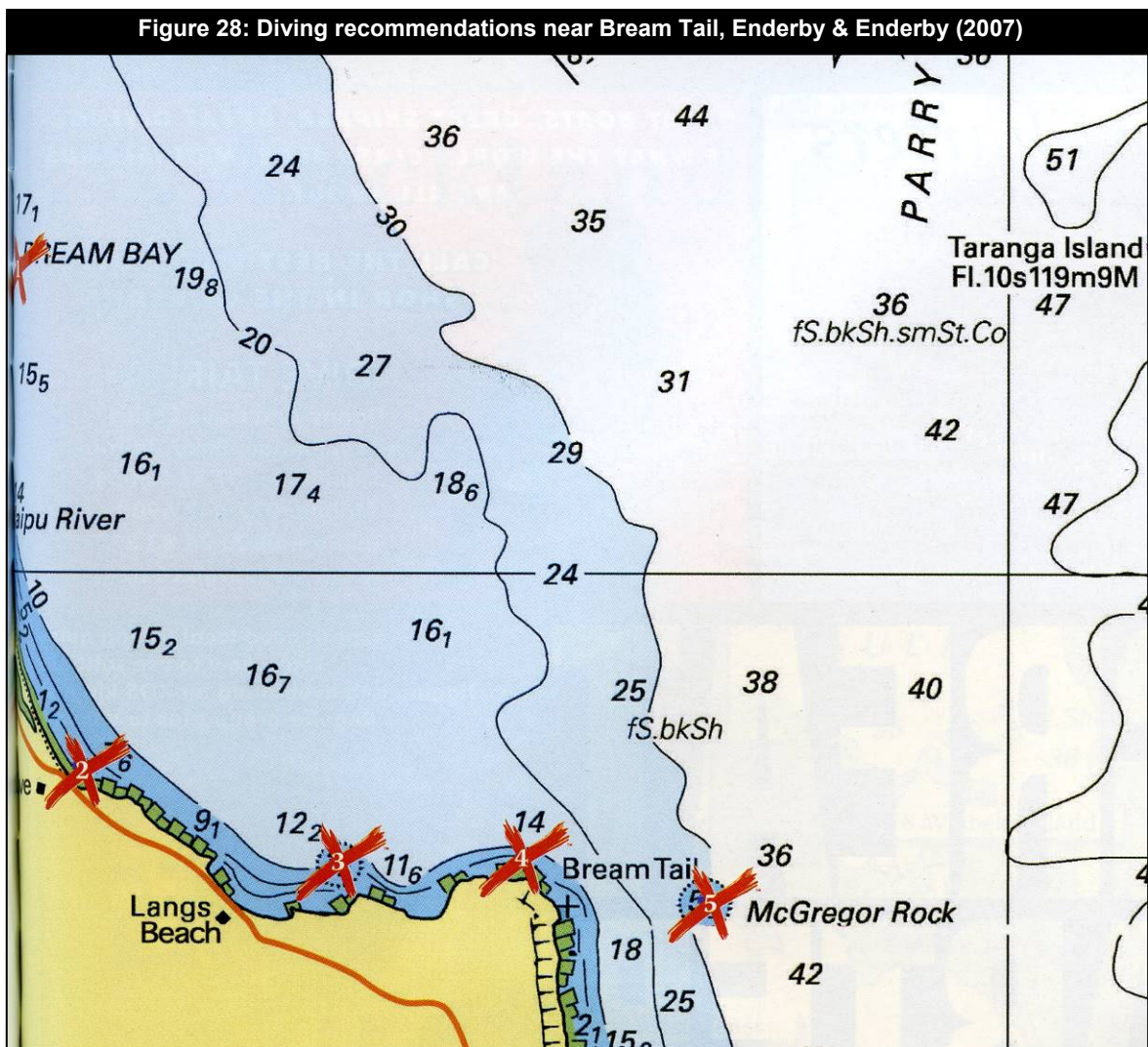
Dive sites near Bream Tail are shown in Figure 28: 1 (on left edge) – Bream Bay (scallops, noting “Not much fish life, apart from occasional stingray and gurnard.”); 2 – Waipu Cove (crayfish, spearfishing, snorkelling); 3 – Langs beach (crayfish); 4 – Bream Tail (crayfish).

The Northland Harbour Board (1989) noted (p113):



The most popular areas for recreational diving in the Whangarei Harbour are the northern shores near the harbour entrance. In these areas, particularly McLeod Bay, Urquharts Bay, Woolshed Bay and Smugglers Bay, scallops are found. This scallop resource is subject to heavy pressure from divers during the scallop season, which currently extends from approximately mid-July to mid-February. Large numbers of boats are launched from Urquharts Bay or McLeod Bay and divers also snorkel or dive from the shore. Due to the swift tidal currents at the harbour mouth, most diving takes place around the turn of the tide.

With the exception of scallop areas, there is very little scuba diving within the harbour. Occasional night dives take place under the Northland Harbour Board's Marsden Point wharf organised by the Whangarei Underwater Club. The major use of the harbour by dive groups is as a base from which to conduct excursions to dive spots such as the Hen and Chicken Islands. However, the coast between Smugglers Bay and Bream Head is used as an important diving area by local divers. This area provides exciting underwater scenery, scallops, crayfish and pelagic fish and thus appeals to all categories of divers from photographers to crayfish hunters and spear fishermen.

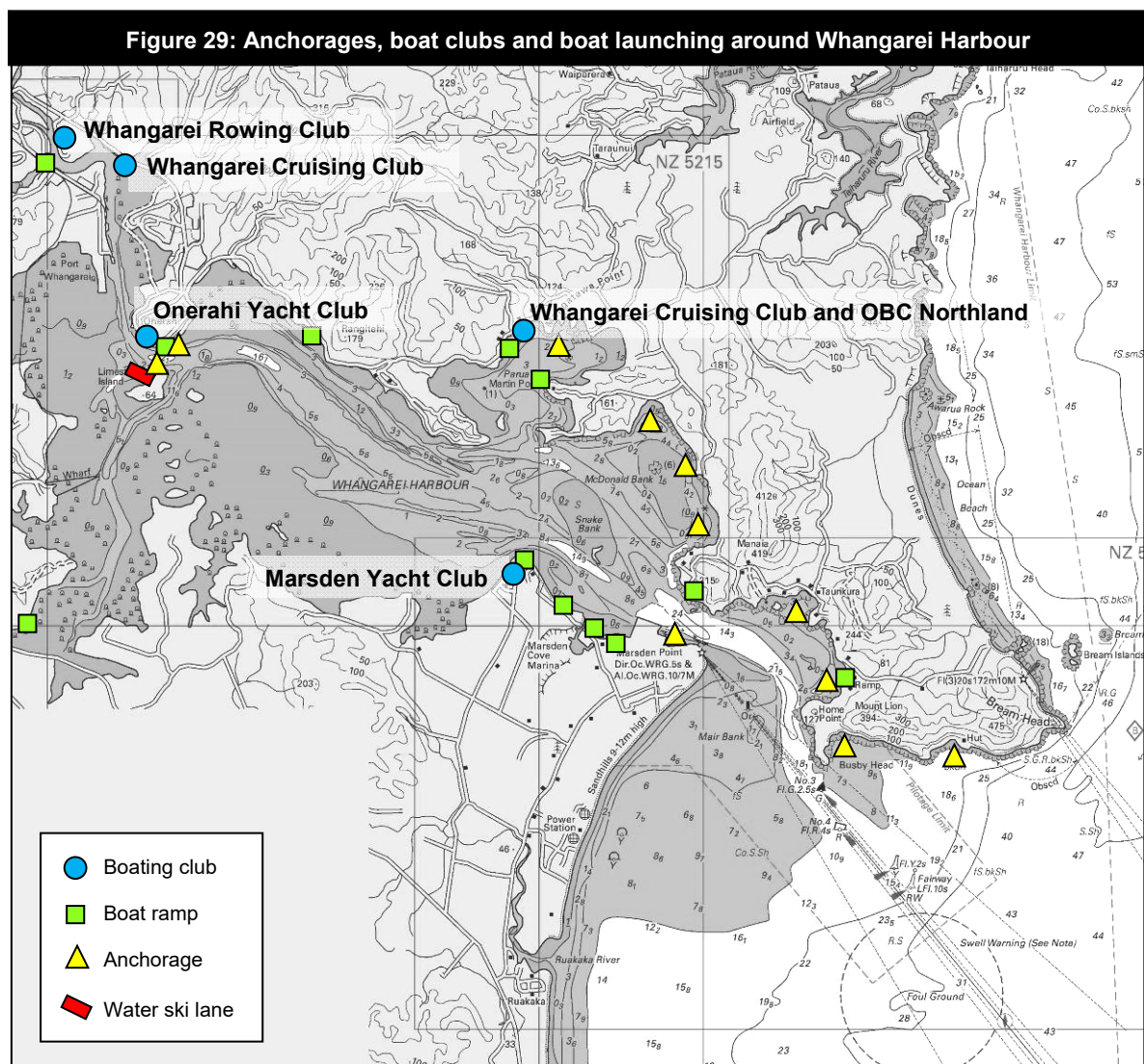


## 4.5 Boating

Figure 29 shows:

- Casual boat anchorages in the study area identified in *The Royal Akarana Yacht Club Coastal Cruising Handbook* (RAYC 2012). Those within Whangarei Harbour are generally identified as reliable in most conditions. Those at Smugglers Bay and Peach Cove are described as open to southerly swells (pp106 – 117).
- Boat launching ramps identified by the WDC and NRC.<sup>16</sup> A ramp off the map but within the study area is available on the Waipu River on Nova Scotia Drive.
- Water ski lanes (only one at Limestone Island) identified by the NRC and provided for in the NRC Navigation Safety Bylaw 2012.<sup>17</sup> (Northland Harbour Board (1989) described three ski lanes in the Whangarei Harbour in 1989: Limestone Island, Marsden Bay and Urquharts Bay.)
- Four boat clubs.

Mooring areas are identified in the *Operational Regional Policy Statement for Northland* planning maps in Appendix 1 to this report. Two marinas are located in the Harbour Basin



<sup>16</sup> <http://www.nrc.govt.nz/Maritime/Boat-ramps-and-maps/#whangarei> and

<http://www.wdc.govt.nz/FacilitiesandRecreation/Beaches-and-Coastal-Facilities/Pages/Default.aspx>

<sup>17</sup> <http://www.nrc.govt.nz/Resource-Library-Summary/Publications/Coast/Navigation-Safety-Bylaw-2012/Access-Lane-Maps/#whang>

(Whangarei Marina and Riverside Drive Marina) and in Marsden Bay (Marsden Cove Marina).

The *Draft Regional Plan for Northland* (August 2016) proposes two regionally significant recreational anchorages in Taurikura and Urquharts Bays and one regionally significant storm anchorage in Parua Bay (Figure 30).

The Northland Harbour Board (1989) noted (p118):

*The Northland Canoe Club uses the longer reaches of the upper harbour for training purposes, particularly the area from Kaiwaka Point to Kissing Point. When there is a high tide or the Hatea River is in flood, the upper Hatea River is also*

*used. The Whangarei Rowing Club uses the same area for its activities. The group, which consists mainly of secondary school students, has a clubhouse on Northland Harbour Board land adjacent to the Pohe Island landfill.*

*Sea scouts also use the harbour regularly. The Onerahi Sea Scout group has a clubhouse on Northland Harbour Board land near the foreshore at Stevens Point. The group has two boats, although their use is sometimes restricted by the exposure of the area to wind and tide conditions. Further upstream are the Shackleton Sea Scouts who have a scout den on Northland Harbour Board land near Orams Marina. Both sea scout groups take part in regattas in Parua Bay. The equivalent girls' group is the Young Mariners Club which currently uses the Whangarei Cruising Club clubrooms at Kissing Point*

The Northland Canoe Club remains active in the Harbour:<sup>18</sup>

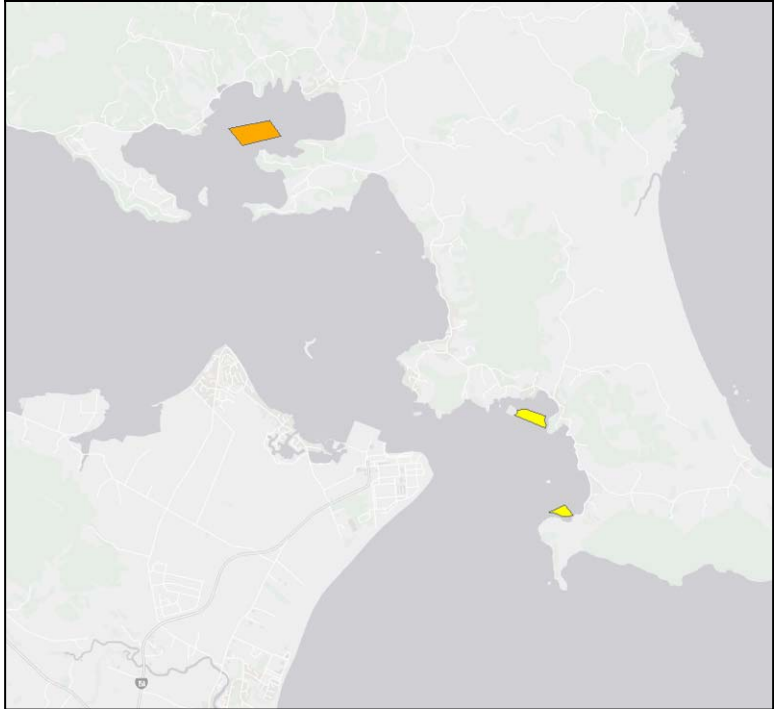
*Northland Canoe Club holds regular paddles on the Whangarei Harbour and around Northland's beautiful coastline. The most regular paddle is held on Wednesday evening, leaving from the public boat ramp next to the Onerahi Yacht Club.*

As are the Shackleton Sea Scouts (various weblinks).

The Northland Harbour Board (1989) noted (p119):

*Windsurfing is becoming increasingly popular as a recreational activity in the harbour, particularly in the vicinity of Onerahi and at Parua Bay. There are approximately 25 members of the Whangarei Boardsailing Club, who organise races at Onerahi and also take part in the combined yacht clubs race series. The Onerahi area is not considered ideal for windsurfers especially for beginners, due to problems with mud at low tide and strong tidal flows. However, members use the area in preference to the more sheltered Parua Bay, because of its more*

**Figure 30: Draft Regional Plan regionally significant moorings**

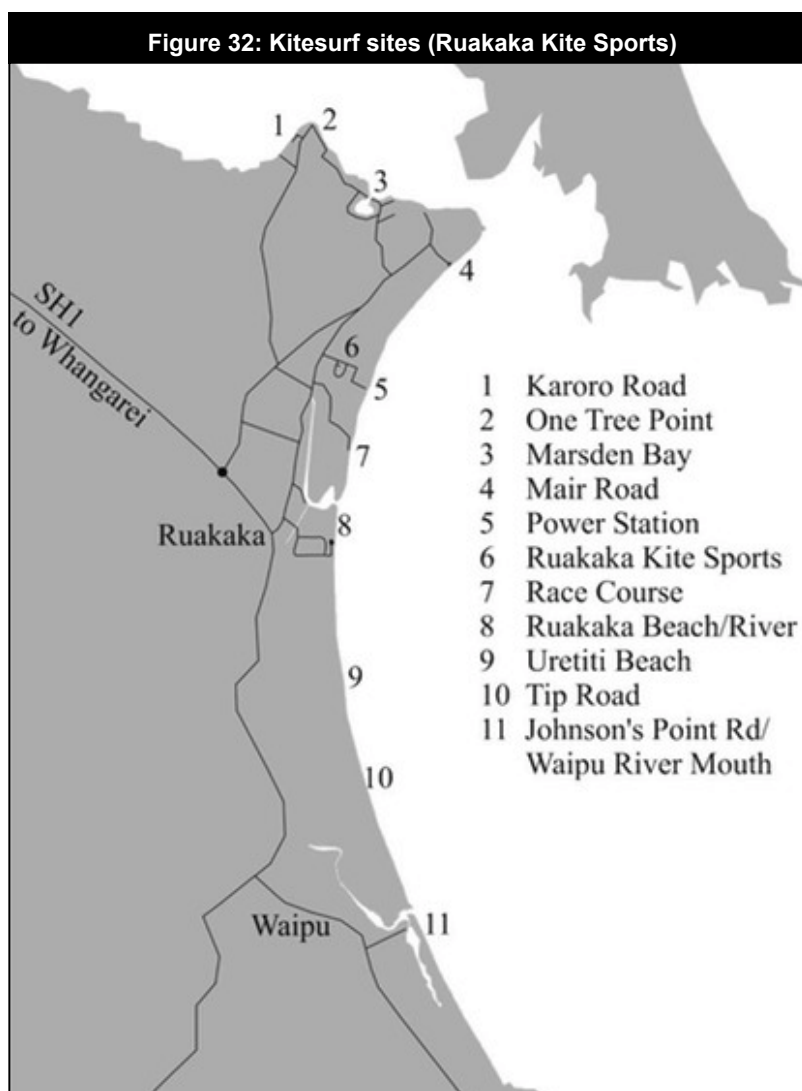
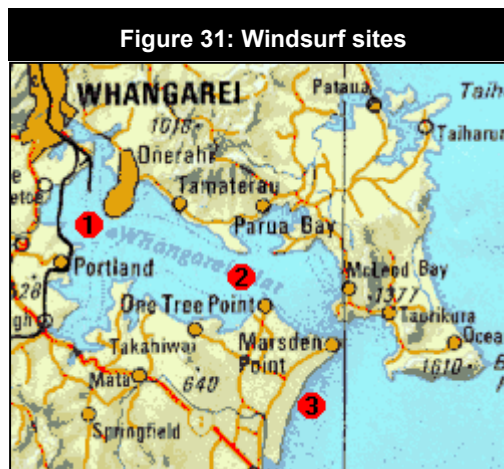


<sup>18</sup> [https://www.facebook.com/pages/Northland-Canoe-Club/165129820303461?sk=info&tab=page\\_info](https://www.facebook.com/pages/Northland-Canoe-Club/165129820303461?sk=info&tab=page_info)

central location to the City. The club has no club facilities and members use the public toilets along the Onerahi foreshore as changing facilities.

Windsurfing New Zealand identifies three sailing sites in the Harbour (Figure 31) – One Tree Point (1), Onerahi (2) and Bream Bay (3).<sup>19</sup>

Ruakaka is described as a 'kitesurfing paradise', and a commercial operator (Ruakaka Kite Sports) recommends the 11 kite sites shown in Figure 32. Full details for the use of each site is provided on the company's website.<sup>20</sup>



<sup>19</sup> <http://www.winzurf.co.nz/windsurf/wgtnz/wgtnz11.htm>

<sup>20</sup> <http://www.ruakakakitesports.co.nz/where-to-kite.html>

#### 4.6 Surfing

The NZ Coastal Policy Statement (DOC 2010) does not identify any surf breaks of national significance in the study area (three such sites in Northland are on the west coast).

The *Wavetrack New Zealand Surfing Guide* (Morse & Brunskill 2004) identifies a number of surfing sites between Ocean Beach and Bream Tail (Figure 33 and Figure 34). The scale on Figure 34 shows the authors' assessment of the quality of the surf when it is running at each site. The text for Marsden Point notes "Find longer waves and walls after harbour dredging". It is unclear to what this refers considering that the nearest dredging occurs at Northport in the upper Harbour. Section 5.2.2 of this report considers wave effects from the Project.

The comprehensive online surf information service 'surf-forecast.com' offers information on the same sites. It describes the Ocean Beach break's reliability as 'fairly consistent', and Marsden Point as 'inconsistent'.

The *Draft Regional Plan for Northland* proposes all these breaks as regionally significant (Figure 36).

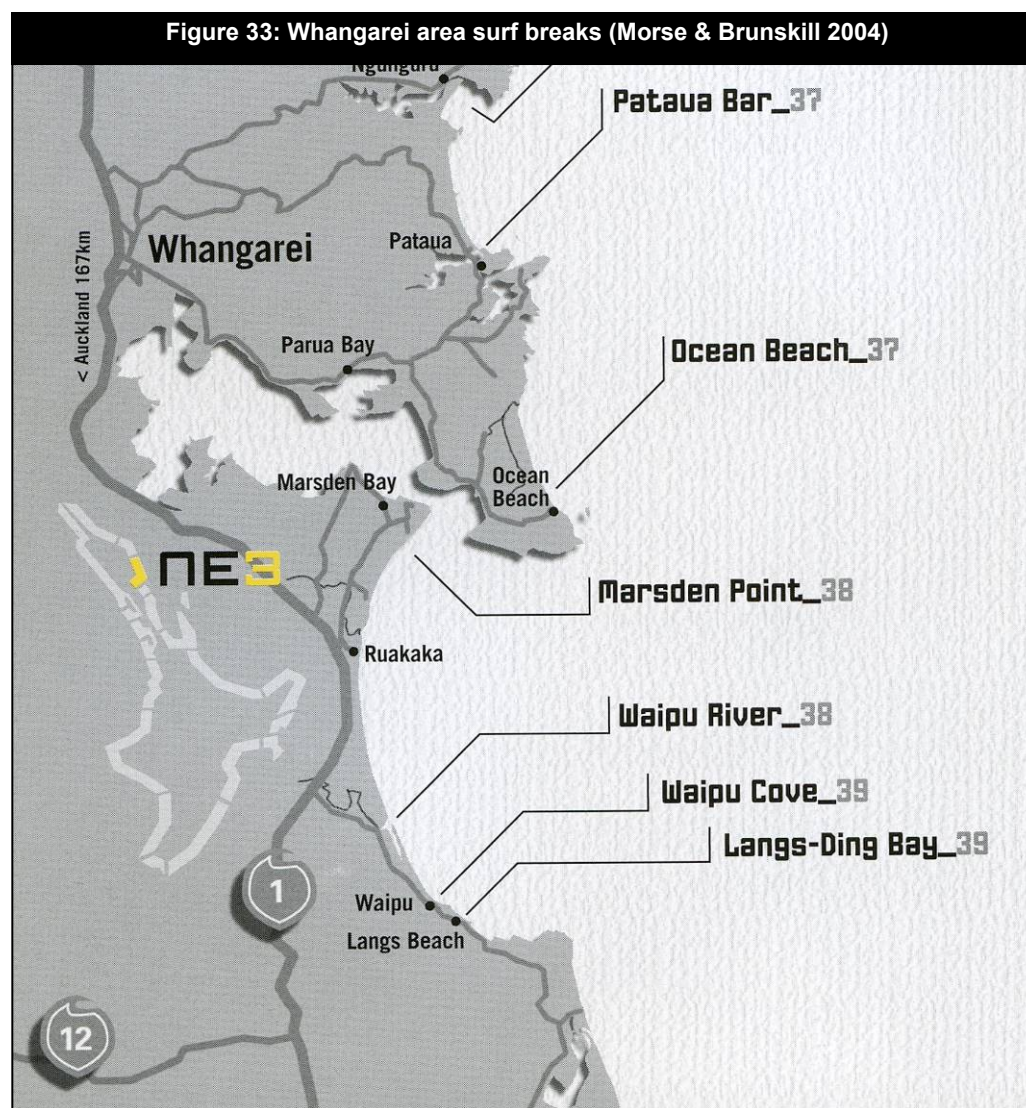


Figure 34: Surf break details (Morse & Brunskill 2004)

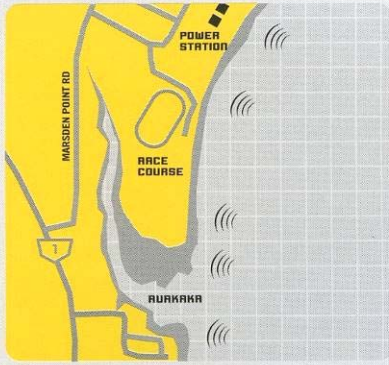
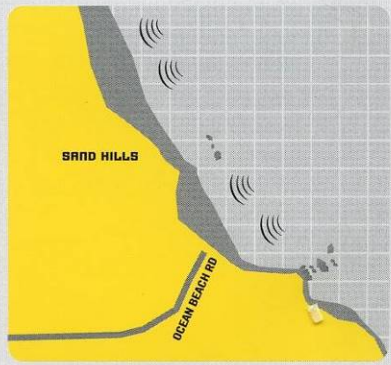
**Ocean Beach**



Head east from Whangarei out to the Whangarei Heads.



Area features a beach break and various peaks breaking around rocky outcrops. Always picks up more swell than other breaks. Works on swells from east and southeast angles. Quality beach break producing solid peaks breaking on inner and outer banks. Optimum wave size 3-6ft (1-2.5m). Will handle 8ft (3m.) Break gets crowded on weekends. Head north to Procters for uncrowded waves. Good for surfers of all levels.



**Marsden Point**



Head north from Waipu on HWY 1. Take a right on Marsden Point Rd.



Area features a beach break with left and right peaks breaking on various inner and outer bars.



Find longer waves and walls after harbour dredging. Beach picks up east and southeast sneaker swells.



Also find a river bar break at the mouth of the Ruakaka River. Expect shifty banks with shape of bars changing constantly. Fun waves - good for surfers of all levels.



**Waipu River**



From HWY 1 take the turnoff to Waipu Cove. Take a left when you reach the river.



Check surf from across the river NB: if it looks 1-2ft, it will be 2ft bigger. Mouth of the river features a right-hand bar break depending on sand bank location. Banks are shifty and constantly changing.



Be ready for a sucky takeoff and short hollow wall. Optimum wave size 3-5ft (1-2m). Break is offshore northwest, west and a light southwest. Competent surfers only.





Figure 35: Surf break details (Morse & Brunskill 2004)



**Waipu Cove**



From HWY 1, head southeast from Waipu on Waipu Cove Rd.



Here you'll find a variable beach breaks which is sheltered from large east and southeast swells.



Find a range of peaks along the beach and a right-hand point located at the southern end. The right breaks with a large wrapping east swell and features a mellow wall which peels through to a sucky shore break. Waipu Cove picks up swells from the north, northeast and east. Good for surfers of all levels.



**Langs Beach-Ding Bay**



Drive southeast over the hill from Waipu Cove.



Another stunning tree-lined bay. Find Ding Bay at the northern end. Can have quality left and right peaks, Bay is sheltered from strong northwest and west winds. Further south you'll find two streams which usually create good banks,



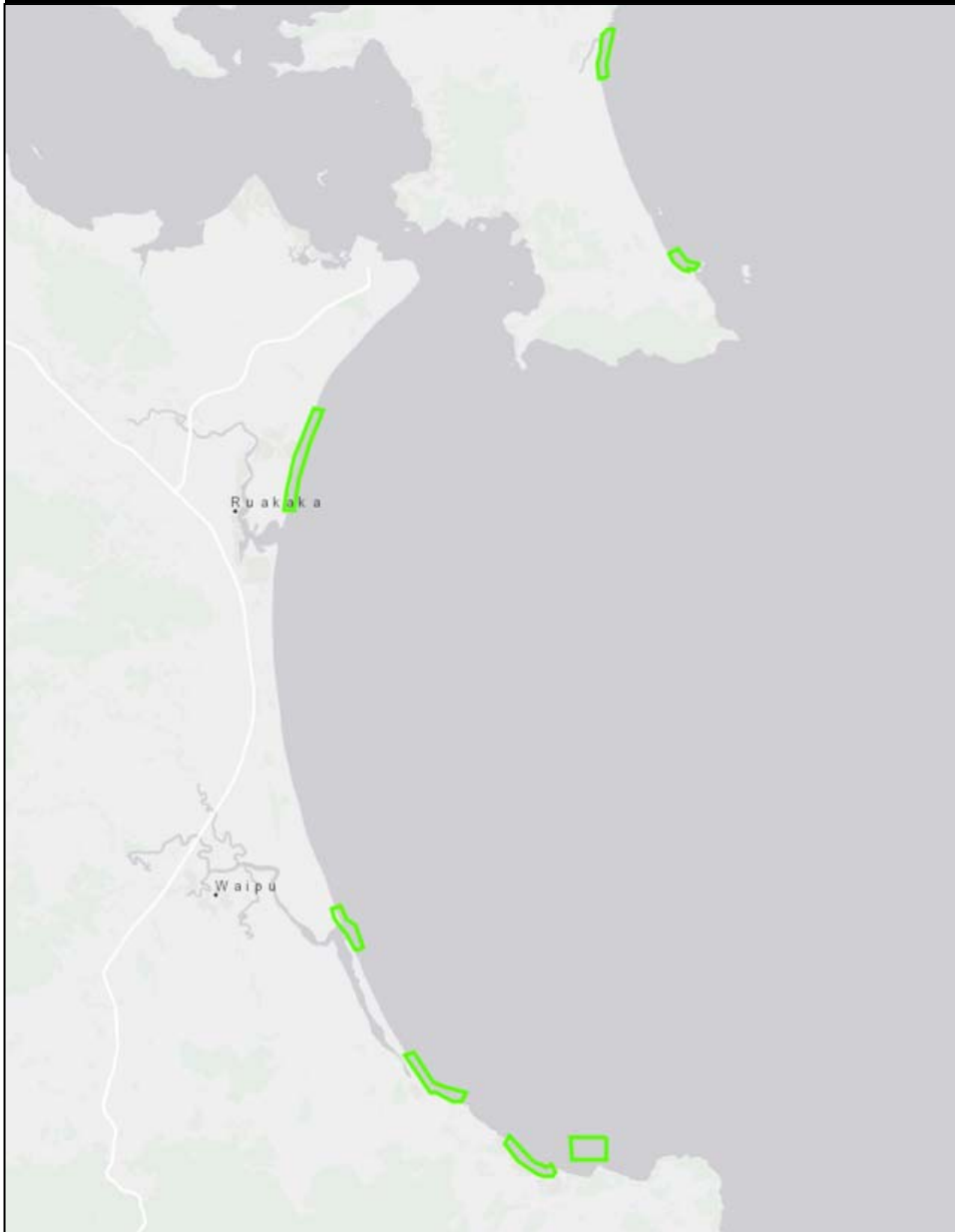
especially after heavy rain. Expect to find a range of shifty peaks along the beach. Best mid to low tide, watch the backwash at high tide. Bay holds 6-8ft (2-3m).



Find a bombie which breaks on macca swells at the south end of the bay. Further around the headland there are two other bays offering assorted breaks.



**Figure 36: Regionally significant surf breaks – Draft Regional Plan for Northland**



#### 4.7 Tourism and commercial marine recreation

The Ministry of Business, Innovation and Employment has upgraded its methodology for its Domestic Visitor Survey and International Visitor Surveys and specific activity participation data for the two markets are no longer provided at the regional level.

At the national level, water-based activities are some of the most popular. Unfortunately, the relevant data are not subdivided by marine and freshwater settings. This means that while 4% of domestic tourism trips included swimming in 2012 (that is, 1.68 million domestic 'trips' included swimming as an activity), this includes swimming in pools, rivers, lakes and the sea. Fishing, with 3% participation for domestic tourists (1.41 million 'trips') similarly includes trout and salmon as well as purely marine species. Boating (marine and fresh) was carried out on 517,000 trips (1.1% of all trips) and dolphin watching was enjoyed on 41,104 'trips' (0.09%). Dining (31%), visiting friends and relatives (21%) and shopping (21%) are the prime domestic tourism activities.

International tourists undertake more activities than domestics, with, for example, 92% of visitors dining and 80% shopping in 2013. Boating (marine and fresh) was undertaken by 23%, swimming by 12%, bird watching by 7%, and fishing and dolphin watching by 5%.

In Whangarei, several providers of tourism and commercial recreation activities can be located online, including:

- A-Oakura Fish Dive & Cruise
- Bream Bay Charters on CARA\*J
- Cronin Fishing Charters
- Marsden Cove Fishing Charters Ltd
- El Pescador Charters
- Lady Jess Charters
- Oceandivesity Sea Adventures
- Whangarei Harbour Cruises

No references to cruise ship activity in Whangarei has been located, although there are online references indicating a desire to see them visiting the Harbour in the future:

**Northern Advocate Oct 6 2012<sup>21</sup>**

*Mr Jongejans [chairman of Northland Tourism Development Group] said Whangarei needed to get in on the "fantastic" cruise-ship industry: "Something like 40 per cent of cruise-ship passengers will come back on another, longer visit, to spend more time here."*

*Though there was nowhere for the ships to berth in Whangarei at the moment, in future they could be put on a new berth at Marsden Pt and passengers taken around the district by bus or smaller boat.*

**Northern Advocate Sept 22 2014<sup>22</sup>**

*Dr Reti [MP for Whangarei] said he also wanted to get a slice of the cruise ship repair industry for Whangarei.*

*"We've got \$24 million worth (of cruise ship repairs) that are just sailing past to New Plymouth or elsewhere and while I don't want to take work from other parts of the country, I want to grow that industry so that we get a slice of the pie in Whangarei. We built the navy frigates here and have an extensive history of ship building in Whangarei and we can do it." he said....*

*He would eventually like to see cruise ships stop at Marsden Pt, but first Whangarei needed a major attraction to take cruise ship passengers to.*

*"We need a major attraction first, but what that is up to the council and public to decide. I don't care if it's something like the Hundertwasser Centre or the (proposed Hihiaua) Maori Cultural Centre, but once it is decided on I will help get Government support for the council's plans."*

<sup>21</sup> [http://www.nzherald.co.nz/northern-advocate/news/article.cfm?c\\_id=1503450&objectid=11077392](http://www.nzherald.co.nz/northern-advocate/news/article.cfm?c_id=1503450&objectid=11077392)

<sup>22</sup> [http://www.nzherald.co.nz/northern-advocate/news/article.cfm?c\\_id=1503450&objectid=11329210](http://www.nzherald.co.nz/northern-advocate/news/article.cfm?c_id=1503450&objectid=11329210)

#### 4.8 Hunting

Wildfowl hunting is identified in Northland Harbour Board (1989) at Skull Creek, Mangapai River and Otaika Creek (p119). Manning (2001) notes (p216):

*About 5770 hectares (80%) of the [Whangarei] harbour area is designated as Wildlife Refuge, which prohibits hunting and deliberate disturbance to wildlife, but does not restrict public access.*

A definition of the refuge boundaries is not available online. Pierce (2005) describes the whole harbour as a wildlife refuge (p1). Refuges are also located at Ruakaka and Waipu.<sup>23</sup> There are no references to hunting on the Whangarei Harbour on the NZ Fish and Game Council website.

#### 4.9 Terrestrial recreation and access

The Walking Access Commission’s online Walking Access Mapping System (WAMS) describes the public access opportunities in the study area (Figure 38, next page).<sup>24</sup> These recreation opportunities are largely the same as those reviewed in section 3 of this report (with lands administered by DOC and WDC).

The WAMS system identifies extensive areas of ‘Crown Land’ in Whangarei Harbour and around Marsden Point and Bream Head (Figure 37). The status of these areas for public access will depend upon which government department manages them (if that is the case), for what purpose, and whether there is any lease or licence to occupy in place.

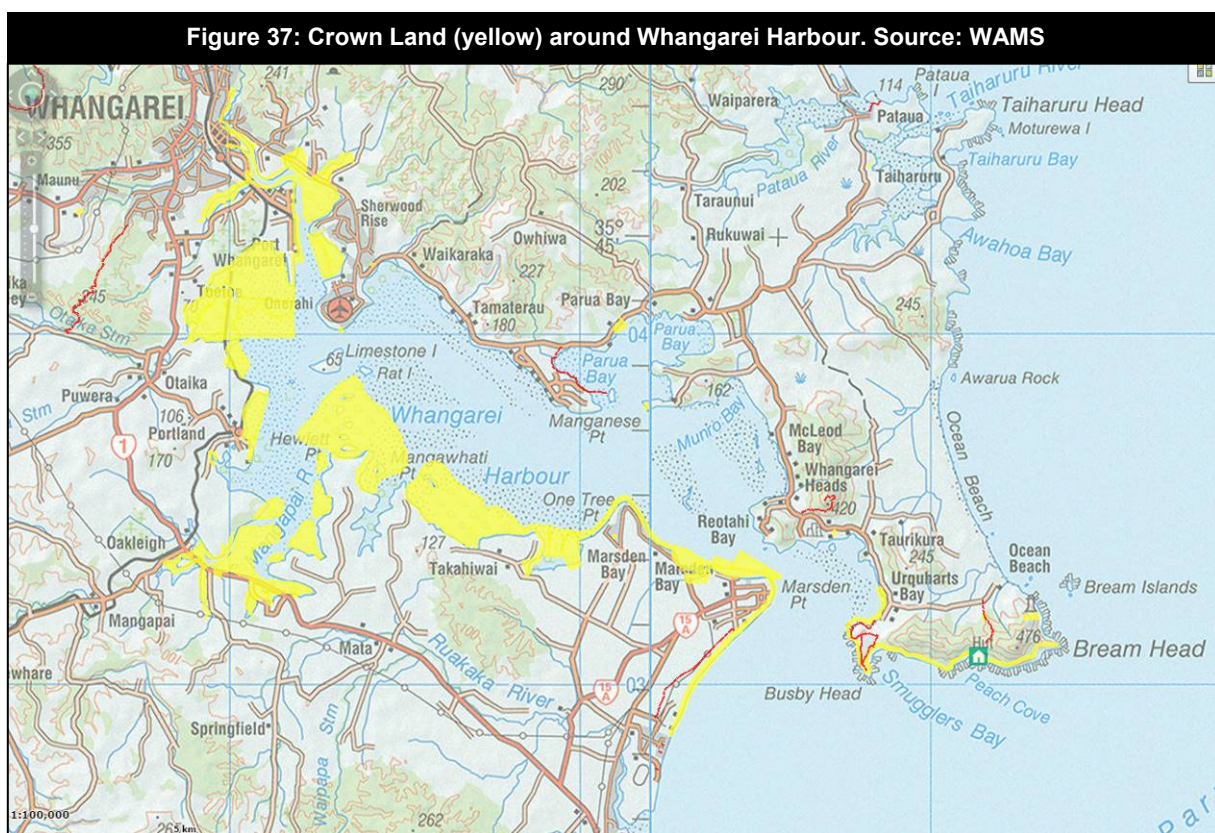


Figure 37: Crown Land (yellow) around Whangarei Harbour. Source: WAMS

<sup>23</sup> See here for a discussion about conflicts with kite surfers: <http://www.doc.govt.nz/about-doc/news/media-releases/2009/kite-boarding-activity-in-ruakaka-wildlife-refuge/>

<sup>24</sup> <http://wams.org.nz/>

Figure 38: Public access around Whangarei Harbour and Bream Bay excluding legal roads. Source: WAMS



## 5 Assessment of effects

---

This section results in the identification of likely adverse effects on recreation potentially caused by the Project, and a review of possible mitigations. This is based on:

- An identification of all potential adverse effects on recreation amenity (identified via parallel technical assessments and the consultation process),
- A review of the technical reports which assess those effects, and the identification of the scale and relevance of each effect,
- A summary of the effects which have the potential to change recreation amenity,
- A discussion of the scale of those effects and their potential for mitigation.

### 5.1 Potential adverse effects

---

The following potential effects of the proposal are of interest to recreation. Effects are considered for: dredging and spoil disposal periods ('construction and maintenance'); and for the ongoing effects resulting from the modified marine settings ('operation'). These potential effects and the relevant recreation activities are summarised in Table 1.

#### Construction and maintenance

- Turbidity effects on recreation settings (particularly swimming and diving areas) and visual amenity at and near the Harbour entrance,
- Mobilisation of contaminants and potential effects on shellfish and other seafood, and for water-contact recreation,
- Effects on marine ecology and the quality, abundance and catchability of marine species, in and around the entrance and at and near the spoil dumping site offshore during the dredging period/s,
- Occupation of marine settings by dredges working or in transit and the creation of hazards for, especially, boaters.

#### Operation

- Changes to tides, currents and wave patterns resulting from altered bathymetry,
- Changes to beach and foreshore profiles resulting from changes to wave patterns, including remobilisation of dumped material,
- Effects on wave energy as a result of the passage of larger vessels,

Effects associated with the location and operation of aids to navigation, such as navigation buoys and markers (*Nav aids*). These potential effects are considered individually in the following sections.

The following potential issues are not reviewed further:

- The presence of birds, which are likely to support marine recreation or increase its value. Relevant effects of the Project is considered in the Bioresearches (2016) report on coastal birds, which finds the potential for adverse effects to be low.
- Navigation risk, which is of interest to recreational boaters. Risk for large ships reviewed by Navigatus (2016). There are no apparent issues associated with deepening and realigning the channel, and relocating or adding navigation beacons, which would affect any recreational skipper sufficiently skilled to navigate the Harbour as it is currently.

- Noise effects on people, which are assessed by Styles Group (2016). Their report considers effects on residents who remain exposed to noise for long periods, and makes recommendations to ensure compliance with relevant noise standards. Recreational visitors may venture closer to dredge activities than residents, but are mobile and temporary visitors. Compliance with required noise standards for residential areas is considered appropriate, otherwise exclusion zones could be required to prevent, for example, a recreational vessel passing within a potentially noisy environment. In any case, Styles Group (2016, p15) finds that “compliance with the relevant noise limits for permitted activities will be achieved generally by a large margin”.
- Commercial fishing, which is reviewed by Boyd (2017).

	Turbidity	Waves	Tides	Beaches	Marine ecology	Contaminants	Dredge activity	Nav aids
Swimming	♦	♦	♦	♦		♦		
Beach use				♦				
Fishing	♦	♦	♦		♦	♦		
Shell fish	♦	♦	♦		♦	♦		
Diving	♦	♦	♦		♦	♦		
Boating*		♦	♦	♦			♦	♦
Surfing	♦	♦	♦					

\* includes small and large craft, yachts, launches, SUP, kite surfing

## 5.2 Technical review findings

### 5.2.1 Turbidity

Dredging activity will disturb the sea floor and release sediment as dredge material is removed and disposed of in spoil grounds. Released sediment may reduce water clarity and decrease amenity for contact recreation.

The NRC Regional Coastal Plan defines water clarity standards for contact recreation based on the ANZECC (2000) water quality guidelines for visual clarity and colour (RCP Appendix 4). The ANZECC guidelines as used by the RCP for contact recreation are:

*To protect the aesthetic quality of a waterbody:*

- *the natural visual clarity should not be reduced by more than 20%;*
- *the natural hue of the water should not be changed by more than 10 points on the Munsell Scale.*

Contact recreation is not anticipated in the dredge disposal areas, and effects of interest relate to increased turbidity in the swimming and diving areas within the Harbour and near the entrance.

Turbidity effects are considered in Coffey (2017). Of note are the following findings:

- Water clarity, as measured by Secchi depth visibility, is generally very good east of Tamaterau (more than 2 metres) but declines further up-harbour. Bream Bay water is generally very clear (pp18, 20).
- Hard-bottom reef communities of high intrinsic, conservation and recreational value are located near the dredge channel (these include the key dive sites near the entrance).

Real-time monitoring of turbidity is proposed to avoid effects on these habitats. The objective is to ensure adverse effects do not occur (p50).

Coffey (2017 p43) notes:

*.... video footage of a smaller, distinct, dredging operation undertaken by Refining NZ in December 2016 - February 2017 to undertake urgent emergency works around its berthing 'dolphins' did not reveal any oil or grease films, scums or foams, and no floatable materials. Moreover, video of the plume generated by the dredge indicated the plume was not associated with a conspicuous change in the colour or visual clarity after reasonable mixing*

Plume modelling carried out by MetOcean (2017, p102) indicates that while dredging plumes within the channel could extend for up to 1200 m from the dredge site, the plume is confined to the harbour channel. There was no indication of plume dispersion to adjacent beaches, sand banks, Marine 1 (Protection) Management Areas or Marine Reserves.

### **Summary for turbidity**

The dispersal of sediment from the dredging activity is likely to be strongly confined to the dredge channel and has a low chance of dispersal to any contact recreation setting. However, real-time monitoring is planned to ensure there are no effects on important marine ecosystems near the dredge channel. There is therefore likely to be very little if any adverse effect on recreational dive and swimming sites, including on the marine life that attracts most divers. While ANZECC guidelines for contact recreation might be exceeded near the dredge sites, they are very unlikely to be breached (or approached) in contact recreation settings. Turbidity in and near the spoil disposal grounds will not present effects on recreation amenity (beyond those considered for fishing).

### **5.2.2 Waves**

Changes in bathymetry have the potential to alter the direction and size of waves entering the harbour. Changes to wave energy may then have consequent effects on beach profiles and inshore marine ecology. These effects may change the existing level of amenity for swimming, surfing, fishing, shellfish gathering, boating and diving.

Consultation identified a query as to whether larger ships entering the Harbour could result in larger wakes affecting beach users and boats. However, wake size is dependent on ship speed more than size or draught. As all large vessels are at reduced speeds within the harbour limits, there is no change to wake size as they get larger or have a deeper draught (R. Reinen-Hamil, Tonkin + Taylor, pers comm).

MetOcean (2017) reviews modelled effects of changes in bathymetry on tides and waves and sediment transport processes; and Tonkin + Taylor (2017) use these and other data to identify effects on coastal processes.

MetOcean (2017, p33) indicate no potential change in mean wave heights, as result of channel deepening, at Ruakaka Beach river mouth, Ruakaka Beach, Mair Bank - middle area and Mair Bank - eastern edge. The Ruakaka Beach – northern area is modelled to have a mean reduction of 1cm from an existing mean wave height of 45cm, and the Marsden - Mair Bank beach area to have an increase of 1cm from an existing mean wave height of 11cm. Slight increases are also modelled for Busby Head (+2cm from a mean of 42cm) and the western side of Smugglers Bay (+3cm from a mean of 26cm). Effects are confined to swell waves and not locally generated wind waves.

Tonkin + Taylor (2017) state in their summary:



*The predicted change in wave height resulting from the dredged channel in average and moderate wave climate conditions are negligible (less than  $\pm 0.02$  m). This variation is an order of magnitude less than the annual variability in mean wave heights over the 35 year hindcast of 0.31 m (i.e. from 0.68 m to 0.99 m). Change to average wave heights resulting from placement of sand in the disposal areas are negligible.*

*For extreme storm events there is some channel refraction effect which may result in slightly higher waves breaking on the edge of Mair Bank and towards Busby Head (between 0.1 m and 0.3 m increase with waves around 5m high). Again, comparing the inter-annual variability on wave heights, the relative change is an order of magnitude less than the annual variability of 1.36 m for the 99% wave height currently experienced. Change to storm wave heights resulting from placement of sand in the disposal areas are negligible.*

### **Summary for waves**

Preferred wave heights for surfing range between 1 and 3 m (see section 4.6). Changes which might be noted by surfers only accrue during storm events with wave heights around 5 m and only at the northern end of the Marsden Point surf break at Mair Bank. This is very unlikely to affect surfing amenity.

Increases in wave energy could have adverse effects on diving and swimming, but effects (as small as they are modelled to be) only occur when there is little natural amenity for recreation due to natural wave action (that is, there needs to be waves in action for there to be an effect on them, and the smaller the wave, the less effect).

More heavily laden vessels will not increase ship wakes.

### **5.2.3 Tides**

Changes in bathymetry have the potential to alter tide direction and strength. These may affect the existing level of amenity for swimming, surfing, fishing, shellfish gathering, boating and diving.

The Tonkin + Taylor (2017) report on coastal processes is relevant. This states in its summary:

*There is generally a very small reduction in tidal velocities as a result of the channel modifications (generally less than 0.02 m/s) except along the channel between Marsden Bank and Mair Bank, within the channel between Mair Bank and Home Point and between Home Point and Busby Head. In these areas the changes are in the order of 0.1 m/s.*

### **Summary for tides**

An acceleration in tidal strength could pose a hazard for boaters in the harbour channel. However, by deepening the channel, tidal speed generally decreases, albeit by a very small amount. There are therefore no adverse effects resulting from changes in tidal speed. The Tonkin + Taylor report also notes the potential for a minor change in timing of high and low tides, which will not affect recreation participation (timing of tides change every day).

### **5.2.4 Beaches**

Changes to wave energy within the harbour have the potential to alter beach profiles. Gains or reductions in the height of beaches may change the availability of sand for general beach recreation and the usability of boat launching ramps.

The Tonkin + Taylor (2017) report on coastal processes is relevant. This states in its summary that no changes are anticipated to existing coastal processes on the open coast from Marsden Point to Ruakaka River or along the rocky coast from Home Point to Smugglers Bay, on the ebb tide shoal and Mair Bank or within the inner harbour area. However, there is the potential for the proposed maintenance dredging to add to the existing trend of a loss of sand at Mair Bank and the coastline extending southward from Marsden Point. It is therefore proposed to deposit a portion of the suitable dredged material within the ebb tide shoal area to enhance the supply of sand to both the shoal and the adjacent shoreline; and to monitor change in these settings over time. The conclusion is that, with this mitigation in place, any effects of dredging on shoreline processes are 'less than minor'.

### **Summary for beaches**

The potential for changes to beach profiles – albeit slight and within a naturally dynamic setting – is confined to at and near Mair Bank and as a result of long-term maintenance dredging activity. The local recreation values are predominantly shellfish gathering. Mitigation options are proposed, via augmenting the local sand supply via depositing some suitable dredge material in the ebb tide shoal area, with an associated monitoring programme. Any changes of relevance to recreation are therefore effectively managed.

### **5.2.5 Marine ecology**

Sedimentation, spoil deposition and changes to the sea floor at the dredging site have the potential to modify marine habitat and the availability of sea food for harvesting.

Coffey (2017, p47 ff.) reviews potential effects of the activities on fish and shellfish species and their habitats and notes:

- Local finfish are expected to avoid areas where feeding grounds have been disturbed but will return once they have recovered.
- The proposed dredging and disposal activities are likely to result in an initial reduction of the population of species such as snapper, kahawai, shark and kingfish using the disturbed sites, but a progressive recovery would be expected to be complete with 6 to 12 months of capital dredging in the dredged channel and inshore/ebb tide shoal disposal area, and within 12 to 24 months in the offshore disposal area, although at the latter an 'ecologically constructive benthic community' (one able to provide feeding grounds for fish) is expected to re-establish within 12 months (meaning all affected areas will be supporting recreational fish species within 6 to 12 months).
- The effects of maintenance dredging are likely to be more confined than capital dredging, with smaller areas disturbed and more rapid recolonisation.
- Maintenance dredging may need to occur every 2 to 5 years in the berth pocket area and in targeted areas of the inner and mid channel to maintain navigable draft around the jetty dolphins. The outer channel may requiring maintenance work after between 5 and 10 years.

Coffey (2017, p51) recommends monitoring and control methods to avoid effects on sensitive hard bottom ecological communities adjacent to the dredging footprint.

There is likely to be some temporary increase in local finfish activity as the dredging activity exposes food sources, but this is not considered to be a mitigating effect.

### **Summary for marine ecology**

Coffey (2017, p50) indicates that the scale of effect on benthic biomass (food sources for recreationally taken fish) are expected to be 'minor to moderate', short-term, and to progressively ameliorate within 6 to 12 months. This is likely to similarly result in some local

displacement of fishing activity from the dredge and disposal footprints during the recovery period. The dredge channel is within a popular fishing area – although anchoring and fishing within the channel itself is not wise boating behaviour – as is part of the disposal footprint.

Although 80% of dredge activity will occur beyond Home Point, both the inner and outer dredge sites are within popular fishing areas.

The total regional level of participation in recreational fishing is unlikely to be affected due to the popularity of the activity and the high number of alternative fishing areas, but local displacement may increase fishing pressure in those alternative sites, particularly areas sheltered by Busby Head and within the Harbour, and accessible sites around Bream Head. No data have been encountered to indicate that these areas suffer recreation conflict or overcrowding, although most anglers prefer less fishing competition than more.

Due to the scale of the local fishing resource, the mobility of finfish, the lack of effect on biota beyond the activity footprints, the progressive recovery of the benthos, and the temporary nature of the effect, the net outcome for recreational fishing from capital dredging is likely to be adverse but also minor. Maintenance dredging will have a lower scale of effect during each event, but due to its frequency (2 to 5 yearly) its net effect will also be adverse but minor.

There is likely to be some temporary increase in local finfish activity as the dredging activity exposes food sources, but this is not considered to be a mitigating effect.

### 5.2.6 Contaminants

Mobilising these has the potential to affect contact recreation activities in the Harbour.

The RCP also requires for contact recreation:

*No conspicuous oil or grease film, scums or foams, floatable or suspended materials, or emissions of objectionable odour.*

Coffey (2017, p50) states that the material to be dredged is not contaminated with any toxins and also has very low levels of organic matter (which, if present, could lead to a drop in dissolved oxygen levels due to spikes in algal growth). This means there are no water quality issues associated with the activity.

### 5.2.7 Dredge activity

The presence of a dredge operating within the Harbour channel has the potential to compete for marine space with recreational craft and to present a hazard. The capital dredging programme is likely to last up to six months, with maintenance dredging involving smaller vessels and much shorter timeframes. Eighty-percent of dredge activity will be in the outer channel beyond Home Point, where there is ample navigation space.

The dredge will be operating within a defined Commercial Vessel Route within the Harbour as defined by the Northland Regional Council (Figure 39)<sup>25</sup>. The use of these routes by large vessels – particularly east of Portland and leading from the harbour limits to Northport and Marsden Wharf – are well-established activities.

The NRC Navigation Safety Bylaw 2012 requires:

*2.12.1 The master of every vessel shall, when navigating within harbour limits, ensure that:*

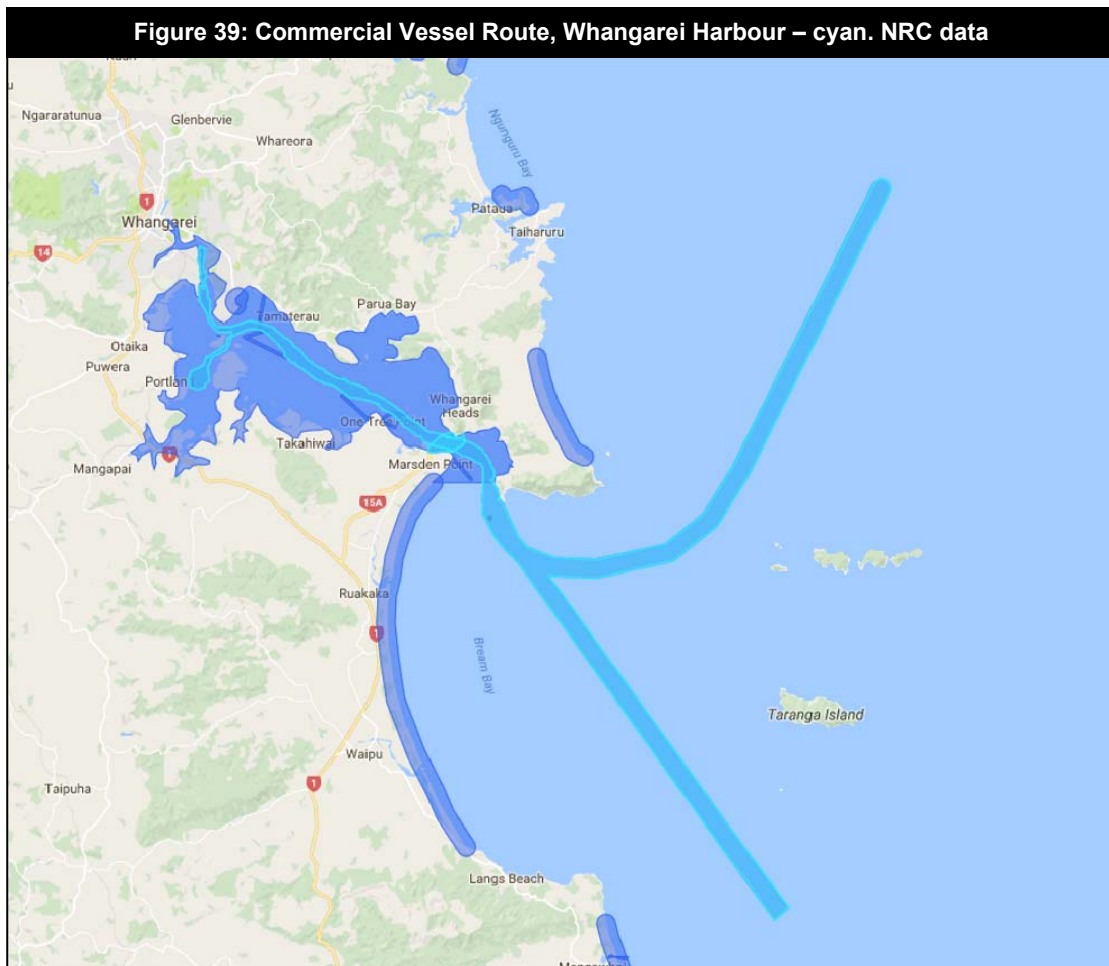
*(a) automatic steering 'pilot' devices, if fitted, are not used, unless a helmsman is standing by in the immediate vicinity of the helm station or wheel. Otherwise, vessels are to be in hand-steering mode; and*

<sup>25</sup> <https://koordinates.com/layer/3226-northland-coastal-information-polygons-coastal-use-and-value/data/14/>

(b) the vessel's main engine(s) is immediately available for reducing speed, stopping or going astern at all times and without delay; and

(c) the vessel's anchors are immediately available for use in an emergency and capable of being used without power....

2.12.3 The master of every vessel under 500 gross tonnage or under 24 metres in length must not impede the navigation of any vessel of 500 gross tonnage or more when operating within harbour limits.



Rule 2.12.3 would apply to most small commercial dredge vessels operating in New Zealand. The Pelican and Kawatiri, for example, have gross tonnages of approximately 1000 tonnes.<sup>26</sup>

Required maritime practice means the dredge will be appropriately lit at night and will obey all marine navigation rules.

### Summary for dredge activity

Any recreation skipper operating in or near the harbour entrance would expect to encounter large ships and to comply with harbour navigation rules. While the presence of a dredge is an additional navigational issue, it should not limit recreation participation by large and small recreational vessels. However, it is recommended that RNZ place on its website information about dredge activities (location and duration of activity), and promote the location of the data to boating clubs and via local print media. This will be of interest to boaties generally, and may assist cautious skippers. Advice should also be given to the regional harbourmaster who can then make judgements about the importance of additional maritime notifications –

<sup>26</sup> Marinetraffic.com data

including whether it warrants a Notice to Mariners (via LINZ). The net effect on recreation participation is likely to be minor or less and the presence of dredges is unlikely to limit recreation participation compared with now.

### 5.3 Nav aids

The reformatting of the location and type of navigation aids is described by Royal Haskoning DHV (2017) and are shown in Appendix 1 to this report,

The existing channel demarcation is provided by a safe water mark (often referred to as the fairway buoy) and nine starboard buoys and nine port buoys. Eight of the existing buoys will need to be relocated to accommodate the reconfigured channel alignment. Two additional channel marker buoys (one starboard and one port) will be installed at -17.7m depth, and the existing fairway buoy will be moved to be aligned with the starboard channel markers at -25.0m depth. An improved Port Entry Light, a modified rear lead light marking the offshore approach channel, and a set of lead lights in Taurikura Bay to assist with night time navigation will also be installed.

The developments are required to mark the new channel alignment and to reduce the risk of marine accidents.

The ecological effects of their installation and operation is reviewed in Coffey (2017), who finds no issues of relevance. The nav aids are located on channel edges where tidal currents tend to be strong and not within recreational diving, snorkelling or swimming areas.

The relocation of nav aids will require a Notice to Mariners (via LINZ) and updates to LINZ marine charts. Such activities are common practice nationally, although many recreational boaters will be unaware of them, and when navigating familiar territory will rarely refer to charts. However, the beacons will be very obvious on the water, day and night, and there will be no introduction of new submerged marine hazards – meaning reliance on local knowledge rather than charts will remain relevant.

Recreational fishers occasionally tie to navigation aids, but this is not an option considering Maritime Rules (Maritime NZ, 2016):

#### *91.14 Damage to navigation aids*

*(1) No person may tie a vessel to any aid to navigation without the written permission of—*

*(a) if the aid to navigation is operated by a local authority or port company, the harbourmaster; or*

*(b) if the aid to navigation is operated by the Maritime Safety Authority, the Director.*

*(2) No person may damage, remove, deface or otherwise interfere with an aid to navigation*

### **Summary for nav aids**

Nav aids are required structures for safe navigation. They are used by both recreational and commercial craft and need to be in the right locations. The recommendations for their placement as part of the Project are made by Royal Haskoning DHV (2017) for the purposes of navigation safety. This is a necessary response to the Project. Local boaters will rapidly adjust to very obvious changes in beacon location, which should be considered a pre-requisite skill for operating watercraft in a navigation channel. The proposed nav aid developments are not considered to be adverse effects on recreation, and any safety improvement in navigation is likely to have a positive effect.

## 5.4 Cumulative effects

---

Cumulative effects include those which may exacerbate effects of already consented activities in the same environment which may not have been undertaken, or increasing the scale, intensity or rate of existing environmental changes.

Three currently consented local activities need to be considered, as described in Coffey (2017 pp31-33): Northport Ltd's expansion plans; The Ruakaka Wastewater Treatment Plant Ocean Outfall; and the NIWA Aquaculture Facility seawater supply and discharge.

For recreation, the effects of the proposal are sufficiently slight to make it unlikely for cumulative adverse effects to arise. Indeed, the relocation of sand material on the ebb tide shoal has the potential to reduce the rate of local coastal erosion resulting from climate change. Effects on marina biota are temporary and localised and are therefore very unlikely to add to changes in fish populations, Ongoing recreational and commercial fishing pressure will far outweigh any potential changes to local fish availability. There are no effects on fish breeding grounds or on the habitat of recreational shellfish due to the limited and controlled turbidity and sedimentation. There has been no identified mechanism by which the proposed activity would affect pipi beds on Mair Bank, and the relocation of sand to the ebb tide shoal will support the maintenance of habitat.

There are no locally consented activities identified which have not been implemented which would increase the potential for adverse effects from the proposal.

## 6 Conclusion

---

Despite the proximity of the dredging activity to an intensely and extensively used recreation setting, effects of the Project are expected to be confined and slight. This is the result of:

- Dredged material being generally of a coarse and clean nature and confined to the harbour channel when it forms a plume; and therefore little chance for effects on contact recreation and on the marine biota of interest to divers and snorkelers.
- The ability to avoid effects on marine ecosystems outside the dredge and disposal sites; and therefore little chance of adverse effects on diving, snorkelling and fishing beyond those footprints.
- Minimal effects on waves and coastal process (and so no effect on surfing), and the ability to address potential effects from maintenance dredging on sand supply at and around Mair Bank, and to offer an enhancement opportunity.
- The presence of large ships being common in the Harbour channel, and dredges therefore not being an unusual impediment to boating – although ensuring information about dredge activity is available is recommended.

Temporary displacement of fishing activity is likely in the dredge channel and at the spoil site as they recover from disturbance. For recreation, this will be the greatest effect, but due to: the scale of the fishing resource, the number of alternative sites, and the relatively short expected recovery period, the effect is likely to be minor and represented by fishers choosing an alternative fishing site nearby. The use of berley to attract fish is normal practice when boat-fishing, and Brian Coffey (author of Coffey (2017), pers comm) notes that using this method in a disturbed area will remain effective in attracting finfish.

## 7 References

---

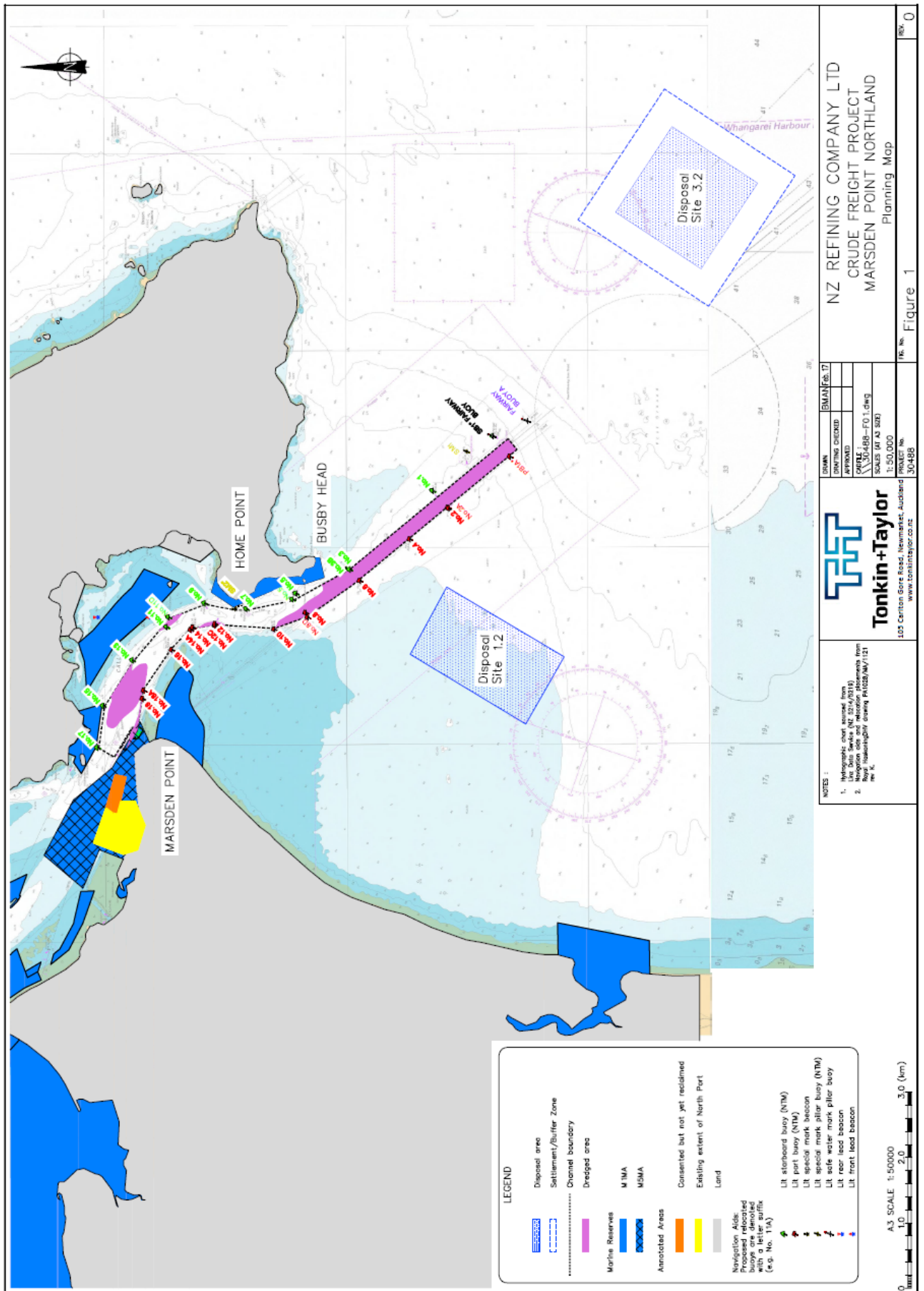
All websites (URLs) are referenced in footnotes.

- Airey, M. 2012. *Spot X Boat Fishing New Zealand*. Spot X Publications, Auckland.
- Allen, W. Elmetri, I. Clarke, S. Gibbons. J. Clark, K., Sinner, J., Jiang, W. and Taylor, M. 2009. *Mapping the Values of New Zealand's Coastal Waters. 3. Social Values*. Biosecurity New Zealand.
- Cummings, V. & Hatton, S. 2003. *Towards the long term enhancement of shellfish beds in the Whangarei Harbour. Part One: Identifying suitable habitat and methodologies for reseeding*. NIWA client report for Northland Regional Council.
- Coffey, B. 2017 *Crude Shipping Project Proposal to Deepen and Partially Realign the Approaches to Marsden Point Assessment of Marine Ecological Effects Excluding Seabirds and Marine Mammals*. Brian T. Coffey and Associates Limited Client report prepared for Chancery Green on behalf of Refining NZ.
- Department of Conservation. 2010. *New Zealand Coastal Policy Statement 2010*. DOC, Wellington.
- Department of Conservation. 2014a. *Conservation Management Strategy for Northland 2014–2024*. DOC, Wellington Conservancy.
- Department of Conservation. 2014b. *Whangarei Harbour Marine Reserve*. DOC, Whangarei.
- Draper, M. 2012. *Sport X Surfcasting New Zealand*. Spot X Publications, Auckland.
- Draper, M. Enderby, T. Enderby J. (eds) 2008. *Sport X Fishing New Zealand*. Spot X Publications, Auckland.
- Enderby, T. Enderby J. 2007. *Sport X Diving New Zealand*. Spot X Publications, Auckland.
- Hampson, N. Kerr, V. Poynter, M. Dunn, M. Makgill, R. Fairgray, D and Farrow, N. 2013. *National Marine Park for Northland Scoping and Review Report*. Market Economics client report for Northland Regional Council
- Kalafatelis, E. & Magill, K. 2013. *Rates of participation in recreation boating*. Research New Zealand client report prepared for Paul Vance, Maritime NZ.
- Manning, D. 2001. *Natural areas of Whangarei Ecological District*. DOC, Northland Conservancy.
- Marine Industry of New Zealand, 2007. *Marine Industry of New Zealand Annual Report for period to 31 December 2007*. MIA, Auckland.
- Maritime New Zealand, 2007. *Boating Safety Strategy - 2007 Review of the New Zealand Pleasure Boat Safety Strategy*. MNZ, Auckland.
- Morse, P.B & Brunskill, P. 2004. *Wavetrack New Zealand Surfing Guide*. Greenroom Surf Media, NZ.
- Murfitt, J. 2014. *Evaluation of the Merits of Supporting a National Marine Park Proposal for Northland's East Coast*. Agenda report for Northland Regional Council meeting 18 March 2014 - ID A593862.
- MetOcean Solutions, 2017. *Crude Freight Project Whangarei Harbour. Predicted physical and environmental effects from channel deepening and offshore disposal*. MetOcean Solutions Ltd: Report P0297-02 June 2016, prepared for Chancery Green for Refining NZ.
- Navigatus, 2016. *Environmental Risk Assessment for Proposed Tanker Operations*. Client report prepared for Chancery Green for Refining NZ.
- Northland Harbour Board, 1989. *Whāngārei Harbour Study*. Prepared by Whāngārei Harbour study working & steering committees for the Northland Harbour Board.
- Northland Regional Council, 2016. *Operative Regional Policy Statement for Northland*. NRC, Whangarei.
- Northland Regional Council, 2012. *Whangarei Harbour Water Quality Improvement Strategy*. NRC, Whangarei.
- Northland Regional Council, 2002. *Northland Regional Council State of the Environment Report 2002*. NRC, Whangarei.
- Pierce, R.J. 2005. *General Patterns of Bird Use of Whangarei Harbour, March 2005*. Wildlands Consultants client report for Northland Regional Council.
- Royal Akarana Yacht Club, 2012. *The Royal Akarana Yacht Club Coastal Cruising Handbook*. 11<sup>th</sup> edition. RAYC, Auckland.



- Royal HaskoningDHV, 2016. *Refining NZ Crude Freight Project. Shipping Channel - Concept Design Report*. Client: Refining NZ. Royal HaskoningDHV Reference M&APA1028R002D08. Dated 12 November 2016. Authors: Matt Potter, Richard Mocke and Justin Cross.
- SPARC, 2009a. *Sport, Recreation and Physical Activity Participation Among New Zealand Adults Key Results of the 2007/08 Active New Zealand Survey*. Sport NZ, Wellington.
- SPARC, 2009b. *Sport and Recreation Profile: Fishing Findings from the 2007/2008 Active New Zealand Survey*. Sport NZ, Wellington.
- SPARC, 2009c. *Sport, Recreation and Physical Activity Profile: Northland Region 2007/08*. Sport NZ, Wellington.
- SPARC, 2009d. *Sport and Recreation Participation Levels Findings from the 2007/2008 Active New Zealand Survey*. Sport NZ, Wellington.
- Sport NZ, 2013. *Gemba Sports Data Tables April 2012-March 2013*. Sport NZ, Wellington.
- Sport New Zealand, 2015a. *Sport & Active Recreation Regional Profile Northland Region - Findings from the 2013/14 Active New Zealand Survey*. Sport NZ, Wellington.
- Sport New Zealand, 2015b. *Sport and Active Recreation in the Lives of New Zealand Adults. 2013/14 Active New Zealand Survey Results*. Sport NZ, Wellington.
- Tonkin + Taylor, 2017. *Crude Shipping Project Coastal Processes Assessment*. Prepared for ChanceryGreen on behalf of Refining NZ Ltd
- Vance, P. 2014. *Synthesis of research conducted in recreational boating*. Maritime NZ internal report.
- Whangarei District Council, 2001. *Open Space Strategy – Open space – special places*. WDC report.

# Appendix 1: Project activity maps



**NOTES :**

1. Hydrographic chart sourced from the Data Service (NZ 2014/1318)
2. Royal New Zealand Navy charts from NZ 1:50,000

**Legend:**

- Disposal area
- Settlement/Buffer Zone
- Channel boundary
- Dredged area
- Marine Reserves
- MIMA
- MUMA
- Annotated Areas
- Consented but not yet reclaimed
- Existing extent of North Port
- Land
- Navigation Aids
- Lit sternward buoy (NTM)
- Lit port buoy (NTM)
- Lit special mark beacon
- Lit special mark pillar buoy (NTM)
- Lit safe water mark pillar buoy
- Lit rear lead beacon
- Lit front lead beacon

**Scale:** 1:50,000  
0 1.0 2.0 3.0 (km)

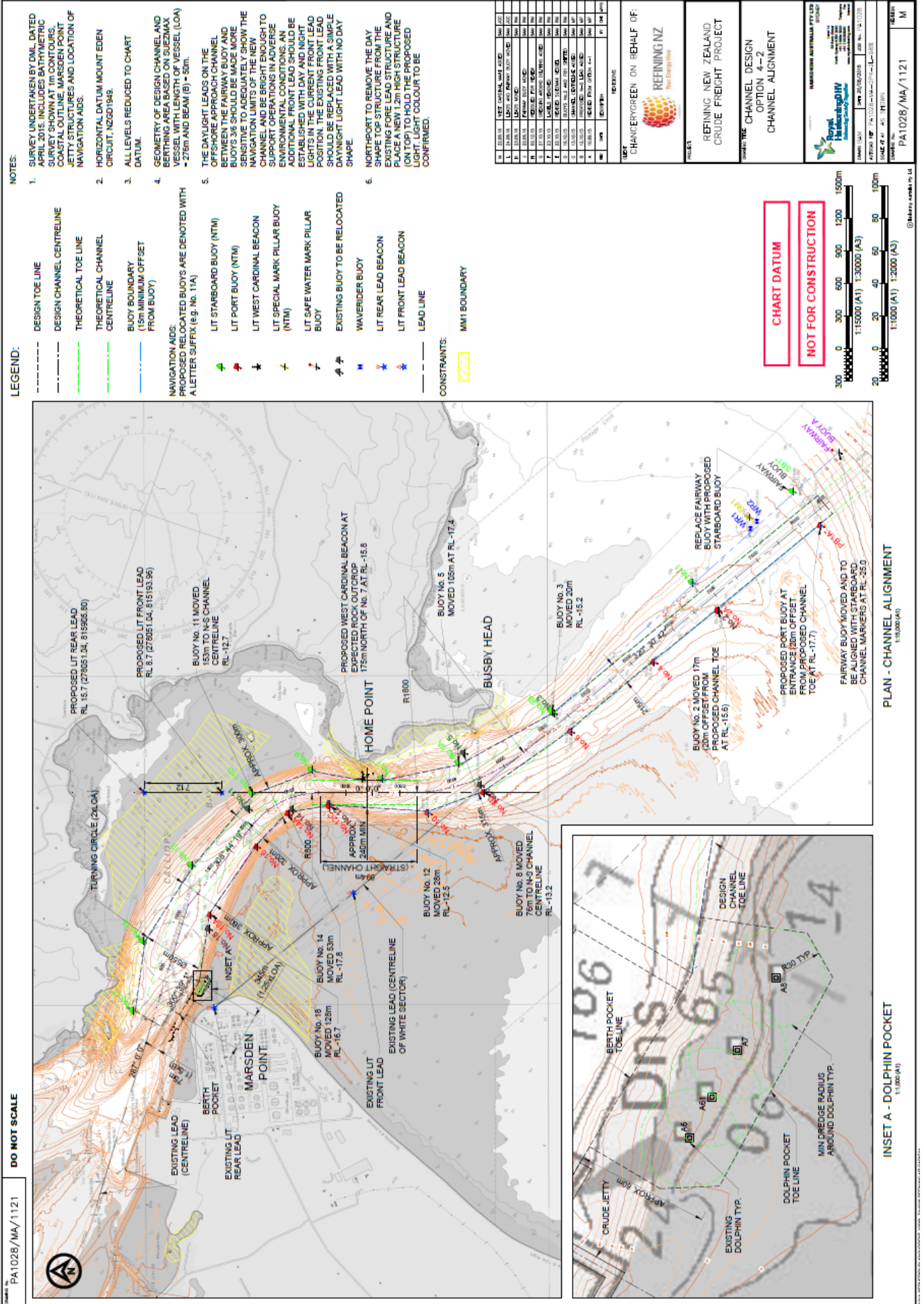
**Project Information:**

**Client:** NZ Refining Company Ltd  
**Project Name:** Crude Freight Project  
**Location:** Marsden Point Northland  
**Map Type:** Planning Map

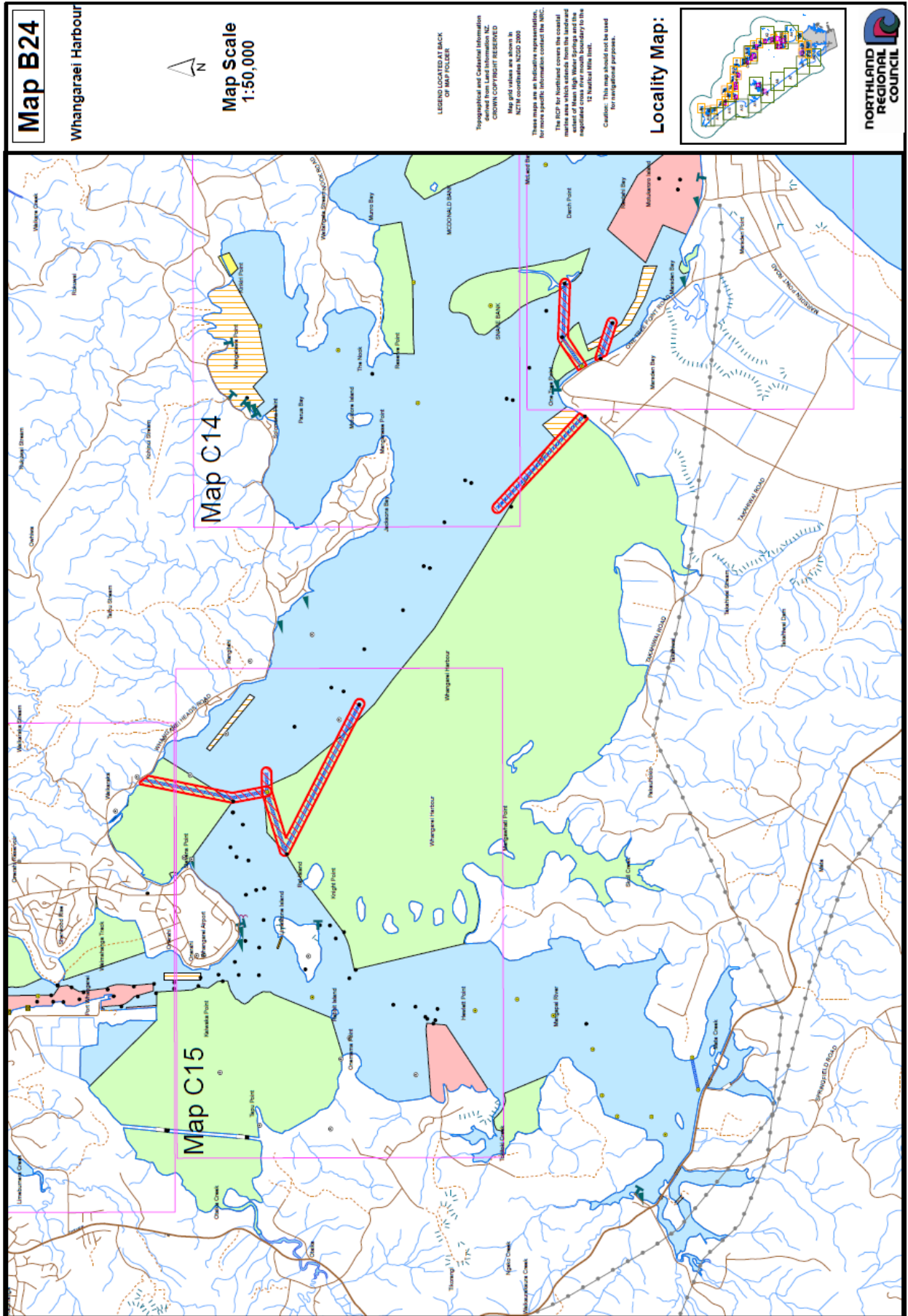
**Scale:** 1:50,000  
**Project No.:** 30488

**Drawn:** BMAN/FB/17  
**Checked:**  
**Approved:**  
**Scale:** A3 Size  
**Scale:** 1:50,000  
**Project No.:** 30488

**Figure 1**



# Appendix 2: Northland Regional Council Regional Coastal Plan maps



# Map B25

Whangarei Heads  
Breem Head



Map Scale  
1:50,000

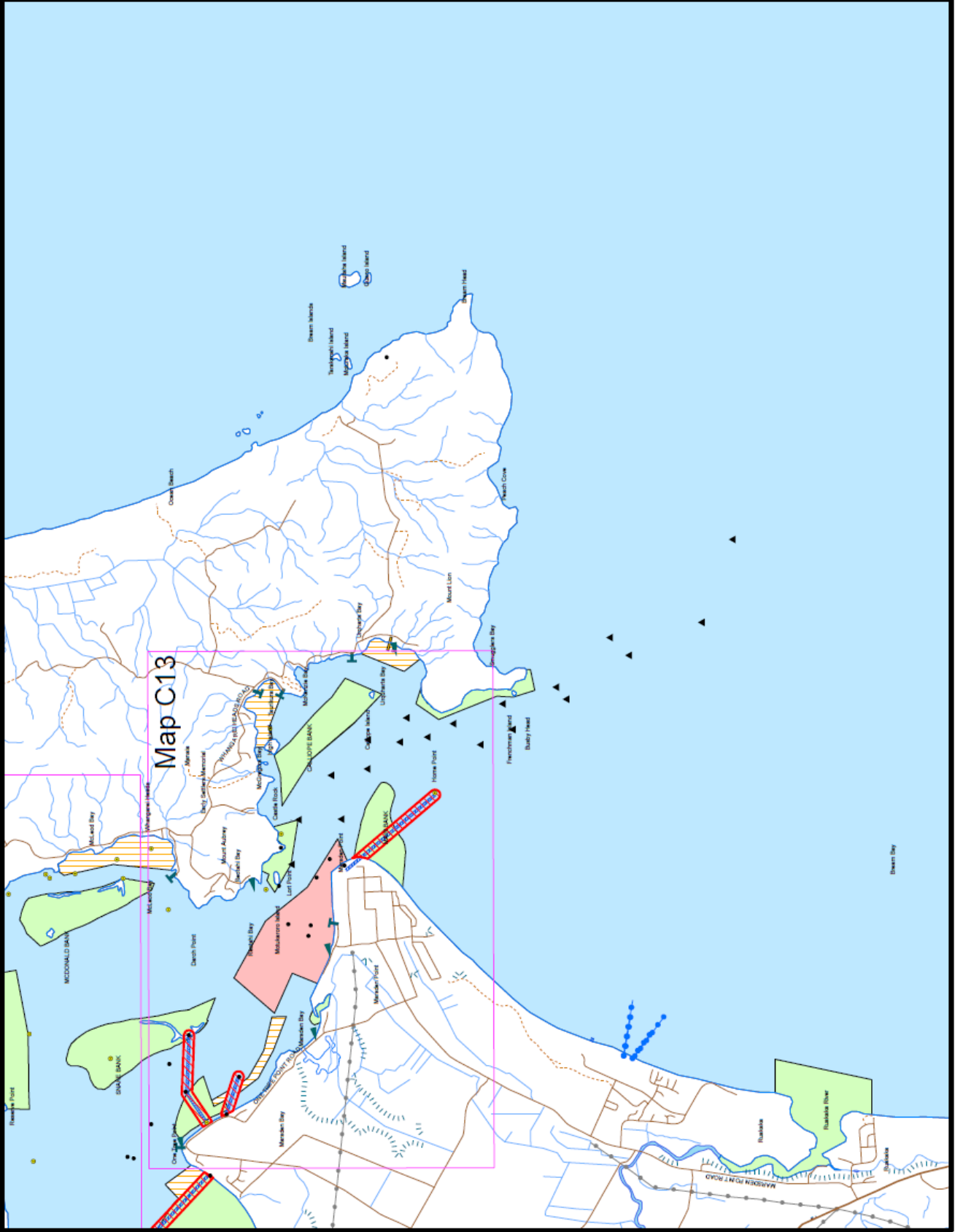
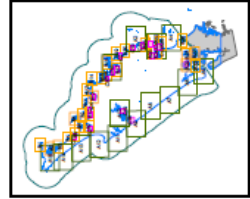
LEGEND LOCATED AT BACK  
OF MAP FOLDER

Topographical and Coastal Information  
Copyright © Crown Copyright  
CROWN COPYRIGHT RESERVED  
Map grid values are shown in  
NZM20 coordinates NZGD 2000






These maps are an indicative representation,  
for more specific information contact the NZCC.  
The RCP for Northland covers the coastal  
marine area within extents from the landward  
boundary of the RCP to the seaward boundary of the  
approximate cross shore mouth boundary to the  
12 Nautical Mile limit.

Caution: This map should not be used  
for navigational purposes.

Locality Map:



## Northland Regional Coastal Plan Map Legend

	Regional Boundary Line		Cliff Edge
	TLA Boundary		Track & Walkway
	State Highway		River
	Road		Coastal Marine Area Boundary
	Aircraft Beacon		Surfing Area
	Boat Ramp		Land outside NRC Region
	Jetty/Wharf		Prohibited Anchorage Area
	Pontoon		Skilane
	Grid Point		Marine 1 (Protection) Management Area
	Slip		Marine 2 (Conservation) Management Area
	Protected Anchorage		Marine 3 (Marine Farms) Management Area
<b>Beacon</b>			Coastal Permitted Marine Farms (Post 20 December 1994)
	lit		Marine 4 (Controlled Mooring) Management Area
	unlit		Marine 4 (Discretionary Mooring) Management Area
<b>Buoy</b>			Marine 5 (Port Facilities) Management Area
	lit		Marine 6 (Wharves) Management Area
	unlit		Cultural Water Quality
<b>Bridge</b>		<b>Water Quality</b>	
	Foot Traffic		CA
	Train		CB
	Vehicle		CN
	Powerline		Mixing Zones For Major Dishcharge
	Underwater Cable		
	Underwater Pipe		

### Appendix 3: Spot X fishing guide recommendations

Source: Allen et al (2009)

