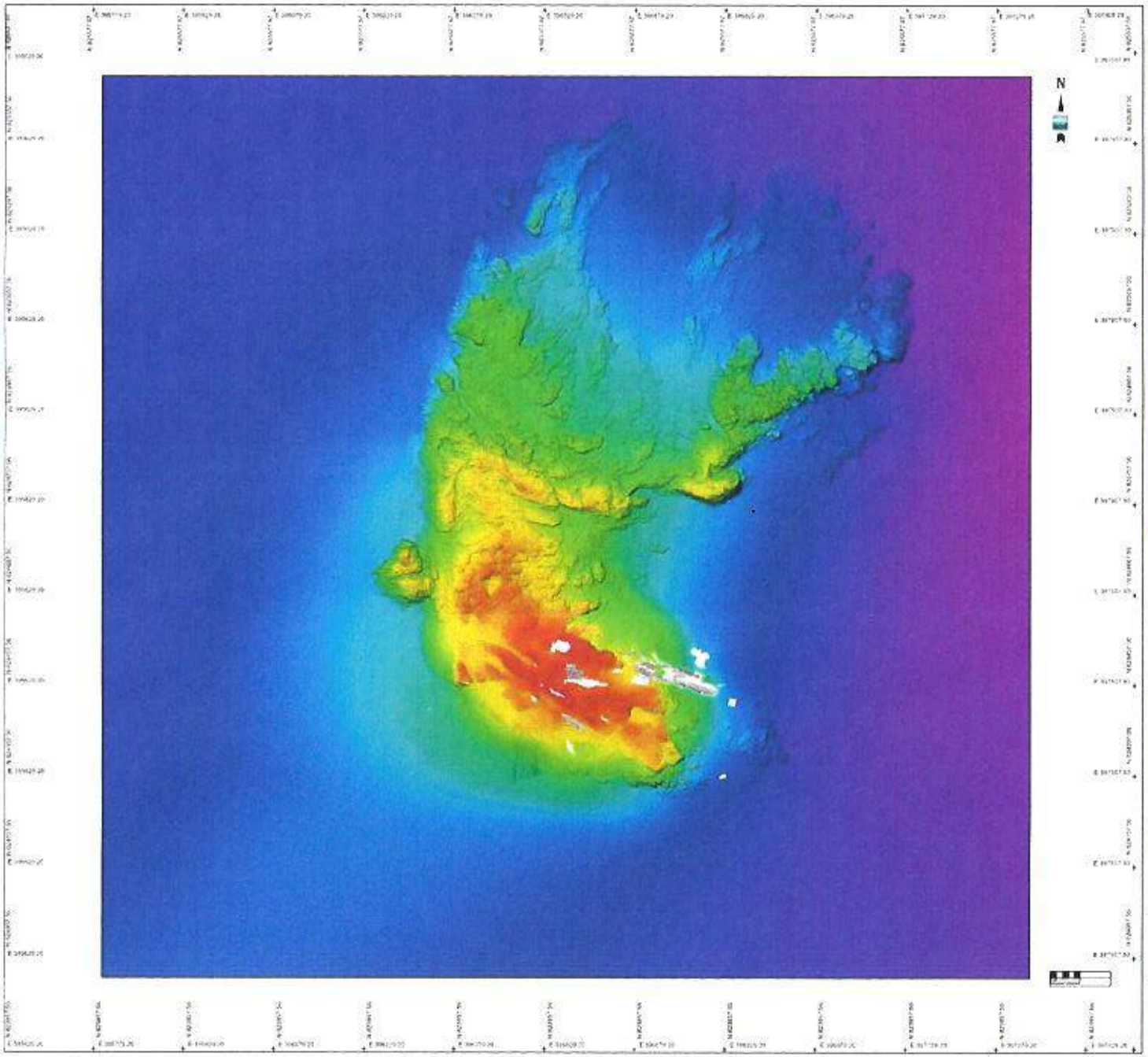
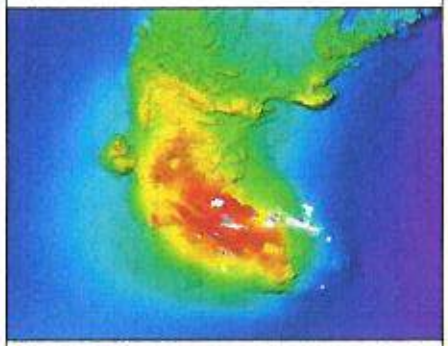


Legend

All grey is wreck and debris

m opposite WGS84 +29.948



Bathymetry Rena
Whole site

Linear unit:	Metres (m)
Datum	WGS 84
Projection	Bay of Plenty 2000
Vertical Datum	WGS84 + 29.948
Scale:	1 / 3000
Date of data acquisition:	19-03-2015 until 24-03-2015
Date of processing:	21-04-2015
Vessel:	Macy Grey/ Robert Stamps
Chart number:	1
Chart Revision number:	1
Final report document number:	PROJ/2-C1-14-2/ENG/001 REV2

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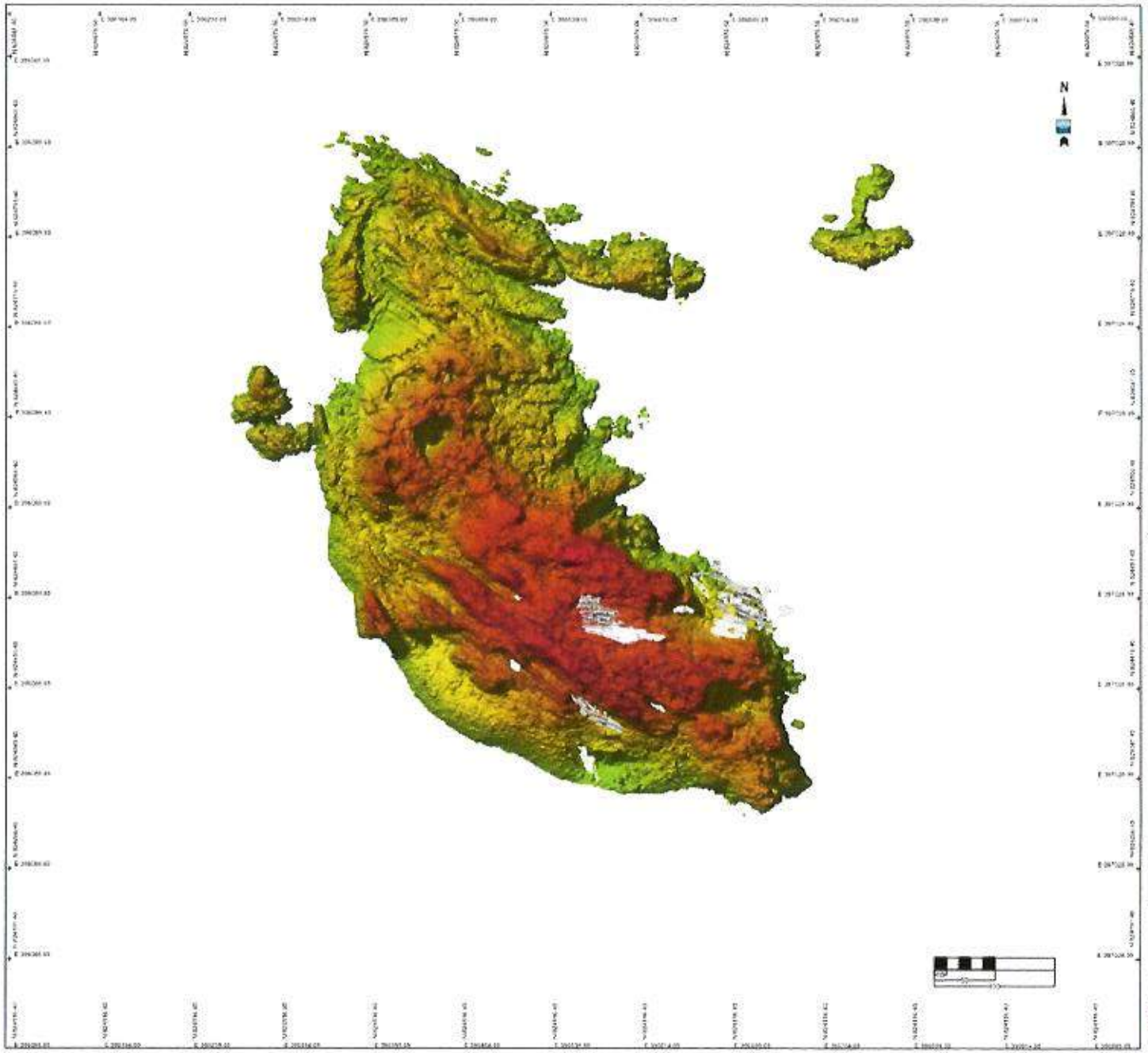

Legend

All grey is wreck and debris

Calculations:

Bathymetry Rena
Reef and Debris above 30m

Linear unit:	Metres (m)
Datum:	WGS 84
Projection:	Bay of Plenty 2000
Vertical Datum:	WGS84 + 29.948
Scale:	1 / 1500
Date of data acquisition:	19-03-2015 until 24-03-2015
Date of processing:	21-04-2015
Vessel:	Macy Grey/ Robert Stamps
Chart number:	1
Chart Revision number:	1
Final report document number:	PROJ/2.01.14.2/ENG/001 REV2

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8. GLOSSARY OF MAORI TERMS

Māori Terms used	Definition:
Hapū	Subtribe
Iwi	Tribe
Kaitiaki, tangata tiaki	Guardian, steward
Mana moana	The authority over the sea, harbours, rivers and lakes. These are extensions of the Iwi or hapū land rights.
Mana whenua	Tribal territorial rights and powers over land associated with possession and occupation of those lands.
Rohe, rohe moana	Area, boundary (rohe moana, sea area)
Tangi, tangihanga	Bereavement, process of grieving for someone who has passed away.
Te Tai Hauāuru	West Coast of the North or South Island
Whānau	Family

Kaimoana terms:	Common name:	Kaimoana:	Common name:
Āhuruhuru, Kanae	Mullet	Pioke	Rig shark, Lemon shark
Araara	Trevally	Pipi, tuatua, kokota	Edible bivalve
Aua, kātahi	Herrings	Pu moana	Stem shell
Haku	Kingfish	Pūpū	Whelk, cats' eye, winkle
Hapuka	Groper	Pūrimu	Surf claims
Inanga	Whitebait	Rāwaru, taipua, pākirikiri	Blue, red cod
Kahawai	Kahawai	Takeke	Piper
Kākahi	Freshwater mussels	Tamure	snapper
Karengo	Seaweed	Tarakihi	Tarakihi
Kina	Sea urchin	Tio	Oyster
Kotere, kotore	Sea anemone	Titiko	mud snails
Koura	Freshwater	Toheroa, tohemaunga	Toheroa
Koura	Crayfish	Tohorā	Whale
Kuku, kutai	Mussels	Tuangi	Cockles
Ngaore, paraki	Smelt	Tuere	Blind eel
Niania, kuku para	Black mussels	Tuere	Blind eels
Pāpaka	Paddle crab	Tuna, tunariki	Long-fin Short-fin eels
Parore	Butterfish	Tupa	Scallops
Pātiki	Flounder	Ururoa, kukuroa, kukuroroa	Horse mussel
Paua	Abalone	Whai	Stingray
Piharau	Lamprey	Wheke	Octopus

Pātaka kai	Store house
Pātaka whata	Is the facility for Iwi and commercial fishing operators to work together to catch, process, and store kaimoana for customary use.

Appendix 2: Commercial And Recreational Fishing Effort in the Bay of Plenty

Commercial and Recreational Fishing effort in the Bay of Plenty

1. Commercial Utilisation

Purse seine fishing

1.1 Purse seining involves setting a large wall of net around a school of fish in a circle and then drawing the bottom of the net together (pursing) to capture it. New Zealand domestic purse seine vessels use nets with a total length of 700-1100m (Langley 2011). Large 'superseiners' fish for tuna throughout the South Pacific but also fish New Zealand waters from time to time. Within the Bay of Plenty purse seine effort is widely distributed, principally between the 50m and 200m depth contours (Fig. A1).

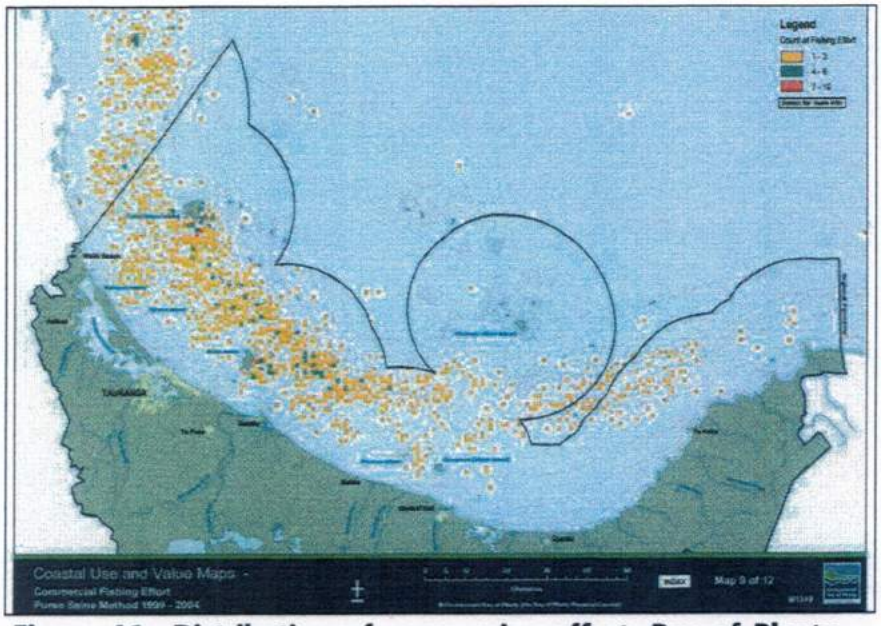

Figure A1 Distribution of purse seine effort, Bay of Plenty 1999-2004 (Source: http://www.boprc.govt.nz/media/306908/aquaculture-map-09-purseseine.pdf)

Bottom Trawl and Danish Seine

1.2 Bottom trawling involves towing a fishing net and associated sweeps and trawl doors along the sea floor to capture fish on or near the

seabed. Danish seining uses a similar net to a trawler, but instead of towing the net, weighted lines (warps) are pulled across the sea floor to herd fish toward the opening of the net prior to towing the net a short distance to capture them.

1.3 The distribution of Danish seine effort in Fig. A2 is indicative of areas fished only as it represents only a small proportion of Danish seining effort where the required fishing position information was available to plot.

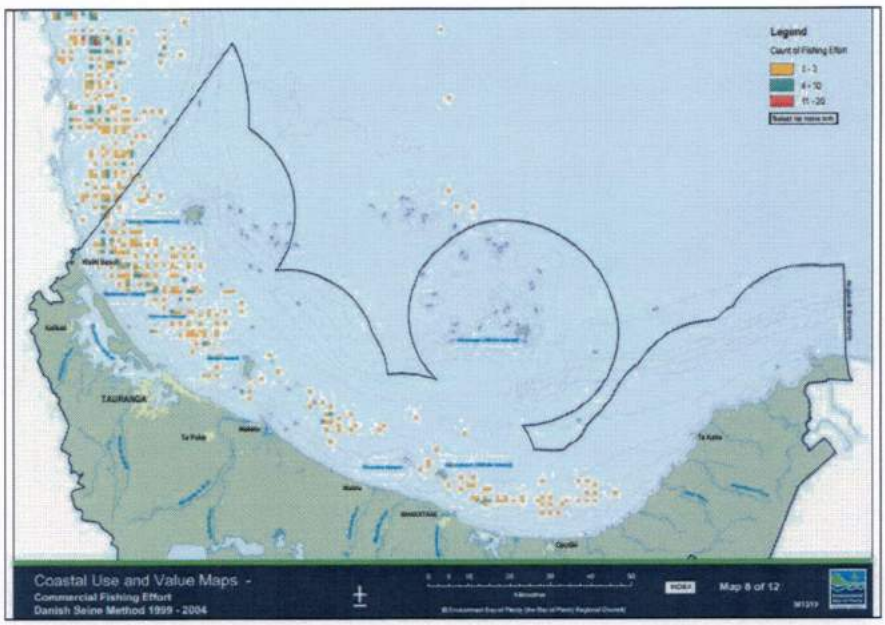

Figure A2 Distribution of Danish seine effort, Bay of Plenty 1999-2004 (Source: http://www.boprc.govt.nz/media/306908/aquaculture-map-08-danishseine.pdf)

1.4 Trawl effort is extensive throughout the Bay of Plenty. The duration of bottom trawls in the inshore fishery can be over 3 hours and the net may be towed 10 nautical miles. Trawl effort is less intensive to the east and north of Motiti Island, generally in the areas of Okaparu, Brewis and Otaiti.

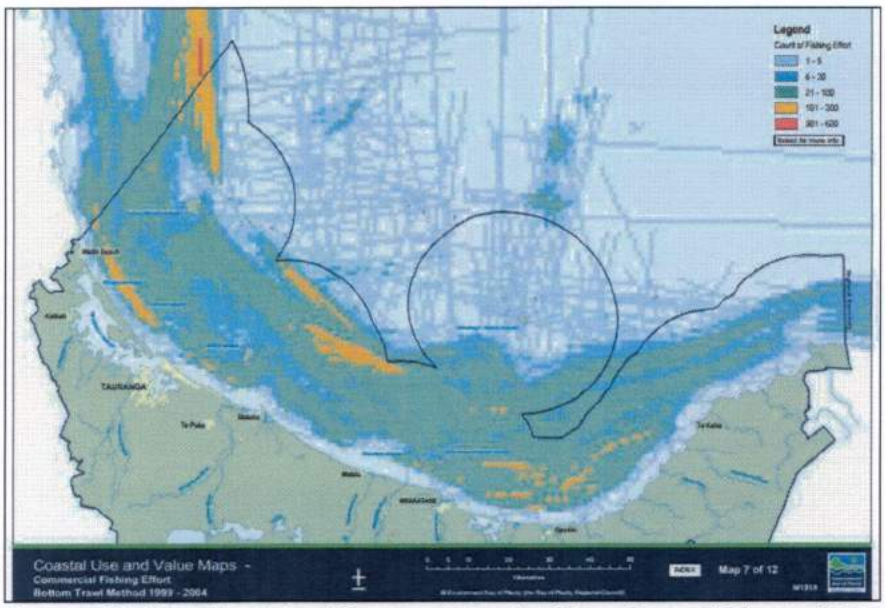

Figure A3 Distribution of bottom trawl effort, Bay of Plenty 1999-2004

(Source: http://www.boprc.govt.nz/media/306908/aquaculture-map-07-bottomtrawl.pdf)

Line Fishing

1.5 In the 2013-14 fishing year there were 758 days of line fishing effort by all lining methods in FSA 009. The use of bottom longlines (556 effort days) predominated with handlines the second main lining method recorded on fishing returns. Bottom longlines are anchored at both ends and can be several nautical miles long with more than two thousand hooks. Line fishing occurs throughout the Bay of Plenty from shallow to very deep waters.

Set-netting

1.6 In the 2013-14 fishing year there were 542 days of set netting fishing effort recorded throughout FSA 009. Nets are anchored at both ends and are usually deployed to fish at or near the seabed. Set nets may be several hundred metres long.

Rock Lobster Potting

1.7 The rock lobster fishery in the Bay of Plenty occurs on and adjacent to rocky reef habitats. Only two commercial rock lobster fishers are known to fish regularly around the rocky reef habitats of Okaparu Reef, Brewis Shoal and Otaiti in the western Bay of Plenty (D. Sykes, pers. comm.).

1.8 Rock lobster statistical areas for reporting catch are different to those for most other species. Fig. A4 shows the rock lobster statistical areas in the Bay of Plenty. Table A1 gives the commercial catch of rock lobster from throughout Area 907 (which includes Otaiti) for the most recent 6 fishing years that data is available.

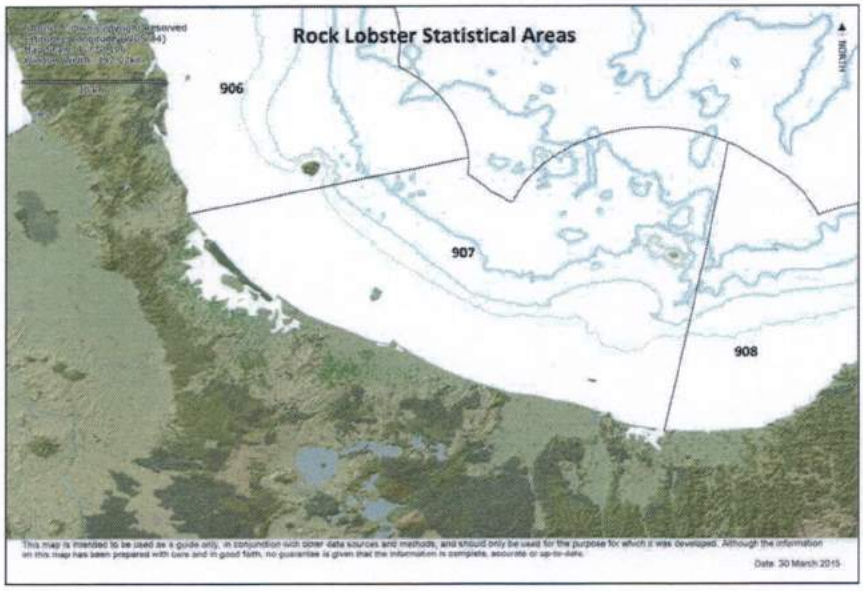

Figure A4 Rock lobster statistical areas in the Bay of Plenty (MPI 2015)

Rock Lobster Statistical Area	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
907	45 258	51 309	50 705	51 316	45 109	46 383

Table A1 Rock lobster catch (kg) in area 907 for the fishing years 2008/09 to 2013/14 (Source, www.nabis.govt.nz)

2. Recreational Utilisation

2.1 Greenaway (2014) provides information on recreational marine participation in the Bay of Plenty including recreational fishing and the areas in which it occurs from an aerial survey conducted by MPI in 2004-05 and other sources. The most recent estimates of recreational harvests from MPI research are for the 2011-12 year when three concurrent projects were undertaken by MPI to estimate recreational harvests – one nationwide and one for the northeast coast of the North Island.

2.2 Bay of Plenty recreational harvest estimates from MPI recreational fishing surveys are presented in Table A2 below. Estimates were only made for these species from the respective surveys in the table. There are no other Bay of Plenty recreational harvest estimates for any other species.

Table A2 Estimated recreational catch (t) from the Bay of Plenty[1] in 2004-05 and 2011-12 ([a] Hartill et al. 2007, [b] Hartill et al. 2013) and in the western Bay of Plenty[2] in 2010-11 and 2011-12 ([c] Holdsworth & Walshe in press).

Year	Snapper	Kahawai	Kingfish	Tarakihi	Trevally	Gurnard	Rock lobster	Scallops
2004-05[a]	517	303	23					
2011-12[b]	546	268		53	41	15		
2010-11[c]		205				23	13.7	36
2011-12[c]		155				13	7.4	24

2.3 Recreational fishing activity is widespread throughout the Bay of Plenty. Most fishing activity is concentrated close to the coast. Recreational fishing at Otaiti is mainly undertaken by hook and line and by diving for rock lobster.

1 Bay of Plenty is the area from Whangapoua Harbour (including the waters around the Mercury Islands) to Cape Runaway

2 Western Bay of Plenty in this study is the area from Port Charles to Maketu

Appendix 3: Hapuku stock status in the Bay of Plenty

Hapuku stock status in the Bay of Plenty

1. The commercial groper (hapuku and bass) fishery in the 20th Century

1.1 I have reviewed all of the available commercial catch information for groper from official sources in order to document trends in the fishery in the Bay of Plenty. The name groper in official sources refers to two species, hapuku (*Polyprion oxygenios*) and bass (*Polyprion americanus*) which are grouped together in most of the commercial fishery catch data available up to the present time.

1.2 Changes in the individual contributions of each of the two separate species – hapuku and bass – to the total commercial catch of 'groper' recorded over the years cannot be determined. However the different depth distributions of the two species (they overlap but bass are found in deeper waters) helps to interpret catch trends.

1.3 Commercial catch data for groper (hapuku & bass) in the Bay of Plenty is only available from 1932 onward. Prior to that time there was no official collection of commercial catch information in New Zealand.

1.4 A number of problems exist in the use and interpretation of commercial fishery data in New Zealand. The principal problems are data quality in the early years and the fact that until 1982, the commercial data collected was 'landings by port' – so the precise catch area is not known. In spite of that, the 1932 to 1982 landings data by port provides valuable information on general trends in the commercial groper fishery. From 1983, vessels have been required to report their catch by 'fishery statistical area' (FSA) which are defined areas of the coast.

1.5 Since 2008 most inshore commercial fishing vessels have been required to record their fishing positions by latitude and longitude on fishing returns. However, this even more detailed information on fishing locations is generally not publicly available under a Ministry for Primary Industries policy that it is commercially sensitive. Thus it is normally withheld under the Privacy Act. As a result, the potentially most useful information to document the specific locations where

commercial fishing currently takes place (such as at or around Astrolabe Reef) is unavailable.

1.6 Using the catch and effort data from commercial fishing returns by FSA since the 1980s, we are now able to look at the patterns of catch and effort since that time over a broad scale. However, the resolution of the spatial information is still relatively poor as each FSA incorporates large areas of the coast

1.7 Based on patterns on reported catch by FSA along the northeast coast (North Cape to Cape Runaway) there has been a gradual and progressive shift of the groper fishery toward the far north of the North Island since the early 1980s. The contribution from the entire Bay of Plenty (FSAs 008, 009 and 010) to the total hapuku/bass catch in northern New Zealand has declined markedly since the early 1980s.

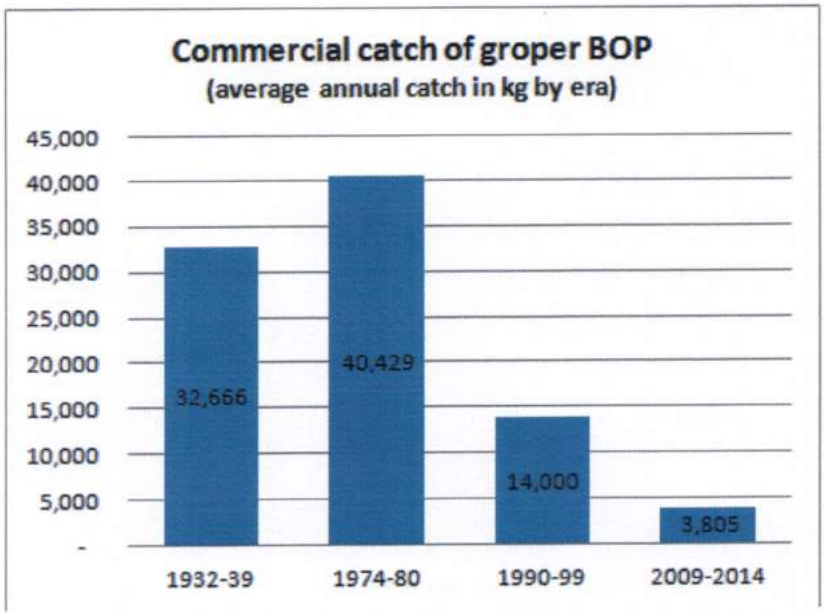

Figure B1. Groper (hapuku/bass) commercial landings at the Port of Tauranga (1930s & 1970s) and estimated catches from FSA009 (1990s onward) in the Bay of Plenty.

1.8 Figure B1 illustrates changes in commercial Bay of Plenty hapuku/bass catches over the last 80 years. The problems in interpreting the area of catch from port landings and the variable data quality from the early years mentioned previously should be kept in mind.

1.9 Figure B1 indicates that catches of hapuku/bass in the western Bay of Plenty (FSA009 which extends from Tairua to Whakatane)) have averaged less than 4t annually in the most recent six fishing years.

This compares to annual landings (for which the precise area of the catches is unknown) at the port of Tauranga that averaged over 32t in the 1930s and over 40t in the 1970s. From that time there is a rapid decline.

1.10 Limitations in the quality of the early data mean it should be interpreted with care. The 1930s data is likely to be less reliable as a systematic collection of fishing return information was still in its infancy. The catch area for fish landed at ports is uncertain, although in the 1930s small line fishing vessels did not travel far from port and generally fished local areas. Hapuku landings at the ports of Mercury Bay, Whakatane and Opotiki were reported separately. It is therefore reasonable to interpret Tauranga port landings in the 1930s (at least for line fishing for hapuku) as being taken from nearby waters in the western Bay of Plenty that correspond roughly to FSA009 (Tairua to Whakatane). By the 1970s Tauranga port landings were possibly coming from some catches further afield – the fishing industry had been deregulated in the 1960s and was experiencing rapid growth. The 1990s data may slightly overestimate catches in those years for the reasons given by Paul (2002). The most recent data from 2009 onward is likely to be quite accurate.

1.11 Even with the limitations in the data in Figure B1 in mind, it is very clear that current commercial fishery catches of hapuku/bass in the Bay of Plenty are a fraction of levels recorded in the past.

1.12 Advances in technology (e.g. vessel size and power, echo sounders, GPS, weather forecasting) also mean that the effective fishing power available to catch hapuku/bass today is far superior to that available in the 1930s. Overall, the reduction in catches points to a dramatic, even catastrophic, decline in the population of hapuku in the Bay of Plenty over the past century. Recent commercial catches averaging less than 4,000kg in FSA009 equate to no more than several hundred hapuku/bass each year, assuming average commercially caught fish weights in the range of 10kg to 20kg.

1.13 Various observers have reported reductions in fish numbers and size for many inshore fish species throughout New Zealand coastal waters over the past 100 years. This is a period when there was significant growth in commercial fish catches. Obtaining the maximum sustainable annual harvest (the maximum sustainable yield or MSY) from a fish stock requires that its abundance (measured as total biomass) be reduced to a much lower level compared to its unfished

state with the fish stock being made up (on average) of smaller and faster growing fish. Moving a stock to the level that generates MSY allows the greatest catch to be taken from a fish stock by all users. In doing so there are significant changes in fish populations that potentially alter the character of the fishery and fishing opportunities. The most observable changes are often most apparent in reduced fish abundance, smaller fish and a contraction of the geographic range of the population.

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Appendix 4: Ecological sub-tidal survey of Astrolabe Reef February 2015

1. BACKGROUND AND METHODS

Following on from discussions at the first round of technical caucusing for the MV *Rena* (the *Rena*) resource consent application, an ecological survey of Astrolabe Reef was conducted on 4 and 5 February 2015. The purpose of the survey was not to conduct a full ecological mapping exercise, but rather to serve as a baseline ecological characterisation given the paucity of data collected on the reef prior to the grounding of the *Rena*. The intention of the 'baseline survey' was to provide information on the state of the grounding site (and other on-reef sampling locations) at, or near, the time of the consent hearing.

The overall survey design was based on an outline provided by Dr Phil Ross (Waikato University), but as a first step mainly covered the broad-scale habitat classification exercise from that original outline.

This broad-scale habitat classification involved:

- GPS referenced video/photograph transects.
- identification of broad habitat types by depth (in metres) along a transect at fixed sample points (*e.g.* 5–10 m).
- some limited 'fine-scale' quadrat or photo-quadrat analysis of major habitat types (where time/resources permitted).

Transects for the survey were selected in advance (see map in Appendix 1). The transects were divided into the two major bathymetric regimes that exist on the reef and have a marked effect on the types of assemblages present; gently sloping rocky reef (hereafter referred to as 'Sloping Reef' or 'SR') and vertical or steeply sloping rock wall (hereafter referred to as 'Rock Wall' or 'RW'). The map (Appendix 1) also shows the starting point for each transect (denoted as '0 m'). The Sloping Reef transects were 100 m long, while the Rock Wall transects were generally deeper but shorter (approximately 25 m in length). The position of each transect was based on *a-priori* knowledge of the reef, the variety of habitat types/exposure and in relation to the *Rena* debris field.

At each of the sites, divers swam the length of the transect recording both the general habitat type and depth, and the presence of conspicuous biota. This was ranked on an 'RCA' scale: Rare (*e.g.* one or a few individuals), Common (*e.g.* five to twenty individuals) or Abundant (*e.g.* greater than 20 individuals). In addition, a second diver collected five photo-quadrats (0.25 m^2) documenting the general habitats at 5 m or 10 m fixed points along the transect. Photographs were taken of the transect line itself (to record distance), and then two photographs were taken on either side of the transect line. An underwater video of the entire transect was also recorded.

2. RESULTS

Below is a summary of the general habitat types encountered along each transect. The related pictorial representation of each transect showing the distance and depth, the primary biota present, and examples of photo-quadrats from two sites along the transect, are in Appendix 2.

2.1. SR1 (depth range 6.6–12.7 m)

The transect extended through bedrock reef dominated by large brown algae (*Carpophyllum plumosum, Ecklonia radiata* and *Lessonia variegata*) with an understory of encrusting coralline algae. A number of encrusting sponge taxa were common (*e.g.* the green sponge *Latrunculia kaakariki*), as was the urchin *Evechinus chloroticus*. Two-spotted demoiselles (*Chromis dispilus*) were common at the start of the transect and a large school of kahawai and kingfish was observed at the end of the transect.

2.2. SR2 (depth range 3.6–15.1 m)

A large swell and strong currents made this transect difficult to assess, but dominant organisms were recorded. The area was characterised by bedrock reef which was dominated by large brown algae (*Carpophyllum plumosum, Ecklonia radiata, Lessonia variegata* and *Xiphophora gladiata*) with an understory of encrusting coralline algae. The red alga *Pterocladia* sp. was also common. Encrusting sponges were abundant or common, and anemones (*Actinothoe albocincta*) and urchins (*E. chloroticus*) were common.

2.3. SR3 (depth range 4.9–18.9 m)

This transect extended through bedrock reef, then a middle area of boulders, cobble, gravel/sand and debris, and finished along bedrock reef. The reef areas were characterised by mixed brown algae (*Ecklonia radiata*, *Zonaria* sp., *Xiphophora gladiata*, *Carpophyllum plumosum and Carpophyllum flexuosum*). Some sponges, urchins (*E. chloroticus*) anemones (*A. albocincta*), triplefins (*Forsterygion* sp. and two spotted demoiselles (*C. dispilus*) were common in isolated areas. Through the middle of the transect, fine green algae covered cobble and boulders but the area did not contain any obvious invertebrates. This transect ran parallel to the main *Rena* debris field and large areas of newly uncovered (largely depauperate) substrate were evident, as were several large pieces of debris in various states of re-colonisation.

2.4. SR4 (depth range 5.2–21 m)

The transect went through bedrock reef dominated by large brown algae (*Carpophyllum plumosum, Carpophyllum flexuosum, Xiphophora gladiata, Ecklonia radiata* and *Lessonia variegata*) with an understory of coralline turf. A number of encrusting sponge taxa were common throughout the transect (a yellow encrusting sponge) or in certain areas (an orange encrusting sponge, *Polymastia* sp. and the grey vase sponge *Ancorina alata*). Cook's turban snails (*Cookia sulcata*) and urchins (*E. chloroticus*) were common along the shallower half of the transect.

2.5. RW1 (5.8–25 m)

This transect was on bedrock reef, and was characterised by brown algae (*Carpophyllum plumosum, Carpophyllum flexuosum, Xiphophora gladiata* and *Ecklonia radiata*) in the shallows, and by bare rock and *Zonaria* sp. in areas below 10 m. A number of sponge taxa were common (*e.g.* the orange golf ball *Tethya aurantium*, and blue, orange, white or yellow encrusting sponges). Anemones (*A. albocincta*) were common throughout the transect, and zooanthids, nudibranchs (*Jason mirabilis)* cup corals and urchins (*E. chloroticus*) were common in areas. This was the most vertical of the rock wall transects sampled and included several areas with overhangs where shade-tolerant taxa like the cup coral (*Culicia rubeola*) are more common. This transect also had the most diverse assemblage of sponges, ascidians, nudibranchs and anemones compared to the other rock wall transects.

2.6. RW2 (12–25 m)

This transect extended predominately through bedrock reef, but also through an area of steel debris and cobble/bedrock reef. It was characterised by the brown alga *E. radiata*, coralline algae and filamentous green algae. Anemones (*A. albocincta*) were common in areas above ~18 m. Oblique triplefins (*Forsterygion maryannae*), spotties (*Notolabrus celidotus*) and two spotted demoiselles (*C. dispilus*) were common. The deeper areas of this transect were predominantly bare rock with filamentous red and brown algae and lacked the sponges and anemones common on other rock wall transects. Since filamentous alga are some of the first colonisers after a disturbance, it appears that this area has been impacted by either physical disturbance or the nearby presence of copper cloves; or, more likely, a combination of the two.

2.7. RW3 (12.3–23.5 m)

This transect was on bedrock reef, and was characterised by brown algae (*E. radiata* and *X. gladiata*) and contained coralline algae and the brown alga *Microzonaria*. The

only invertebrates observed were cook's turban snails (*C. sulcata*), which were rare. Butterfly perch were common at the deep end of the transect.

2.8. RW4 (14.8–25.1 m)

The transect mostly extended through bedrock reef, but also through an area of boulder and debris. It was characterised by large brown algae (*E. radiata*, *X. gladiata*, *C. plumosum* and *C. flexuosum*) fine red, coralline and filamentous brown algae. Sponges were present but rare (*e.g.* the orange golf ball *T. aurantium*, the grey vase sponge *A. alata* and orange or yellow encrusting sponges). Cook's turban snails (*C. sulcata*) were common in the shallowest part of the transect, and two spotted demoiselles (*C. dispilus*) were common in the middle section.

2.9. General habitat depth ranges

The main habitat types observed on Astrolabe Reef and their common depth ranges for both the sloping reef and rock wall transects are shown in Figure 1. These depth ranges are not absolute limits but rather the most common ranges where the different habitats were observed and are likely to be found. While the depth ranges overlap for many of these broad habitat types, they do not necessarily co-occur at these depths. For example, the kina habitat type is often called a 'kina barren'. It is typified by large numbers of kina that have grazed and completely denuded the kelp canopy (*e.g. Carpophyllum* sp. or *Ecklonia radiata*) that would normally occupy that depth range. Similarly, some of the habitat types observed on the sloping reef may also occur on the rock wall depending on the incline of the slope. For example, coralline turf algae and *E. radiata* were observed on some of the less vertical rock walls.

The primary differences between the Sloping Reef and Rock Wall transects was the dominance of algal-based habitats on the sloping reef transects. These included varying mixtures of the main dominant macroalgal taxa listed in Figure 1, including *Lessonia variegata, Carpophyllum plumosum, Carpophyllum flexuosum, Ecklonia radiata* and *Ulva* sp. These large algal species are canopy forming and provide a protective understorey for encrusting algae, kina, sponges, grazing gastropods (*e.g.* the turban snail—*Cookia sulcata*) and various small fish like triplefins (*e.g. Forsterygion maryannae, Notoclinops segmentatus, etc.*).

In contrast, the more vertical aspect of the rock wall, including overhangs and shade, precludes the attachment and growth of algal species. These rock wall habitats are dominated by suspension feeding encrusting organisms and sessile solitary species like sponges, ascidians and anemones. They can be incredibly diverse and colourful and support a range of different mobile invertebrates including: kina (*Evechinus chloroticus)*, crayfish (*Jasus edwardsii)*, nudibranchs (*e.g. Jason mirabilis*,

Ceratosoma sp.), crabs, whelks (*e.g. Charonia* sp., *Dicathais orbita*), brittlestars, and seastars.

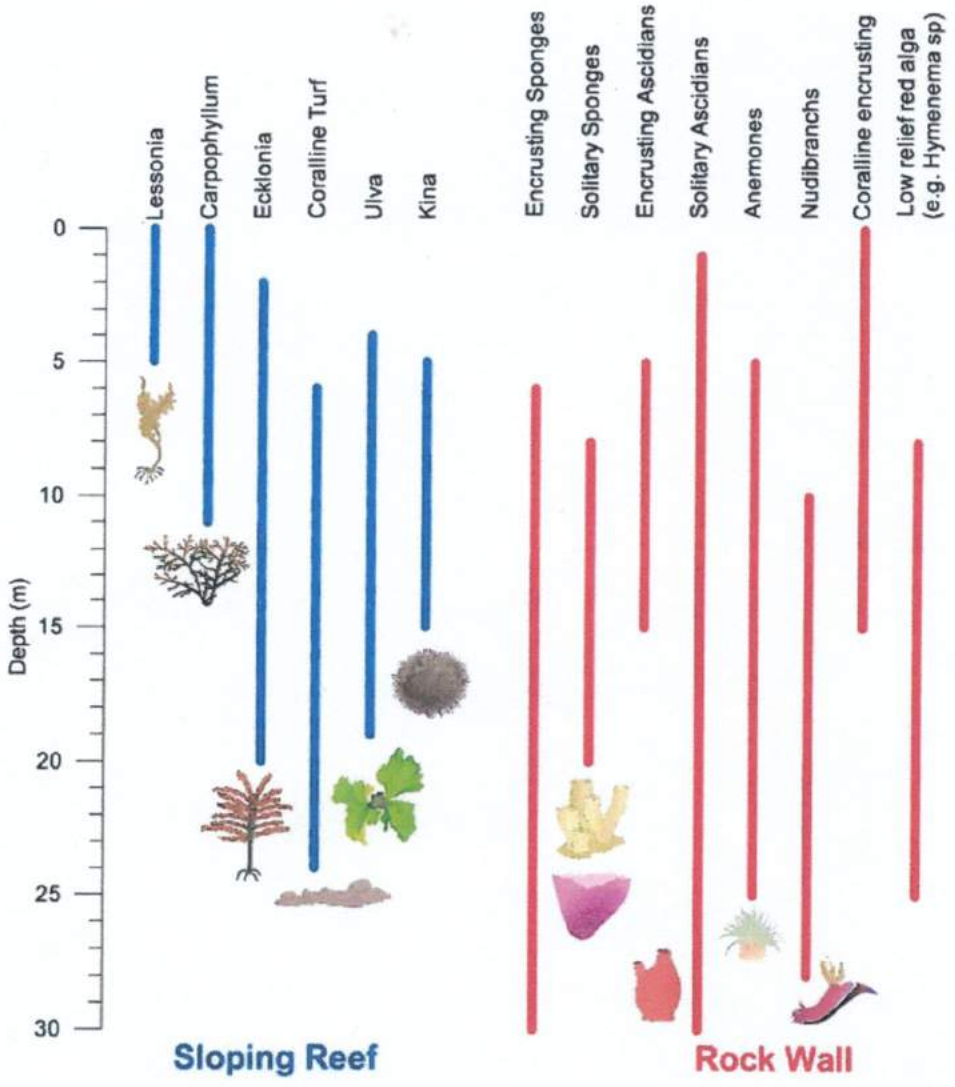
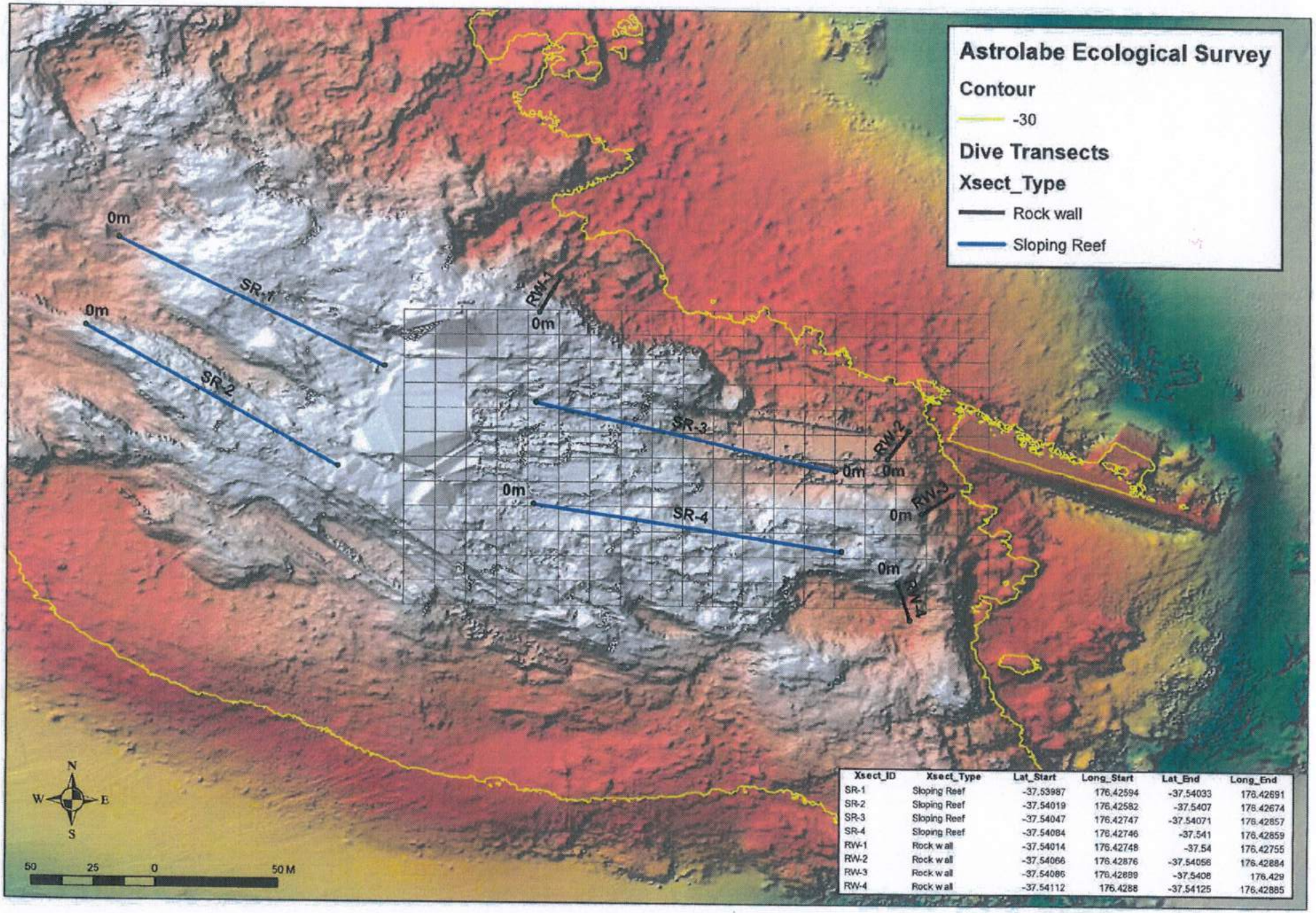


Figure 1. General habitats and depth ranges on the Astrolabe Reef for both Sloping Reef and Rock Wall transects.

Finally, observational data collected along each transect is included in Appendix 3. However, at this stage, there has been no quantitative analysis of the individual photo-quadrats nor has the video footage been reviewed or summarised.



Xsect_ID	Xsect_Type	Lat_Start	Long_Start	Lat_End	Long_End
SR-1	Sloping Reef	-37.53987	176.42594	-37.54033	176.42691
SR-2	Sloping Reef	-37.54019	176.42582	-37.5407	176.42674
SR-3	Sloping Reef	-37.54047	176.42747	-37.54071	176.42857
SR-4	Sloping Reef	-37.54084	176.42746	-37.541	176.42859
RW-1	Rock wall	-37.54014	176.42748	-37.54	176.42755
RW-2	Rock wall	-37.54066	176.42876	-37.54056	176.42884
RW-3	Rock wall	-37.54086	176.42889	-37.5408	176.429
RW-4	Rock wall	-37.54112	176.4288	-37.54125	176.42885

Appendix 5: Fisheries Species Overview

FISHERIES AND ECOLOGICAL EFFECTS OF THE PROPOSAL FOR LEAVING THE WRECK OF MV RENA ON ASTROLABE REEF

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Appendix 8.4 Fisheries Information

8.4.1 Bluenose, (*Hyperoglyphe antarctica*), Matiri

Physical Characteristics

Bluenose have a dark blue-grey top with silver-blue belly and flanks. They can grow to a length of 137 cm.

Life Cycle

Bluenose have a maximum age of 60 years. The reach sexual maturity at 10 years of age and 60-65 cm in length. Spawning takes place between January and April.

Habitat

Bluenose are common throughout New Zealand waters. The depth distribution varies with age, but overall they range from smaller fish found near surface waters and larger fish down to depths below 600 m. They feed on squid, crabs, lantern fish and small ling.

Fisheries Management

Figure 8.1 Bluenose Fisheries Management Areas, BNS1

Commercial Fisheries

There is substantial targeting of bluenose by the line fishery in the Bay of Plenty and off Northland (BNS 1). A small amount of target setnet fishing for bluenose occurs in the Bay of Plenty.

The current Total Allowable Commercial Catch (TACC) for the management area BNS1 is 786,000 kg. In the past few years an average of less than 600,000 kg of this TACC has been landed from the entire BNS1 area (Figure 8.2). It is unknown how much of this was from the Bay of Plenty region.

Figure 8.2 Seasonality of Bluenose Catch and Catch vs. TACC from BNS1.
(thousands of kg)

Recreational Fisheries

The annual recreational catch of BNS 1 was estimated from diary surveys to be 2,000 fish in 1993–94 (Teirney *et al.* 1997), 5,000 fish in 1996 (Bradford 1998) and 11,000 fish in 1999–00 (Boyd & Reilly 2005). However the harvest estimates derived from these surveys are considered to be unreliable.

In the BNS1 area a recreational allowance of 15,000 kg has been allowed for in the Total Allowable Catch (TAC) of 809,000 kg.

Customary Non-Commercial Fishing

No quantitative information on the level of customary non-commercial take is available.

In the BNS1 area a customary allowance of 8,000 kg has been allowed for in the Total Allowable Catch (TAC) of 809,000 kg.

8.4.2 Red Gurnard, (*Chelidonichthys kumu*), Kumukumu

Physical Characteristics

Red Gurnard are beige or pink on top with orange or brown blotches and silver undersides.

The large pectoral fins are bluish-green with one large, dark spot and several small white or blue spots and a blue margin. The head is bony, and the scales are small. They can grow to a maximum length of 55 cm with females growing faster and larger than males.

Life Cycle

Red Gurnard have a maximum age of 16 years. They reach maturity at 23 cm in length and 2-3 years of age. Red gurnard have a long spawning period which extends through spring and summer with a peak in early summer. Spawning grounds appear to be widespread, although perhaps

localised over the inner and central shelf. Egg and larval development takes place in surface waters, and there is a period of at least eight days before feeding starts. Small juveniles (< 15 cm FL) are often caught in shallow harbours, but rarely in commercial trawls.

Habitat

Red Gurnard are found throughout New Zealand coastal waters and are found on sandy shell seabeds at depths of 10-200 metres. They feed on shellfish, crustaceans, and crabs.

Fisheries Management

Figure 8.3 Gurnard Fisheries Management Areas, GUR1

Commercial Fisheries

Red gurnard are a major bycatch of inshore trawl fisheries in most areas of New Zealand. They are also directly targeted in some areas. Up to 15% of the total red gurnard catch is taken by bottom long line and set net.

Annual landings of GUR1 have been relatively stable since 1986–87, generally ranging between 900,000 kg and 1,300,000 kg; substantially lower than the 2,287,525 kg TACC. (Figure 8.4) About 60% of the GUR1 total is taken from FMA1, as a bycatch of a number of fisheries including inshore trawl fisheries for snapper, John dory and tarakihi. The remaining 40% is taken from FMA9, mainly as a bycatch of the snapper and trevally inshore trawl fisheries.

Figure 8.4 Seasonality of Gurnard Catch and Catch vs. TACC from GUR1.
(thousands of kg)

Recreational Fisheries

Red gurnard is, by virtue of its wide distribution in shallow coastal waters, an important recreational species. Vulnerable to recreational fishing methods, it is often taken by snapper and tarakihi anglers, particularly in the Northern Region.

The 1993–94 North Region Recreational Fishing Survey (Teirney *et al.* 1997) estimated the annual recreational catch from GUR1 of 155,000 – 245,000 kg. The 1996 National Recreational Fishing Survey (Bradford, 1998) estimated the annual recreational catch from GUR1 in the 1996 fishing year of 100,000 – 120,000 kg. The 2000 National Recreational Fishing Survey (Boyd *et al.* 2005) fishing survey provided an estimate of 188,000 - 256,000 kg. However the harvest estimates derived from these surveys are considered to be unreliable.

A combined aerial overflight / boat ramp survey was undertaken in FMA1 during 2005 (1 December 2004 to 30 November 2005), primarily targeting snapper (Hartill *et al.* 2007). The GUR1 recreational harvest was estimated by this survey to be 127,000 kg.

Customary Non-Commercial Fishing

Red gurnard is an important species for customary non-commercial fishing interests, by virtue of its wide distribution in shallow coastal waters. However, no quantitative estimates of customary non-commercial catch are currently available.

8.4.3 Groper, Hapuku (*Polyprion oxygeneios*) & Bass (*Polyprion americanus*)

Physical Characteristics

There are two species of Groper in New Zealand, commonly known as Hapuku and Bass. Both species are grey-blue or grey-brown on top and white on the underside. Hapuku can grow to a maximum length of 150 cm, though most adults are 70-100 cm. Bass are larger, growing to a maximum length of 200 cm, though most adults are 80-

Hapuka

110 cm. Bass are distinguished from Hapuka by having a deeper body, larger eyes, a shorter spiny dorsal fin and a short blunt snout that does not have an undershot lower jaw.

Life Cycle

Both species of Groper are long-lived, with maximum age estimates from 40-60 years. Hapuku reach maturity at 10-12 years. Spawning for both species takes place in winter.

Habitat

Groper are found throughout New Zealand. They live in areas with rough ground from the central shelf to the shelf edge at depths to 500 m. Groper feed on red cod, tarakihi, blue cod, hoki, and squid.

Fisheries Management

Figure 8.5 Hapuku and Bass Fisheries Management Areas, HPB1

Commercial Fisheries

Both groper species, *Polyprion oxygeneios* (hapuku) and *P. americanus* (bass), occur in shelf and slope waters of the New Zealand mainland and offshore islands, from the Kermadecs to the Auckland Islands. The groper fishery takes both species, but in different proportions by region, depth, fishing method and season, and these have changed over time. Reported catches generally do not distinguish between species, and published data combine them. The main fishery comprises a number of domestic fishers working small to medium sized vessels – longliners, setnetters and trawlers, at a variety of depths (according to method) out to 500 m. The majority of the fish are catch by long line.

The Bay of Plenty fishery developed during the 1960s and 1970s. It is unknown how much of catch reported in HPB1 was from the Bay of Plenty region.

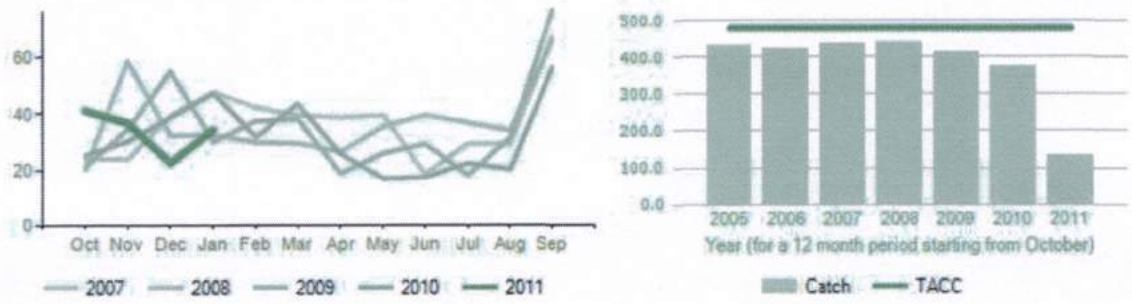


Figure 8.6 Seasonality of Hapuku and Bass Catch and Catch vs. TACC from HPB1. (thousands of kg)

Recreational Fisheries

Groper are taken by handline and setline, and to a lesser extent by setnets.

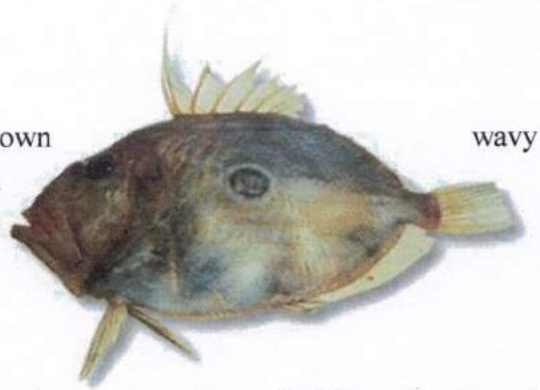
The 1993–94 North Region Recreational Fishing Survey (Teirney *et al.* 1997) estimated the annual recreational catch from HPB1 of 190,000 – 220,000 kg. The 1996 National Recreational Fishing Survey (Bradford, 1998) estimated the annual recreational catch from HPB1 in the 1996 fishing year of 40,000 – 60,000 kg. The 2000 National Recreational Fishing Survey (Boyd *et al.* 2005) fishing survey provided an estimate of 209,000 - 476,000 kg. However the harvest estimates derived from these surveys are considered to be unreliable.

Customary Non-Commercial Fishing

Groper (hapuku and bass) were certainly taken by early Maori, and would have been available in greater numbers at shallower depths than is the case at present. Quantitative information on the current level of customary non-commercial catch is not available.

8.4.4 John Dory, (*Zeus faber*), Kuparu

Physical Characteristics



John dory are silver-grey or light brown with green-brown wavy stripes and a central black spot with a silver ring around it. Females are larger than males, reaching a maximum length of 60 cm.

Life Cycle

John dory have a maximum age of 12 years. Males reach maturity at 23-29 cm length and females at 29-35 cm length. They are serial spawners with a spawning season from December-April on the north east coast, varying in other regions.

Habitat

John dory are most commonly found around the inshore coastal waters of New Zealand north of Cook Strait. They are found in depths down to 300 m, but most commonly in depths of 50 m. John dory feed on small schooling species and larger reef fishes.

Fisheries Management

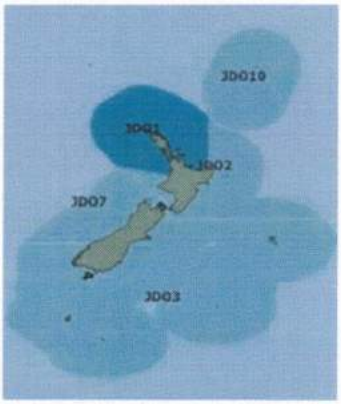


Figure 8.7 John Dory Fisheries Management Areas, JDO1

Commercial Fisheries

John dory are taken mainly as a bycatch of the trawl and Danish seine fisheries. In recent years, around 50-65% of the total reported catch has been taken in JDO1, and around 20% taken in JDO2. Landings from the eastern part of JDO1 are taken primarily in target fisheries for john dory and snapper. However, since 1990 there has been a steady trend of increased target fishing directed at john dory and decreased landings of this species from the snapper fishery.

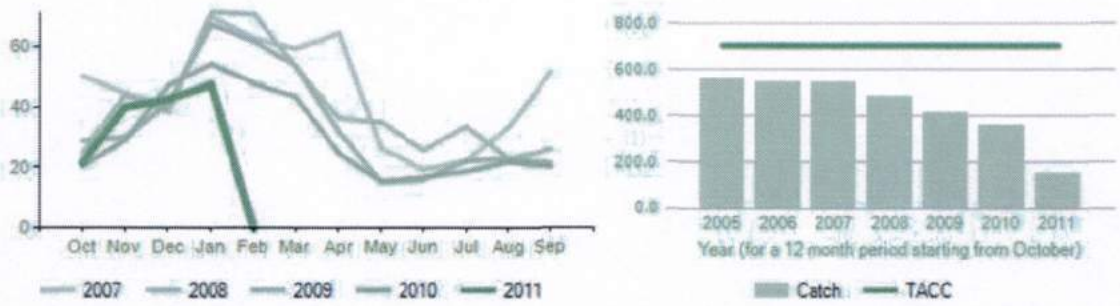


Figure 8.8 Seasonality of John Dory Catch and Catch vs. TACC from JDO1.
(thousands of kg)

Recreational Fisheries

John dory is an important recreational species in the north of New Zealand. The 1993–94 North Region Recreational Fishing Survey (Teirney *et al.* 1997) estimated the annual recreational catch from JDO1 of 75,000 – 95,000 kg. The 1996 National Recreational Fishing Survey (Bradford,

1998) estimated the annual recreational catch from JDO1 in the 1996 fishing year of 80,000 – 100,000 kg. The 2000 National Recreational Fishing Survey (Boyd *et al.* 2005) fishing survey provided an estimate of 174,000 - 280,000 kg. However the harvest estimates derived from these surveys are considered to be unreliable.

Customary Non-Commercial Fishing

No quantitative information is available on the current level of Maori customary non-commercial catch.

8.4.5 Kahawai, (*Arripis trutta* and *Arripis xylabion*)

Physical Characteristics

There are two species of Kahawai, *Arripus trutta* and Kermadec kahawai *Arripus xylabion*. *A. trutta* are more common, but both species look very similar and are blue-green with black spots on the back and silver undersides. *A. trutta* reaches a maximum length of 79 cm and *A. xylabion* can reach 94 cm.

Life Cycle

There are no available data on the biology of *A. xylabion*. *A. trutta* have a maximum age of 26 years and reach maturity at 39-40 cm in length, corresponding to about 4 years old.

Habitat

Kahawai is mostly found north of Cook Strait at depths to 150 m. They feed on other fish, crustaceans and copepods.

Fisheries Management

Figure 8.9 Kahawai Fisheries Management Areas, KAH1

Commercial Fisheries

Commercial fishers take kahawai by a variety of methods. Purse seine vessels take most of the catch; however, substantial quantities are also taken seasonally in set net fisheries and as a bycatch in longline and trawl fisheries.

The kahawai purse seine fishery cannot be understood without taking into account the other species that the vessels target. The fleet, which is based in Tauranga, preferentially targets skipjack tuna (*Katsuwonus pelamis*) between December and May, with very little bycatch. When skipjack are not available, usually June through November, the fleet fishes for a mix of species including kahawai, jack mackerels (*Trachurus* spp.), trevally (*Pseudocaranx dentex*) and blue mackerel (*Scomber australasicus*).

These are caught 'on demand' as export orders are received (to reduce product storage costs). However, since the mackerels and kahawai school together there is often a bycatch of kahawai resulting from targeting of mackerels. Reported landings are predominantly that of *A. trutta*.

In KAH 1, a voluntary moratorium was placed on targeting kahawai by purse seine in the Bay of Plenty from 1 December 1990 to 31 March 1991, which was extended from 1 December to the Tuesday after Easter in subsequent years. While total landings decreased in 1991–92, landings in KAH1 increased, and in 1993–94 the competitive catch limit for purse seining in KAH1 was reduced from 1666 t to 1200 t.

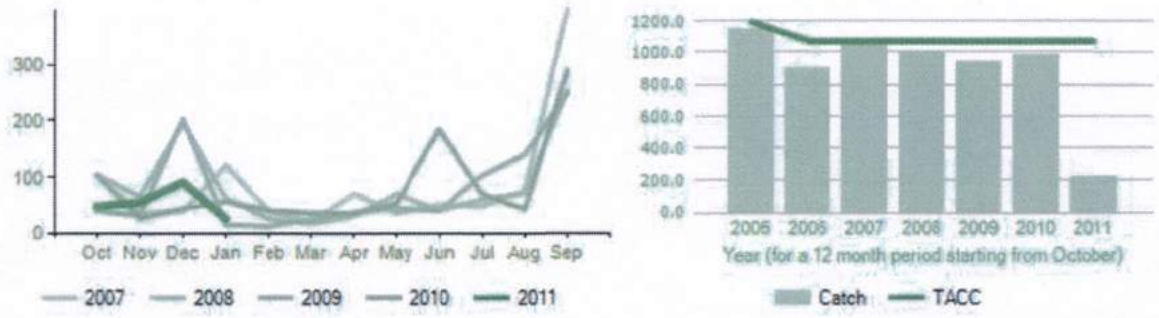


Figure 8.10 Seasonality of Kahawai Catch and Catch vs. TACC from KAH1.
(thousands of kg)

Recreational Fisheries

Kahawai is the second most important recreational species in FMA1 (after snapper). Kahawai are highly prized by some recreational fishers, who employ a range of shore and boat based fishing methods to target and/or catch the species. The only regulatory restrictions on recreational fishing for kahawai are a multi-species bag limit of 20 fish and a minimum set net mesh size of 90 mm. Kahawai is one of the fish species more frequently caught by recreational fishers, and recreational

groups continue to express concern about the state of kahawai stocks. Historical kahawai recreational catches are poorly known.

The 1993–94 North Region Recreational Fishing Survey (Teirney *et al.* 1997) estimated the annual recreational catch from KAH1 of 920,000 – 1,035,000 kg. The 1996 National Recreational Fishing Survey (Bradford, 1998) estimated the annual recreational catch from KAH1 in the 1996 fishing year of 900,000 – 1,020,000 kg. The 2000 National Recreational Fishing Survey (Boyd *et al.* 2005) fishing survey provided an estimate of 916,000 – 2,475,000 kg. However the harvest estimates derived from these surveys are considered to be unreliable.

A combined aerial overflight / boat ramp survey was undertaken in FMA1 during 2005 (1 December 2004 to 30 November 2005), primarily targeting snapper (Hartill *et al.* 2007). The KAH1 recreational harvest was estimated by this survey to be 530,000 kg, 303,000 kg of this from the Bay of Plenty area.

Various working groups have suggested that the National Recreational Fishing Surveys overestimate the numbers and the aerial overflight survey under estimated the numbers and that the actual number is a range somewhere in between.

Customary Non-Commercial Fishing

Kahawai is an important traditional and customary food fish for Maori. The level of customary catch has not been quantified and an estimate of the current customary non-commercial catch is not available. Some Maori have expressed concern over the state of their traditional fisheries for kahawai, especially around the river mouths in the eastern Bay of Plenty.

8.4.6 Kingfish, (*Seriola lalandi*), Haku

Physical Characteristics

Kingfish are green on top with a white underside and a green-gold band from nose through the eye down to a yellow tail. They can grow to a maximum length of 160 cm.

Life Cycle

Kingfish reach maturity at a length of 83 cm for males and 97 cm for females.

Habitat

Kingfish are found around the northern North Island and Kermadec Islands at depths of 200 m. They are pelagic on the shelf and often associate with reefs. Kingfish are carnivores that feed on koheru and trevally.

Fisheries Management

Figure 8.11 Kingfish Fisheries Management Areas, KIN1

Commercial Fisheries

Kingfish commercial landings are reported largely as non-target catch of inshore setnet, trawl and longline fisheries. Commercially, kingfish is a moderately high value species and is usually sold as fillets or whole chilled. In recent years about one quarter of the commercial catch has been exported, the main markets being the United States and Australia.

The main fishing areas for kingfish are the east (KIN1 and KIN2) and west coast (KIN8) of the North Island of New Zealand. The largest commercial catches generally come from KIN1. The annual catch of kingfish from KIN 1 has fluctuated between 100,000 and 250,000 kg from 1993–94 through 2000–01 and declined to less than 50,000 kg in 2003–04.

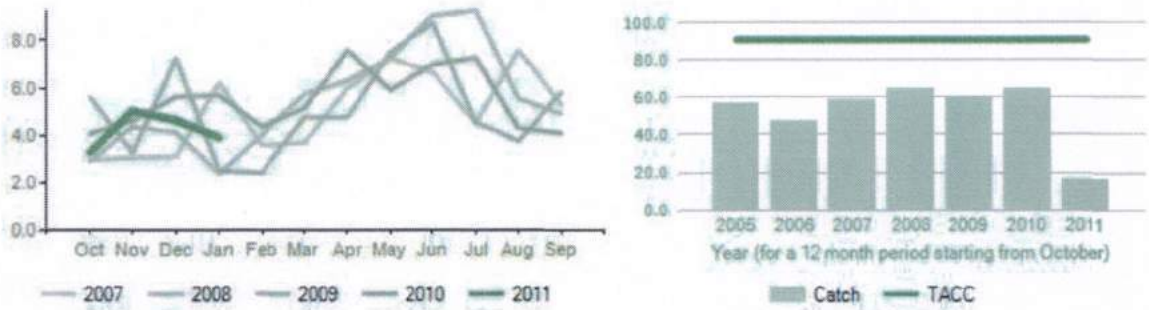


Figure 8.12 Seasonality of Kingfish Catch and Catch vs. TACC from KIN1.
(thousands of kg)

Recreational Fisheries

Kingfish is highly regarded by recreational fishers in New Zealand for its sporting attributes and large size. Kingfish are most often caught by recreational fishers from private boats and from charter boats, but are also a prized catch for spearfishers and shorebased game fishers. Kingfish are

recognized internationally as a sport fish, and kingfish caught in New Zealand waters hold 20 of the 22 International Gamefish Association World Records.

Recreational fishers have voiced concerns over a perceived marked decline in the size of kingfish available to them in recent years. Many clubs, competitions and charter boats have implemented a voluntary one kingfish per person per day limit in response. A number of gamefish clubs have also adopted a minimum size limit of 100 cm for kingfish.

The 1993–94 North Region Recreational Fishing Survey (Teirney *et al.* 1997) estimated the annual recreational catch from KIN1 of 240,000 – 280,000 kg. The 1996 National Recreational Fishing Survey (Bradford, 1998) estimated the annual recreational catch from KIN1 in the 1996 fishing year of 215,000 – 255,000 kg. The 2000 National Recreational Fishing Survey (Boyd *et al.* 2005) fishing survey provided an estimate of 590,900 – 764,000 kg. However the harvest estimates derived from these surveys are considered to be unreliable.

All indications are that the recreational catch is in the range of 500,000 – 700,000 kg in KIN1.

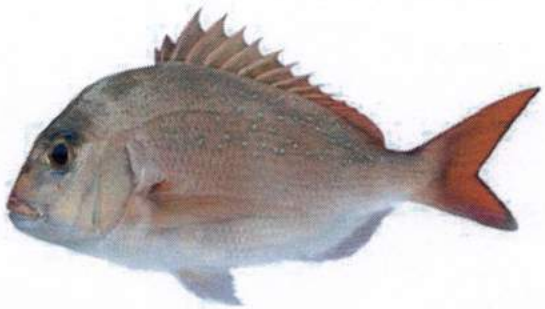
Customary Non-Commercial Fishing

Kingfish is an important traditional food fish for Maori, but no quantitative information on the level of Maori customary non-commercial catch is available. The extent of the traditional fisheries for kingfish in the past is described by the Muriwhenua Fishing Report (Waitangi Tribunal 1988). Because of the coastal distribution of the species and its inclination to strike lures, it is likely that historically Maori caught considerable numbers of kingfish.

8.4.7 Snapper, (*Pagrus auratus*), Tamure, Kouarea

Physical Characteristics

Snapper are copper-pink on top with a silver-white underside and a number of small blue dots on the flanks. Their growth varies with region, but can reach a maximum of 105 cm.



Life Cycle

Snapper have a maximum age of 60 years and reach maturity at 3-4 years old and 20-28 cm. They are serial spawners and release numerous batches of eggs throughout spring and summer.

Habitat

Snapper are found in central and northern areas of New Zealand to depths of 200 m. They are one of the most abundant inshore fishes in New Zealand. Snapper feed on a range on invertebrates including crabs, worms and shellfish.

Fisheries Management

Figure 8.13 Snapper Fisheries Management Areas, SNA1

Commercial Fisheries

The snapper fishery is one of the largest and most valuable coastal fisheries in New Zealand. The commercial fishery, which developed last century, expanded in the 1970s with increased catches by trawl and Danish seine. Following the introduction of pair trawling in most areas, landings peaked in 1978 at 18,000,000 kg. Pair trawling was the dominant method accounting for on average 75% of the annual catch from 1976 to 1989.

In the 1980s an increasing proportion of the SNA1 catch was taken by longlining as the Japanese "iki jime" market was developed. By the mid 1980s catches had declined to 8,500,000 – 9,000,000 kg, and some stocks showed signs of overfishing. The fisheries had become more dependent on the recruiting year classes as stock size decreased.

Figure 8.14 Seasonality of Snapper Catch and Catch vs. TACC from SNA1.
(thousands of kg)

Recreational Fisheries

The snapper fishery is the largest recreational fishery in New Zealand. It is the major target species on both coasts of the North Island. In the SNA1 area a recreational allowance of 2,600,000 kg has been allowed for in the Total Allowable Catch (TAC) of 7,550,000 kg. Within SNA1 the snapper bag limit for amateur fishers has recently been re-set at 7 per person and minimum legal size (MLS) at 30 cm from April 2014.

Three methods have been used to estimate the recreational catch; tag ratio, telephone survey and aerial overflight. In 1984 a tag ratio method was used to estimate 400,000 kg of an estimated 1,600,000 kg total recreational catch from SNA1, was caught in the Bay of Plenty. The 1993–94 North Region Recreational Fishing Survey (Teirney *et al.* 1997) estimated the annual recreational catch from SNA1 of 2,857,000 kg. The 1996 National Recreational Fishing Survey (Bradford, 1998) estimated the annual recreational catch from SNA1 in the 1996 fishing year of 2,324,000 kg of which 1,611,000 kg was estimated to have been caught in the Hauraki Gulf / Bay of Plenty. The 2000 National Recreational Fishing Survey (Boyd *et al.* 2005) fishing survey provided an estimate of 6,242,000 kg annual recreational catch from SNA1. It estimated 1,984,000 kg was caught recreationally in the Bay of Plenty. A combined aerial overflight / boat ramp survey was undertaken in FMA1 during 2005 (1 December 2004 to 30 November 2005), primarily targeting snapper (Hartill *et al.* 2007). The SNA1 recreational harvest was estimated by this survey to be 2,419,000 kg, 516,000 kg of this from the Bay of Plenty area.

However the harvest estimates derived from these surveys are considered to be unreliable, but the Recreational and Snapper Working Groups both concluded that the boat ramp / aerial overflight approach provides the most reliable estimates of recreational harvest.

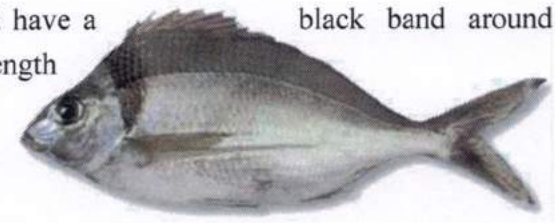
Customary Non-Commercial Fishing

Snapper form important fisheries for customary non-commercial, but the annual catch is not known.

8.4.8 Tarakihi, (*Nemadactylus macropterus*)

Physical Characteristics

Tarakihi are grey or silver with paler undersides and have a black band around the nape of the neck. They can grow to a maximum length of 70 cm.



Life Cycle

Tarakihi have a maximum age of over 40 years and reach maturity at 25-35 cm length and 4-6 years. Spawning occurs from summer to autumn in three main areas: Cape Runaway to East Cape, Kaikoura to Pegasus Bay, and the west coast of the South Island near Jackson Bay.

Habitat

Tarakihi are found throughout New Zealand inhabiting depths of 100-500 m. They feed on worms, crabs, brittlestars and shellfish.

Fisheries Management

Figure 8.15 Tarakihi Fisheries Management Areas, TAR1

Commercial Fisheries

Tarakihi are caught by commercial vessels in all areas of New Zealand from the Three Kings Islands in the north to Stewart Island in the south. The main fishing method is trawling. The major target trawl fisheries occur at depths of 100–200 m and tarakihi are taken as a bycatch at other depths as well.

The major fishing grounds are west and east Northland (QMA 1), the western Bay of Plenty to Cape Turnagain (QMAs 1 and 2), Cook Strait to the Canterbury Bight (mainly QMA 3), and Jackson Head to Cape Foulwind (QMA 7). Around the North Island 70–80% of the tarakihi catch is targeted. The fishery appears to have been relatively stable since the initial development phase.

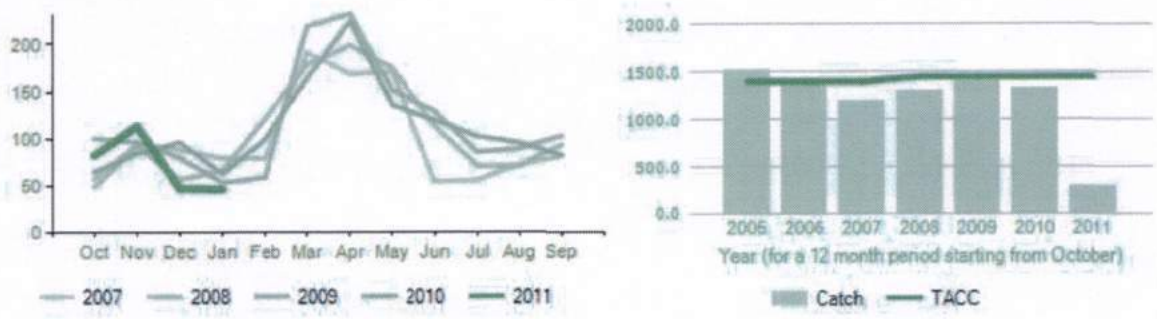


Figure 8.16 Seasonality of Tarakihi Catch and Catch vs. TACC from TAR1.
(thousands of kg)

Recreational Fisheries

Tarakihi are taken by recreational fishers using lines and setnets.

The 1993–94 North Region Recreational Fishing Survey (Teirney *et al.* 1997) estimated the annual recreational catch from TAR1 of 225,000 – 400,000 kg. The 1996 National Recreational Fishing Survey (Bradford, 1998) estimated the annual recreational catch from TAR1 in the 1996 fishing year of 280,000 – 330,000 kg. The 2000 National Recreational Fishing Survey (Boyd *et al.* 2005) fishing survey provided an estimate of 516,000 - 7555,000 kg. However the harvest estimates derived from these surveys are considered to be unreliable.

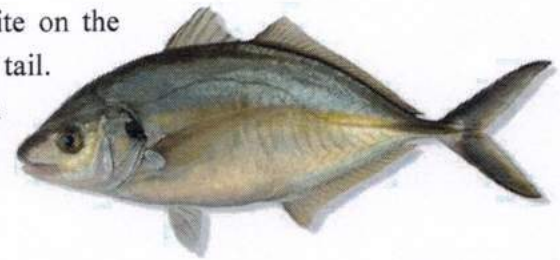
Customary Non-Commercial Fishing

No quantitative information on the level of customary non-commercial fishing is available.

8.4.9 Trevally, (*Pseudocaranx dentex*), Arara

Physical Characteristics

Trevally are light blue-green on top and silvery-white on the underside with a yellowish sheen, especially near the tail. As juveniles they have up to 9 grey bands. They can grow to a maximum length of 80 cm.



Life Cycle

Trevally can reach ages of over 40 years. They have a moderate growth rate until reaching maturity at 3-5 years of age and 32-37 cm in length. At this point growth becomes very slow. Spawning occurs over summer, with small batches of eggs released over several weeks or months.

Habitat

Trevally are commonly found around the North Island and the north of the South Island. Until the age of two, trevally inhabit shallow areas like bays, estuaries and harbours. They then move to reefs or open waters with depths to 150 m. They feed on planktonic organisms on the surface and a variety of crustaceans on the bottom.

Fisheries Management

Figure 8.17 Trevally Fisheries Management Areas, TRE1

Commercial Fisheries

Trevally is caught around the North Island and the north of the South Island, with the main catches from the northern coasts of the North Island. Trevally is taken in the northern coastal mixed trawl fishery, mostly in conjunction with snapper. Since the mid 1970s trevally has been taken by purse seine, mainly in the Bay of Plenty, in variable but often substantial quantities. Setnet fishermen take modest quantities.

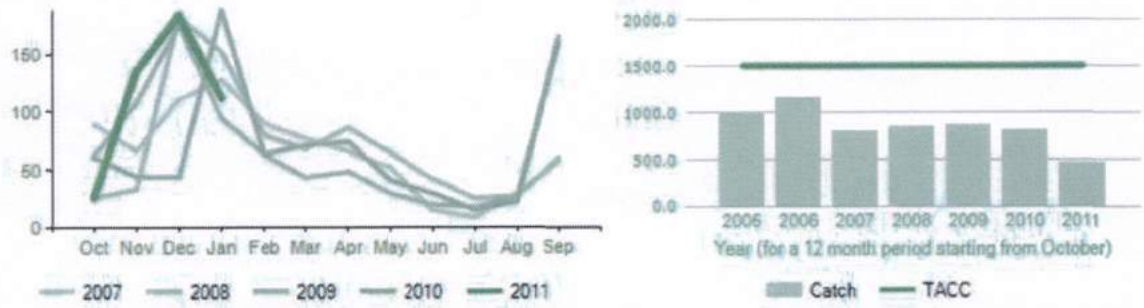


Figure 8.18 Seasonality of Trevally Catch and Catch vs. TACC from TRE1.
(thousands of kg)

Recreational Fisheries

Recreational fishers catch trevally by setnet and line. Although highly regarded as a table fish, some trevally is used as bait.

The 1993–94 North Region Recreational Fishing Survey (Teirney *et al.* 1997) estimated the annual recreational catch from TRE1 of 240,000 – 280,000 kg. The 1996 National Recreational Fishing Survey (Bradford, 1998) estimated the annual recreational catch from TRE1 in the 1996 fishing year of 215,000 – 255,000 kg. The 2000 National Recreational Fishing Survey (Boyd *et al.* 2005) fishing survey provided an estimate of 590,900 - 764,000 kg. However the harvest estimates derived from these surveys are considered to be unreliable.

A combined aerial overflight / boat ramp survey was undertaken in FMA1 during 2005 (1 December 2004 to 30 November 2005), primarily targeting snapper (Hartill et al. 2007). The TRE1 recreational harvest was estimated by this survey to be 105,000 kg.

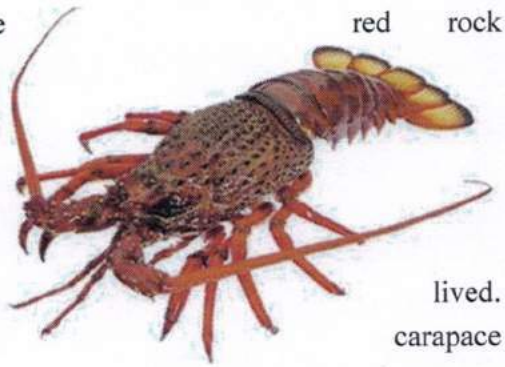
Customary Non-Commercial Fishing

Trevally is an important traditional and customary food fish for Maori. No quantitative information is available on the current level of customary non-commercial take.

8.4.10 Rock Lobster, Crayfish, (*Jasus edwardsii, Sagmariasus verreauxi*), Koura papatea, Pawharu

Physical Characteristics

There are two species of rock lobster in New Zealand, the red rock lobster (*Jasus edwardsii*) and the packhorse rock lobster (*Sagmariasus verreauxi*). The packhorse lobster is larger than the red rock lobster.



Life Cycle

Both species of rock lobster are slow growing and long lived. Red rock lobster females reach maturity at 60-120 mm carapace length. Spawning occurs after moulting in autumn.

Habitat

Red rock lobster are found all around New Zealand. Packhorse lobster are found around the northern North Island.

Fisheries Management

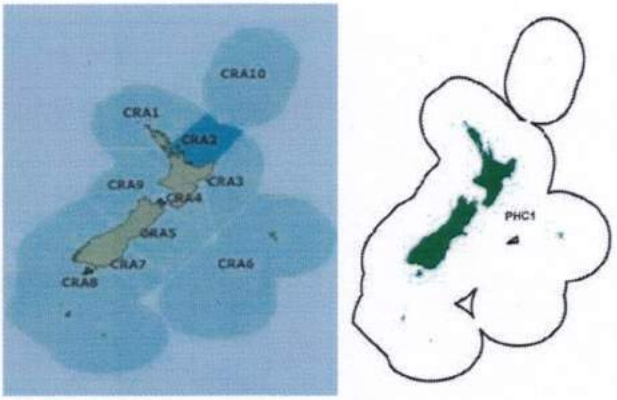


Figure 8.19 Crayfish Fisheries Management Areas, CRA2 and PHC1

Commercial Fisheries

Two species of rock lobsters are taken in New Zealand coastal waters. The red rock lobster supports nearly all the landings and is caught all around the North and South Islands, Stewart Island and the Chatham Islands. The packhorse rock lobster is taken mainly in the north of the North Island. Packhorse lobsters (PHC) grow to a much larger size than do red rock lobsters (CRA) and have different shell colouration and shape.

For commercial and recreational fishers in CRA2, the red rock lobster MLS (Minimum Legal Size) has been 54 mm TW (Tail Width) for males since 1990 and 60 mm TW for females since 1992 in all areas of NZ. The commercial and recreational MLS measure for packhorse rock lobster is 216 mm TL (Tail Length) for both sexes.

Catch data shown in Figure 8.20 indicate that the peak harvest season is in winter and spring, and that in CRA2 the harvest has been at or just below the TACC of 236,083 kg since 2006.

Figure 8.20 Seasonality of Crayfish Catch and Catch vs. TACC from CRA2.
(thousands of kg)

Thirty-four vessels reported catch greater than 1,000 kg from CRA 2 in 2010–11, an increase of 2 vessels from the 32 that have reported since 2007–08. This is a drop of 4–5 vessels compared to those reporting in the early 2000s and less than half the number reporting in 1979–80.

CRA2 has been divided up into 4 statistical areas; 905 Hauraki Gulf, 906 Eastern Coromandel, 907 Central BOP, 908 Western BOP. Area 906 (Eastern Coromandel) has been the predominant statistical area in terms of catch, accounting for 35–45% of the annual catch since 1990–91. However, this percentage dropped to 31% in 2009–10 and to 28% in 2010–11, more or less equalising the distribution of catch between the four statistical areas. The percentage of catch coming from the eastern Bay of Plenty (combined Areas 907 and 908) has remained relatively constant between 40 and 50% since the mid 1990s and has moved slightly above 50% in 2009–10 and 2010–11, with the relative contribution between these two statistical areas varying between years.

Recreational Fisheries

For commercial and recreational fishers in CRA2, the red rock lobster MLS has been 54 mm TW for males since 1990 and 60 mm TW for females since 1992 in all areas of NZ. The commercial and recreational MLS measure for packhorse rock lobster is 216 mm TL for both sexes.

The 1993–94 North Region Recreational Fishing Survey (Teirney *et al.* 1997) estimated the annual recreational catch from CRA2 of 82,000 kg. The 1996 National Recreational Fishing Survey (Bradford, 1998) estimated the annual recreational catch from CRA2 in the 1996 fishing year of 138,000 kg. The 2000 National Recreational Fishing Survey fishing survey provided an estimate of 235,900 kg. The 2001 National Recreational Fishing Survey fishing survey provided an estimate of 241,400 kg. However the harvest estimates derived from these surveys are considered to be unreliable.

Customary Non-Commercial Fishing

The Ministry of Fisheries provided preliminary estimates of the Mäori customary catch for CRA2 for the 1995–96 fishing year of 16,500 kg and PHC1, 500 kg.

8.4.11 Scallop, (*Pecten novaezelandiae*), Kuakua, Tipa

Physical Characteristics

Scallops grow to a width of 157mm with a circular shell of two equal sizes. The upper shell is flat and the lower shell convexed. The shells are "scalloped" with radiating ridges. Colour ranges from pink, white, mauve and brown.

Life Cycle

Scallops live for around 5 years and reproduce at 3 years old.

The growth of scallops within the Coromandel fishery is variable among areas, years, seasons and depths, and probably among substrates. In the Hauraki Gulf scallops have been estimated to grow to 100 mm shell length in 18 months or less whereas this can take three or more years elsewhere. In some years, growth is very slow, whereas in others it is very rapid. There is a steep relationship with depth and scallops in shallow water grow much faster than those in deeper water.

Habitat

Scallops are found throughout New Zealand in sand and mud from low tide to 50m depth often in sheltered waters of harbours.

Fisheries Management

Scallops are a highly valued species and support regionally important commercial, recreational and customary fisheries.

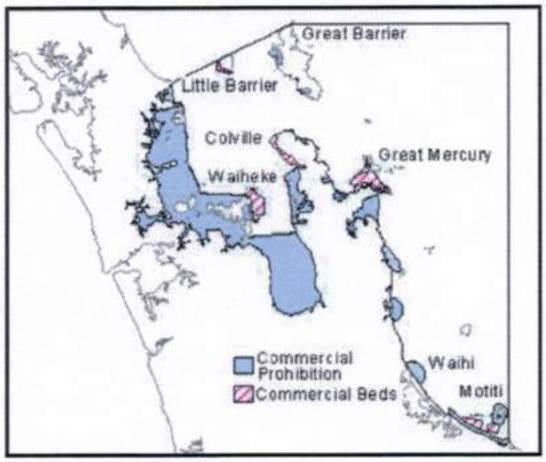


Figure 8.21 Scallop Fisheries Management Area, SCA CS

Commercial Fisheries

Fishing is conducted within a number of discrete beds around Little Barrier Island, Waiheke Island, at Colville, north of Whitianga (to the west and south of the Mercury Islands), and in the Bay of Plenty (principally off Papamoa, and around Motiti Island), these are the commercial beds shown in Figure 8.21. All commercial fishing is by dredge, with fishers preferring self-tipping "box" dredges. The Coromandel commercial scallop fishing season runs from 15 July to 21 December each year. The minimum legal size for scallops taken commercially in the Coromandel scallop fishery is 90 mm shell length.

The abundance of scallops can vary rapidly in response to environmental conditions. As a result, the Total Allowable Commercial Catch (TACC) is set very low at the start of the season (22,000 kg meat weight TACC). If a survey is conducted before the season begins the estimate of abundance of scallops for the survey year is used to adjust the catch limit. If the results of the survey become available after the season has started the Ministry for Primary Industries then works closely with the commercial fishers and other stakeholders to establish a sustainable and cautious in-season increase to the total allowable catch. At the end of the season the TACC for the following year returns to 22,000 kg.

Table 8.5 Catch Limits and Landings (tonnes meat weight or green weight) from the Coromandel Scallop Fishery Since 1974.

Season	Catch limits (t)		Landings (t)				Estimated catch (t green)			
			MHR	LFRR	CELR					
	Meat	"Green"	Meat	Meat	Meat	Green	Hauraki	Mercury	Barrier	Plenty
1974	–	–	–	–	–	26	0	26	0	0
1975	–	–	–	–	–	76	0	76	0	0
1976	–	–	–	–	–	112	0	98	0	14
1977	–	–	–	–	–	710	0	574	0	136
1978	–	–	–	–	–	961	164	729	3	65
1979	–	–	–	–	–	790	282	362	51	91
1980	–	–	–	–	–	1005	249	690	23	77
1981	–	–	–	–	–	1170	332	743	41	72
1982	–	–	–	–	–	1050	687	385	49	80
1983	–	–	–	–	–	1553	687	715	120	31
1984	–	–	–	–	–	1123	524	525	62	12
1985	–	–	–	–	–	877	518	277	82	0
1986	–	–	–	162	–	1035	135	576	305	19
1987	–	–	–	384	–	1431	676	556	136	62
1988	–	–	–	182	–	1167	19	911	234	3
1989	–	–	–	104	–	360	24	253	95	1
1990	–	–	–	153	–	903	98	691	114	0
1991	–	–	–	203	–	1392	*472	822	98	0
1992-93	154	1232	–	147	–	901	67	686	68	76
1993-94	132	1056	–	62	–	455	11	229	60	149
1994-95	66	528	–	49	–	323	17	139	48	119
1995-96	86	686	–	88	79	574	25	323	176	50
1996-97	88	704	–	81	80	594	25	359	193	18
1997-98	105	840	–	94	89	679	26	473	165	15
1998-99	110	880	–	37	19	204	1	199	2	1
1999-00	31	248	–	8	7	47	0	12	17	18
2000-01	15	123	–	7	10	70	0	24	2	44
2001-02	22	176	–	22	20	161	1	63	85	12
2002-03	35	280	28	32	31	204	0	79	12	112
2003-04	58	464	58	58	56	451	63	153	13	223
2004-05	78	624	78	78	78	624	27	333	27	237
2005-06	118	944	119	119	121	968	21	872	75	0
2006-07	118	944	118	118	117	934	28	846	60	0
2007-08	108	864	59	–	59	471	51	373	45	2

Monthly Harvest Return (**MHR**) forms, Licensed Fish Receiver Return (**LFRR**) forms, Catch Effort and Landing Return (**CELR**) forms,

Recreational Fisheries

There is an intense non-commercial (recreational and Maori) interest in scallops throughout the Coromandel fishery. Non-commercial fishing for scallops occurs in suitable areas throughout the fishery, mostly in enclosed bays and harbours. Scallops are usually taken by diving using snorkel or SCUBA, although considerable amounts are also taken using small dredges. In storm events, scallops can be cast onto lee beaches in large numbers. To some extent, management of northern scallop fisheries has concentrated on spatial separation of commercial and amateur fisheries through the closure of harbours and enclosed waters to commercial dredging. There remain, however, areas of contention and conflict, some of which have been addressed using additional voluntary or regulated closures as shown in Figure 8.21.

Recreational regulations restrict the daily harvest (bag limit) to 20 per person; there is a minimum legal size of 100 mm shell length. The recreational scallop season runs from 1 September to 31 March.

Estimates of catch by recreational fishers from the two northern scallop fisheries have been made on four occasions as part of recreational fishing (telephone and diary) surveys. For the 1993-94 fishing season the recreational catch from the Coromandel fishery was estimated to be 60,000 – 70,000 kg green weight Bradford (1997). For the 1996 fishing season the recreational catch was estimated at 62,000 kg green weight Bradford (1998). For the 1999-00 fishing season the recreational catch was estimated at 30,100 kg green weight Boyd and Reilly (2002). For the 2000-01 fishing season the recreational catch was estimated at 55,300 kg green weight Boyd et al (2004). However the Marine Recreational Fisheries Technical Working Group considered that these estimates may be very inaccurate. Therefore currently, there are no reliable estimates of non-commercial harvest of scallops from the Coromandel or Northland fisheries.

The 1993–94 North Region Recreational Fishing Survey (Teirney *et al.* 1997) estimated the annual recreational catch from CRA2 of 82,000 kg. The 1996 National Recreational Fishing Survey (Bradford, 1998) estimated the annual recreational catch from CRA2 in the 1996 fishing year of 138,000 kg. The 2000 National Recreational Fishing Survey fishing survey provided an estimate of 235,900 kg. The 2001 National Recreational Fishing Survey fishing survey provided an estimate of 241,400 kg. However the harvest estimates derived from these surveys are considered to be unreliable.

Customary Non-Commercial Fishing

Scallops were undoubtedly used traditionally as food by Maori, although quantitative information on the level of customary non-commercial take is not available.

8.4.12 Paddle Crab, (*Ovalipes catharus*), Papaka

Physical Characteristics

Paddle crabs can grow to a length of 150 mm, but have an average size of 130 mm.

Life Cycle

Paddle crabs have been estimated to reach at least 4-5 years of age. Growth and maturity parameters differ according to environmental conditions. Spawning takes place in inshore waters during winter and spring.

Habitat

Paddle crabs are found off sandy beaches, harbours and estuaries throughout New Zealand. They are most abundant from the intertidal zone to depths of at least 10 m. Paddle crabs are active at night and move to shallow areas to feed on molluscs, crustaceans, polychaetes, fish and algae.

Fisheries Management

Figure 8.22 Paddle Crab Fisheries Management Area, PAD1

Commercial Fisheries

The commercial catch of paddle crabs from the PAD1 has decreased in the past ten years from greater than 150,000 kg to less than 50,000 in recent years. No data are available to determine if this is the result of reduced numbers or reduced catch effort.

Figure 8.23 Seasonality of Paddle Crab Catch and Catch vs. TACC from PAD1.
(thousands of kg)

Recreational Fisheries

Preliminary data from the 1996 National Marine Recreational Fishing Survey indicate that paddle crabs are seldom caught (NIWA unpublished). Paddle crabs are taken as a bycatch of beach and estuarine seining and in setnets throughout much of their geographical range.

Customary Non-Commercial Fishing

There is no quantitative information on the current level of customary non-commercial catch.

8.4.13 Sea Urchin, (*Evechinus chloroticus*), Kina

Physical Characteristics

The growth of Kina varies regionally but can grow larger than 100 mm in diameter.

Life Cycle

Kina have a maximum age of at least 20 years and the size at maturity varies from 30 mm to 75 mm. Spawning takes place annually from November to March.

Habitat

Kina are found on rocky substrates to depths of 50 m. Kina is herbivorous and competes for food with paua.

Fisheries Management

Figure 8.24 Kina Fisheries Management Area, SUR1B

Commercial Fisheries

Most kina are found in waters less than 10 m deep and are harvested by breath-hold diving. Some target dredging also occurs in SUR 7. There is no minimum legal size for kina. Almost all of the roe harvested in this fishery is consumed on the domestic market.

On 1 October 1992 the Ministry of Fisheries placed a moratorium on the issue of permits to commercially harvest kina. The kina fishery has evolved considerably since the imposition of the moratorium.

Figure 8.25 Seasonality of Kina Catch and Catch vs. TACC from SUR1B. (thousands of kg)

Recreational Fisheries

Recreational catch was estimated in a national survey in 1996 (Fisher & Bradford 1998, Bradford 1998) and 2000 (Boyd & Reilly 2005). The recreational harvest estimated for 1994 in the Bay of Plenty was 160,900 kg and the combined total from SUR1 was estimated to be 198,900 kg. In 1996 the recreational harvest survey only presented the combined harvest from Northland, Hauraki Gulf and the Bay of Plenty areas which, was estimated to be 78,500 kg. The recreational harvest for SUR1 in 2000 was estimated at 445,200 kg.

Customary Non-Commercial Fishing

There is an important customary non-commercial harvest of kina by Maori for food. Where data are available, only small catches of kina have been reported under the customary non-commercial harvest provisions of the Fisheries Act 1996.

Motiti Rohe Moana Draft Customary Fisheries Plan 2015 - 2020

Motiti Island from North towards mainland Bay of Plenty coast

Protect **Preserve** **Provide**

Nga Hapu o Te Moutere o Motiti

Rohemoana@gmail.com

Kaupapa

"Tiakina i nga rawa hi ika, a tatau kaimoana mo nga uri whakaeke"

Protecting Motiti fisheries for future generations

Ma Motiti Mo Motiti

Contents

A: Motiti Rohe Moana Customary Fisheries Plan 2015-2020

B: Motiti marine spatial planning & marine protected areas

C: Appendices

Summary

Motiti Customary Fisheries Management Objectives

"*Protect Preserve & Provide*"

1. Taonga fisheries restored, preserved and protected for future generations.

2. Collaborative partnerships

3. Capacity development to meet responsibilities as *Kaitiaki*

4. Customary fisheries are healthy, sustainable and support the cultural wellbeing of community

5. Fisheries are sustainable to support economic future wellbeing

Te Moutere o Motiti from SW Horopupu reef Taumaihi Island

<u>Our Mission</u>: is to conserve, protect and enhance the biological diversity, ecological integrity and cultural legacy of the Motiti Rohemoana while facilitating compatible use.

<u>Purpose:</u> Motiti Rohemoana Natural Environment Area Management Plan

1. Describe regulations and boundaries
2. Outline organisation
3. Set priorities Goals and performance measures for programmes & activities
4. Guide development of future management activities

State of the Rohemoana reports

- Resources and Uses of the Motiti Rohemoana
- Characteristics and assessment of resource status and habitats
- History of marine species population data & Fish ecology

Motiti Rohemoana Alive programme

<u>Goal:</u> To increase awareness of Motiti Rohemoana

Key natural and cultural resources

Environmental Conditions

Geology
Bathymetry
Oceanography

Natural Resources Data

Phytoplankton
Zooplankton
Benthic Organisms
Fishes
Marine mammals
Seabirds

Historical and Cultural Resources

Management for Resource Protection & Research

Motiti Natural Environment Area - Regional Coastal Environment Management Plan

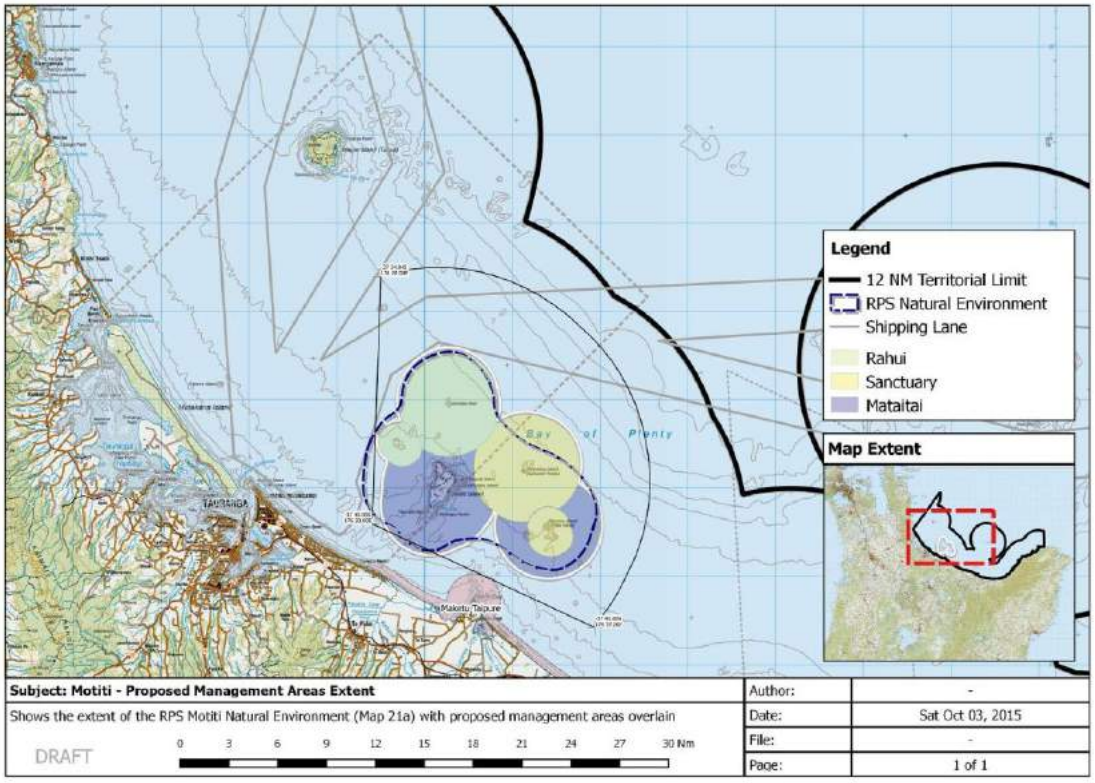
Management for Human Activities

Rena information links

Purpose

The purpose of this Customary Fisheries and Marine Management Plan is to support decision-making processes for the integrated resource management of the Motiti Rohemoana Natural Environment Area.

This Plan is designed to inform customary fisheries objectives for the period 2015-2020.



Objectives

Use Outcomes

All fisheries resources of Motiti Rohemoana are used in a manner that provides the optimum sustainable cultural, social and commercial benefits to hapu and whanau.

Environmental Outcome

The capacity and integrity of the biological and physical environment are managed in a sustainable way and to a level that provides for the growth and wellbeing of all the communities it supports, while reflecting the cultural aspiration of Motiti tangata whenua, tangata moana.

Management Outcomes

Together Motiti Collective and other stakeholders to ensure that appropriate decisions are taken to manage the fisheries resources effectively and sustainably.

1. Objective 1 - Protect, Preserve, Provide
2. Objective 2 - Collaboration management
3. Objective 3 - Kaitiakitanga
4. Objective 4 - Customary sustainability
5. Objective 5 - Economic sustainability

Management Objecive 1 - Protect, Preserve and Provide

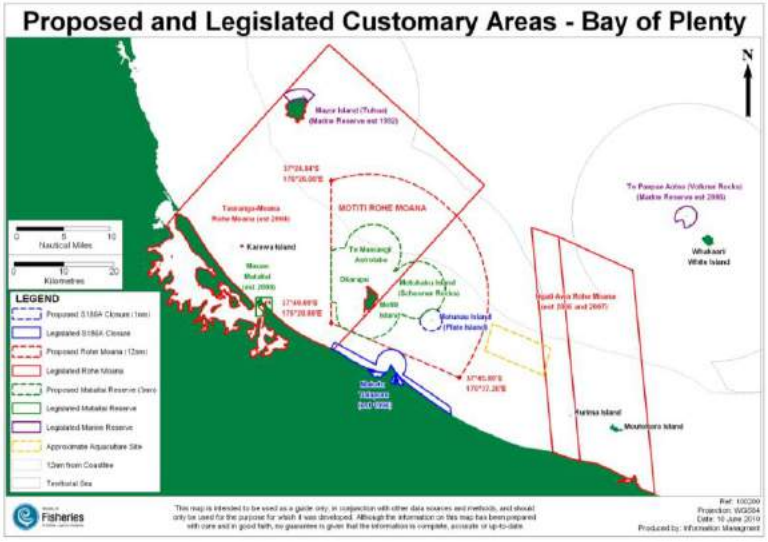
Mana and Rangatiratanga over Motiti Rohemoana is restored, preserved and protected to ensure provision of customary & recreational fisheries resources for future generations

Performance Measures

1. Fisheries habitat and species are protected preserved and enhanced

2. Motiti Collective contribute to decision-making about fisheries and habitats through Ministry supported iwi-led research

3.Tikanga related to fishing practices and environmental standards are preserved through strong participation and education of whanau to guide future fisheries managers



4.Motiti Collective environmental managers are supported across agencies to ensure that environmental standards and policies are implemented in a way that promotes healthy fisheries

5. Motiti Collective are assisting to engage in proactive decision-making processes across agencies where economic resource development and ventures can be investigated for the betterment of Motiti Rohemoana fisheries and habitat, and to future proof management rights

6. Customary Marine Title recognition

Management Objective 2 - Collaboration Management

Collaborative partnerships in fisheries and environmental resource management are realised

Performance measures

1. Motiti Collective individually and also collectively with other iwi, can participate in investment and growth initiatives of fisheries opportunities where viable

2.Undertake a collaborative approach to implement fisheries regulations within the Motiti rohemoana and in other processes that are identified as necessary

3.Motiti Collective are able to openly engage and share relevant fisheries information, systems and possible expertise when coordinating management planning processes within Ministry and iwi fisheries frameworks

Management Objective 3 - Kaitakitanga

Motiti Collective to have sufficient capacity to meet their individual and collective responsibilities as *Kaitiaki* in partnership with others

Performance measures

1. Fisheries Monitoring strategy within Motiti rohemoana

2. Fisheries Act s186A Closure application

3. Establishment and development of Motiti rohemoana Kaitiaki programme

Management Objective 4 - Customary sustainability

Our Customary non-commercial fisheries are healthy, sustainable and support the cultural wellbeing of Motiti rohemoana

Performance measures

1. Mataitai establishment process and application

2. Increase recording and collection of data at significant customary sites

3. Promote Kaitiaki programme and sustainable practices

Management Objective 5 - Economic Sustainability

Our commercial fisheries are sustainable and support the economic wellbeing of Motiti rohemoana

Performance measures

1.Engagement with MPI and its partnerships with other fishing industry players is able to benefit from the optimum value for core commercial stocks

2. Engagement with MBIE to explore feasibilities for economic developments within the rohemoana

3. Innovations in commercial fisheries (aquaculture, research and technology, new business) are explored and adopted where viable

Management Framework

Ministry of Primary Industries - Fisheries			
Motiti Marine Forum - Kaitiaki & Stakeholders			
Maori	Recreational	Commercial	Environmental Groups

Science R&D	Zone Use designations	Permits, access

Environmental response
Community and Tangata whenua benefits

Customary Fisheries Stock

[MPI customary fisheries report Tauranga moana]

Customary fisheries were examined in a feasibility report, and engagement of customary fisheries management in the Bay of Plenty area.

Motiti has specific and shared culturally important species considered taonga to the people of Motiti.

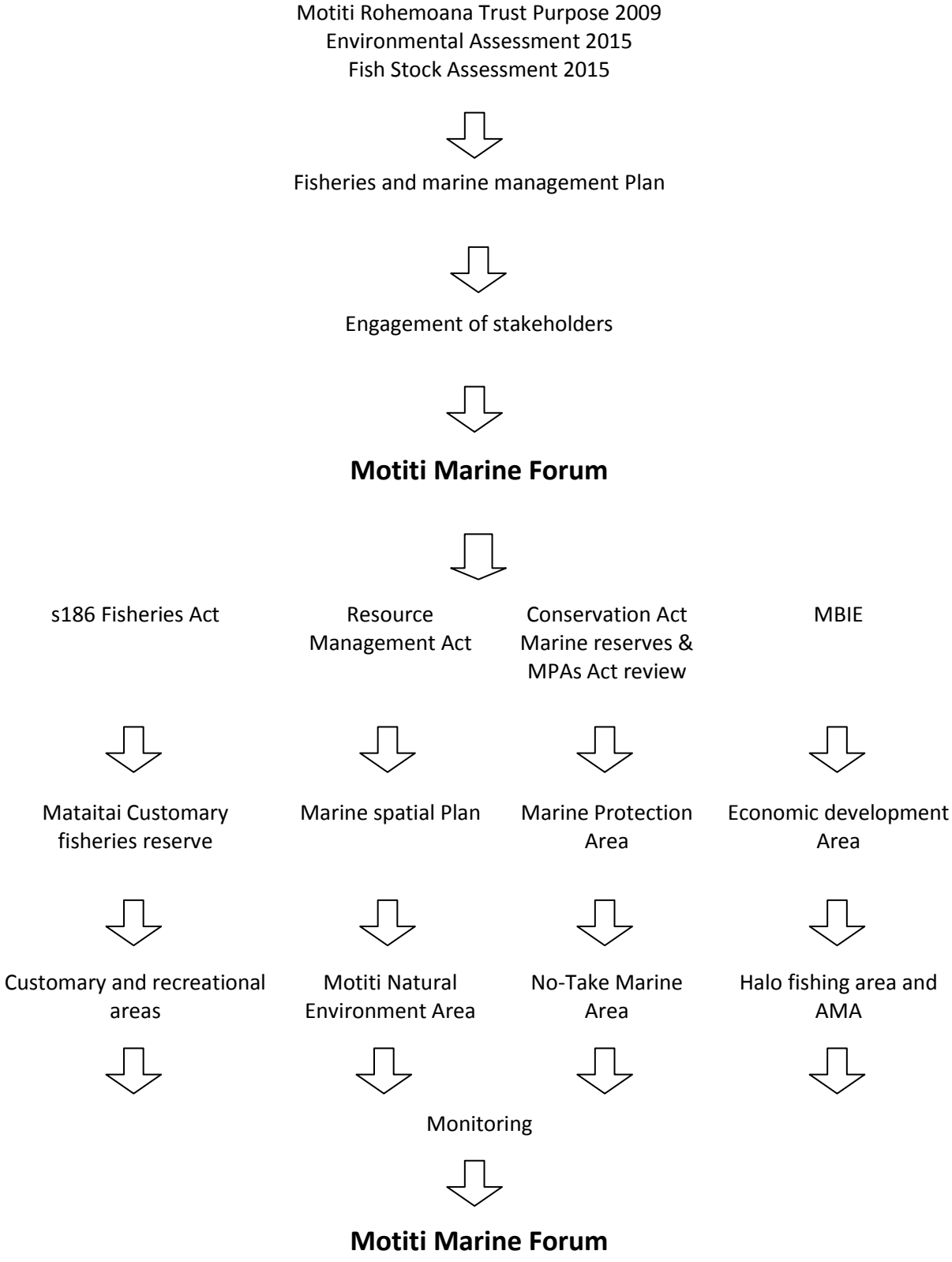
Taonga Species

Taonga Species are of the utmost importance to tangata whenua (Table 1). These species have seen a substantial decline as they are shared with commercial interest. A case study into highlights the decline of customary resources in the Bay of Plenty (Boyd, 2015).

Table 1: Taonga Species important to tangata whenua of Motiti (Francis, 2012)

Maori Name	Scientific Name	Common Name
Haku	*Seriola lalandi*	Kingfish
Kahawai	*Arripis trutta*	Kahawai
Tamure	*Pagrus auratus*	Snapper
Araara	*Pseudocaranx georgianus*	Trevally
Tarakihi	*Nemadactylus macropterus*	Tarakihi
Maomao	*Scorpis violacea*	Blue Maomao
Parore	*Odax Spp*	Butterfish
Hapuka	*Polyprion oxygeneios*	Groper
	Polyprion americanus	Bass
Whai	*Myliobatis tenuicaudatus*	Stingray
Pioke	*Mustelus lenticulatus*	Rig shark, Lemon shark
Takeke	*Hyporhamphus ihi*	Piper
Wheke		Octopus
Koura		Crayfish
Tupa		Scallops
Kuku, kutai		Mussels
Kina		Sea urchin
Pūpū		Whelk, cats' eye, winkle
Paua		Abalone

Information and decision-making frameworks



Information sources

Motiti Rohemoana Trust Purpose 2009

Environmental Assessment 2015

Fish Stock Assessment 2015

Wai 2391 Motiti Island - Rena Report 2014

Wai 2521 Nga Hapu o te Moutere o Motiti Claim 2015

Customary Marine Title Application [CIV-2015-485-767]

s186A Temporary Closure Application

Mataitai Reserve Proposal

MPA proposal

Marine sanctuary Proposal

Motiti Marine Forum Charter

NABIS

Motiti Rohemoana Stakeholder relationships

Maori

Motiti Island

- Motiti Marae Committee
- Te Patuwai ki Motiti
- Motiti Environment Management Society Inc.
- Ngai te Hapu Inc.

Mainland

- Te Arawa ki tai Trust
- Tauranga Moana Iwi Collective

Government

Local and territorial

- Department of Internal Affairs - Offshore Islands
- Bay of Plenty Regional Council
- Tauranga Harbour Master

Central

- Ministry for Environment
- Department of Conservation
- Ministry of Primary Industries
  - [Motiti Rohemoana Trust does not have a formal engagement with MPI]
- Ministry of Business, Innovation and Employment

Commercial

Fishing Industry

- Sanfords
- Moana Pacific
- Cray fishers
- Local fishers

Tourism Industry

- Dive zone Tauranga
- Charter fishers
- Dolphin experience
- Tourism Bay of Plenty

Community/Public

- Legasea
- Recreational Fishing Clubs
- Charter Fishing Association
- Recreational Dive Association
- Forest and Bird
- Friends of The Bay

Science Institutions and Universities

- University of Waikato
- University of Auckland
- NIWA
- Cawthron institute

References

The following documents were reviewed in preparation of this Customary Fisheries Plan:

Marine Reserves, The Public Trust Doctrine and Intergenerational Equity (Christie, 2004)

Marine Protection Areas (Fisheries & Conservation, 2008)

Safeguarding Our Oceans (Kate Mulcahy, 2012)

Future Seas: Scenario Planning and the Establishment of a Marine Reserve Network (URS, 2009)

Draft National inshore Fisheries Plan (MPI, 2011)

Integrated Management of New Zealand Coasts: Challenge and prospects (Peart, 2008)

Feasibility study for assessment of customary harvest by Kaitiaki in the Te Tai Hauāuru and Tauranga Moana Regions (Kawe, 2014)

Fisheries and Ecological Effects of the proposal for Leaving the Wreck of MV Rena (White, 2013)

Natural Character Assessment: Proposal to leave the remains of the MV Rena on Astrolabe Reef (Robertson, 2014)

Astrolabe Reef Metocean Conditions: Wave, Ocean Current and Wind (Metocean, 2013)

Benthic Sediment Quality Report - Astrolabe Reef (Don, White, West, & Bell, 2013)

Review of sustainability and other management controls for snapper 1 (SNA 1) (MPI, Review of sustainability and other management controls for snapper 1, 2013)

Biodiversity Conservation (Costello & Ballantine, 2014)

B: Proposed Motiti Marine Spatial Planning - marine protected areas (MPAs)

Te Huruhi Bay, Motupatiki & Turitea island - eastern Motiti Island

Application of applied marine spatial environmental planning at regional planning level will provide a structural framework overlay for a multi-use marine management regime.

Motiti is a unique marine space as it is an offshore island with oceanic influences in relative close proximity to the Bay of Plenty coast.

Use management regime

Diverse uses

Biodiversity protection

Non-Take Marine protection area

Provide for ecosystem recovery post Rena - **Rahui**

Te Tau o Taiti (Astrolabe) reef

Marine Environment sanctuary

Provide ecosystems protection measure to enhance biodiversity

Schooner rock/Plate island

Customary use area - Maitaitai reserve

Provide for sustainable customary use

Motiti Island

Recreational Use areas - Recreational fishing sanctuary

Provide managed and monitored area to best provide for recreational fishing.

Okarapu (Okaparu, *sic*) Reef

Commercial Fishing protection halo - economic offset

Provide Sustainable economic fisheries resources on the fringe of the MPA'S

Penguin shoals

MPA	Area proximity	Provide for	Govt agency
Full Protection Marine Reserve	3 Nm around Astrolabe reef	biodiversity enhancement	DoC
Marine Environment sanctuary	3Nm around Schooner rock and Plate Island	Provide ecosystems protection measure	MPI DoC
Customary use area - Maitaitai	1 Nm around Motiti Island	sustainable customary use	MPI
Recreational Use areas - Recreational fishing sanctuary - Mataitai	Okarapu Reef and 3 Nm around Motiti	Managed and monitored	MPI
Commercial Fishing protection halo - economic offset	Penguin shoal	Sustainable economic fisheries resources	MPI

Integrated Marine Management areas approach

Sites	Management Area	
Te Tau o Taiti Reef	*Marine Protection Area*	No-Take
Motunau Island	*EBM 1*	Managed Take
Motuhaku Schooner Rocks	*EBM 2*	Managed Take
Pudney Rock	FMA 1	Open
Penguin Shoal	FMA 1	Open
Motiti Rohemoana		
Tumu Bay	*Mataitai*	Customary Take
Te Huruhi Bay	*Mataitai*	Customary Take
Wairere Bay	*Mataitai*	Customary Take
Orongatea Bay	*Mataitai*	Recreational/Customary Take
Okarapu Reef	*Mataitai*	Recreational/Customary Take
Brewis Shoal	*Mataitai*	Recreational/Customary Take
Otamarakau	AMA	Aquaculture Area
Mainland Sites		
Pukehina	Taiapure	Open
Okurei Point	Taiapure	Open
Mauao	Mataitai	Recreational/Customary Take

Motiti Rohemoana Natural Environment Area - Characteristic assessment 2015

[summary of DoC, 2006 marine environmental assessment]

[Regional Council information, Stephen Park's environmental assessment memos]

[Waikato University Rena environmental studies]

Landscape and Marine-scape

[Summary of Sub-tidal Ecological Survey Conducted on Astrolabe Reef (Barter & Dunmore, 2015)]

Ecosystem characteristics

[Seashore Ecology of New Zealand and the Pacific (Morton, 2004)]

Oceanic Water column

Sub-tidal Sediment bottom

Sandy beach

Sub-tidal Rocky Reefs

Intertidal Rocky Reefs

Coastal Margin

Environmental influences and Impacts

Natural

Human

C: Appendices

a Matheson, 1979 extract: *"Acres of Fish"* (pp 81-83; 78-80)

b HMP maps

c Motiti Rohemoana maps

iii

Motiti Island

Bay of Plenty

by

A. H. Matheson

Alistair Hugh Matheson.

A H Matheson

1979

Published by the author under the auspices of the Whakatane and District Historical Society (P.O. Box 203, Whakatane) and distributed by the Society as Monograph Number 2.

ACRES OF FISH

The rocks, reefs and shoals in the waters around Motiti, which are such a hazard to shipping, have produced some of the best fishing in the Bay of Plenty. the fishing was once so good that, in 1924, the *Bay of Plenty Times* considered it, along with Mayor Island, as an "admirable base from which deep sea fishing parties may work with every degree of comfort". According to the *Times*, 30 December 1929, a "sportsman aboard a launch" reported that there were:

> ". . . acres of fish in shoals near Motiti Island and he has never before seen kingfish and kahawai so numerous . . . His party caught as many of they wanted in a very short time and then desisted. The surface of the ocean was literally swarming with fish."

During the same week Major Choate, Dr MacDiarmid and party, also fishing in these waters, caught 35 hapuku, 3 sharks, and numerous snapper, tarakihi and cod. At the end of March 1930 the islanders caught a 125 kg swordfish and prepared a big feast on the fish.

There is no doubt that the Motiti fishing grounds were an important source of food for the Maori people, not only on the island but on the mainland as well. "Comus", the author of two articles about Motiti in the *Auckland Weekly News*, 14 and 28 December 1889, was impressed with what he saw of the fishing on his visit to the island and with the possibilities of a fishing industry there:

> "Fishing is one of the principal occupations in the summer time. Large quantities of crayfish are caught, both by diving and in baskets. Many of these are sold in Tauranga. All the ordinary kinds of fish abound, and are readily caught by throwing out a line from the shore. The hapuku fishing ground, a little to the east of the island, is one of the very best to be found anywhere. These fish are caught in large numbers. The natives have a peculiar way of preserving them by steaming in their ovens [hangis] and drying in the sun. In this form they are often sent as presents to other tribes. It is very likely that, before long, Motiti will be the site of a fishing industry, and the hapuku, now so little heard of, will become objects of keen competition. It is strange that more has not been done to develop the fishing in the Bay of Plenty and elsewhere. With capital and push it could doubtless be made one of the most profitable of our local industries."

Anyone familiar with the Motiti fishing grounds in 1979 can only ask, "Where have all the fish — and crayfish — gone?" Has there been too much "push" by professional and amateur fishermen alike? For the Maori people, though, there are at least plenty of sea eggs, possibly because they don't suit European tastes.

When the young Dutch immigrant Garry Oster stayed on the island with Kepa and Bella Nuku in 1953-4, the Maoris could catch all the fish they wanted simply by throwing out lines from the shore. After working for a few hours in the maize fields, they would return when the tide had gone out and pick up the fish lying on the now exposed rocky shelf.

Some enormous fish were caught in those days. One snapper caught by Bella Nuku, recalls Garry Oster, was about a metre long and half a metre wide.

He also remembers that the islanders regarded octopus as a delicacy. It was usually well salted and hung up on a tree to dry, and later delicious steaks were cut from it. Garry also has vivid recollections of a naked islander emerging from the sea near the rocky shore with a huge grin on his face and numbers of crayfish tied around his waist.

With all the abundance of sea foods at Motiti, there is one longtime staple of Maori diet — the common pipi — that is not to be found there. Moreover, every attempt to establish that shellfish on the island coast, especially at Te One (or Sandy) Bay, has ended in failure. In the late 1920s and the 1930s, recalls Bella Nuku, parties of Motiti people used to sail over to Maketu in their boats and take pipis from the sand-spit west of the township. However, they much preferred the shellfish on the Kaituna Estuary side of the spit to those on the ocean side. In the evening the islanders would make a fire and camp for the night in the sand-hills — or maybe attend a dance in Maketu. At a later date the Maketu people would come over to Motiti to a dance at the island.

An unusual fishing story of early Motiti was recounted in the *Times* in 1881, shortly after the death of the chief Hori Tupaea. In the year 1856, when a European trader was visiting Motiti, at the same time as Tamihana (the King-maker) was staying on the island with Hori Tupaea, a storm occurred the like of which had never been heard of by the old Maori sages. Among the many vessels wrecked was a Maori trading schooner, which apparently lost all hands overboard and was later found high and dry on a sandbank inside Katikati Heads.

Some time after the storm a large canoe returned to Motiti from the fishing grounds with a big catch of hapuku and a number of sharks for division amongst the different families. While the women were cleaning the fish, however, they found inside them portions of human flesh. At this, they began to yell and cry alarmingly, and all the people of the pa came running to the beach.

The chief Hori Tupaea, who is said to have had a great abhorrence of human flesh, advised them to throw the fish away. This however, they declined to do. Tupaea, in anger at their behaviour, left the pa for several weeks. But he consented to return after the people had agreed to abandon their old cooking stones and coverings, at which there were great rejoicings.

On a less serious note, the *N.Z. Herald* reporter who visited Motiti early in 1955 remarked on the islanders highly developed sense of humour: "One of their favourite gambits is to regale visitors with stories of large catches of fish and then produce a tin of sardines for a meal."

A Whale Chase

On several occasions in former years so many whales were seen near Motiti that the islanders obtained the necessary equipment and set out after them. In the Spring of 1872, with gear lent by Mr D. Asher, of Tauranga, they caught three whales, although one got away. It was expected that in future the trade would be a lucrative one, but a decade passed before another catch was made.

In the winter of 1882 whales were again about in the Bay of Plenty. On 24 June the *Times* reported that the Motiti people were organising a whaling expedition, in which the Te Kaha people also had an interest. Four large boats had left Tauranga fully equipped with the necessary gear. But it was not until the Spring

that the islanders had an opportunity to test themselves against the great mammals of the sea, and it was a test that nearly ended in tragedy. By early November they had caught, and lost, two whales. Then, on Saturday 11th, they had another chance to make a catch. The story of the drama that followed was printed in the *Times* on the following Monday:

> "An exciting chase after a whale took place outside our harbour on Saturday. At dawn in the morning a large school of whales were seen on the seaward side of Motiti, and three boats, manned by the Patuwai natives, put off. Two of the boats soon fastened to a very large 'Humpback', and were dragged at great speed in the direction of Tauranga. When just off the entrance, the whale headed out again, and on reaching Karewa [Island] it was so exhausted that the men hauled close up and lanced it repeatedly, apparently in a vital place, for it spouted blood, dyeing the water for some distance round.
>
> "Owing to the heavy sea, one of the boats by this time was full of water, and had to cast off. As 'Friday', the 'headsman' in the other boat was preparing to lance the fish again, it suddenly struck the boat with its 'flukes', and tearing the line out of the groove, sweeping away the oars and rowlocks from one side, and drawing two of the men overboard and filling the boat with water at the same time, the harpoon drew, and the fish, which was worth [$600], escaped. A third boat arrived just too late. The natives were much exhausted and landed on Karewa [Island] to dry their clothes.
>
> "In the afternoon Capt. Baker, who was passing with the 'Staffa', with his usual kindness, gave them a tow in.[134] The man 'Friday' appears to have been bruised internally and was in great pain. The boats returned to Motiti last night."

Before the end of the month the islanders succeeded in catching a calf whale 6 metres long. From this prize they expected to extract 3 tonnes of oil, and they made a trip to Tauranga for a large number of casks to hold it. On 28 July 1883 the *Times* reported that the Motiti people had fitted out 4 whale-boats, built by themselves, for the whaling season, which promised to be a successful one:

> "They are well equipped and the services of some whalers from the East Cape have been secured, as well as that of a native named Friday who is well known as being a first class hand."

Until about 30 years ago whales continued to be a fairly common sight in Motiti waters. The greatest visitation appears to have been in November 1926, when the Tauranga paper noted:

> "During the past fortnight a large number of whales have been observed in the vicinity of Motiti Island. The whales came as close as two miles [3.2 kilometres] off the island. The natives say that they have sighted as many as twenty whales spouting at the same time. Five whales were seen off the Island yesterday morning. An old native resident states that he has never before observed as many whales in the locality."

Once, Mr Bill Paterson witnessed a titanic and bloody battle between a whale and a shark off the north-western side of the island. The fight went on for some time without any apparent decision, and the combatants eventually moved away in the direction of Mayor Island.

> came out sodden. We were passing the 'Old Kuia' [Te Kuia Rock, see below] and she threw the whole lot at the old lady, 'Take it all, you old devil, you didn't get me that time.' Marmee was always afraid of the sea and it says a lot for her courage and determination that she stuck it out on Motiti for 6 years.
>
> "Another trip, this time from Tauranga, took us nine hours, as we had to creep down the coast to Maketu, then over from there. I can't remember any details, I was so ashamed of myself. I was sea sick, the first and only time, but it was an awful thing for an 8 or 9-year-old to admit to. It turned out alright the next day, tho, as I woke up covered in measles! We must have been staying on the mainland for a while and I picked them up from someone there."

Te Kuia Rock

For generations it has been the custom for those on board the boats of the "Motiti flotilla", and indeed all other vessels passing through the Tauranga harbour entrance, to throw into the sea a small offering of food, coin or tobacco to "Te Kuia" (meaning "the old woman") the rock formation at the foot of Mount Maunganui marked on the charts as North-West Rock. Actually, there are two rocks, one smaller than the other.

According to one Maori legend, the larger rock is the petrified body of a kuia (old woman) and the smaller that of her dog. It seems that once in ancient times when the old woman was sitting on top of the Mount with her dog she sighted hostile war canoes approaching. In her haste to get down the Mount to warn the people below, she lost her footing and fell headlong into the sea, followed by her faithful dog. And although the dog struggled valiantly to save the unconscious woman, at length both were drowned and their bodies washed ashore. To commemorate this event the two of them were turned into rock to stand on perpetual guard at the entrance to Tauranga Harbour. As F. M. Pinfold writes (*Journal of the Tauranga Historical Society*, March 1960. See also the *Times*, 7 November 1945.):

> "And that is why, from every launch that passes, some food is thrown to the Kuia Rock as an offering for a surety of calm seas and a successful expedition. It is not the amount of food so given which matters, but rather, the spirit behind the gift. So, should you have not even bait in your boat, the tossing overboard of a small coin will have the same effect, for with it the kuia may buy herself some food!"

It was not far from Te Kuia Rock that a party of Motiti people had a miraculous escape from death on 18 May 1947. Those who left the island that day on Kepa Nuku's launch *Huinga* were Mrs Ngarongaro Wi Keepa, Joe and Hazel Grant, Mick Hoete, Eddie Matehaere, Kepa and Bella Nuku and their daughter Maraea. Before leaving they had been warned by Mr Nuku's grand-uncle, Ikanui Rihara, not to go because the waves were breaking on a certain reef in the direction of Mayor Island, and this only happened in the heaviest seas. okaparu.

As it turned out, the conditions were the worst that skipper Nuku had ever experienced, and it was necessary for his relative, Mick Hoete, to assist by

watching the movements of the sea. When trouble came, however, there was little they could do as a huge, freakish double wave reared up behind them and engulfed the *Huinga*. But by an incredible chance the onslaught of the wave jolted out of place a torch so positioned as to hold open the cabin door, which instantly slammed shut and saved the boat from being swamped and those inside from a watery grave.

When the monstrous wave had passed, the *Huinga* was on her side and her bow was pointing back towards Motiti. With the next swell, though, she righted herself, Kepa Nuku meanwhile grimly holding on to the wheel and bringing her round. Three more great waves swept the *Huinga* along and then the launch was in calm waters, near Te Kuia Rock. Later, as they proceeded up the harbour to Tauranga, the islanders were met by Mr George Faulkner coming out to search for them in one of his firm's launches. He had been informed of the capsizing of *Huinga* by a resident of Mount Maunganui.

TERRIBLE REEFS

There are enough reefs, shoals and rocks in the waters around Motiti Island to cause mariners to exercise some caution. In February 1827 the French navigator Dumont D'Urville's ship *Astrolabe* was caught in a violent north-easterly storm in the Bay of Plenty and had a frightening experience near what is now known as the Astrolabe Reef. The visibility cleared just in time to reveal the awe-inspiring sight of the huge waves crashing on the rocks and sending columns of foam high into the air. The Frenchmen were glad to leave behind the "terrible reefs which might have been the grave of the 'Astrolabe' ".[128]

A little over a year later, in the morning of Monday, 7 April 1828, the Rev. Henry Williams arrived off Motiti in the C.M.S. schooner *Herald*. It was probably the sight of this same reef that prompted him to remark in his journal:

> "At daylight discovered a very dangerous sunken rock which we had passed near in the night. The sea was breaking fearfully upon it. The Lord is my shepherd I will not fear."[129]

The survey by H.M.S. *Pandora*, in 1852-3, marked the position of the reef accurately on the charts, but the early editions of the *N.Z. Pilot* warned that at high water in very fine westerly weather it might not show. Mariners were also advised to avoid the neighbourhood at night because Motiti is low-lying and there is no other land near as a guide. Even at low tide in these conditions the Astrolabe Reef can be a menace, as the fate of the 67-tonne schooner *Nellie*, which struck the reef on Sunday, 13 January 1878, clearly proved.

The *Nellie* was on a voyage from Lyttelton to Auckland with a cargo of oats, flour, malt and bacon. At about 8.20 p.m. on a clear moonlight evening, with a smooth sea and the wind from W.S.W., there was no sign of a wash to show the 1/3 metre or so of rock the schooner suddenly struck. Captain Armstrong succeeded in getting the vessel off the reef—injuring himself in the process—and as she was badly holed and making so much water, he tried to beach her on the eastern side of Motiti. But the wind was baffling and there was no time to spare, so he ran her onto the rocks on the northern side of the island. After engaging

the islanders to get the cargo out at once, the captain set off for Tauranga in Mr Douglas' boat to report the accident.

Before the vessel broke up, most of the cargo, together with spars, rigging and an anchor were salvaged. One week later, on Sunday afternoon, 20 January, the s.s. *Staffa* (Capt. Baker) called at Motiti and lay about 400 metres off shore while the islanders brought out in their boats the 35 tonnes of goods they had saved from the wreck. The hull of the *Nellie* was purchased from the New Zealand Insurance Company, at auction in Tauranga, by Mr Thomas Wrigley for "one pound sterling ($2), according to the *Bay of Plenty Times*.

Another of Motiti's dangerous reefs, the Okarapu,[130] was not generally known to Europeans until it was discovered, in 1866, by Captain T. S. Carmichael, the first Pilot and Harbourmaster at Tauranga. In his log, Saturday, 17 March 1866, Carmichael recorded:

> "Light wind from the N.E. and very heavy sea running . . . Saw the sea breaking over the Astrolabe Rock, also a heavy continual break bearing from centre of Mount Maunganui N.E. by E ¼ E Eastly and appeared to be about 1¼ to 2 miles from the northern end of Flat Island [Motiti] which is not down on any chart, the natives call it the Okara."

Two days later, when Captain Carmichael piloted the steamer *Ladybird* up to Te Papa, Tauranga, he marked the reef on the captain's chart and gave him a notice to be published in the newspapers.

The dangers of the Okarapu Reef — a break only shows in heavy seas — were noted in the *N.Z. Pilot*. But this did not prevent the bulk-phosphate carrier *Golden Master* from striking these submerged rocks on the afternoon of 10 January 1959. The 13,000 tonne ship was holed and making water so quickly she had to be beached off Matakana Island. After repairs, however, she was able to make her way into the Tauranga harbour under her own power.

When Gilbert Mair Snr published his pilot directions for New Zealand waters, in 1839, he pointed out another difficulty for shipping around Motiti. Mair remarked that the island had no harbours, but small vessels could anchor between it and the main, although "the holding ground is not good being rocky bottom".[131]

The truth of this observation is borne out by the experience of the survey vessel H.M.S. *Pandora* on 30 November 1852. Early in the morning all hands had to be "turned up" to prevent the anchored ship drifting on shore in Orongatea Bay.[132] In more recent years some of the "Motiti flotilla" and at least one visiting launch have run onto the rocks after dragging their anchors.

A rocky bottom can occasionally hold an anchor so fast it can't be recovered. This was the experience of the Rev. Henry Williams, who anchored the mission cutter *Karere* off Motiti on 5 November 1831 and sent a canoe ashore for wood and water. The following day (Sunday) he recorded in his journal:

> "Appearance of wind from the S.E. Attempted to weigh the anchor, but found it had hooked a rock. After much trial were obliged to slip and make sail to get under command before the breeze freshened."[133]