Netting Coastal Knowledge

A report into what is known about the South Taranaki-Whanganui marine area

JULY 2006

Department of Conservation
Te Papa Atawhai

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Based on a draft report prepared for the Project Team by
Michelle Rush
Michelle Rush Consulting Ltd
PO Box 29-001
WELLINGTON

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Project Team:

- Department of Conservation
- Go Deep Scuba
- Horizons Regional Council
- Ministry of Fisheries
- Nga Rauru
- Ngati Ruanui
- Ohawe Boating and Angling Club
- Patea and Districts Boating Club
- Taranaki Regional Council and
- Wanganui-Manawatu Sea Fishing Club

Cover photo: View from Castlecliff north.
Photo: L. Douglas

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Summary

WHAT'S IT ALL ABOUT ?

What is known about the South Taranaki coast, between Manaia and Wanganui? What information is contained in published reports? And, perhaps more interestingly, what information is lurking in the heads of those members of the community who have lived, worked and played in this area for many years?

This project set out to engage with the community to learn more about the South Taranaki coast.

The report is divided into two parts: The first part sets out the method and results of gathering information from the South Taranaki coastal community. Through workshops, face-to-face interviews and written questionnaires people who were familiar with the coast (the majority had used it for over 20 years) were asked for information on where they were fishing/diving/gathering kaimoana/seeing marine mammals etc, what species they saw and what changes they had noticed. They were asked what they valued about the area, what their desires for its future were, and what ideas they had for management.

The research project highlighted the significance of the area for the people who use it. People value the area for its naturalness and remoteness, and also for the diversity and abundance of fish caught. There have been some clear and noticeable changes to the fishery over the last 20 or so years. These were apparent to the majority of people interviewed. In particular, the explosion in the spiky dogfish and paddle crab populations suggested to many interviewed that there was some sort of ecological imbalance. Furthermore, changes have been noticed in the numbers of people using the area and the fishing technology available.

There was certainly a desire from those interviewed for some sort of change in the management of the area, especially if that was what it would take to keep things the same. This came from even those who said that the fishing was the same as it had ever had been. In particular there was a desire for more say at the local level in how the fishery was managed. There were concerns about certain types of commercial fishing – which may have been genuine, or may have just reflected a lack of understanding of how commercial fishing operates.

The second part of this report summarises all available technical information on such topics as the physical features of the ocean, the geology that shapes the area and what is known about the biology. Background material was unearthed on the recreational and commercial fishery and monitoring into the state of the coastal environment. Management of the coastal marine area is complicated, and Part II of the report concludes with a summary of the current management situation and an outline of management tools available.

The final chapter of this report looks at what information gaps the research has identified and what options there are available for progressing changes to management.

Part I Information on the South Taranaki - Whanganui coast obtained from the community through interviews, workshops and questionnaires.

Photo credit: L. Douglas

1 GATHERING INFORMATION FROM THE COMMUNITY

Introduction

In April 2005, a community based project team was formed to research more about the marine environment along the South Taranaki coast.

This came about after a public meeting was held that discussed a recent inventory that had been conducted of existing information[1], and how to address the apparent lack of information for the South Taranaki–Whanganui coast. The feeling of the meeting was that whilst there appeared to be few written reports about this area of coast, information was held in the heads of the people of the community, and it was this information that should be accessed to provide a baseline of information for future research.

Throughout this report the word **Whanganui** which is literally translated as "big bay", has been used to refer to the river, bay, coastline and general area. The word **Wanganui** has been used for the city name, organisations which bear the city's name and in instances where the city or settlement have been used as a point of reference.

The project team that was formed to oversee the research comprised the following organisations:

- Department of Conservation,
- Go Deep Scuba,
- Horizons Regional Council,
- Ministry of Fisheries,
- Nga Rauru,
- Ngati Ruanui,
- Ohawe Boating and Angling Club,
- Patea and Districts Boating Club,
- Taranaki Regional Council, and
- Wanganui-Manawatu Sea Fishing Club.

Other organisations and individuals also took part in one or more project team meetings.

The chapter concludes with listing the information which people in workshops wanted to see included in this project. While not everything that people were interested in could be covered in this project, the list of things that people did want to see included not only highlights where there is a lack of technical information, but also where there are education gaps. For example, there were clearly misunderstandings between the commercial and recreational fishing sectors that might need addressing with better information sharing.

In this chapter

This chapter provides the background for the social research that forms Part I of this report. It outlines the purpose and objectives of the research and how the research was conducted.

The research purpose

The project team identified that the purpose for the research was to:

- establish information about the coast and its history;
- build relationships and networks among all those with an interest in the marine environment through the process of doing the research; and
- produce a report that will assist in future management decisions about the sustainability of the area.

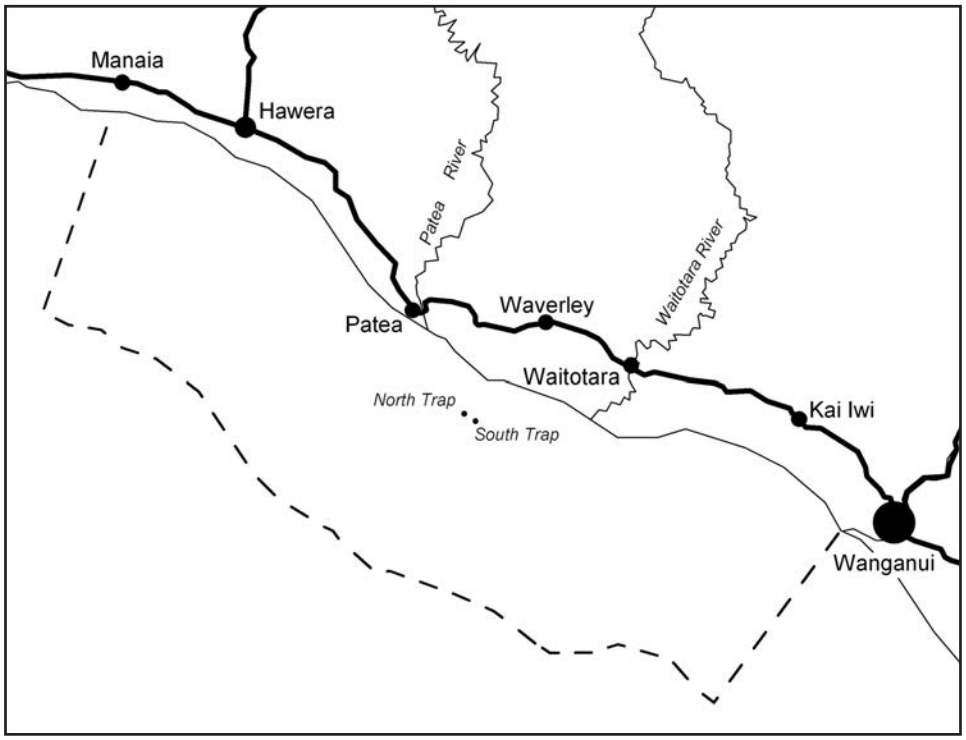


FIGURE 1: THE FOCUS OF THIS RESEARCH IS THE 115 KM LENGTH OF COAST AND MARINE ENVIRONMENT BETWEEN MANAIA AND CASTLECLIFF OUT TO THE 12 NAUTICAL MILE LIMIT.

The research objectives

Within the broad research purpose, the project team identified some specific objectives:

- to build a picture of the marine environment as it is today using existing published information, anecdotes, stories and other information held by locals;
- to document what we know about the environment and its resources in the past and what has changed;
- to build an understanding of what is important to the groups and individuals with an interest in the area, and what they wish to see in the future;
- to identify information gaps and make recommendations for future research; and
- to increase awareness of management issues for the area.

How the research was conducted

A researcher was appointed by the Department of Conservation to coordinate the research effort, with direction from the project team.

The key steps were:

RESEARCH STEPS	EXPLANATION
Literature review	Published information about the South Taranaki Bight was reviewed and summarised.
Workshops with local organisations	Seven workshops were held with clubs and other local organisations. At these workshops a presentation was given outlining the purpose of the research. Then the groups taking part in the workshops were asked: • what information they were interested in seeing included in the report; • what areas (on a map) they knew something about, or used for fishing, diving etc.; • what things were important to them about the area; • what changes they had noticed; and • what they wanted for future management. Approximately 100 people were involved.
Face-to-face interviews	79 face-to-face interviews were conducted. Questions asked in the interviews are included in Appendix 1. Total numbers taking part were approximately 85.
Mail out of a 'post-back' written survey	A written survey was mailed out with boat and dive clubs newsletters. Four clubs mailed the survey out to their members. A survey was also placed as an advertisement in local newspapers. 55 people returned completed written surveys.
Preliminary findings presented	Preliminary findings were presented to the project team to seek feedback before confirming the shape of the final report.
Draft report circulated for peer review	Circulation of the draft report to the project team and other key individuals for formal peer review.
Report published	Publication of this report.

Key areas to research

The project team felt that information needed to be gathered from both existing literature and from the community in order to describe:

- the marine environment as it is today;
- what is being monitored and what it tells us;
- what is important about the coast to locals;
- what locals want the coast to be like in the future;
- what appears to be at risk; and
- information gaps and how those gaps might be addressed by future research.

What people wanted the research to find out

In the workshops and face-to-face interviews, people were asked what information they would find interesting. This was to guide the project team so that information of most interest to the people of the coast could be included as far as possible.

Biology, geology, ocean and climate

People were interested in the biology of the area – how it was changing and whether things were getting better or worse, and if the use of the area was sustainable.

The erosion of the cliffs along the area and the location of reefs were issues of interest, along with finding out more about what is on the seabed. There were locally relevant questions raised about changes to the Castlecliff Beach in terms of sand movement and swimming off Patea.

Other people were interested in the ocean currents – the strength, speed and changes. One of the younger respondents was curious as to why the water was blue. People were interested in how the weather affected the fishery – particularly seasonal changes such as El Nino.

Recreational fishing

People were interested in trends in fish numbers, and changes in shellfish. They were particularly interested in reasons behind some of the changes that they had observed, for example, why there are more spiky dogfish and paddlecrabs and what impact these species have on other species. There was a range of specific fish-related issues that concerned people: Is the spiky dogfish a NZ wide problem? Why are paua so small? What are the lifecycles of blue cod, cray and snapper? How long do fish take to grow to legal size? Where are fish spawning? etc.

Given the strong recreational fishing background of the majority of respondents, there was a keen interest in finding out who was using the resource, how the technology had changed and what increase in recreational fishing pressure there was. Practically everyone was curious to know where the good fishing spots were!

Commercial fishing

People were interested in finding out more about commercial fishing, particularly about trawling – whether the voluntary trawl ban was enforced, what the frequency of trawlers was, how close trawlers came to shore, and if trawling impacted on the breeding stock or on the environment generally. People wanted information on what was happening with the fish stocks, particularly species like kawahai. There were a number of people wanting general information on how the commercial fishery worked – how the quota management system worked, what happened to bycatch or fish caught without quota etc.

State of environment

There was much interest in finding out about changes in the environment, particularly in terms of weather patterns, water quality, temperature and the impact of land management (such as use of fertilisers, dairy farm run off) and specific industries such as the dam on the Patea River; Fonterra, the oil industry – seismic testing and explosives, and the Wanganui wastewater discharge.

People's views

People were interested in finding out what other people thought about various issues such as commercial fishing, marine reserves/protection options and management options. The relationship between the recreational and commercial fisheries was one that people wanted to see explored.

Management

Finally, there was interest in exploring ideas for effecting management change – for both recreational and commercial fishing, but also for managing erosion and exploring improvements to coastal access and the idea of an artificial reef.

2 THE PEOPLE OF THIS COAST AND WHO WAS INVOLVED IN THE PROJECT

Introduction:

This chapter describes the settlements, population, ethnicity, and income characteristics of the communities along the South Taranaki coast. This is to provide a social background to the area.

It then describes the people who were involved in the research – the numbers of people involved in workshops, face-to-face interviews and written surveys. It discusses how long those who took part in the research had used the coast, and what they used it for.

Settlements

Settlements along the study area include the city of Wanganui and the towns of Waverley, Patea, Hawera and Manaia. A number of smaller coastal settlements also fringe the study area including Ohawe, Waiinu, and Mowhanau.

Surrounding the towns is considerable pastoral farming, some horticulture and also forestry. The area's most significant rural industry is dairying. The milk processing plant at Whareroa, near Hawera that is operated by Fonterra is the largest single plant of its kind in Australasia.

Population

As at the 2001 census (more recent census data was unavailable at the time of printing), the population of the South Taranaki district was 27 537 and the Whanganui district was 43 266. The populations of settlements in the study area were:

TABLE 1: SOUTH TARANAKI POPULATION

SETTLEMENT	POPULATION AT 2001
Wanganui	39, 423
Waverley	906
Patea	1302
Hawera	10,944
Manaia	951

Source: Statistics New Zealand.[2]

Age statistics showed that in 2001[3] there were greater numbers of young people (0-14 years), greater numbers of older people (64 years +) and proportionately fewer people in the 15-64 age bracket than the New Zealand average.

Ethnicity

The people of the area are predominantly of European and Maori extraction, with small numbers of other ethnicities including Pacific Island and Asian. At the 2001 census, 84% of people in the Whanganui district and 87% in the South Taranaki district identified as European (compared to 80% average across New Zealand). 21% of people in the Whanganui district and 20% in the South Taranaki district identified as Maori (compared to 15% across New Zealand and 47% from Patea).

Income

Income levels vary with most localities ranking under the national median income of $18,500 per annum. Exceptions to this include Hawera, with its median income sitting just above the national median at $19,100 per annum, and Patea, with its median income of $12,000 per annum, well below the national median as well as below other localities in the district.

Who was involved in the research?

As the research purpose was to obtain information from people familiar with the coast, the method of selecting participants was not representative of the general population (a consequence of the 'snow-ball' methodology of selecting people to interview). The following section discusses the types of people involved in the research. It is clear from this analysis that recreational fishermen dominated the group of respondents, with commercial fishermen, iwi, divers, environmentalists and agency representatives making up the remainder of the group.

As a consequence, the results should not be used as an indicator of the views of the whole population of South Taranaki and Whanganui, but rather as an indication of the views of coast and marine area users.

Workshops

Four fishing based clubs took part in workshops – two from the Patea end of the study area (Patea and Districts Boating Club and Ohawe Boating and Angling Club) and two from the Wanganui end of the study area (the fishing adjuncts of the Wanganui Cosmopolitan Club and the Wanganui East Club). The Wanganui-Manawatu Seafishing Club was unable to fit in a workshop in the time available, however, a presentation of the draft research findings was also given to this club and useful feedback was obtained.

The other groups that took part in workshops included the Wanganui Underwater Club, the Castlecliff Linking Group (a group that includes representatives from a number of Castlecliff based community groups) and a group of students (self-selected) from the Patea Area School. Members of the South Taranaki Dive Club were also involved in the Ohawe Boating and Angling Club workshop

Face-to-face interviews

79 face-to-face interviews were conducted. A number of interviews were conducted with pairs of respondents; the total number of people taking part in interviews was approximately 85. Participants came from throughout the study area.

Written surveys

A written questionnaire was sent out with the newsletters of the Ohawe Boating and Angling Club, Patea and Districts Boating Club, Wanganui-Manawatu Seafishing Club and Wanganui Dive Club. An advertisement, with the written questionnaire, was taken out in the Hawera Star and the Wanganui Chronicle.

Fifty-five people returned the questionnaire.

Recreational fishers

70% of respondents (again, both those interviewed and those that returned written surveys) used the coast for recreational fishing. This reflects the fact that the method for selecting participants in this research was not random (i.e. the survey respondents were selected on the basis of having knowledge of the coast). They therefore are not representative of the entire population, but do represent the recreational fishing community. This approach is consistent with the purpose of this research, being to seek information from those familiar with the coast, and therefore it was appropriate to target this group.

Other uses of the coast

Many of those that were included in the research also indicated that they used the coast for boat fishing, surfcasting and beachwalking. There are many other uses, including 4WD biking, surfing, whitebaiting, painting and spiritual revitalisation.

Many years on the coast

68% of respondents had used the coast for more than 20 years with many of them having used the coast for over 40 years. Collectively, therefore, the respondents had many years of experience on the coast. Thus the observations from these people, whilst only 'anecdotal', provide valuable, previously unpublished information on changes that have occurred through time.

Customary fishing

Only about 10% of the respondents indicated that they gathered kaimoana from the coast. Nga Rauru and Ngati Ruanui were both represented on the project team and therefore provided information to the project. To ensure that all tangata whenua had an opportunity to input to the project, a draft of the report was circulated to representatives from Nga Ruahine iwi and Te Runanga Tupoho.

Nga Ruahine was reluctant to get involved in the project when they were not on the project team. Information on Nga Ruahine's relationship with the coast is therefore limited to that obtained from existing literature, and information obtained from Maraekura Horsfall of Manaia.

Commercial fishing

Only about 10% of the respondents indicated that they used the area for commercial fishing. Indeed, a number of these identified themselves as ex-commercial fishers. To address the lower numbers involved from the commercial sector in either the project team or the respondents interviewed, the draft report was peer reviewed by a representative of the Taranaki Commercial Fisherman's Association.

3 WHAT PEOPLE VALUE ABOUT THIS COAST

Introduction

This study revealed that the South Taranaki – Whanganui coastal area is a special area for many reasons and is a well kept secret! Locals value the area for its remoteness and naturalness as well as the ability to catch a wide range of fish species.

In this chapter

Quotes in *italics* throughout this report were made by participants in the workshops or face-to-face interviews.

This chapter summarises the responses that people gave when asked what was important to them about this coast. Answers were grouped into the following themes:

- the naturalness of the coast;
- recreation, including fishing, diving, walking, swimming and surfing;
- access; and
- the weather.

Naturalness of the coast

A number of respondents said the naturalness of the coast was important to them. The ruggedness, uniqueness, beauty and unspoilt nature were mentioned.

"It's a fantastic wild area." – Recreational fisher.

"There are beautiful views of Mt Taranaki and Ruapehu as both are visible on a fine day."- Local resident.

Photo credit – A. Cox

The peaceful and remote nature of the coast was valued, and the fact that it was not overpopulated.

"We don't want it to look like Surfer's Paradise." - Local resident.

"It's important that I can go fishing, [but] irrelevant whether I catch fish or not. It is magic to see the sun come up." – Recreational fisher.

"It's an absolutely beautiful place to be," - Local resident.

In a similar vein, a few people said "Keeping it secret" was important.

"[I] want to see it protected. Not publicised. We don't want more people." - Recreational fisher and diver.

The need to preserve the coast's important natural features and environmental quality, particularly water quality, was important to a number of public agency respondents.

The relative absence of pollution was also mentioned. One respondent commented that there was no sewerage, and another said there was not much rubbish on the beach. Another person mentioned the absence of oil drilling as important.

Five respondents specifically mentioned geological features as important. These included the fossils in the cliffs, blowholes, preserved forest at Waitotara, ventifacts, fault lines and the North and South Traps.

"A lot of fault lines. Fascinating."- Local resident.

"It has a great history and a unique geology with rare fossils of various types, including our famous ventifacts." -Former commercial fisher.

Even the sand rated a mention!

"The black sand keeps you warm."- School student.

The rocky bottom was seen as important as it helped protect the fishery.

"The rocky bottom which keeps the trawlers out."- Recreational fisher.

Fishing

Over thirty respondents valued the coast for fishing and gathering kaimoana.

"It is our food resource. Our pataka." –Tangata whenua.

"Fish is a part of our diet."- Local resident.

The uniqueness of the fishery was mentioned by a number of respondents.

Photo credit – S.Hornby

"There is no other place like it." - Former commercial fisher.

"It balances the catch we get from the North Taranaki Bight and some species (i.e. trevally) are larger and more productive in the southern area."- Commercial fisher.

"Recreational fishing is very important for a coastal community." - Local resident.

"This particular fishery is quite unique. My colleague, formerly from East Coast, is amazed at the size of the fish and the fish being caught, e.g. large snapper, blue cod, and shark. Fish stocks are healthy as a result of weather patterns protecting it." - Ministry of Fisheries officer.

A feature valued as important by a full third of those mentioning fishing as important, was the ability to catch enough for a feed. One person

rated the fishing as better than off New Plymouth in this respect, and other people commented on the fact that the area was not over-fished. "You can catch a fish" was a typical comment.

A small number of respondents thought it was important that protection measures didn't inhibit use, with one person saying that ensuring there is no reduction in catch limits was important.

The variety of species was important, with some people mentioning the diversity of fish available, and the diversity of reef systems as well.

Photo credit – S.Sammons

"The ability of my customers to get out and enjoy themselves and show the kids what fishing is all about." – Charter operator.

Some fishing areas were singled out for mentions of their importance:

"The [Patea] mudflats are important for pupus (snails etc)." – Tangata whenua.

"The groper hole, and underwater mountain." – Recreational fisher.

"The Waitotara River is a major whitebait breeding ground." –Local resident.

Diving

Diving was important to a small but significant number of respondents (12). Of these, five people said it was some of the best diving to be had. Features mentioned as important included the North and South Traps and reefs beyond the Traps. Some respondents mentioned coral and increasing numbers of unidentified tropical fish.

Photo credit – J.O'Leary

"Here if I am diving and find a unique spot, I feel like I am the first person to ever see it." – Diver.

"The reef areas can be as good as that found at the Poor Knights. It needs conserving before it's too late." – Diver.

Walking

A small number of respondents (4) named the walking opportunities the coast provided as important.

Photo credit
– R.Miller, DOC.

"You can walk for miles." -Local resident.

Younger respondents also mentioned sand dune sliding (on boogie boards) and sliding down mud banks along the beach as important. Fossicking on the beach and picking up objects such as rocks was also important to younger respondents.

Swimming

The water heating up in summer, and the pleasure of swimming at the Patea moles at full tide, and jumping off the wall was mentioned by a few respondents.

Castlecliff, circa 1915

Photo credit – Whanganui Regional Museum.

Access

Accessibility was of great importance (14), particularly that the coast was accessible to everyone. The available vehicle access, car parking and maintenance of launching facilities including structures such as the walls at Patea were valued.

The proximity of the coast for locals and easy access for children, and the benefits of this for family time and relaxation were important.

"I just love it. Born and bred here. A feed of fish is a bonus."- Local resident.

"It's our home coast. We need to look after it." - Recreational fisher.

"The coast is one of the reasons I am here." - Recreational fisher.

The reserves and the facilities provided were also mentioned, e.g. BBQ areas and tables. The land reclaimed by the moles at Castlecliff was also valued for its amenity.

The reality that a lot of the coast was not accessible was also seen as important. Two main aspects were mentioned - the rugged, inaccessible nature of many parts of the coastline itself and the limitations of getting out to sea on such an open exposed coast.

The weather

The weather itself rated a mention.

"Only the hardy fishermen go out. The fishing is an adventure here." – Recreational fisher.

"Stormy conditions make the view interesting" –Local resident.

The role of the weather and the exposed coast in limiting how often people could go fishing was seen as important by quite a number of respondents (14).

"Recreational fishers would never be able to over-fish this coast." – Recreational fisher.

Photo credit- A.Cox

"It's good on a good day." - Local resident.

Rough waves featured in many people's accounts of some of their worst days off this coast:

"I got swept out to sea off South Beach... somehow I managed to swim back in." - Recreational fisher.

"We got caught in a storm in a 20 ft trailer boat with way too much fish on board. We were nearly sinking. There were huge waves breaking over us. It's a bad day when you're out there and it's rough and you lose gear." - Former commercial fisher.

"We took three waves one day coming over the Patea bar. We took it too lightly that day." - Recreational fisher.

"I lost the Pandora on the Whanganui bar with 1400lb of flounder aboard. We were pooped by the south wall and I lost the boat and the catch." - Former commercial fisher.

A Holiday Adventure...

"Through the 1960s and early 1970s we spent the summer holidays camping at Kai Iwi beach. Instead of going to the Mowhanau camping ground we set up our tent at the old Waitotara County Council Reserve, enjoying the privacy (there was a tap, long drop and rubbish collection). Mr Gay of Manaia brought his 5 donkeys down each year to give donkey rides, and these donkeys shared our paddock.

One night a gale force southerly blew up, with torrents of rain. The donkeys, wise beasts, took shelter in the lee of our tent. Suddenly a violent blast lifted the tent off the centre pole and down it fell, leaving 2 adults, 4 children and 3 donkeys struggling to get out of wet, flapping canvas. Pandemonium reigned for a while, but no-one was hurt, and it was a great adventure for the kids to look back on."

- Local resident

4 FISHING AND DIVING

Introduction

This project has highlighted that the South Taranaki to Whanganui coast is considered highly valuable for the fishing and diving opportunities it provides – even if the weather is not always that obliging!

Recreational fishing is an important pastime for local people. The South Taranaki fishery is recognised by those interviewed as unique: at a time where many fisheries around New Zealand are under considerable pressure, many believe that this fishery has inclement weather as its built-in protector.

During the workshops, people gathered around a nautical chart, and identified broad areas where they went fishing, or areas they knew something about. In the face-to-face interviews, people were asked to identify on the chart which areas were important to them (for fishing, diving, gathering kaimoana, marine mammal watching etc). People who completed the written surveys were also asked to indicate areas where they fished or dived.

Specific GPS points of people's favourite fishing spot were not sought, rather, people indicated general areas.

People were also asked what species of fish were most often seen or caught, and what species were rare to catch.

In this chapter

This chapter summarises the results from asking people what areas were important to them for fishing and diving, what fish species they were catching or seeing and what the seabed is like from a diver's perspective.

This study did not attempt to gauge catch levels at all. The aim was simply to identify the range of species targeted, and to get a sense of their perceived abundance and location.

What areas are important for fishing?

To identify which areas were important for fishing, the nautical chart was divided into large grids, and people were asked in the workshops and face-to-face interviews to identify which squares were important for fishing. The project team specifically agreed not to attempt to seek specific GPS points from fishers due to the sensitivity of such information.

A tally was made of the frequency each grid was mentioned. This provided an approximation of areas that were more frequently mentioned during this research than others (see Figure 2).

FIGURE 2: AREAS IDENTIFIED THROUGH WORKSHOPS AND INTERVIEWS AS BEING IMPORTANT FOR FISHING.

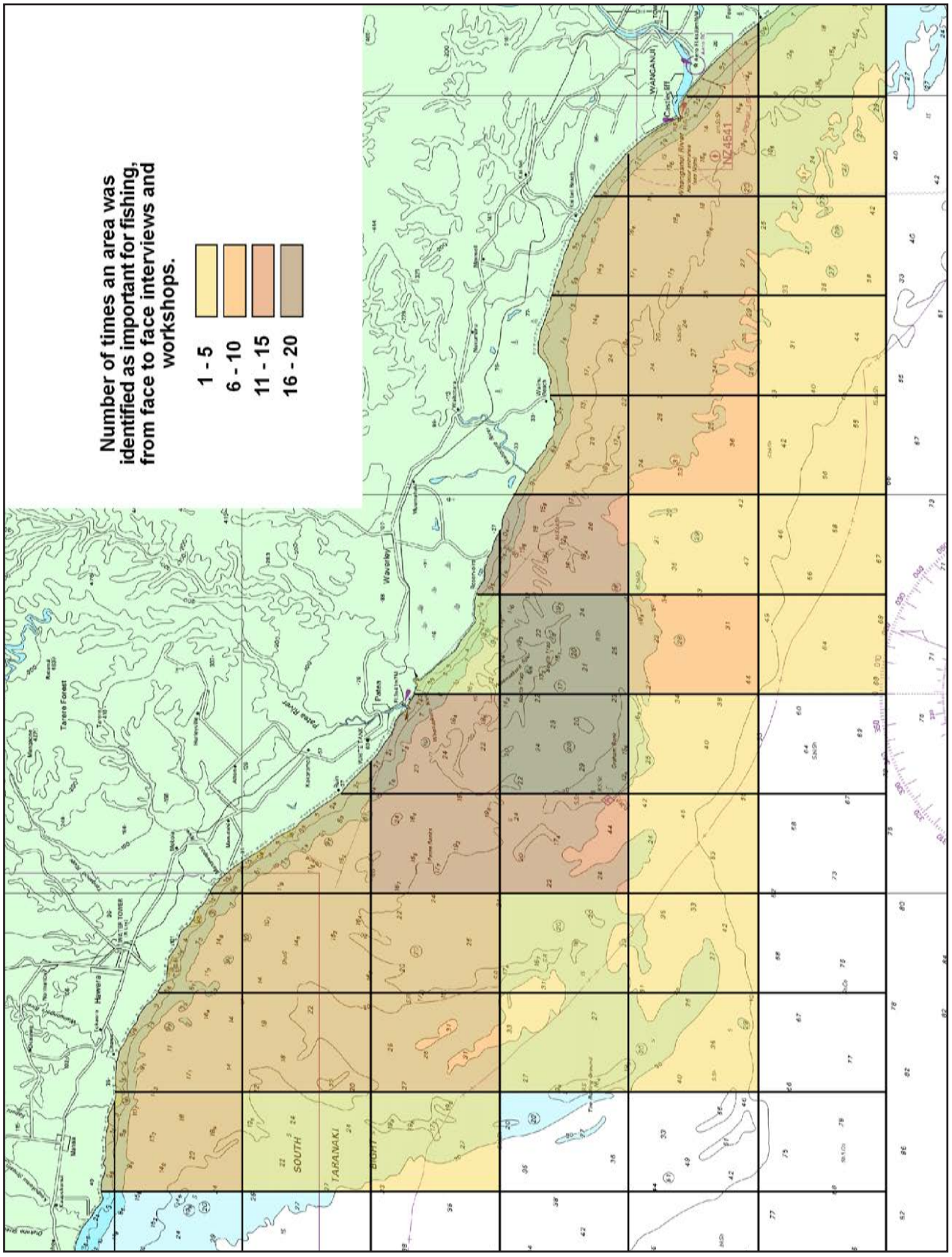
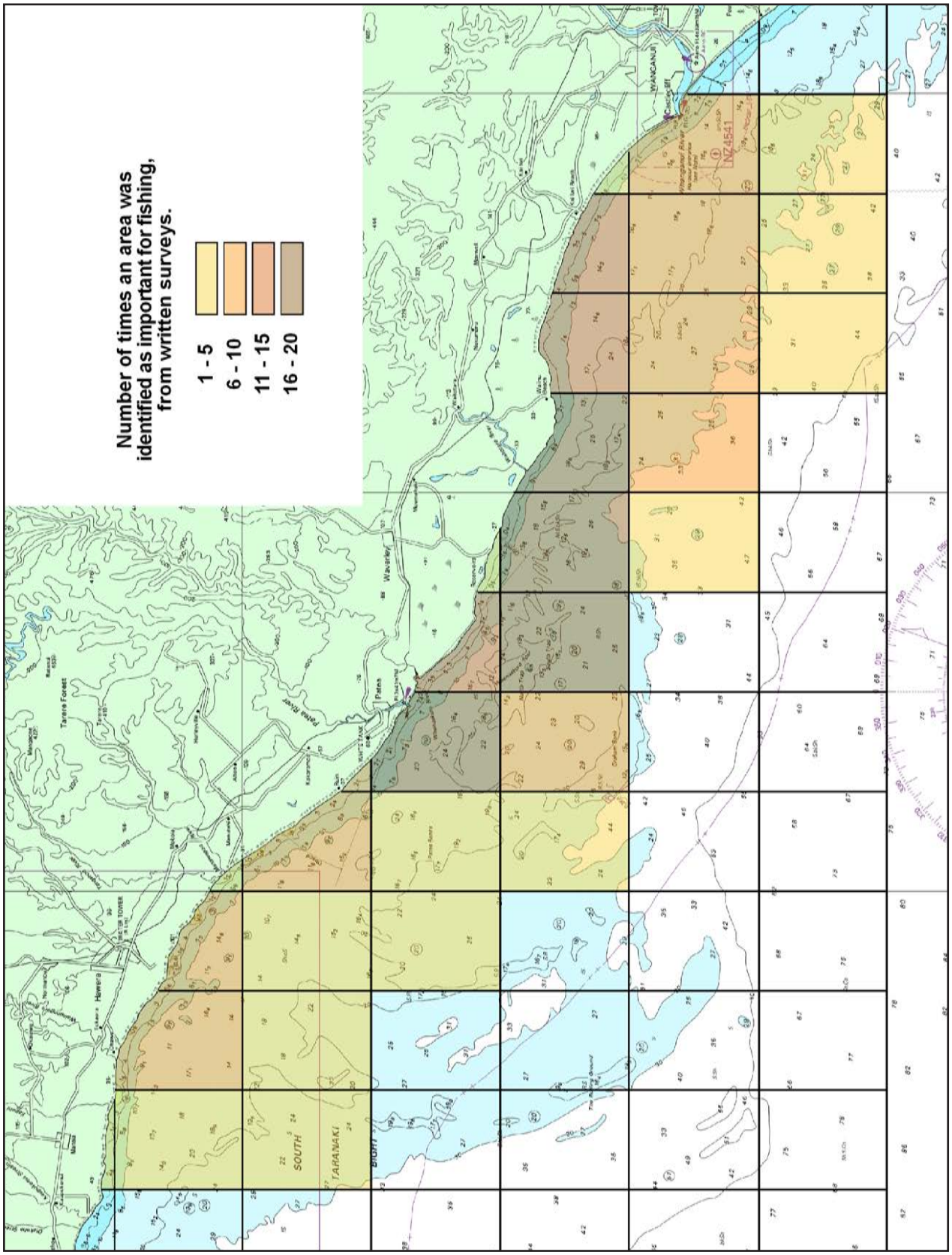


FIGURE 2A: AREAS IDENTIFIED AS IMPORTANT FOR FISHING FROM THE WRITTEN QUESTIONNAIRES.



A similar tally was made of the information from the written questionnaires (Figure 2a). Information from the written questionnaire was kept separate from the face-to-face interviews and the workshops because of the smaller map provided for people to fill in. The fishing map for the written surveys was less detailed – the scale of map respondents used was smaller, and estimates had to be made of what people meant by 'off Waitotara' etc.

The results from the written questionnaire were consistent with the other results confirming fishing 'hot spot' areas off Patea, off the North and South Traps, off Waitotara and Waverley and down along the coastal strip towards Wanganui.

'We fish at the Graham Bank and the rolling ground. Get the fish anywhere. To trawl here (off Castlecliff) have to go out to 4 miles and tow south. Too many rocks closer in. Have to go out 27-30 fathoms.'- Former commercial fisher.

People indicated that they varied where they fished according to the weather, but would generally fish into the wind so that there was a tail wind for the return trip home. In addition, people varied their fishing spot according to the season.

Fishermen were aware of the seabed they fished over, and recreational fishers tended to target reef or foul ground. Blue cod in particular are targeted over foul ground. One area directly off Kai Iwi (the 24-27m line on the chart) is known by Whanganui fishers as the cod bank.

"[I] used to be able to land on my favourite cod spot 50% of the time, now with GPS, can land on it 100% of the time. I managed to fish out a favourite spot by returning to it repeatedly, and then all of a sudden the fish were under size. It took over 2 years for the fish at that spot to build up again. GPS haven't helped fish stocks, especially blue cod which need foul ground.' – Recreational fisher.

Seabed used by commercial fishers varied according to species targeted or fishing method used.

"Grey mud when we were trawling – or reef and foulground for longlining or set netting." – Former commercial fisher.

Fish species caught

The most common fin fish caught are blue cod and snapper. Kahawai and gurnard were common but to a lesser degree.

Other species caught included tarakihi, barracouta, john dory, and trevally. Fish species considered rare to catch by respondents included groper and kingfish.

Spiky dogfish were the most common shark reported by respondents.

Other species reported

Other species mentioned by two or more respondents included blue wharehou, flounder/sole, squid, conger eels, elephant fish and herring.

Other species mentioned by respondents included blue moki, butterfly perch, blue mao mao, yellow eyed mullet, jock stewart, slender roughy, grey mullet, blue mackerel, trumpeter, monk fish, butterfish and ling.

"I saw a huge basking shark once. It was longer than a 40 foot boat. It had its huge mouth wide open." - Former commercial fisher.

"Someone got a video of a marlin jumping off Waverley." - Recreational fisher.

Some respondents mentioned encounters with great white sharks.

"My worst day [out on the coast] was when a 4m white pointer came up following a hooked kahawai to breach beside the boat... a very impressive specimen!" - Recreational fisher and diver.

"Once a flying fish flew onto the [boat] deck. We took it to the museum because we didn't know what it was!" - Former commercial fisher.

Table 1 lists fish species mentioned by respondents. The number given in the column 'reported abundance' is the total number of mentions made, and whether the respondent stated it was 'common' to catch, 'rare' or 'other'. For some species, respondents did not specify whether the species mentioned was 'common', 'other' or 'rare' to catch, and for these species, the numbers given are for the number of times the species was mentioned.

TABLE 1: REPORTED FISH SPECIES AND ABUNDANCE

COMMON NAME	MAORI NAME	SCIENTIFIC NAME	REPORTED ABUNDANCE		
			COMMON	OTHER	RARE
Barracouta		Thyrsites atun	5	26	
Blue Cod	Pakirikiri, Rawaru	Parapercis colias	96	7	
Frostfish		Lepidopus caudatus	2	2	2
Groper / Hapuku	Hapuku	Polyprion oxygeneios	4	8	26
Gurnard	Kumukumu	Chelidonichthys kumu	44	36	4
Jack mackerel	Hauture	Trachurus novaezelandiae	5	7	2
John dory	Kuparu	Zeus faber	6	19	23
Kahawai	Kahawai	Arripis trutta	55	27	7
Kingfish	Haku	Seriola lalandi	9	21	32
Leather jacket	Kokiri	Parika scaber	9	10	3
Marlin		Makaira nigricans	4	10	8
Moki			6	2	4

TABLE 1: REPORTED FISH SPECIES AND ABUNDANCE... CONTINUED...

COMMON NAME	MAORI NAME	SCIENTIFIC NAME	REPORTED ABUNDANCE		
			COMMON	OTHER	RARE
Parrot fish			3	10	3
Red cod	Hoka	Pseudophycis bachus	17	17	23
Shark (rig, grey, gummy, sand)		Mustelus lenticulatus		13	
Shark (grey / school)				1	
Shark (spiky dogfish, spiny dogfish)		Squalus acanthias		33	
Shark (spotted smooth hound, lemonfish, spotty), rig		Mustelus lenticulatus		10	
Shark (unspecified dogfish)				3	
Shark (carpet)		Cephaloscyllium isabella		4	
Shark, mako	Mako	Isurus oxyrinchus		1	
Shark blue		Prionace glauca		1	
Shark, thresher		Alopias vulpinus		1	
Shark, white-pointer		Carcharodon carcharias		1	
Snapper	Tamure	Pagrus auratus	85	19	3
Stargazer	Kourepoua	Genyagnus monopterygius		5	4
Spanish mackerel		Family Scombridae		4	3
Stingray	Whai	Family Dasyatidae		8	1
Tarakihi		Nemadactylus macropterus	13	36	15
Trevally	Arara	Pseudocaranx dentex		23	12
Tuna		Family Scombridae		1	7

The abundance results given in Table 1 should be used as indicative only given the limitations of the research. These results relied upon those interviewed subjectively stating whether a species was commonly caught, other, or rare to catch. Note that information on shark abundance was not gathered by the interview team.

Who else is using the area?

People interviewed face-to-face were asked who else they noticed using the coast. People fishing in the area were mainly described as locals. Where 'outsiders' were using the area, they were generally believed to be coming from the Manawatu or to a lesser extent, from New Plymouth, particularly during competitions. There were occasional mentions of people from other areas.

What areas are important for diving?

North and South Traps

The areas most frequently mentioned by respondents as important for diving were the North and South Traps off Patea.

Fish species seen regularly here included terakihi, red moki, cod, snapper, rock lobster, Spanish lobsters and packhorse crayfish, kingfish, blue moki, big eye, leather jacket and other smaller reef fish (Wanganui Underwater Club workshop).

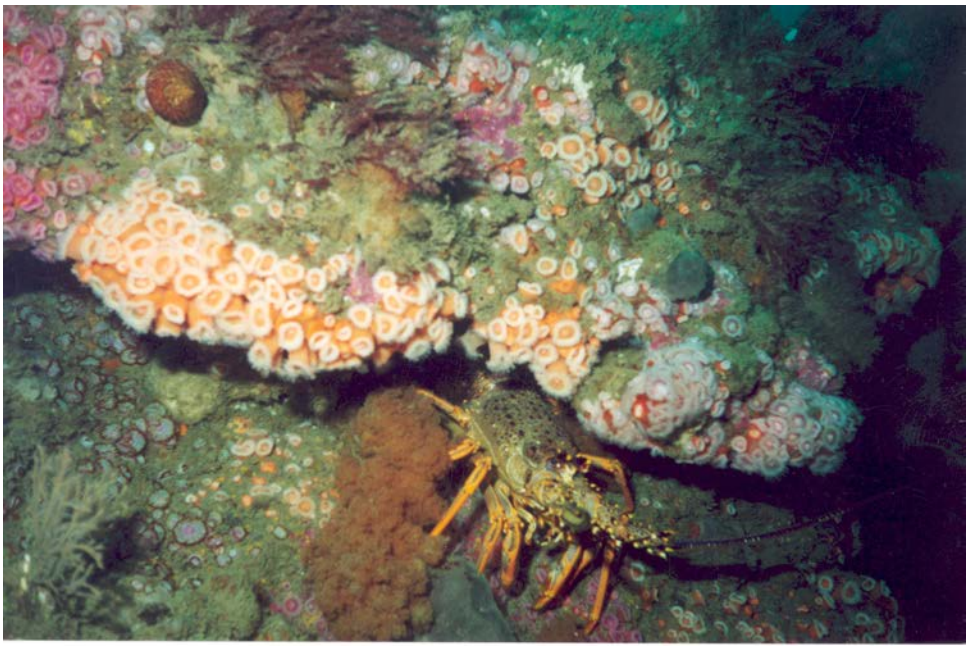


Photo credit – J. O'Leary

"The traps provide some of the best diving in New Zealand because the weather protects them, they haven't been over harvested, they have huge drop offs and fantastic colours on the walls." – Diver.

Photo credit – J. O'Leary

"You find conger eels, large patches of kina, large crabs, scattered patches of kelp. Papa and rock. Rock walls are covered with anemones, nudibranchs (the Jason Clown species), colourful algae, corallina paint – pink and purple etc." – Diver.

"Pretty with a torch – different algae, sponges, get elephant sponge shallower than you should – probably because of a lack of clarity. There is more weed at the South Trap because the water is clearer. There are kina in patches. Also see conger eels, banded wrasse, parrotfish, triplefin and nudibranch. A little bit of kelp on the South Trap." – Diver.

Other diving spots

Divers also mentioned diving off Patea, Waverley and Waitotara. They described rock 'mounds' sitting on the sand which were papa rocks with shell layers, about knee high, in water 8-10m deep. They also described the following papa rock structures running out from the coast like fault lines or a papa uplift:

"Off Waverley and north of Waitotara there are papa rock ledges and gutters running about 0.5 km long on a 45 degree angle to the sea floor, perpendicular to the coast. Rock lobster hide there (clinging under the roof of the rock formation). It's in water from 8m-20m deep."- Diver.

Other divers described areas off the coast of Patea and further around the coast:

'...papa ridges - scattered - long ridges of reef with bits broken off and cracks once off ring plain area.' – Diver.

Further out, some divers talked about the Graham Bank:

"On the edge of the Graham Bank there's a steep drop off with a ridge of papa. Good visibility." – Diver.

"Graham Bank is pure sand. There is nothing on it." – Diver.

5 CHANGES IN FISHING

Introduction

Fishing has been important for local people in South Taranaki since it was first settled. In recent years, improvements in technology and the advent of more affordable boats, has seen increased numbers of people enjoying this pastime.

Participants in the research were asked to identify what changes they had noticed in the area generally. Many of their replies were related to changes observed in fishing. People were also asked if fishing was harder, the same or easier and why.

While the results discussed in this chapter are generally only based on anecdotal information obtained through the interviews, written questionnaires or workshops, it is worth keeping in mind that the huge majority of participants in the interviews had used the coast for over 20 years, and many of those had used the coast for much longer than that.

Harder or easier?

More than 50% of all survey respondents believed that fishing had got harder in recent years.

Less than 25% of survey respondents thought it was about the same, perhaps with some species by species variation and the remainder of respondents (also just under 25%) thought fishing was easier.

A perception held by a significant proportion of respondents, probably around about half, is that there are fewer fish. A number of these respondents also mentioned an increase in poor quality (meaning less desirable) fish species.

Why?

After people were asked if fishing was harder, easier or the same as it had been in the past, they were asked to identify why. Table 2 summarises those responses.

"Boats are bigger, faster, and able to go out further."- Recreational fisher.

"We used to use long lines and set nets before GPS." - Recreational fisher.

"[There] used to be 50 boats maximum on the weekend. Now you'll see 100 boats on a week day."- Recreational fisher.

TABLE 2: REASONS WHY PEOPLE BELIEVED FISHING IS HARDER, EASIER OR THE SAME

HARDER	EASIER	THE SAME
Improved technology – resulting in over fishing certain areas	Improved technology	Improved technology – so can travel further
Quota management	Quota management	Weather
Trawlers – too close, too many	Voluntary trawl agreement	
More fishers		
Over abundance of spiky dogfish		
Commercial fishing in the past – Japanese longliners and pair trawlers		
Erosion, sand covering reefs, pollution		

Other information available

A number of people interviewed indicated that they had kept records (informal or regular) and the majority of these indicated that they would be happy to make this information available for future research. Such information included fishing logs or diaries (maintained by 14 people), dive logs (maintained by 3 people) and club or competition records (maintained by 3 people). Detailed data from commercial fishing off Wanganui in the 1970s is held by Audrey Cox. This additional data was not analysed through this study, but has the potential to contain valuable information, at the local scale, that could be analysed in the future.

Summary of changes observed

Changes in the shore fishery – particularly from surfcasters and shellfish gathers were reported. Species for which fishing was perceived to have changed were snapper, kahawai, blue cod and rig. Other changes included significant increases in spiky dogfish and paddlecrabs. There was a perception that numbers of recreational fishers had increased, and that people were able to get out more thanks to improved boats and equipment. There was a perception that there were more trawlers operating.

Changes in the shore fishery

Quite a few respondents believed that there had been a decrease in shoreline fish stocks:

"When Dad used to surf cast he could get 2-3 snapper an hour. At Pihana, you could see snapper tails as they were feeding on mussels." – Recreational fisher.

"As a child I used to fish off the rocks with a handline and would always catch things. But I seldom do now." – Recreational fisher.

"The inshore fishery is totally over fished. Species have disappeared,

e.g. Patiki (flounder). As a child, 6-8 of us could go down to the beach at low tide in February-March with a spear and get a good feed of flounder for the whole family. Not now. Although there has been a small improvement in the last 2 years." - Tangata whenua.

This was echoed by another respondent.

"As a kid we used to catch flounder from the beach and sometimes tread on them when swimming. Now very occasionally people catch them in streams." - Recreational fisher.

One respondent put forward a possible reason for this:

"In the 1960s there was a trawler in the flounder season that ran between Castlecliff and Kai Iwi. Must have done a lot of damage." - Tangata whenua.

"I used to do a lot of floundering in the late 1950s and 60s. I often caught 100 flounder or sole. Once I caught several sackfuls and took them up to the Grand Hotel and sold them for thruppence each."- Local resident.

"There has been a noticeable decline in fish caught over the last 10 years." –Recreational surfcaster.

Data was provided from the Patea Surfcasting Club (Table 3). This appears to illustrate a decline in fish caught by surfcasting. This may be indicative of an actual decline, or it may merely reflect a reduction in fishing effort through there being fewer club members.

TABLE 3: NUMBERS OF FISH CAUGHT SURFCASTING BY THE PATEA SURFCASTING CLUB

SEASON	NUMBER OF FISH CAUGHT
1995	219
1996	239
1997	206
1998	180
1999	162
2000	134
2001	68
2002	39
2003	28
2004	33

Source: Patea Surfcasting Club annual competition records (edible species),
Fred Petterson pers com.

"You used to be able to catch snapper in the river off the wharf. They used to sell for 2'6. Now you just get enough for a feed." - Recreational fisher.

Changes to fish size

A few people mentioned that fish were generally smaller than they were 5-10 years ago, with one suggesting they were smaller out to 3-4 miles off shore. Several respondents commented that it was necessary to go further out to catch fish, with a few suggesting larger cod and snapper can be scarce.

However, some respondents believed that there had been some improvement in reef fish able to be caught from the shoreline.

"We landed bigger fish in the competitions last year (off Wanganui) than we got when I was long lining in the 1940s and 1950s." – Former commercial fisher.

Changes in shellfish

A number of respondents commented that there were fewer shellfish available on the shoreline.

"There are fewer shellfish between Wanganui and Waitotara. I don't think the bed is there anymore. We used to dig up pipis to use for bait. You don't see whole shells on the beach like you used to. Just small bits... it could be a natural thing such as sand shift or disease." - Former commercial fisher.

Another respondent echoed this, and added that tuatua had also gone from the Waitotara River mouth area. A third respondent mentioned cockles as less plentiful.

One respondent observed that they used to get mussels off Ototoka Beach.

"Even 6-8 years ago you could get a feed – now you can't. This is due to over harvesting." – Local resident.

Another respondent observed that in the 1970s the mussels in the rock pools were a very good size, but by 1985 were much smaller.

Yet another respondent could remember paua being taken from Waitotara Beach.

"In the last 10 years, tuangi (surf clams) were washed up dead in very large amounts. A huge heap of them along the coast, perhaps half a metre thick to 2 metres wide. All the way between Patea and Otaki. A natural phenomenon, but I have never seen this again in all my 67 years." - Tangata whenua.

"There was a shell fish die off along the coast about 6 years ago. Big bi-valve shells washed up – could this have affected inshore fishing?" – Local resident.

"Also, gastropod, volute shells are much less common than when I was a boy – you can still find them down at Waikanae." – Local resident.

"The rock pools past Snapper Rock had lots more and larger mussels – everything of eatable size is gone, there are seeding mussels only on the Waiinu side." - Local resident and naturalist.

"There are now more blue bottles than in the past." - Recreational fisher.

Increases in paddlecrabs

Several respondents mentioned increases in the size and number of paddle crabs, and one put this down to a decline in the rig fishery:

"I believe that rig is now fished out. They used to travel up and down the coast in vast quantities. [Rig] used to feed on paddlecrabs. In the 1960s they were very small perhaps one inch (20mm) across near Wanganui. Because rig was hit so hard commercially it has upset the structure that was going on. We did not have big paddlecrabs there. Now if you go fishing you catch heaps of them. I believe that the decline of rig and snapper has allowed the paddlecrab population to increase. It was the mid-1980s that suddenly we had very big paddlecrabs. They bite your feet surfcasting and come on the line." - Former commercial fisher.

"One of the banes of the beach at the moment is a population explosion in the paddlecrab numbers, caused, we think, by large scale set netting of the shark population." -Commercial fisher.

Although a couple of beach walking respondents believed that there were fewer crabs.

"There are fewer dead paddlecrabs."- Local resident.

Changes in kahawai

Kahawai is another fish popular with recreational fishers that appears to have declined in recent years. Certainly, a significant number of respondents felt that there were fewer kahawai in the area.

"We live in sight of the sea and don't see the schools of kahawai we used to." - Local resident.

"When I was growing up I lived next to the Whanganui River. I can remember hearing kahawai at night, a huge noise like a waterfall of fish on the river. Back in the 1960s you would get 150 kahawai in a 30 m net in the river. There was also mullet in the river." - Former commercial fisher.

"In the 1960s I remember seeing kahawai drive shoals of sprat up the [Whanganui] River. Also Te One Kahawai too. I last saw this happen about ten years ago. It would cause small fish to jump out of the water onto the shore." - Tangata whenua.

However, at least one respondent felt that kahawai were still plentiful:

"Kahawai are still OK off the river mouth."- Recreational fisher.

Increase in spiky dogfish

Many respondents reported an increase in spiky dogfish and complained of it being a pest to fishers:

"Spiky dogfish have increased to plague proportions. The possum of the sea." - Recreational fisher.

"It was the mid-1980s that...spotty spiky shark also started becoming more common." - Former commercial fisher.

Decrease in sharks

Fewer sharks, particularly 'good sharks' were reported by several respondents. Some wondered if this was because of a change in the food chain, or perhaps the current flow.

One respondent put the decrease in rig down to females being 'hammered when in pup.'

Changes in rock lobster or crayfish

A few respondents mentioned an increase in the number of juvenile crayfish:

"Crayfish have got smaller. You never used to see the little ones."- Diver.

An increase in the number of softshells was also reported. However, at least one respondent felt that this increase (in seeing juvenile crayfish) was evidence of an improvement in crayfish numbers. A commercial fisher noted that crayfish have generally increased in numbers on the west coast of the North Island with major increases in small rock lobsters being noticed and good catches of larger fish.

Decrease in whitebait

A few respondents reported fewer whitebait and herrings. One suggestion for this was changes in the seasons affecting fish cycles.

Photo credit: A.Cox.

"If we went whitebaiting at Kai Iwi in the 1970s and 1980s, you could get enough for a meal for 4-5 people. I remember learning how to make whitebait fritters." - Local resident

Decrease in groper

"In 1963 and 1964 I went out with Bill Cox and set 100 hooks we went to the groper spot off Kai Iwi that is now long gone. We filled the boat up with groper in under an hour. We worried and hoped there were not too many fish on the long line because we knew we

might sink the boat. We came back grossly overloaded... This was normal." - Former commercial fisher.

Changes in blue cod

A common response on blue cod was that you had to go further out to get them, and that they were harder to catch. A few respondents commented that they were not as widespread, and that the reason was spiky sharks driving them out.

However, at least one respondent felt that there had been an increase in the size of cod.

Increasing numbers of recreational fishers

Increased numbers of recreational fishers was mentioned frequently. Members at one fishing club estimated that their numbers had at least doubled in the last decade.

A few respondents felt that there were more people coming from outside the region, e.g. Taihape, Foxton and Palmerston North.

One suggestion as to why this was occurring was the increased reliability of boats and the ability to obtain a boat at a more reasonable price in relative terms than in the past.

A number of respondents observed that there had been an increase in divers, possibly because of diving courses being made available locally.

An increase in numbers of charter boat operators was also observed.

Increased shore fishing was also commented on, and increased numbers gathering kaimoana.

Improvements to fishing technology

Improvements in technology were mentioned by a large number of respondents. This included better boats and increased quality of, and use of fish finders and hand held GPS.

"Now everyone has a fish finder and depth sounder on their boat and a GPS in their pocket." - Ministry of Fisheries officer.

A few respondents felt this had meant a decrease in the use of long lines and nets.

"We used to use long lines and set nets before GPS." - Recreational fisher.

"Boats are better, faster, and able to go out further." – Recreational fisher.

"There are lots more 14-20 ft boats." – Former commercial fisher.

"Motorbikes on beaches – give greater range for trailers with nets." - Recreational fisher.

Some people see this increase in technology as having its down side in a number of ways:

"GPS enables fishermen to go back to the same spot and hammer it." - Recreational fisher.

"GPS marks which previously were good spots are now either barren or have a much smaller amount of fish on them." - Recreational fisher.

"GPS means people aren't plucking (taking luck to find a good spot) and also are relying on the information, therefore increasing safety risks if there is a failure." – Former commercial fisher.

"You don't see people setting a net, or using one off the beach – mainly because now they get vandalised. Nor do you see people netting in the surf like we used to – people are too lazy now with their flash boats." - Local resident.

However, a few respondents observed that the mainstay of much recreational fishing – the rod and line – remained pretty much as it had always been, notwithstanding improvements in reels, hooks, lures and line invisibility.

One respondent believed that there had been an increase in recreational people using gill nets.

However, a significant group of respondents (12) believed that fishing was about the same, despite a number of these respondents acknowledging that there were more boats and better equipment available to fishers.

"There is no great fishing pressure in South Taranaki." - Recreational fisher.

Of those that believed fishing was easier than in the past, a significant number (4) said that improved technology was the reason for fishing being easier. GPS, sounders, fish finders were the key technological advances mentioned.

"I keep a diary and fishing does seem to be getting better although we now have bigger boats and travel further afield." - Recreational fisher.

Increase in petrol costs

An increase in petrol costs meant that some people were not going out as often.

"I don't go out as far now due to petrol costs." - Recreational fisher.

Changing attitudes

A change in attitude by recreational fishers was commented on by a couple of respondents. Some felt attitudes were more responsible:

"Getting the limit isn't as important as just being out there and catching a feed." - Recreational fisher.

People are more responsible than in the past." - Recreational fisher.

Others didn't think much had changed however:

"I do think we take the beaches and coastal areas for granted." -

Recreational fisher.

"People are not protecting the area as they once did." - Commercial fisher.

Changes in commercial fishing

"My father was one of the first fishermen 60-70 years ago. Had a clinker boat. Fished using hand lines. Brought back sacks full of snapper." - Recreational fisher and diver.

"[Commercial fishing] started in the 1960s when trawlers found out what was here. Before then, in the 1950s, Bill Cox and I would go out in runabouts and never used to see anyone. We could get 15-20 dozen snapper in an afternoon. The weather won't let you do it all the time here. I used to do Bill Cox's long lines. Get them ready for the next day. The set lines would come up with 100 hooks and a fish on every hook." - Former commercial fisher.

"I started out during my school holidays in 1966, trawling on the Oceania. We were fishing snapper and used to sweep everything else back over the side – tarakihi, flounder, john dory... it's always been a good longline fishery... before the big trawlers started." - Former commercial fisher.

"By the early 1970's the Port of Wanganui had the reputation as the best snapper long line fishery in the country."- Former commercial fisher.

People noted that there were less local commercial fishers using Wanganui and Patea, and recalled being able to buy fish directly off the wharf, but not anymore.

"During the 1950s, four or five boats under 15 feet long fished off Kai Iwi beach for snapper.... They used to bring the snapper in by the coal sack and sell them from the boat, in the driveway, for half a crown each... people would queue all the way down the road." - Former commercial fisher.

Some respondents described a decrease in commercial fishing in general, especially gill netting, which they used to use for rig and grey shark, also that there are now fewer squid boats than in the 1970s. Where there used to be a lot of smaller boats doing long lining, there were now more trawlers.

"There used to be a lot of smaller boats doing long lining. Now there are more trawlers." - Former commercial fisher.

"There are fewer squid boats fishing than in the 1970s." - Recreational fisher.

Japanese long liners operated here in the 1960s and 1970s. They were so close in, you could see the top of the mast over the cliff. They set lines in a box formation – took a lot of fish. The snapper fisheries disappeared about then." - Recreational fisher and diver.

"Things got tough for small commercial boats because of regulations

from MAF... the mercury ban on grey shark put many fishermen out of business." - Former commercial fisher.

"In 1975 most commercial long lining was for snapper. There were also gill nets for dogfish and wharehou... the most hooks I would set would be 6000 in a day. That was on my own. This was more than you could do in other parts of New Zealand. There were a couple of years where if I didn't have 3000 hooks, I wouldn't go fishing. Most of this was done at Patea." - Former commercial fisher.

Others felt that there was more commercial fishing happening, in particular from large out of town boats.

A number of those reporting that fishing was either easier or the same credited changes in management of commercial fishing with their observations of the recreational fishery:

"Snapper have come back because big scale trawling has stopped. Perhaps this is because of the quota system – it has worked to an extent, e.g. Snapper 8 – they can fish anywhere in there." – Recreational fisher.

"Generally fishing off the beach seems harder than 50 years ago, but in the last 2 years I have seen people getting good snapper off the beach – maybe because the trawlers are not coming in so close?" – Recreational fisher.

One thought the reason fishing was still the same was that there were fewer locally based commercial boats working the area than in the past.

A group of respondents (9) believed that fishing was easier now than in the past. Of these, the greatest number said that this was because of the quota management system.

One respondent thought fishing was easier because the voluntary 'no trawl' agreement had been upheld.

"To a certain degree, the no trawl zone is respected..." – Recreational fisher.

"Since the mid 1980s and early 1990s fishing has improved. Snapper have returned and size increased. This is possibly due to no pair trawling, commercial set netting being reduced, set lining reduced, amateur quotas, bigger, faster boats going further and reducing local pressure." – Recreational fisher.

The role of the weather

Most of the people who said they believed the fishing was about the same felt that the weather was its best protector.

"The weather on this coast has the most constant swell lines and onshore winds with N-S current of approximately 7 knots. In other words, the weather is atrocious." – Recreational fisher.

"Blue cod grow quick – 1-2 years and there are huge areas there. Because of the weather limiting fishing, they won't be fished out." - Former commercial fisher.

6 MARINE MAMMALS

Introduction

Three quarters of those interviewed had seen marine mammals in the area. The most common species mentioned were the NZ fur seal, followed by dolphins, orca and whales. People also indicated where they had witnessed whales that had been washed up onto the beach. These included some of the rare beaked whales.

What marine mammals are present in the area?

Table 4 sets out all the species mentioned by respondents as present in the area. The number in the 'number of mentions' indicates the number of respondents who mentioned seeing these marine mammals. Where people indicated that they were rare to see, this has been indicated.

TABLE 4: REPORTED MARINE MAMMALS IN SOUTH TARANAKI

GENERA	SPECIES	NUMBER OF MENTIONS
Seals	(species not specified)	37 * 1 said rare
	NZ Fur seal	1
Dolphins	(species not specified)	30 * 2 said rare
	Hector's dolphins	1
	Dusky dolphins	1
	Bottlenose dolphins	2
Orca	Pilot whale, black fish	28 * 6 said rare
Whales	(species not specified)	11
	Humpback Whale	5
	Southern Right Whale	2
	Sperm Whale	2 (1 stranded)
	Cuvier's Beaked Whale	1 (stranded)
	Scamperdown Whale	1 (stranded)
	Pygmy Sperm Whale	1 (stranded)
	Toothed Whale	1
	Minke Whale	1

Seals

People reported seeing seals frequently using the area to haul out (this is when seals come on shore to rest on the beach).

Seals off Patea

Photo credit – S.Hornby

"We didn't used to have seals here. Now they use the area as a haul out. They didn't breed in North Taranaki in the past, but now they are, on the islands." Local resident and naturalist.

"Lots more haul out. Apparently 600 counted between Wanganui and Hawera. Maybe that's why there are less fish. They are known to play with fish, i.e. play with more than they eat." - Recreational fisher.

"I've seen seals sunbathing at Waverley beach."- Recreational fisher.

"I caught a small seal in a gill net up the Patea River last winter." - Recreational fisher.

Orca

A number of people reported seeking orca travelling through the area. Those that were able to indicate on a map where they had seen them highlighted inshore areas off Waitotara, Waverley and Patea.

"I once saw an orca and calf heading down the coast just off Waverley Beach." – Recreational fisher.

"Orca feed on red cod in winter." - Diver.

"Orca come in close – I've seen them at wharves and river mouths. I think they come up in February to feed on stingrays. It seems to be the same family. Orca Watch have suggested it's the same group having a beat that they do." - Former commercial fisher.

Whales

"In 1995 I saw a humpback whale and calf at Ohawe." - Recreational fisher.

While the research was going on, a southern right whale and its calf travelled through the area. Department of Conservation staff were able to take a small skin sample for genetic analysis for research into southern right whale populations. The research, carried out by Auckland University, aims to clarify whether the New Zealand population of southern right whales is distinct from the population around Antarctica.

Southern right whale and calf seen off Castlecliff Beach, Wanganui, July 2005

Photo credit: Wanganui Surf Rescue

Have marine mammal numbers changed?

Respondents were in two minds as to whether marine mammals had increased or not in South Taranaki.

"There's not as many as there was." - Former commercial fisher.

"The mussel reefs have been depleted at Waiinu and now the seals have gone. This is the result of people taking too many shellfish." - Commercial fisher.

"You used to see black fish [orca] twice a year 20 years ago. Now I haven't seen one for a long time. It would be 8 years at least since I last saw one." - Recreational fisher and diver.

A few survey respondents thought dolphin numbers had declined.

"2-3 years ago dolphins were abundant. Not now." - Recreational fisher.

This same respondent thought this was because they were getting caught in nets.

However, a few respondents thought there were more dolphins than in the past:

"There are more now than there have been for quite a while. In the 1950s and 1960s you used to see a lot (but equally I spent a lot more time on the beach then). They seem to be back more frequently now. But maybe it's because we're more conscious of them now." - Local resident.

Comments made about particular species were inconsistent, with some people arguing fewer of a species, but others arguing that there were more.

7 BIRDS

Introduction

Bird diversity and abundance appears fairly low throughout the South Taranaki – Whanganui coastal marine area.

"The Hawera coast is not very rewarding for bird watchers. Many more species are seen on the coastal lakes and sewage ponds where spoonbills, for instance, are to be seen, but I have never seen them on the beach." - Local resident and environmentalist.

Artic Skua off Tangahoe River mouth

Photo credit – S.Hornby

The coast itself has only a few places bound to excite a bird watcher. These areas tend to be at the estuaries of rivers such as Waitotara and Whenuakura, which provide important 'stop-over' points for migratory birds.

Only a few areas, such as Nukumaru, provide breeding grounds for shore birds, although there are significant black-backed gull rookeries scattered around the coast and particularly along the cliffs.

Quite significant numbers of seabirds are sighted by fishers when out at sea, suggesting that the South Taranaki Bight may provide an important feeding ground.

"Arctic skua will hang around tern colonies. Chase the tern and grab fish from them before they hit the sea. They can be seen off the Patea stacks." - Local resident and naturalist.

What bird species did people report seeing in this area?

Respondents mentioned the following birds as ones they had sighted at sea or on the coast in South Taranaki (Table 5). The number in the 'number of mentions' indicates the number of respondents who mentioned seeing these bird species. Where people indicated that they were rare to see, this has been indicated.

The five birds most frequently mentioned by respondents were gulls (including black-backed and red-billed), gannets, albatross, penguins and terns.

TABLE 5: REPORTED BIRD SPECIES

FAMILY	SPECIES	NUMBER OF MENTIONS
Gulls	(type not specified)	42
	Black backed gulls, Karoro	13 * 1 said rare
	Red billed gulls, Tarapunga	6

TABLE 5: REPORTED BIRD SPECIES ... CONTINUED...

FAMILY	SPECIES	NUMBER OF MENTIONS
Gannet		33 * 8 said rare
Albatross/ Mollymawk	(type not specified)	39 * 15 said rare
	Shy (white-capped) mollymawk	1
	Black-browed mollymawk	1
	Grey headed mollymawk	1 * 1 said rare
	Salvin's albatross	1 * 1 said rare
Penguins	Little blue penguin, Korora	19 * 2 said rare
Terns	(type not specified)	18
	Black-fronted Tern, Tara	1
	Caspian Tern, Taranui	2
	White-fronted Tern, (Black Cap)	1
Shearwaters	(type not specified)	3 * 1 said rare
	Sooty shearwater, Mutton bird, titi	10* 1 said rare
	Fluttering shearwater	1
Oyster catchers	(type not specified)	11
	Variable oyster catcher	1
Shags	(type not specified)	9 * 1 said rare
	Black, Kawau	2
	Pied, Karuhiruhi	2
	Little, Kawaupaka	2
	Spotted, Parekareka	2
Petrels	(type not specified)	8
	Cape Pigeon	6
	Storm Petrel	1
Herons	Reef heron	2
	White heron, Kotuku	1
	White-faced heron	5
Stilts	(type not specified)	5 * 1 said rare
Prions	Fairy Prion, Titiwainui	5
Duck		5

TABLE 5: REPORTED BIRD SPECIES ... CONTINUED...

FAMILY	SPECIES	NUMBER OF MENTIONS
Swan		4
Kingfisher		3
Dotterels		2
	Banded dotterel	2
Godwit		2
Plovers	Spur-winged Plover	4
Skua	(type not specified)	3* 1 said rare
	Arctic skua	1
Royal spoonbill		3
Swallow		3
Skylark		2
Magpie		2
Starlings		1
Sparrow		1
Egrets	White egret	1
Pipit	NZ Pipit, Pihoihoi	1

Have bird numbers changed?

There was a perception by a significant group of respondents that there were fewer birds around than in previous years. Some mentioned this period as being previous decades, but one person said fewer than 2-3 years ago.

'Nothing like you used to [see]." -Former commercial fisher.

Gulls

Black-backed gulls are the only birds noted as having colonies on the cliffs, although people interviewed for this project also mentioned starlings nesting in the cliffs, particularly off the Hawera coast. Black-backed gull rookeries were mentioned as being found along cliff tops and sometimes on stacks off the coast.

"There are quite a few areas where you can see black back gulls

Photo credit: DOC image library

nesting on the cliffs or at the bottom." - Local resident and naturalist.

Red-billed gulls are known to be relatively uncommon in the area.

"South of Cape Egmont you don't see many red billed gulls. In winter, however, you do get an influx around Ooanui... probably they come from Kaikoura in the winter and go back again for breeding in the summer." - Local resident and naturalist.

Gulls – more or less?

Some respondents reported more gulls, but a few respondents reported a perceived drop in the number of gulls.

"I think seagulls could be increasing. I've seen thousands." - Commercial fisher.

"Black backs are increasing around New Zealand, especially near rubbish tips. Red bills are also increasing. There has been an increase in breeding numbers around the coast." - Local resident and naturalist.

"Seagulls are conspicuous by their absence at Waverley. They would follow the kahawai up the beach. They would be a nuisance when you were fishing, trying to get the bait."- Recreational fisher.

A variety of ideas were put forward as to why gull numbers might be decreasing. Two respondents suggested it might be because of the Wanganui rubbish dump closing, meaning that there was less food. One blamed changes in wind and sea currents, and another thought the reason was low breeding success of black-backed gulls.

"In [my] younger days there were heaps of seagulls. Today you just do not see so many. I think it has to do with the [Patea meat] works closing down." - Recreational fisher.

Gannets

"The nearest breeding colonies are at Kawhia and Farewell Spit. They are seasonal. There are more of them in summer. This may be related to food or possibly water turbidity. In winter, the water in the inshore area can be pretty dirty."- Local resident and naturalist.

"I don't remember seeing gannets before. But this year they were working on kahawai off Waitotara." - Former commercial fisher.

Albatross (Mollymawks)

These large ocean going birds are occasionally seen here.

"Albatross in the summer are rare, but you often see them in winter."- Charter boat operator.

A group of respondents felt that there were fewer albatross.

"Albatross didn't used to be rare. Where the kahawai went, the albatross went as well." - Recreational fisher.

A reason put forward for this by several survey respondents was fewer fish, therefore less food available for the birds.

"It is because kahawai stocks have been reduced by purse seining." - Recreational fisher.

Little Blue Penguin

Penguins were seen well out in the ocean by boat fishers.

"It has to be calm to see them out at sea." - Recreational fisher.

The presence of penguin nests on the shoreline appears unknown.

"There is no sign of blue penguins coming ashore for breeding – even under Taupata which is good habitat. They could be breeding in Cook Strait, for example, on Stevens Island." - Local resident and naturalist.

Terns

"You see the terns chasing kahawai that are chasing whitebait up the Patea River." Recreational fisher.

"76 pairs used to breed on a stack just north of Patea. Now the black-backed gulls have taken over. There was one pair of black-backed gulls one year with the terns. They predate on terns. Then there were more. I assume that the terns have found another stack to be on, but I don't know where this is."- Local resident and naturalist.

Gulls and Terns

Photo credit – L.Douglas

Prions and mutton birds in large numbers

Several participants talked about seeing large numbers of small black and white birds. These were most probably prions. Several other respondents mentioned seeing 100s of 'little grey birds' that could possibly be mutton birds.

"I've seen thousands of little black and white birds on the water." - Recreational fisher.

Fewer pipits

One respondent mentioned seeing fewer pipits, but greater numbers of spur-winged plovers.

"Pipits are less visible now, but there are huge mobs of spur-winged plovers…Pipits may predate on the edge of a seagull colony, but there is not enough food for both pipits and spur-winged plovers."- Local resident and naturalist.

8 CUSTOMARY FISHING PAST AND PRESENT

Introduction

Fishing and the gathering of other kaimoana was a fundamental part of early Maori settlement of the South Taranaki coast. As a result, Maori hold a very strong relationship with the sea, and traditional management approaches exhibit a high level of knowledge about the resource, and how and when to access it.

There are four iwi, including many individual hapu, holding an association with the South Taranaki coast. Customary management has had to adapt to new circumstances, and whilst there has been a loss of adherence to traditional management practices, there is evidence that this may well return with the efforts of local iwi.

This chapter draws on information provided through interviews, from representatives on the project team and from published literature where it was available, particularly on one project carried out by the Taranaki Catchment Commission in the 1980s.

This project did not include hui to discuss, or draw together information, which would have been a more traditional approach, and perhaps one that might have gathered more information. It became clear in adopting the approach that we did, that much customary related information is considered too sacred to be shared easily. This has been respected. Therefore, this chapter does not comprehensively cover all the customary fishing information for this coast.

In this chapter

The following topics are explored in this chapter:

- iwi of the South Taranaki coast;
- early Maori settlement;
- how resources were traditionally managed;
- customary resources today; and
- how resources are managed now.

Iwi of the South Taranaki coast

There are four iwi with important associations to the South Taranaki coast between Manaia and Castlecliff. These are:

- Te Atihaunui-a-Paparangi
- Nga Rauru Kiitahi
- Ngati Ruanui
- Nga Ruahine-Rangi.

Te Atihaunui-a-Paparangi

The Whanganui iwi are strongly river (the Awa) people. The Whanganui Estuary and coastal regions are important to the Whanganui iwi as well. Runanga Tupuho in particular has a strong relationship with the coast.

Spiritual as well as physical sustenance has always come from a strong association of the iwi with the river and the coast.

"There used to be huge pipi/tuatua beds at the Whanganui River mouth – on the island and on the sand bar. These have died from pollution. As the river is being cleaned up, mullet are returning back." – Tangata whenua.

"People used to go north in waka for kaimoana. When setting hinaki for eels, sharks used to come in and take them. People would catch shark in February-April, full of eel."- Tangata whenua.

"We had an understanding with northern iwi to fish in their area" – Whanganui tangata whenua.

Nga Rauru Kiitahi

Nga Rauru Kiitahi holds a cultural, spiritual, historic and traditional association with the coastal marine area from the Patea River to the mouth of the Whanganui River.[4]

Within the coastal area between Rangitaawhi and Wai-o-Turi Marae is 'Te Kiri o Rauru', the skin of Rauru. Te Kiri o Rauru is an important life force that has contributed to the physical and spiritual wellbeing of Nga Rauru Kiitahi.[5]

Nga Rauru Kiitahi used the entire coastal area from the Patea River (known to them as Te Awanui o Taikehu) to the mouth of the Whanganui River and inland for food gathering, and as a means of transport. The coastal area was a rich source of all kaimoana. Nga Rauru Kiitahi exercised the values of Nga Raurutanga in both harvesting and conserving kaimoana.[6]

"... around the 1880s... Maori would herd the kahawai that would come into the [Whanganui] River mouth with boats into the shallows and club them." - Local resident and environmentalist.

Important sites

There are many sites of cultural, historical and spiritual significance to Nga Rauru Kiitahi along the coastal area from Patea River mouth of the Whanganui River.

"Waikaramihi was an ancient camp. The fish were used by people for many generations." - Tangata whenua.

Tapuarau Conservation Area

Tapuarau is the name given to the area at the mouth of the Waitotara River. Nga Rauru Kiitahi has used Tapuarau as a seasonal campsite from where it has gathered mahinga kai in accordance with the values of Nga Raurutanga. This area remains a significant mahinga kai source today.

Tapuarau extends from the mouth of the Waitotara River to Pukeone and includes several small lagoons, including Tapuarau Lagoon, which are the source of tuna (eels), flounder, mullet, whitebait and inanga. During flooding, Nga Rauru Kiitahi was able to take tuna as it attempted to migrate from the nearby lagoons to the river mouth. The old marae named Hauriri was also situated in this area.[7]

Association with the rivers in the area

The Patea, Whenuakura and Waitotara rivers are the life forces that sustain Nga Rauru Kiitahi.

Nga Rauru Kiitahi knows the Patea River by the name of Te Awanui o Taikehu. The Whenukura River is known as Te Aarei o Rauru. The area along the Whenuakura River is known to Nga Rauru Kiitahi as Paamatangi.

All these rivers are the life force that sustained whanau and hapu along their lengths.

Nga Rauru Kiitahi used the rivers for food gathering. Sources of food included kakahi (fresh water mussels), tuna, whitebait, smelt, flounder, and sole.

Each of these rivers remain sacred to Nga Rauru Kiitahi as a mahinga kai source from which the physical wellbeing of Nga Rauru Kiitahi is sustained, and the spiritual wellbeing nourished.[8] Historically rivers were also used as a means of transport.[9]

Nga Rauru Kiitahi gains management role

As a result of the passage of the Nga Rauru Kiitahi Claims Settlement Act (27 June 2005), four sites adjacent to the coastal marine area will be transferred to Nga Rauru Kiitahi. These are:

- Okehu Stream Conservation Area;
- Waiinu Beach Conservation Area;
- Puau Conservation Area; and
- Approximately 100 ha of Nukumaru Recreation Reserve.

Rehu Village conservation area will be transferred to an entity jointly agreed by Nga Rauru Kiitahi and Ngati Ruanui.

Ukaipo, or temporary camping entitlements will be established. These will be to enable gathering of kaimoana and other natural resources. These include Hawken's Lagoon conservation area (to be renamed Tapuarau conservation area), and Waipipi Marginal Strip.[10]

Ngati Ruanui

Ngati Ruanui holds a cultural, spiritual, historic and traditional association with the coastal marine area from an area just before the Whenuakura River in the south, to an area well outside the study area boundary at Manaia to the north.

Ngati Ruanui comprise a number of sub-tribes including Nga Ruahine-Rangi, Tangahoe and Ngati Hine.[11]

Important sites

For the strip of the coast in the territory of the Ngati-Hine and Tangahoe hapu (subtribes) (between Denby Road, near Hawera, and a small stream at Waverley), individual reefs have been identified and marked on a map in a previous study.[12]

There are four reefs in the north-western part of the territory (Pukeroa, Koutu, Tangahoe, Hingahape) separated by a long stretch of sand from there towards the southeast (Rangitawhi, Waipipi, Waipapa).

It has been stated that the Waipapa Reef is the last reef between Waverley and Waikanae but this was not substantiated. Waipapa and Waipipi reefs were covered to a large extent by sand. Waipipi Reef had in the past been a source of large mussels.

Waipapa Reef had a large population of small seedling type mussels but no edible-sized shellfish. In the past it was a source of red crab and large mussels.

At the time of the survey work from which this information is taken (1983), the northernmost Pukeroa Reef was no longer used due to pollution from the nearby Kiwi Co-operative Dairy company's outfall one km to the south (now Fonterra). The outfall has now been extended, and monitoring, undertaken with tangata whenua, shows the inshore reef is now in a good state.

The reef known as Koutu is extensive, covering several hectares, while Tangahoe and Hingahape are much smaller.

Rangitawhi can be used only at very low tide.[13]

Nga Ruahine-Rangi

Nga Ruahine is associated with the South Taranaki coast from Waihi Stream in the southeast, to well beyond the northern boundary of the study area at Manaia. Unfortunately, the project team was not very successful in engaging with either Nga Ruahine iwi, or the individual hapu for the purpose of this project. Therefore information of Nga Ruahine has been gathered from previously published reports.

Nga Ruahine is made up of more than nine hapu. Four of those have been identified with territory in the study area. They include Ngati Tu, Ngati Manuhiakai, Inuawai, Okahu,[14] and Umutahi/Kaniti.[15]

Important sites

Papakainga (or settlements) were found at the mouth of every river in the Nga Ruahine-Rangi rohe. For example, at the mouth of Kapuni Stream there are three pa sites – Orangituapeka Pa on the west side, Waimate Pa and Wharuwharunui Pa on the east side.[16] At the mouth of the Inaha Stream is Otaika Pa, and also the site of the former Heretoa Mission Station, which was established in 1842.[17]

Urupa, or burial grounds are located on these settlements.[18] Canoe landing places, or Tauranga waka, were where the ancestors'canoes were housed and launched from. The rohe of Nga Ruahine-Rangi is based on the canoe landing places, and these Tauranga waka hold the mana and rangitiratanga of the ancestors.[19]

Whare-Wanganga (Maori universities or places of learning) were also situated along the coast.

Early Maori settlement

Settlement concentrated in coastal areas

It is thought that by the 14th century, settlement of coastal areas around New Zealand was widespread but sparse.[20] Most early settlements were within five or six kilometres of the coast. This, in large part, reflects the importance of fishing and gardening and as sources of food.

"Kaimoana was gathered right along the coast. The Opunake area was the main food source. It had a diversity of foods. But there are pockets of high concentrations of paua, mussel and crayfish all along the coast. Local hapu still know these." – Tangata whenua.

Historical documents show that there was extensive occupation along the coast from Manaia to the Whenuakura River, extending some distance inland (up to about 12 km). The rivers were particularly important.

There are a number of well known moa hunter sites at mouths of rivers along this stretch of the coast.[21] These sites are of national archaeological importance. Extensive moa hunter sites have been found at the mouths of the Waingongoro and Kaupokonui rivers and a smaller moa hunter camp has also been located in sand dunes on the cliff top immediately to the south of Hawera.[22]

Seasonal fishing camps important to inland iwi

There are major concentrations of pa sites in all the major river valleys particularly Patea, Whenuakura, Waitotara, and Whanganui.[23]

Even when living further inland, groups would come down to the coast to fish in summer, and return up river with stocks of dried and smoked fish for winter consumption.[24]

Important fish were shark, snapper, kahawai and hapuku, but anything taken was likely to be eaten.

"There was once a hapuku reserve in a certain large hole off the coast. I have tried, but can't find a legal reference to this. It was the favourite fishing spot for canoes to catch hapuku. Half way between Wanganui and Kai Iwi – about 3-4 km off. A very deep hole. But then a commercial fisherman found it and emptied it. People would protest about that now." - Tangata whenua.

Wanganui

Descriptions of Wanganui from the 1840s note the presence of many 'fishing' villages at or near the mouth of the Whanganui River (from Putiki south).[25]

"In his diary from the 1840s, Rev Richard Taylor talks about there being so many fish at the mouth of the Whanganui River, that one could 'almost walk across the river mouth on the fish.'" - Tangata whenua.

There are records from the 1840s of kahawai, dogfish and small shark

being caught in large numbers and dried for later consumption at the Whanganui River mouth.[26]

Waipipi

There was evidence of fishing camps in the coastal dunes at Waipipi including middens, ovens, flaked stone and net sinkers.[27]

Patea

An important archaeological site, the Waitore site, is located between the Patea and Whenuakura rivers. It is currently the earliest stated assemblage of wooden artefacts in New Zealand. The site was buried under metres of sand and was only uncovered by a stream cutting into the dune.[28]

Analysis of a midden 100 m inland, dated back to AD 1525, included very small tuatua shells and the bones of small fish. Bird species included NZ quail, pukeko and harrier.[29]

Waitotara

The Waitotara area has a long history as a major fishing ground for the Maori and was suitable for growing kumara.[30]

At Waitotara, there is an 1840 record of a deserted fishing village with racks and fish bones near the mouth of the Waitotara River.[31]

Round pits from which Maori removed sand to mix with soil for the kumara crop are recorded along the coast in this general vicinity.[32]

Waingongoro

Out at sea from the mouth of the Waingongoro River, there were tribal fishing grounds or tahuna. In the old days, the canoes would put out to the fishing grounds at the correct seasons, and would remain there for some days at a time.[33]

The fishing ground for hapuku was some miles out to sea. The spot was located by paddling the canoes until an old rimu tree on the peak of Tirotiro-moana seemed on a level with the sea. This rimu has been cut down long since. There were other fishing grounds nearer the shore for kahawai and tamure (snapper).[34]

"Maori used the river mouths, reefs and 5-15 miles off coast for targeting sharks. Species included school, rig, mako, bronze, wharehou – it has a strong run in spring and autumn – you can judge when it is there by the water temperature. They would set nets deep to catch it. They also got tarakihi, snapper, jack mackerel, gurnard off the reefs. Natural burley [a fish attractant] at river mouths meant the best fishing was there." - Ministry of Fisheries officer.

The Waingongoro itself was an important source of food supply for Maori. In its waters were caught tuna, piharau, kokopu and pokotea. Along the coast were secured kutai, pipi and paua.[35]

Archaeological excavations at Waingongoro have revealed significant

quantities of extinct birds (including moa), sea mammals, early artefacts and evidence of cooking and dwelling.[36]

Te Ranga-tapu, the ancient village of the Moa hunters is located at Ohawe Beach. Te Ranga-tapu means 'the sacred band'. The pa was situated on the eastern bank at the mouth of the Waingongoro River, where rising ground lent itself to defence.[37]

Te Ranga-tapu has a history of over six centuries, for it was actually a settlement of tangata whenua before the arrival of Turi of the Aotea canoe in the middle of the fourteenth century. These earlier people knew the river as Wai-aro-riri, 'the angry waters', and the mountain as Puke-haupapa, 'ice hill', before the men of the heke renamed them Waingongoro and Taranaki.[38]

Te Ranga-tapu in due course became a fortified pa of the Nga Ruahine of the Ngati Ruanui tribe.[39] By 1865 Te Ranga-tapu Pa had become simply a fishing village.[40]

Opposite Te Ranga-tapu Pa, and on the western bank of the Waingongoro River, was Te Kawau Pa. This coastal pa was at the mouth of the river, but there has been so much erosion by the sea only a small part of the earthworks remains.[41]

Shellfish uncommon

Shell middens are rare compared with other areas of northern New Zealand. This reflects relatively unfavourable conditions for shellfish along the coast at least as far south as the Rangitikei River mouth.[42]

Much early historical evidence lost

Rates of erosion around the coast in the last 150 years, and at river mouths suggest the probability that an unknown number of sites at river mouths and on the coast have been lost.[43]

The legend of Ohawe

The people of ancient Te Ranga-tapu Pa, and the related people of the sister pa, Okahu-titi, and of other pa of the Nga Ruahine hapu, enjoyed the fishing at the mouth of the Waingongoro. The fish of that place were theirs, and had been so for generations. This right was a treasured possession of the hapu, and was jealously guarded. The inhabitants of the Ohawe Pa were Ngati-Tupaea hapu. (Ohawe pa was on the heights above the eastern end of Ohawe Beach, close to the site of General Cameron's Waingongoro 1865 redoubt. The West Coast sea has claimed practically the whole of this old pa). Although they lived so near the river, they had no share in the fishing rights at the mouth, and they were envious. The legend goes that the Ohawe people dug a new channel overnight to divert the course of the river so that it should have a new outlet to the sea, and thus the fishing rights at the mouth would be rendered valueless. They achieved this, but Ra-wiri-wai-mako, the aged and learned tohunga of Te Ranga-tapu restored the former mouth by

invoking a southerly storm which filled up the new channel and resulted in the river flowing in its old and natural course again. To this day, the place where the channel was dug may still be seen, following the shortest route from the bend of the river to the sea.[44]

How resources were traditionally managed

Several aspects are important in understanding traditional management:

- a specific iwi, hapu or whanau was responsible for the resources of a particular area, e.g. a reef. They were known as the kaitiaki for that area;
- kaumatua and kuia (the elders) would hold, practice, and pass on to the next generation specific knowledge and skills about how to use and manage that area's resource; and
- in South Taranaki, there were regional variations in management arrangements.

Maori relationship with the sea

Water forms a central part of life for Maori, both as an important source of food and in a spiritual sense. The proximity of Maori settlements to rivers and coastal resources throughout history reflects the vital importance of water to the Maori.[45]

In Maori mythology, Tangaroa is 'God of the Sea' who has laws governing the way the environment is to be used. The name 'Tangaroa' was a sacred one, only spoken aloud by the priests, ordinary people described the god of the sea as 'Maru.'[46]

As gifts of Tangaroa, fish and other marine resources are far more than a food source; their inherent value as taonga is inextricably based in the wider social, spiritual and cultural situation of iwi, hapu and whanau. These linkages to the sea are incorporated into waiata, proverbs and haka.[47]

Kaumatua and kuia taught the ways of the land and the water and showed how the resources of Tangaroa were to be cared for. These practices known as tikanga include the turning back of rocks after gathering kai, not eating mataitai (kina, paua, mussels) while at the beach, and returning kai moana shells after the food has been eaten.[48] Other practices included certain rituals, which varied seasonally, and included such things as blessing the waka with kelp, offering up the first fish of the season etc.[49] Women traditionally were not involved in such rituals.

Specific knowledge about particular resources and accompanying rules were respectively held and administered by those who were kaitiaki for a specific area.

Fishing Karakia

The fish, the fish of Waitotara,

The fish, the fish of Whenuakura,

The fish, the fish of Patea,

The fish, the fish of Tangahoe,

The fish, the fish of Waingongoro,

The fish, the fish of Kawhia,

The fish, the fish of Taranaki,

The drawing to us the fish,

To this deep hole, to this bank,

The fish to this ledge of rock,

The fish to this current made sacred,

The fish to the current made sacred by Tane,

To the sacred current of Tangaroa.

A West Coast karakia, used by tohunga on the return of a successful fishing party. Translated by the Rev. Richard Taylor.

Source: Houston 1965, p 144.

Specific kaitiaki for each area

A report on kaimoana in South Taranaki carried out by the then Taranaki Catchment Commission in the 1980s illustrated that individual reefs were known by name, and managed by specific hapu. That report noted that several people consulted through that study stated that they would not consider taking seafood from reefs in other areas without the consent of, or without being accompanied by, a member of the local hapu.

"The resource was managed by specific hapu in the area. We generally knew what the consumption of whanau and hapu was. There was a quota type system. If you had more tangi or hui, well sorry, if you'd had your share for the season." - Tangata whenua.

Knowledge of the resource

The knowledge held about the resources would include:

- an understanding of the resources themselves, e.g. when fish were spawning, where and when they are found;
- knowledge about how to access the resource, including knowledge of weather, waves and sea temperature; and
- what should be practised to ensure the resource was available in the future, e.g. limits on how much was taken, or periodic bans (rahui).

"The old people knew where and when spawning took place and avoided fishing at those times. In comparison, commercial fishermen target spawning snapper. I used to be a boat builder, and I would

go out as part of the sea trials on the boats in the 1960s. I have seen them hauling in long lines with spawning snapper on." - Tangata whenua.

"As part of that basket of knowledge the old people had... was how to read the weather. I can remember my father in law, who died some 14-15 years ago, teaching us how to count waves before jumping on the rocks to avoid getting splashed." - Tangata whenua.

"[The old people] knew when to fish. They would impose rahui (if someone died there would be a ban on fishing). That is broken down now." - Tangata whenua.

"Everything had a season and they would only gather enough. They used to dry shellfish in the sun." - Tangata whenua.

Management varied between the north and south

Traditional fisheries management varied between the south of the study area and the north, partly in response to the different conditions of the coast.

"Ownership issues are very tight especially in the ring plain of the mountain and its coastal reef systems. There is a unique rights system.

This doesn't apply so much south of Hawera, where access points become the issue. In the southern area, fishing beds are not so concentrated. This is partly because there are more soft shore areas, and [more dispersed] species such as surf clams." - Ministry of Fisheries officer.

The need for inland hapu and whanau to access coastal resources led to sharing arrangements between those living on the coast, and those inland.

"Our hapu – Mokoia – had a rule to provide what the sea had to offer to the inland hapu. You will see that permeating through waiata, mihi mihi, and korero.

For example, Mokoia has a tradition in which there is a three week timeframe to catch tuna (eel) for the year. This occurs after a full moon, in accordance with the Maori fishing calendar. You could catch hundreds of eel per night. Eel are best caught at night, not during the day.

We would use a gaffe and spears and a tilly lamp pumped with gasoline. The old people did this. Our job as kids was to gather the tuna and put them in a pit. Our job during the day was to get manuka and smoke and dry them. Then we would deliver them to the hapu. This took place year in and year out. None of us would go to school.

In times when there was an absolute glut we would let the rest go. It was drummed into us. If you catch everything in there, how will it continue? If you catch them all, there won't be any left." - Tangata whenua.

Customary management today

Introduction

The 20th century has brought far-reaching changes to traditional social and community structure, as well as to local environments and their resources and management. Despite this, the importance of kaimoana to hapu and whanau is not diminished.

Framework for traditional management remains

Traditional resources are still part of the basic diet of many families. Hapu and whanau still hold detailed knowledge, but in many places there have been significant losses both of species and their habitats, as well as the traditional cultural and spiritual frameworks governing environmental management.

This was born out in the face-to-face interviews. Respondents emphasised that the framework for traditional management was still in place, if a little shaky, and used at least in part.

"The traditional concept of placing rahui (harvesting bans) is still used. It is placed by kaumatua of a seaside hapu... before the advent of email it would be made known via hui. Kaumatua of inland hapu would tell their whanau." - Tangata whenua.

Legal mechanisms allowing for traditional management continue to operate.

"There are defined customary fishing areas and reserve areas at almost every river mouth. These were important as launching points, also for whitebait, lamprey... Kaitiaki would regulate take off each reef." - Ministry of Fisheries officer.

Some traditional resources no longer accessed

Some resources were no longer accessed, or being accessed in a different way to the past. Some types of fin fish are not targeted in the way they had been in the past.

"Maori have moved away from fin fish that required community effort to reach in 1930s-40s. They used big row boats at that time. Now individual families gather food concentrated on the close shoreline and river mouth fisheries." - Ministry of Fisheries officer.

However, certain fin fish such as kahawai and hapuku are still highly valued, even if they are not targeted to the same extent that they were in the past.

"Most popular fish was the frost fish. When walking along the beach on a cold morning at a certain time of the month you would find them. They were just starting to be available again and the weather changed. Not many frost fish now. The scientific reason is that the fish stranding was something to do with the full moon." - Tangata whenua.

Some traditions no longer practiced

A few respondents felt that some traditions were not being practised at all.

"The transient nature of people today and technological advances, e.g. scuba tanks, have changed things. People can launch from Wanganui, go in, blow a place away and you won't see them. We've also been a bit lethargic ourselves." - Tangata whenua.

"Gathering of kai used to be preceded by very old karakia. The people with that knowledge have now passed on. There is no longer that level of spirituality associated with harvest…Those people could see the decline of fish stocks over time and decided not to pass on knowledge – if less of us today have that knowledge of where customary fish stocks are, then we are less likely to go and get it..Pakaraka Marae has a good example of this. Karewaonui (waka) was used by the hapu for fishing. As soon as last captain died, they took it out of water and decided not to use it again…He had decided there was no one around him who could safely carry on that parcel of knowledge about the kaimoana." - Tangata whenua.

Some people were concerned that recent legal changes were further undermining customary fishing.

"Now they are defining our customary rights for us. I believe only I can define customary rights. What the government is pushing is wrong. Customary rights are about feeding the whanau. It is not just about hui and tangi." - Tangata whenua.

Access to traditional resources has also been affected by ongoing coastal erosion, and modern day issues such as pollution.

"In the past we could gather in the same place, but now it has moved further out on the reef. This is because of the erosion. You can only go there in certain tides. A real low tide when we can walk." - Tangata whenua.

"The Waipipi sand mining almost destroyed the mussel beds. Whitakau (Puhu) are gone." - Tangata whenua.

"We never gather kaimoana from the [Whanganui] River now because of the pollution. Now we gather mainly north of Castlecliff." - Tangata whenua.

Traditional ways of managing resources were being forced to adapt.

"If your [mussel] reefs turn over then you move down and concentrate effort on where there are good healthy fish. This is different to the past, when kaitaiki would regulate take off each reef." - Ministry of Fisheries officer

One tangata whenua respondent was critical of the permit system:

"The current permit system doesn't work. My cousins fill out the piece of paper, but then there is no monitoring and no policing of it. People issue permits over areas that they are not the home people of" – Tangata whenua.

This person suggested instead that Haukainga (home people) be better recognised and given the resources to manage their rohe (takiwa taonga-o-nga-matua/Tupuna).

9 WHAT PEOPLE FEEL IS AT RISK

Introduction

Chapter Three discussed what people valued about the coast. People were also asked to identify management issues, threats and risks to those values. Those qualities that people valued about this coastal area were seen to be threatened from changing uses of the resource and changing technology.

In this chapter

This chapter summarises the responses people gave when asked to identify what was at risk. The key themes arising from answers to this question were:

- risks to the marine environment from oil exploration, ironsand mining, trawling, biosecurity;
- risks to fishing and fish stocks;
- risks from pollution;
- risks of coastal erosion;
- risks to natural character of the coast; and
- risks to coastal infrastructure.

This chapter summarises the responses obtained through workshops, written questionnaires and face-to-face interviews without any attempt to 'ground truth' or correlate people's views with that gathered from technical reports. Part II of this report includes chapters that summarise available technical information from monitoring and research, and should be read in conjunction with this chapter.

Risks to the marine environment

Continued oil exploration, ironsand mining, and trawling impacts on habitat on the sea bottom were mentioned as being risks to the marine environment:

"The ironsands permit that the Chinese government has got for exploration... could do huge damage. Also the gas field exploration and seismic surveys are devastating for fish – fish disappear for months or even years. This is a regular pattern. It was done for Kupe. They go looking for domes, opening old wells and so forth." - Ministry of Fisheries officer.

"Oil exploration has done damage... they originally used explosives. There were columns of water 80 ft in the air. Now they use pulses which are less damaging." – Former commercial fisher.

"Taking of sand [in the past] has upset the balance of the coast." - Recreational fisher.

A couple of respondents felt that marine life as a whole was at risk.

"Everything is at risk. The whole environment is at risk. Air, water

temperatures, the level of fish stocks, the status of the whenua leading onto the beaches, and political instability at every level.... Warming oceans and rising sea levels – you can't make a scrap of difference to that." – Tangata whenua.

"The whole environment is at risk because of the plague of spiky sharks (the possum of the sea.) When they arrive in April, to when they leave, they breed 2-3 times. An average number would be 10 young." - Commercial fisher.

Biosecurity was also seen as a significant risk area:

"We could have oil rigs coming in with stuff stuck on their hulls."- Regional council officer.

Management beyond the 12 mile limit was identified as a risk by one public management agency and the lack of good information by another:

"The regulation is uncertain. There's a lack of integration between statutes and a poor job [done] of regulation by central government." - Regional council officer.

"Lack of information on the biodiversity of the marine life off this coast makes it difficult to know if the current management is sufficient to look after its biodiversity." – DOC officer.

Risks to fishing and fish stocks

Fish stocks and fishing were seen as being at risk by a significant group of respondents (15), with a number of people saying that fish stocks were at risk from over fishing (6), and others mentioned the risk to fish stocks from the increasing numbers of people and boats (11).

In relation to types of fishing at risk, surfcasting (shore fishing) and gathering kaimoana was particularly mentioned.

"We [surfcasters] are on the end of the food chain. There's bugger all." - Recreational fisher.

Misuse of the fishing resource was mentioned most frequently as a threat to fish stocks.

"The pressure is both recreational and commercial. You can get 70 boats out there in a day. Once upon a time, you'd just have 4 or 5." – Recreational fisher.

"It could be fished out like New Plymouth with a combination of commercial and amateur." - Charter operator.

There were different views about exactly who was to blame for this misuse however.

A handful of respondents mentioned growth in recreational fishing, and poor recreational fishing practices.

"The biggest risk to fish stocks is the uncontrolled growth in the recreational fishing sector which contributes nothing towards fisheries management costs or catch information." – Commercial fisher.

"We have a guy down here [our local beach]. I have seen him mincing up little blue cod for bait. He used to mince up every little thing he could... this guy sells the stuff. Uses it to pay for diesel and petrol. I feel sorry for people in ten years time. There will be nothing left." - Former commercial fisher.

The quota management system was criticised by a handful of respondents.

"The quota system is ridiculous. The quota for recreational fishers is too high."- Recreational fisher.

Another group of respondents thought the reduction in fish was because numbers of commercial fishers had increased (13).

A large group of respondents (13) mentioned trawling and trawler damage as threatening fish stocks and fishing. There was a common perception that trawlers 'came in too close.' A couple of respondents perceived the problem as 'outsiders with bigger boats.'

"Trawlers rip weeds and seabed with chains in the process of flattening the ground to drag the net." - Former commercial fisher.

"Too much trawler pressure is destroying food beds. The areas holding fish are now very small in size compared to 5-10 years ago." – Recreational fisher.

"Trawling makes the biggest difference. The trawl diagrams show two thick lines of points." – Recreational fisher.

"When the sea is calm to fish with rods, there is [a] bloody trawler putting miles of net 200 metres off the shore." - Recreational fisher.

One or two respondents perceived that the decline in fish stocks was because trawlers were targeting when the snapper came in to spawn.

Bottom trawling was mentioned as a problem by a couple of respondents.

"The seabed is being destroyed by bottom trawling." - Recreational fisher.

Pair trawlers also came in for a mention related to the decimation of the snapper fishery in the 1980s.

"...1980 Nelson trawlers worked out that snapper were spawning in Golden Bay. There is a story of 2 pair trawlers having a tow and physically stopping because they were so full of snapper they filled the hold and the deck and continued to tow, returning to Nelson towing a full net... a lot of fish were wasted. Stupid stuff like that. This decimated the snapper fishing. There is [only about] 16 nautical miles between this fishery and Golden Bay." - Former commercial fisher.

The unevenness of fishing activities was noted by two respondents as having the potential to pose a threat.

"In summer there are huge influxes of holiday makers to Kaupokonui, Ohawe, Waiinu, Waverley – huge camp areas. Full of people. Just as popular as North Taranaki. There are nets in the river, and an

increase in calls from landowners about nets across streams for mullet and flounder..

There are pulses of activity that can disturb the stability of the fishery for a period. This, plus the unstable ecosystem, e.g. rivers pouring silt out in times of flood, just adds to this." - Ministry of Fisheries officer.

Specific fish stocks were mentioned by a number of respondents as being at risk. These included kina, snapper, kahawai, blue cod, paua, groper, tarakihi, trevally and crayfish, particularly stocks on the North Trap.

"They [large fishing boats from outside the area] throw away big fish that can't be sold to Japan so [snapper] spawning potential is lost." - Former commercial fisher.

Commercial fishing practices, particularly new technology and long lines were seen as posing a threat.

Long lines were mentioned by a handful of respondents as the reason for declining fish stocks. Two respondents mentioned Japanese long liners operating in the 1960s or 1970s. However, one respondent did not think long lines posed a problem.

Nets were mentioned by quite a few respondents, both in terms of the use of nets in general, and the damage that could be done by lost nets.

"Gill nets are being lost. They should be banned. You shouldn't be allowed to abandon a gill net. One month I saw one washed up that had been improperly anchored. It ended up on the beach rotting. Full of crabs and fish.... Abandoned nets also cause pollution." - Recreational fisher.

Set netting was also mentioned as a cause of fish stock decline by a handful of respondents.

The loss of breeding grounds was given as a reason for the risks to snapper and kahawai.

Poaching and black market sales were seen as a threat to both paua and kina.

"People are taking more than the legal limit, and then selling them." – Commercial fisher.

Other risks to fish stocks mentioned included:

- illegal fishing practices;
- floods and damage to catchment areas on land, e.g. erosion of river banks dumping mud on the seafloor. The floods of February 2004 were specifically mentioned by a few respondents;
- cliff erosion resulting in lack of food;

"Cliff erosion damages marine life in rock pools and deposits rubbish on the beach."- Local resident.

- seasonal weather patterns and rougher sea conditions;
- fish killed during oil surveys in 1960s;

- predator fish and mammals on the increase; and
- reduction in food for fish since the closure of the Patea freezing works.

It should be noted, however, that a couple of respondents specifically mentioned that they believed fish stocks were not at any risk. These included blue cod and snapper.

"I believe that there is an extensive blue cod fishery that is rejuvenating itself." - Former commercial fisher.

"Nothing's at risk. The quota management system is doing a good job of managing fish stocks and preventing any decline in species." - Commercial fisher.

Risks from pollution

Pollution was seen as a reason why fishing was at risk by a handful of respondents. There were mentions of damage to paua and kina and mussel reefs as a result of pollution.

"There are mussel reefs at Waitotara where my family used to go in summer 10 years ago. Then one time my wife and I got sick. We thought it was a oncer, but the same thing happened again the next year. We took samples to the Heath Department and they told us they identified faeces in the mussels. They couldn't be sure if the source was animal or human... This happened not long after the settling ponds were put in at Waiinu settlement. I believe that they are too close to the shore because it is a very porous area." - Tangata whenua.

"Our food resource is at risk. Dairy farms are increasing. Where does the run-off go? They have ponds, but it has to go somewhere." – Tangata whenua.

"I have seen evidence of shellfish damage, e.g. mussels... too much nitrogen will cause excessive growth.. You can crumble them up with your hand."- Recreational fisher.

"Pauas are abundant, but not too big. In areas of high turbidity there are lesions on the shells. The old guys say they don't recall seeing that in the old days, 40-50 years ago." - Ministry of Fisheries officer.

"There are fewer crabs. A crustacean type honeycomb with red worm casts has disappeared. It was on the low tide zone and was used as burley [used to attract fish]. It disappeared at the time of the urea plant – about 30 years ago." Recreational fisher.

Pollution was also mentioned as a threat to the coastline in general. People mentioned the Fonterra Hawera dairy factory, plastic along the beaches and the potential threat of an oil spill.

However, a few people don't see pollution as posing a great risk.

"Pollution is not a great risk because the oil companies have got a vested interest in not having a spill." - Local resident and naturalist.

"The oil industry is perceived as an issue, but monitoring shows

minimal environmental effects, especially with new seismic methods." - Regional council officer.

"A lot of people blame pollution for no, or small sized, kaimoana. The truth is environmental quality has improved and the problem is caused by over fishing." – Regional council officer.

One respondent said that there had hopefully been an improvement in Wanganui's waste water disposal.

Another said there was less algae in coastal rivers as a result of better effluent disposal and riparian planting.

"20 years ago people got typhoid from mussels, not now." - Recreational fisher.

"There is more silt in the rivers. This is a result of deforestation, precipitation and deterioration of river water quality." - Local resident.

Risks of coastal erosion

Natural processes such as cliff erosion were seen as a significant risk by a handful of respondents (6).

"Banks are unstable with rain and sea encroachment."- Recreational fisher.

One regional council officer predicted that with climate change, storm events are likely to be more pronounced which would increase pressure at the sea - cliff interface.

Kai Iwi village was identified as at risk from erosion.

Several respondents commented on the loss of sand to beaches and dunes.

One area of concern was the loss of the sandy shore north of Kai Iwi, perceived by some to be the result of changes in wind patterns.

"You can't walk the beach when the tide is coming in now as there are no escape routes between Kai Iwi and Okehu. I am concerned that someone will get buried under a collapsing cliff." - Recreational fisher.

One respondent gave an alternative explanation to why this was occurring.

"The big problem is the extensive planting of pine trees on the sand dune areas near the Okehu Stream. They prevent the natural wind drift of sand into the stream that distributes it along the beaches south east of the point."- Local resident.

Other respondents felt the Patea Dam was to blame for erosion in that area.

"The Patea Dam has reduced the amount of sediment coming down the river. The bar is inside now, instead of beyond. Lack of sand replenishment on the beaches is causing excessive cliff erosion." - Recreational fisher.

"[Since] the dam, we have lost our coastal beaches. Erosion is running at 800 mm per year and the Queen's chain is being lost." - Recreational fisher.

"The water is not as deep at the Patea wall." - Recreational fisher.

Another local resident commented on dunes disappearing "4 chain in 20 years" and identified that sand drifts were increasing with more southwest and southeast winds.

Risks to natural character of the coast

Subdivision pressure was seen as posing a significant risk.

"The biggest thing is the number of houses being put in totally inappropriate locations. Instead of a pastoral expanse they are breaking it all up – a spread of houses which will end up with nothing being natural." - Local resident and naturalist.

"Buildings should not be built on the foreshore. Building development should be prevented, especially on areas where ancestors are buried." - Tangata whenua.

Associated with this was a perception that access to the coast was also at risk.

"Access across farmland relies on the good will of farmers." - Local resident and environmentalist.

"Sales of private land are blocking access. Publicity about Maori claims is also causing problems." - Local resident.

Four wheel drive motorbikes were seen as a factor by several respondents.

"Ease of access by ATV's hasn't helped either." - Former commercial fisher.

"Motor bikes are the biggest curses – they don't use their proper tracks causing erosion of marram grass, creating ill feeling between the council and fishermen – we don't go in the sand hills, yet we get the blame for it." - Recreational fisher.

A number of specific features were listed as being at risk along the coastline. These included the significant geological formations called 'ventifacts' found in a number of areas and rare plants, including pingao.

"Pingao grass has all but been lost to this coast." - Former commercial fisher.

"People are taking pieces of rock formations for souvenirs."- Local resident and naturalist.

"Miniaturised plants around the blowholes area – they are not as lush and diverse as in the past. They are being damaged by grazing (rabbits)." - Local resident and naturalist.

A new seaweed?

A few respondents mentioned they had noticed a new species of seaweed.

"There is a red weed that blossoms and breaks off." - Recreational fisher.

Photo credit: L. Douglas

"There is a red algae that wrecks your fishing line. It gets washed up as a thick layer on the shore about twice a year. Two new species of shellfish appeared along with the algae after the iron sand carriers were anchored off the Waverley coast." - Recreational fisher.

Risks to coastal infrastructure

Coastal infrastructure was also mentioned as being at risk by a few respondents, of which the Wanganui Port was named.

"There is no proper control of the harbour – Port management don't know what they are doing. This is particularly in regard to dredging operations. They need to dredge out the basin on a regular basis, but the barges are being sold off." – Former commercial fisher.

10 WHAT PEOPLE WANT FOR THE FUTURE

Introduction

In the research conducted, people were asked what they wanted for the future of the area. Many people had suggestions for how that vision might be achieved. These suggestions are discussed in the following chapter.

This chapter outlines what people wanted for the future. The themes arising from answers to this question were that people wanted:

- the area kept as it is;
- use of the resources to be sustainable;
- the fishery protected or improved;
- erosion controlled;
- continued access; and
- beach improvements.

Keep the area as it is

A significant number of respondents (42) said they wanted to keep the area as it is. Opinions on what was needed to ensure this occurred varied however.

"We live at Ohawe Beach, walk daily and fish whenever possible. We want to continue doing this successfully. It is an unspoilt area which is respected by most of the community." – Local resident.

"Keep it as it is now or better. I am a diver not a hunter so I want to preserve it for my kids and others." –Recreational diver.

"Keep it like it is. Reducing fishing areas will add pressure to the remaining areas." – Local resident.

Ensure use of resources is sustainable

Quite a few respondents (14) wanted to see the area sustainable in the future for future generations.

"We need sustainability into perpetuity. Forever." – Tangata whenua.

"Balanced use. Recognise people are part of the system and that use is sustainable, and has outcomes that represent people's values for the area." – Recreational fisher and diver.

"It should be protected but not shut down. The beach is for everyone." – Recreational fisher.

A significant number of people commented on the need to sustain marine life and the fishery overall (7).

"What we want is a sustainable, well managed fishery that meets the needs of New Zealand as a whole." – Ministry of Fisheries' officer.

"It's a tall order, but I'd like it to go back as far as possible to the state it was in before we stuffed it up with over exploitation of marine mammals, land and fisheries and deforestation." – Local resident.

One respondent said they wanted to see fewer spiky dogs and paddle crabs, believing that their increased presence is the sign of some sort of ecological imbalance. A number of respondents were keen to see a future without over exploitation:

"I wouldn't like to see over exploitation of the shellfish beds." – Recreational fisher.

"Ensure onshore reefs are not stripped of undersized species." – Local resident.

"Estuaries need greater protection or awareness of the value of estuaries needs to be greater as they are very vulnerable to pollution." – Local resident and naturalist.

Protection for future generations, particularly for the grand children, was raised by a number of respondents including recreational fishers, tangata whenua and a former commercial diver.

"I would love to take my grandchildren down to the beach with spears and get flounder. To see the kahawai surfing in the waves, and to watch them go after the fish. I would like to be able to look all the way from Castlecliff to Kai Iwi, from horizon to horizon, and to see the birds in feeding frenzies. With kingfish numerous too." - Tangata whenua.

Protect or improve the fishery

Having a plentiful supply of fish in the future was mentioned by a significant number of respondents (15).

"The most important thing is to preserve fish stocks so we can take our grand kids out and catch a fish." - Recreational fisher.

In particular, improving shoreline fishing was mentioned by a handful of respondents and others mentioned protecting whitebait breeding areas.

"I would just like the chance to go down and throw a rod into the water and have a chance to catch a fresh fish. That chance is getting less and less every year." - Local resident.

Erosion control

A handful of respondents wanted to see erosion better controlled in the future, and one younger respondent wanted to ensure that the water stayed the same colour it was now "and didn't get more brown." One respondent sought erosion protection from the stream at Ohawe to Snapper Bay.

Public agencies also saw erosion control as important.

"I would like to see the end of big brown slicks coming out of the river systems – I would like to see a reduction in inland land management practices that allow timber and silt to egress into the marine environment." - Regional council officer.

Access

Ensuring continued free access to the beaches and coastline in the future was important to a number of respondents. The existence of the Queen's Chain was seen as important to retain. Access for specific activities, including swimming, surfing, walking and boat launching was discussed. Ohawe Beach and river mouth were specifically mentioned.

Some respondents wanted to see improved access.

"Access to coast and beaches all the way to Paraparaumu. A great coast, not enough access. [Coast could] cope with thousands of visitors for all purposes if spread out."- Recreational fisher.

Beach Improvements

A handful of respondents wanted a future where the beaches were clean and tidy with less pollution.

"I don't want the sewerage going in there." - Local resident.

"Less dead animals." - Local resident.

"I want to be able to swim in the Kai Iwi Stream."- Local resident.

A couple of respondents wanted use of 4WD vehicles (motorbikes and cars) restricted in some areas for safety and retaining a peaceful environment:

"I want an area of beach that is vehicle free, where there are no 4WD bikes, so the kids can play safely." - Local resident.

"With all the 4 wheel motorbikes and 2 wheelers going up and down the beach it sometimes feels like a motorway... Even though I ride a quad bike I would be happy to seem them all banned for 6 weeks at Christmas time."- Local resident.

A desire to curb residential development and over development of amenities was expressed by a few respondents.

"Don't wreck it with overdevelopment of facilities, e.g. concrete ramps." - Recreational fisher.

"We would not like to see unlimited residential development along it." - Local resident.

Visions for the future of specific beaches were discussed. For example, at Castlecliff Beach a few people wanted to see a better managed swim beach, with holes and rips dealt with. Improved beach facilities were envisioned for the future at Patea, including provision of lifeguards, and improvements to ablutions such as provision of showers and toilets "with paper and clean taps."

Economic Opportunities

A small number of respondents wanted to see new economic opportunities followed up. Included amongst a range of ideas was seeing Wanganui functioning again as a working port, exploring ironsand mining, oil exploration (although these were equally identified as a risk to the area in Chapter 9) and tourism.

"A lot more dollars are to be made showing people things than in a commercial fishery, if this is done properly. A lot of people just want to look, for example at the reef out here." - Recreational fisher and diver.

One respondent felt that commercial fishing opportunities were under-exploited in the area and any applications should be seriously considered. These could be viable if properly controlled. Crayfishing, squid and leatherjacket were all potentially viable fishing enterprises in the vicinity.

"It is a 'forgotten coast' – it has never been commercially crayed – and not trawled as far as I know." - Former commercial fisher.

How did this survey compare with another study?

A wider survey[50] carried out on behalf of all the Taranaki district councils and Taranaki Regional Council called "Future Taranaki," found that residents considered that protection of the natural character of the coastline was very important. Overall they considered that the region's natural environment is of a high quality but that there is no room for complacency about what they have.

Almost three quarters of telephone respondents from that study felt that protecting the quality of the water around the coastline was very important. In South Taranaki the coastal environment was considered to be under threat from both erosion and property development. There was a strong feeling that the coast should not be subject to over development as residents do not want to see Taranaki turn into a "Mount Maunganui." It was also felt that erosion needed to be addressed to protect farms and roads.

Therefore, there was considerable consistency in views from the current study and this previous research.

11 HOW PEOPLE WANT THE COAST MANAGED IN THE FUTURE

Introduction

A minority of respondents felt management should be 'kept as it is' with some reiterating the self-management role played by the weather, but the majority of respondents contributed ideas to improve coastal and fisheries management. People were asked how they wanted risks or threats managed. A wide variety of ideas were put forward to deal with those aspects seen as being at risk. People were also asked to identify ways of reconciling conflicting aspirations for coastal management.

Photo credit: L. Douglas

In this chapter

This chapter sets out the key suggestions made for ways to improve future management:

- more local management;
- change agency responsibilities;
- more communication and consultation;
- more education and awareness;
- more enforcement; and
- base decisions on factual information.

There was also a raft of specific suggestions for managing various aspects of the coast. These included suggestions for managing:

- marine protection;
- recreational fishing;
- commercial fishing;
- customary fishing;
- coastal development;
- coastal erosion; and
- land uses affecting the coast.

No judgement has been made on which of these ideas is more worthy than others, as to do that would have required detailed information about the workings of current local arrangements to which the researchers were not party. The themes, however, provide a useful indication of where coastal users see improvements could be made to current management arrangements.

More local management

There was a strong call for more local level management.

A handful of respondents made suggestions for how this might be achieved through people working and deciding together. These included setting up some sort of working committee, or a structure that followed the Guardians of Fiordland model (this is further explained in Chapter 22).

A couple of respondents mentioned continuing the current project approach in some sort of modified form. Some advocated involvement of recreational fishers in such a forum, others advocated those that farmed the adjoining coast to be included. One respondent suggested that a Port Liaison Committee be established at every port so that locals could look after their own area while another suggested a recreational fisher's lobby group.

"We need representation from all users to reconcile different views." - Recreational fisher.

Photo credit: L. Douglas

"[We need to] get Maori, local people and people with a good knowledge of the coast to manage the fishery. We need a local office for access to a management strategy." - Local resident and recreational fisher.

This type of approach found endorsement from a Ministry of Fisheries representative:

"The expectation is that what we should head towards is stakeholders and iwi working together to identify rules they consider appropriate... Increased decision-making capacity of locals. This should leave the government to set high-level boundaries." - Ministry of Fisheries officer.

There was a call by some for co-management.

"We need a joint partnership with Maori, district and regional councils and central government." - Tangata whenua.

"Tou Rou Rou

Taku Rou Rou

Ka ora ai te whanau

Ka ora ai te hapu

Ka ora ai te iwi

'with your basket of knowledge, and my basket of knowledge put together.' An ancient whakatauki with modern day value." – Tangata whenua.

"We need to ensure co-management of coast by DOC and Council does not leave gaps... Deal with coastal issues on a continuum – councils [should be] working alongside [each other] or together rather than in isolation."- Local resident and environmentalist.

A couple of respondents saw value in identifying a common goal between all the parties involved in coastal management, not just the agencies.

Kai Iwi circa 1920

Credit: Wanganui Regional Museum

"Many people want sustainability for the environment. But we all have our own interests. The trick is someone listening really well who is able to pull this together into a common goal that all parts of the community can buy into. Make it robust and sustainable. [Find someone] who can listen best and put it together best. The commercial aspect is the biggest problem. And this applies within Maoridom too." –Tangata whenua.

Some wanted to see locally relevant management approaches, e.g. approaches that took into account the small size of mature paua in the region. One suggested establishment of areas with specific management goals. User pays was also mentioned.

A few respondents felt management would be improved if statutory management areas could be broken down.

"One way to improve fisheries would be to have sub-areas within existing areas in the quota system for more accurate localised Totally Allowable Catch (TAC) management." – Commercial fisher.

"It would be nice to think it could be managed as a separate area – rather than as part of the wider area. Perhaps if recreational fishers had a little more say when we could sense the decline in the fishery before it is let go and then have to fight to get it back. At the fishing club we get feedback all the time – could use this to build up a picture from the boating committee, then get a recommendation written out on behalf of the club to go to someone who could do something about it. In this way we could contribute to managing the resource properly at the local area." - Recreational fisher and diver.

Several people identified that the sustainability task carried a degree of individual responsibility.

"Look after the fish. Take only enough for a feed." - Local resident.

The need for good governance was mentioned by some respondents.

"We need to see honesty and fairness by all involved to manage and preserve the coast." - Commercial fisher.

Change agency responsibilities

A few respondents suggested that there be changes to the agencies responsible for coastal and fisheries management.

Some believed that DOC should take over responsibility for inshore fisheries, as long as it was properly resourced.

"MFish haven't done enough. There was the voluntary no-trawl agreement – and they have increased kingfish size in the last 20 years but [it's] not good enough. Not solving the issues here [for shoreline fishing]... Would be OK if left to police it and had more staff. DOC should run inshore fishing – has big lump of it with whitebait, should do same thing it does for whitebait... MFish has enough on its plate with commercial fisheries." - Recreational fisher.

One respondent however specifically said that DOC should not be involved however.

Photo credit: L. Douglas

"Not DOC. Too many greenies. [Should be] a local authority but using the expertise of people who know what they are talking about." - Local resident.

One respondent suggested that regional councils should be involved in the policing role.

A few respondents spoke of establishing a 'single agency' approach to coastal management, with the major benefit of reducing confusion. The Local Government Act was seen as a potential route for achieving this.

"A single agency with responsibilities, for instance under the Local Government Act, [you] could allow a regional council to apply RMA [Resource Management Act] processes to the whole area... Look at the RMA system – it's worked on land. This approach to coastal management could allow integration both beyond the 12 mile limit and within."- Regional council officer.

The division of coastal management responsibility between DOC and regional councils was commented on by one respondent.

"[It] doesn't help having DOC dealing with restricted coastal activities (RCA's)." - Regional council officer.

A Department of Conservation officer highlighted recent developments with a national Marine Protection Area Strategy which anticipated DOC and the Ministry of Fisheries working with regional forums that would include regional councils, iwi and stakeholders to look at ways of progressing marine protection. This is further discussed in Chapter 22.

More communication and consultation

Better communication and consultation between all the parties was highlighted by quite a group or respondents. Several ideas were put forward, including:

- the need to keep talking;
- a need for public discussion in an open forum;
- the need to identify ways to keep everyone informed, e.g. through a mailing list, or something like this project; and
- the importance of proper consultation.

"When people stop talking, they find differences come up and things get confused. And emotion comes into it – because it's fishing. Even if we disagree we still need to talk. Sooner or later we will find common ground." - Ministry of Fisheries officer.

"More often than not the main view is the same thing just coming from different directions." – Tangata whenua.

"We need to recognise that all cultural views have a similar element – that values of recreational use are sympathetic to conservation use." - Local resident and naturalist.

"Talking to people (such as this project) is a good way of compiling information. It encourages people to think more about the information they have... We need to make people think about the environment – so they don't take it for granted." - Former commercial fisher.

In particular, the need to bring commercial fishers and recreation fishers together was mentioned specifically by a couple of respondents. Others mentioned the need to include oil companies.

"Get them to work together to solve problems." - Former commercial fisher.

Whilst there was a strong call for consultation to include all the parties, there were some differences of opinion over just what this meant. A couple of respondents wanted stakeholders consulted first, with others later on. These respondents wanted the rights of fishers, particularly recreational fishers recognised ahead of others who don't use the resource.

"We should be investigating 'rights based' systems. We need to structure processes and organisations that allow decisions at the right scale. We need to get those who don't normally get involved to where they can be involved, and accountable." -Recreational fisher and diver

There was a concern among a few respondents that their views wouldn't be taken into account.

"You can influence the local council but not the regional council." - Commercial fisher.

"You feel that even if you had a view, it would not be listened to." – Tangata whenua.

Quite a number of respondents felt that people needed to be prepared

to reach an agreed position. Suggestions for achieving this included negotiating an outcome, or entering into some form of dispute resolution. One respondent suggested getting everyone to buy into a written goal.

"Depends on what they want for the coast... I like to see fairness. You can't please all of the people all of the time." - Recreational fisher.

"I'd like to see the differences between us and the people who couldn't care less reconciled – I'd like to see the public protecting the resource instead of exploiting it." - Local resident

"Everyone should have a part in conserving fish stock." – Charter boat operator.

"... Get all of the community engaged, where everyone has to buy in and agree in print what their vision is... we need to manifest this into a written vision that answers 'what are we trying to achieve here?'" - Tangata whenua.

A couple of people also felt achieving this would take quite a long time, and that timeframes should reflect this.

"It is achievable. Our [iwi vision document] took seven years but we got there. Sometimes we are too constrained by timeframes to drive this sort of process... we need to take away the timeframe." - Tangata whenua.

More education and awareness

Quite a significant group of people felt that there was a need for education as a means of increasing awareness as part and parcel of resolving differences.

Two key aspects were highlighted – the need for education about the resource and risks to it, and the need for education to understand other users of the resource.

A couple of respondents were concerned about the 'false blame' often put on commercial fishers, and sought more education, starting with boat clubs, to overcome this.

"A lot is blamed on 'trawling' when it actually isn't occurring. Many boats people see are set netters – a huge difference between set nets and trawlers and what they do. Sometimes they are crayfish boats. These are rigged up in a way that makes them look like trawlers but they are actually crayfish boats. They go in 30-40m off shore and people think they are trawling. People also get confused when boats are trolling (running lines run off the back for tuna)...Set netting involves a lot of laying and picking up gear. Boats doing this may well have trawl gear on board...There was even confusion over the Tangaroa! [the NIWA research vessel]. We need a programme to educate – fishing clubs first, talking together." - Ministry of Fisheries officer.

"It's about educating people. The people fishing off here [Patea] are mainly locals. If they look after it, it can stay the way that it is." - Recreational fisher and diver.

"A knowledge of past history – and possible problems in the future

– should be discussed with all the interested parties." - Former commercial fisher.

"We need to re-sensitise New Zealanders to the value of New Zealand heritage and its environmental worth. This is a societal responsibility. My hope is that all New Zealanders would want the same for the environment to be available for use but to be protected. We tend to take things for granted and don't view them for the treasures that they are." - Local resident and naturalist.

Photo credit: L. Douglas

" We need to raise the awareness of the whole community of the special values of this coast, and how we all need to work together to protect representative bits of it for future generations. Wanganui, for example, has generally turned its back on its coast, and doesn't see itself as a 'beach-side' town." – DOC officer.

"People have to be made aware of the commercial fishers' right to catch the quota." - Commercial fisher.

"[We need] more education of everyone about retaining fish stocks – tossing rookies back. That's the rules." – Recreational fisher.

"People need to be educated regarding how to care for coastal flora and fauna." - Former commercial fisher.

Maori fishing traditions were seen as having something to offer here.

"Maori traditions are useful. Leave it as you found it." – Recreational fisher.

A couple of respondents wanted better education of families and children about the values of their local beaches.

"I think for the benefit of the next generation someone starts a club where kids can join and learn to protect our environment. If no one looks after it, it'll get worse." –Recreational fisher.

"I want to see kids of the next generation helping their environment improve with their help with planting more native trees and protecting animals. I want to see the South Taranaki coastline protected better and actually see people, children helping." - Local resident.

More enforcement

A number of respondents wanted to see MFish better resourced so that it could carry out more surveillance and monitoring, therefore more effectively policing the fishing regulations. Better resourcing of the inshore fishery was specifically mentioned. Having people permanently in local areas, even on a part time basis, was seen as one possible option.

"There should be someone with local presence being kaitiaki for regulations and reserves."- Regional council officer.

Someone else wanted to see it made easier to contact MFish.

In a call for more prosecutions, some respondents also wanted the law improved to enable this.

"I'd like to see MFish checking bag limits. Certain fishermen and some divers are known to over fish frequently and they are never caught. This needs to be monitored." - Diver.

The need to manage the summer influx was discussed.

"Target competitions in summer, beach festivals etc. Amazing what a marked vehicle does. Makes people compliant."- Ministry of Fisheries officer.

The need to enforce customary take was also mentioned, including a need for improved laws governing this area.

The need for better policing of quota was also raised.

Base decisions on factual information

The importance of having discussions about future management based on factual information or 'hard data' was emphasised by quite a few respondents.

"If they don't agree with the evidence they are only looking after themselves." Recreational fisher.

"Good technical data, at the scale relevant to the area being managed, is important in making management decisions." – DOC officer.

The potential of commercial fishers to provide some of the factual data was acknowledged by several respondents.

"[In our current project] the parties that can affect the environment are not there. What would be really good would be to have commercial fishers involved. What they say should be fact." - Recreational fisher.

"Recreational fishers don't fish very much – hours with hooks in water is what it's about... consider three rods and three hours a day – the equivalent of about 50 hooks. Compare this with 5000 hooks in the water for 3-4 hours – that is 15-20000 hooks in just one day. Thus most recreational fishers don't have a concept of what is going on. Whereas commercial fishers will have a very good understanding of what is out there.... On an average day you will have 25 km of line out." - Former commercial fisher.

Ideas for marine protection

A few respondents wanted to see a marine reserve or exclusion area established.

"I'd like to see a marine reserve to give fish a chance to breed, and an opportunity to watch what happens in the area, so we can understand it better." - Local resident and environmentalist.

"I would be quite happy to see a reserve." – Diver.

"By creating exclusion areas, everyone would be excluded. I have a reserve area mapped out in my mind for this. It is a logical place with defined boundaries." – Recreational fisher.

"A protected area would populate the nearby surrounds once the reserve is 'full' of species." - Diver.

Most of those who indicated support for some sort of marine reserve favoured a small reserve that did not affect on-shore fishers.

"Potentially a small reserve area to try and maintain fish population. Don't stop surfcasters." - Recreational fisher.

The North and South Traps were mentioned as a possible site by a number of respondents.

"The North and South Traps do need preserving. They are almost the icon of the area, quite a goldmine." - Former recreational fisher.

"A small marine reserve – maybe around shell rock areas – such as South Trap – probably needs to go out from Snapper rock – doesn't need to be that big an area." - Regional council officer.

Another person favoured a marine reserve at one of the Traps but was concerned it couldn't be properly policed. While another person was concerned that establishment of a marine reserve would transfer pressure to other areas with detrimental effects, for example if one of the Traps became protected whilst the other was not.

The purpose of a reserve was important to some respondents.

"Reserves are OK for monitoring but not for a no take approach for recreational fishing." - Recreational fisher.

"Marine reserves will do nothing. You're talking about hook time in water. Compare 15,000 – 20,000 hooks in the water from a commercial fisher with even 100 boats recreational fishing – they wouldn't put anything like this in the water. Recreational fishing has a negligible impact." - Former commercial fisher.

It should be noted, however, that quite a few respondents specifically stated that they did not want to see a marine reserve established. Management options, including voluntary approaches or catch limits and other such measures were seen as more favourable.

"A fishing reserve would make life unfair for surfcasters and locals." - Local resident.

"No reserves please. It is naturally protected." - Recreational fisher.

"You'd never get a marine reserve through. You'll get shot by the Maoris. What can you do? There are more boats every week!" - Former commercial fisher.

One respondent summed up the dilemma quite eloquently:

"A marine reserve is like a rubbish dump or a prison. We need them but nobody wants one on their back door."- Recreational fisher.

A handful of respondents discussed parks or protected areas. One sought that DOC or MFish should take steps to establish a marine park. A benefit seen of marine parks was that they would enable local people to set the rules.

Ideas for changing recreational fishing management

Some people believed that recreational fishing should be afforded preferential status or the area designated for recreational fishing only.

Photo credit: J. O'Leary

"In my view, NZ recreational fishers should have priority right to catch the fish and the surplus caught for export." - Recreational fisher.

"Our fishing resource is one of our last natural resources. The value of this resource is huge and the recreational potential is larger than the commercial catch. Having a good sustainable resource will bring in more money than commercial fishing." -Recreational fisher.

"Save it for recreation fishers while it is still the best fishing spot in the country." - Recreational fisher.

There was a range of ideas proposed to change recreational fishing rules. These are listed here without any attempt to prioritise them, but in accordance with how frequently the idea was proposed:

- reduce the amateur bag limit e.g., reduce the blue cod bag limit from 20-10;

"Daily limits of 20 fin fish plus 10 snapper per person are too high. No-one needs that amount."- Recreational fisher.

"Reducing the legal limit will discourage amateurs selling their fish." - Recreational fisher.

- reduce fish size limits;
- license recreational fishers;
- get recreational fishers to log daily catches. One person suggested that logs be used instead of a daily catch rate;
- one person suggested that bag weight rather than size and number be used;
- rules for gear limitations;

"Use only 25 hook long lines and 60 m gillnet." – Recreational fisher.

"Hook size needs to be increased on blue cod and long shank hooks used instead of box snapper hooks." - Commercial fisher.

- change rules for owning nets;

"You could consider licensing net owners. Would stop flounders/rig being over fished, e.g. if lose a net, can't get another one. Would take people who can't manage the net out of the equation." - Former commercial fisher.

- ban set nets for recreational fishers;
- ban long lines for recreational fishers;
- restrictions during spawning – either restrictions in spawning areas or at spawning times; and
- improve handling practices, to enhance fish survival.

"We need to encourage people to unhook in the water, to use a towel when handling fish, and to handle and release undersize fish in a way that improves their chance of surviving when they are thrown back in." - Recreational fisher and diver.

There were a few comments relating to retaining existing fishing rules:

Photo credit – P.Brommers (used with permission from S. Hornby)

- one person felt the current snapper limit was sustainable; another person thought that the ability for recreational fishers to long line should be retained, primarily for snapper.

  "We need to retain the ability to long line recreationally. It's important for catching snapper, a skittery fish." - Former commercial fisher.

- another person suggested an increase in paua take to 20.

  There were a range of area based fishing management suggestions including a system of rotation like that in place for scallops at the top of the South Island, which allows recovery of fish stocks.

"Rahui (bans or restrictions at certain times) is intuitively the better way to go – you can use it to close in the short term and then think about rules for when you reopen the fishery. Stratifying close, near and off-shore activity might also help." - Ministry of Fisheries officer.

A couple of respondents wanted seeding of fish or shellfish investigated as a means of improving the fishery.

A handful of respondents (6) sought establishment of artificial reefs. A couple of these wanted the reefs established for fishing and diving.

"Establish a few artificial reefs in the 20-30 m [depth] area."- Recreational fisher.

"I would like to see an artificial reef made closer to Wanganui, maybe off Kai Iwi." - Local resident.

Ideas for managing commercial fishing

A significant number of people reiterated their support for the quota system, although a few people discussed the importance of it being well managed, and a few wanted cuts in quota. One person didn't see much point in changing quota as a management tool, saying it was too hard to police. The quota system was seen by some as having shortcomings for inshore fishery management.

"In Area 8 the companies own quota all over NZ. They can walk in anywhere they like. Area 8 should be like the crayfish- allocated to so many boats that fish in the area. Should be locally restricted, the same as paua and crayfish." - Former commercial fisher.

"I don't have faith in the ability of MFish to manage the quota system – every large commercial fishing area is in a state of crisis or collapse. They call kahawai the 'shit fish' and just throw it away… Look at the orange roughy experience. They annihilated it…. Commercial fishing and whaling should cease now. Or be severely regulated." - Tangata whenua.

Some people expressed concern about the fisheries permit system, and the fact that permits could be issued without the need to take into account known environmental impacts. There was a call for the impacts of both recreational and commercial fishing to be quantified.

The concern also extended to the need to think more about impacts in planning or improving facilities for fishing.

"It's not about building a boat ramp… it's about what effect it's going to have beyond that, for example by fixing the area at Patea, it means better access. This will mean more people. Need to look at the bigger picture and the effect this could have." - Tangata whenua.

A significant number of people wanted restrictions on how and where commercial fishers could fish. One respondent, however, made a plea that commercial fishers not be stopped from accessing favoured places.

Other specific suggestions in relation to commercial fishing included:

- retain the voluntary 'no trawl' agreement already in place;
- replace the voluntary regime with a ban on trawling, with suggested distances varying from 2 km to 15 km;
- ban gill nets, with suggestions ranging from a complete ban, to 2-12 nautical miles off the coast;
- ban set nets;
- not allow any commercial fishers 'in close';

"There should be a blanket moratorium on commercial fishing within five kilometres because this is a nursery area."- Recreational fisher.

- reduce overall fish exports;
- restrict the areas where commercial fishers can go – one respondent suggested outside the 12 mile limit;

"There should be closer monitoring of commercial operators and introduction of a boundary, i.e., how close to shore are they allowed to fish. Have noticed an operator working approximately 40 m off Waverley Beach." – Recreational fisher.

- ban trawling – bottom trawling; 'trawling with gates and chains' and instead returning to long line;

"I'd like to see a total trawl ban inside the Graham bank for all bigger boats." - Former commercial fisher.

- minimum distance for long lining from the coast;
- vessel size limit in close;

"I would like to see set netting banned or at least pushed out to 6 miles. This would allow breeding grounds to rebuild." – Former commercial fisher.

- keep foreign vessels out; and
- prohibit taking of ironsand.

One respondent felt management responses should emphasise tighter control in the areas where commercial pressure was the greatest, and that this wouldn't necessarily be within South Taranaki.

"The snapper follow warmer water. They leave in May and come back in August. We should understand [where they go] and manage where snapper is being commercially hit – target New Plymouth and Golden Bay, not here." - Former commercial fisher.

Ideas for managing customary fishing

There was a call from a number of respondents, including iwi and other fishers, for better management of customary fisheries.

"[We need to] change the policy on Maori entitlements because the current policy is allowing stripping of shellfish." - Recreational fisher.

There was a concern that the paua fishery was mismanaged. Some wanted to see tighter policing of Maori gatherings.

"[I] don't think Maori should be able to get food for hui or tangi – [They] don't need 150 crayfish or 100 paua. It seems they get given an open permit to get as much as they like under a customary permit – it is wide open to abuse... I think daily bag limits are more than generous. There should be an emphasis on this." - Recreational fisher and diver.

One respondent suggested that a higher authority was needed to give permission for Maori customary fishing.

A number of tangata whenua believed part of the answer to this lay with regaining the knowledge the old people had. Education and the need to build respect for nature were key issues.

"We are taking on the responsibility to educate our own iwi in traditional management and everything that goes with this – the spiritual aspects and so forth." – Tangata whenua.

Ideas for managing coastal development

A couple of respondents wanted the Resource Management Act used to regulate coastal subdivision, through controls in district and regional plans. One person felt that development would self-regulate as there would only ever be a limited demand.

There was a call for consistency across councils in their approach to the rules.

"Everywhere you go, local authorities have separate rules for subdivision. South Taranaki District Council, for example, said it would revise its subdivision rules but I haven't heard anything. By way of example, there is a sandy bay at Ooanui, very natural, with dotterels and other birds. It is a valuable area. There is a DOC reserve and covenanted land. Now there are six sections for sale on the back fence. Also another development planned. I went and talked to the developer, to try and make them aware of what was there. They are now promoting it on the basis that there is a natural reserve area there. But people will bring cats and dogs. I hope we can get the people buying alongside us, and that they can become the area's protectors. They would be the greatest hope." - Local resident and naturalist.

One respondent suggested specific management steps.

"You need to have room along the coast for natural events to occur, i.e., don't build houses so close to the dunes and beach. For example, allow 500 m from the high tide line." - Local resident and environmentalist.

Ideas for managing coastal erosion

The need to update information about local erosion risk, and the potential need to revise existing risk management zones, for instance at Mowhanau and Kai Iwi, was acknowledged by agency respondents.

A couple of people put forward suggestions to reduce cliff erosion.

Some advocated using natural processes, whilst others suggested more interventionist approaches.

"Cut down the trees and do not replant dune areas. Erect signs to educate visitors and the public about the fragile nature of the beach and how it should be preserved." - Local resident.

"There is an example where there had been gravel extraction, but now is a stepped cliff which is retaining vegetation with stock excluded. It is not eroding."- Local resident.

"Lay sand sausages to trap sand – e.g. like the moles that have created the beach at Castlecliff. If you laid sand sausages perpendicular to the cliff just south of Mowhanau and by Archers Bridge it would allow sand to accumulate."- Local resident.

Ideas for managing land use affecting the coast

A number of respondents wanted changes to land use practices to reduce impacts from land on the fishery and coastal birds, plants and animals.

"[On the] farms up stream. Areas alongside [the streams] should be covenanted, e.g. whitebait habitat, where there is private land, otherwise they risk being drained. Forests are still being felled, with increased flood risks." - Local resident and naturalist.

Specific suggestions included:

- improved grazing management, e.g. stock exclusion from river banks, fencing of cliff edges;
- riparian planting;
- better management of nitrogen and phosphorous;
- encourage tree planting on cliff tops, coastal edge;
- stop the dunes being washed away;
- investigate land uses so that natural sand drift occurs; and
- establish observation points along the coast to check shifting sand and its effects.

"I'd like to see a national park strip from the mountain to the coast to provide a corridor of bush for bird life." - Local resident and naturalist.

Part II A summary of published information on the South Taranaki coast

Summary

This part of the report on the South Taranaki-Whanganui coast summarises information gathered from existing literature. Comments from participants in the research described in Part I of the report are scattered throughout. An overview is first provided of the climate, ocean, geology and biology.

The climate of this area is described as a maritime temperate climate with prevailing westerly winds and a higher than average rainfall due to the influence of Mt Taranaki. The oceans in turn are influenced by the currents spiralling off Farewell Spit, bringing nutrient rich water into the high wave environment of the South Taranaki Bight area. Undersea sand ripples, sand waves and drowned dunes are features of the seabed and influenced by both ancient geology and present day waves and currents.

Looking north around the South Taranaki Bight from Castlecliff Beach, Wanganui

Photo credit – L.Douglas

The geology of the area influences the biology. The stretch of coast from Manaia down to Ohawe beach is strongly influenced by the volcanic Mt Taranaki. From Ohawe to Castlecliff, Wanganui, the geology consists of sedimentary rock, uplifted terraces and highly erodable cliffs. This section of the study area will be referred to as the 'papa-rock' section.

There is likely to be differences in the biology between these two different geology types, although little study in the intertidal or subtidal area of the 'papa-rock' section has been undertaken. Species richness across the whole area is described as low, a by-product of a rugged high energy physical environment, and yet, despite this, a rich fishery is reported.

Existing literature about resource use along the coast is summarised. There is little quantitative information on the level of recreational fishing in the area. Surveys on recreational fishing are carried out by the Ministry of Fisheries, but at a nationwide scale. The Ministry of Fisheries also gathers data on commercial fishing, but again, much of that is gathered at a larger scale than just this study area. The area has a rich history of commercial fishing that has included whaling and the birth of New Zealand's deep sea fishing industry. Other marine resource use in the area includes some oil and gas exploration, black sand mining

and limestone extraction.

Taranaki Regional Council undertakes extensive monitoring of both the state of the coastal environment and of specific coastal permits (discharges). Monitoring tends to conclude that the region has excellent coastal water quality which compares well with other regions in New Zealand. Gaps in monitoring, such as monitoring of the Wanganui wastewater discharge, are identified.

The final chapters in Part II summarise the current management structure for managing the coast in terms of the responsibilities of the different agencies and tools that are available for changing management. The report then concludes with chapter exploring recommendations for 'where to from here'.

12 CLIMATE

Introduction

Climate is important as it has a major bearing on the use of the coastal environment, as well as shaping the features of the environment itself.

The coastal region of South Taranaki is, like much of the rest of New Zealand, a 'maritime temperate' climate, with no great extremes between summer and winter.

The area is located in central New Zealand, and typically the weather patterns are characterised by the eastward migration of anticyclones at five to seven day intervals, separated by low pressure troughs.

Photo credit – L.Douglas

Anticyclones account for settled conditions, which occur about 25% of the time with the rest of the weather being determined by the low pressure systems.

Topography influences local weather patterns, particularly the cone of Mt Taranaki. This means that parts of western Taranaki have quite high rainfall, whilst its rain shadow to the east means other areas are drier and sunnier.

"The weather protects this coast." -Many recreational fishers.

"Every day is a good day if the weather is right." - Recreational fisher.

Wind

Prevailing westerly wind

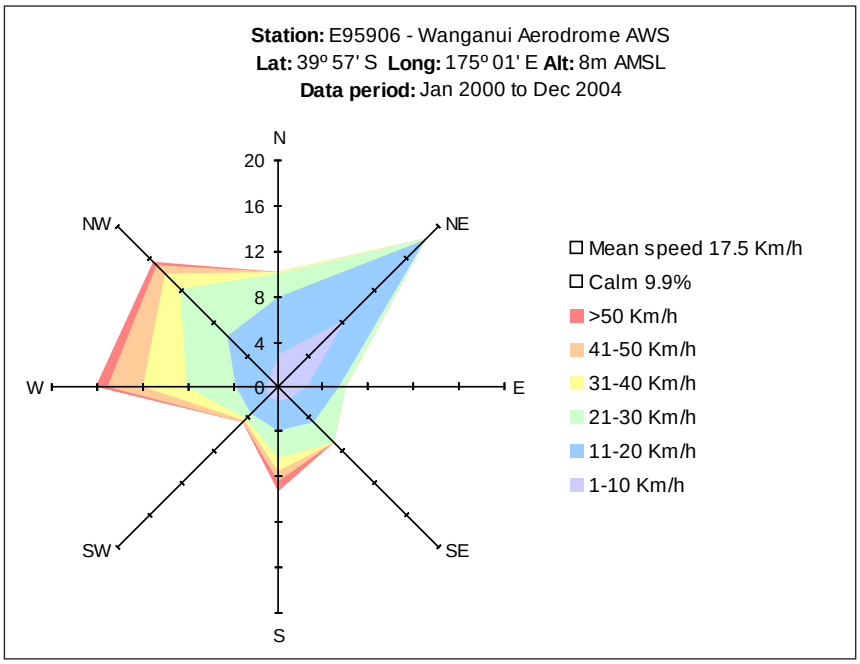
The region is directly exposed to the prevailing westerly airflow, and is known as one of the windier parts of New Zealand.

Wind records taken at Patea show that westerly winds tend to predominate during spring and summer and northerly winds predominate during autumn and winter.[51]

The strongest winds tend to be from the westerly direction.

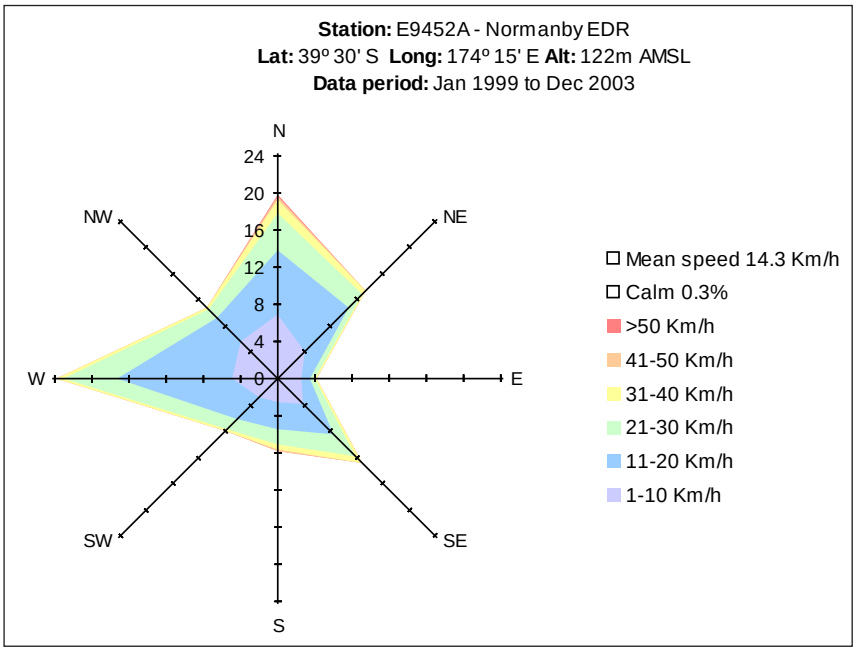
Wind rose data for Wanganui Airport and Normanby show a significant variation in average wind direction between the northern and southern parts of the study area.

FIGURE 3: WIND ROSE FROM WANGANUI



Source NIWA

FIGURE 4: WIND ROSE FROM NORMANBY



Source NIWA

Influence of El Nino and La Nina

Patterns are further modified in response to El Nino/Southern Oscillation (ENSO) events, whereby an El Nino event typically results in a west-southwest anomaly superimposed on the "normal" wind conditions, causing strengthened and more frequent west- southwesterly winds.

For a La Nina event the opposite is generally true, and this results in an east-northeasterly wind anomaly.

Interpreting Wind Rose Diagrams

- The wind rose diagrams show the percentage frequency of winds of various strengths for the eight compass points, in a 'footprint' pattern.
- The extent of the 'footprint' along each axis, gives the overall frequency from that particular direction.
- The width of each colour along the axes gives the frequency of winds within the strength range represented by those colours.
- North, east, south and west directions cover 50 degree sectors (e.g. east: 070° to 110°), while northeast, southeast, southwest and northwest directions cover 40 degrees (e.g. southwest: 210° to 240°).

Source: NIWA

Seasonal variation

The path of anticyclones across New Zealand shows a seasonal variation with their influences extending further South during summer and autumn months.

"The past three years have been a lot rougher than the previous four years. The direction of the wind has changed – we got out more often in our smaller boat that we had before, than we do now with our bigger boat!" - Recreational fishers.

Influence of topography

The airflows in the greater Cook Strait region (within which the study area falls) are influenced strongly by topography, and for this reason, it is difficult to generalise wind conditions offshore from weather stations onshore.

However, studies done for the Kupe Gasfield development area, indicate that wind measurements from the offshore Maui platform are likely to be representative of the Kupe location, which is within the study area.[52]

The wind from the Maui platform indicates that the predominant onshore winds in the study area are likely to be west and southeast.

Rainfall

Two key factors influence rainfall on the South Taranaki coast. These are exposure to moist westerly airflows and the influence of Mt Taranaki.

Exposure to moist westerly airflows

As the region is located in central New Zealand and on the west coast, it is directly in the path of prevailing moist westerly air masses. As a result, rainfall is higher than the average for the rest of New Zealand.

The influence of Mt Taranaki

The western most parts of the South Taranaki coast are in the lee of Mt Taranaki, and therefore subject to what is called a 'rainshadow' effect. Moist westerly winds are forced to rise, and therefore lose their moisture as rain on the exposed side of Mt Taranaki. Those areas closer to the mountain have slightly higher rainfall than those further away.

TABLE 7: SOUTH TARANAKI RAINFALL

LOCATION	AVERAGE ANNUAL RAINFALL (MM)
Hawera	1176
Patea	1159
Wanganui	906

Source: Hawera, Patea figures, Taranaki Regional 2003a; Wanganui figures, Horizons Regional Council 2005.

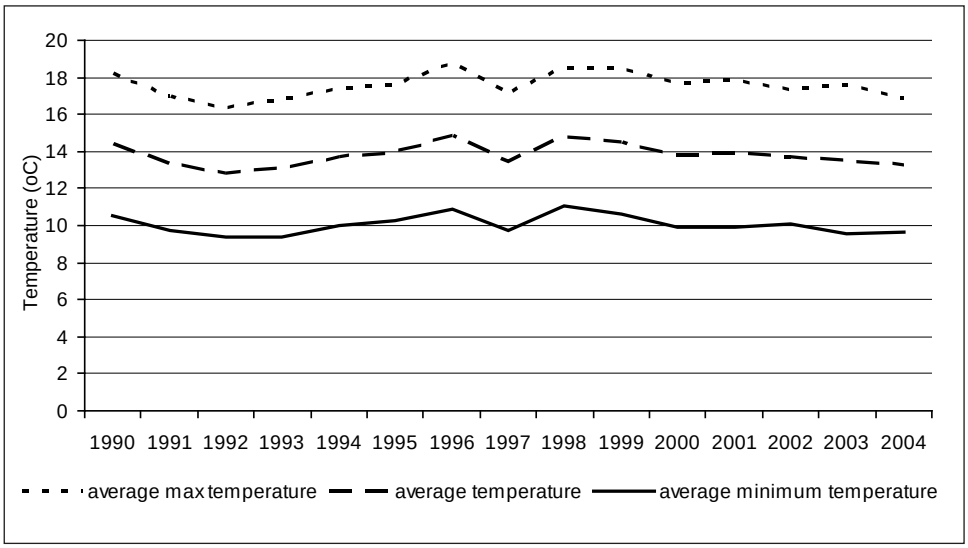
Temperature

Mild climate

The mild climate of the South Taranaki area sees it having an average temperature of about 14 degrees (taken at Wanganui Airport).

"The nights are colder. The days are still hot, but it gets colder quicker on the beach." - Recreational fisher.

FIGURE 5: DAILY AVERAGE TEMPERATURE FROM WANGANUI AIRPORT BETWEEN 1990 AND 2004



Source: NIWA

13 THE OCEAN

Introduction

A number of factors affect the seas of the South Taranaki Bight. These include tides, currents, waves and water temperature. These factors, in turn, are influenced by topography and climate. The oceanography of the area is very complex, featuring upwellings and strong tidal flows.[53]

This chapter summarises information known on the following topics:

- seawater;
- waves;
- tides; and
- currents.

Seawater properties

The seawater in the South Taranaki Bight has a number of features that affect the marine plants and animals that live there. In particular, nutrients are brought into the area by cooler currents spinning off Farewell Spit. Those nutrients are then used by microscopic algae to grow, which are then fed on by microscopic animals that are in turn fed on by fish.

Water temperature

The water temperature near the seabed on the continental shelf, around about 100 m deep, stays fairly constant at about 13.5°.[54]

Average temperature over the surface of the ocean off the Patea coast has been reported to range from 19° in summer to 13° in winter. These temperatures decrease towards the south.[55]

"I think the sea temperature has changed. I've seen quite a few tropical fish offshore that I have never seen in the past." - Recreational fisher.

Thermal layering

During settled periods of weather in the spring and summer months, thermal layering of the water column occurs over a large portion of the Western Cook Strait, including the study area. It is caused by solar heating of the upper water column. On the continental shelf, this usually breaks down by late autumn, when the water column becomes isothermal (meaning that the temperature is more or less the same throughout).

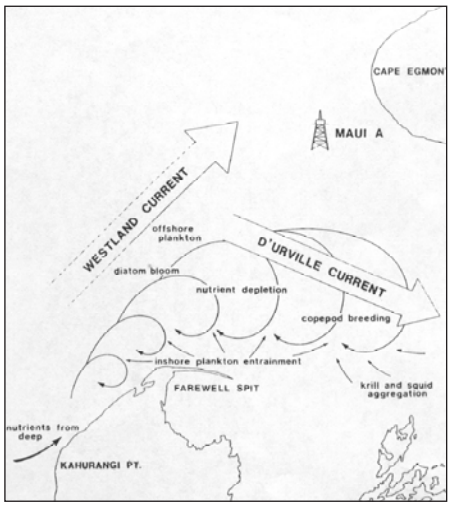
As stormy weather can occur at any time of the year, it can quickly cause significant vertical mixing, breaking down any layering that might have been caused by warmer water sitting on top of cooler water. As a result, the water might not be layered into warmer/cooler sections. However, this can occur during settled periods of weather during summer months.

Upwellings of cold nutrient-rich water

The temperature regime of coastal waters, unlike the deep ocean, is influenced by upwellings of water. Upwellings are cold, often nutrient-rich waters from the ocean depths which rise to the surface. This can happen when strong, usually seasonal, winds push water away from the coast, bringing cold, nutrient-rich deep waters up to the surface.

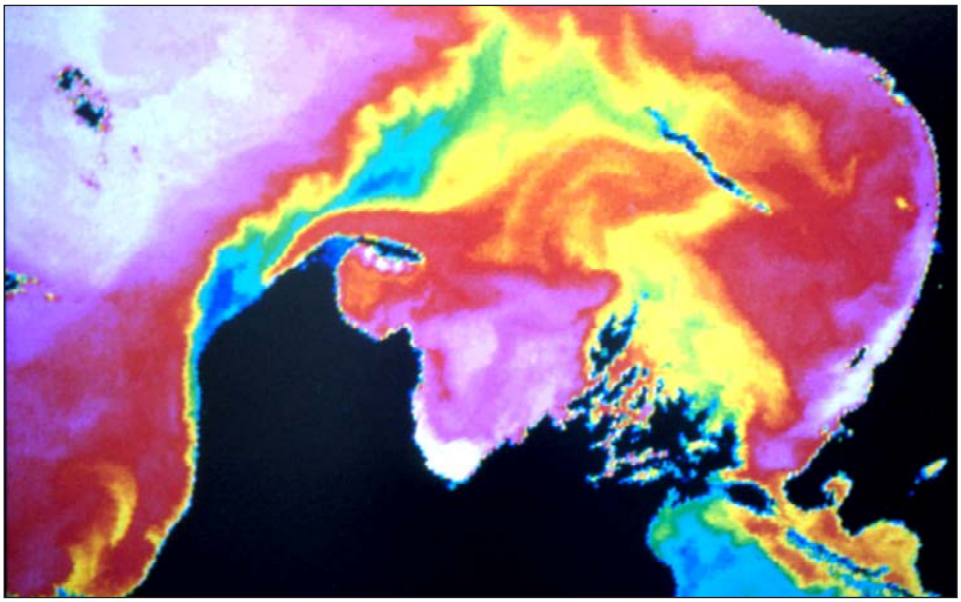
The South Taranaki Bight is known to be affected by upwellings that originate off Cape Farewell from the Kahurangi shoals. It is thought that currents from Westland flow past the Kahurangi shoals and around Farewell Spit resulting in meanders and eddies.

FIGURE 6: SCHEMATIC REPRESENTATION OF THE BIOLOGICAL EVENTS RESULTING FROM THE UPWELLING OF COLD, NUTRIENT-RICH WATER AT KAHURANGI



Source, McComb 2004 from Bowman et al., 1982

FIGURE 7: CZCS SATELLITE IMAGE OF SEA SURFACE TEMPERATURE SHOWING UPWELLING PLUMES OF COLD WATER BEING SHED AS VORTICES FROM THE KAHURANGI SHOALS / CAPE FAREWELL



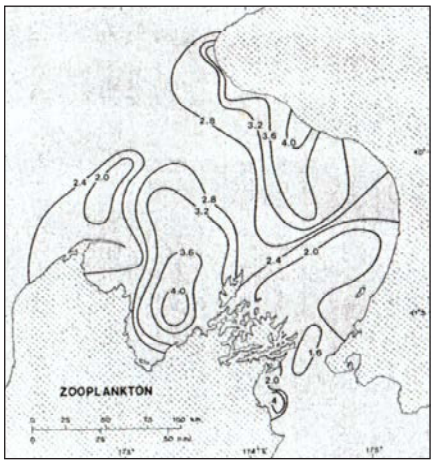
(Photo courtesy of P.McComb)

"Pulses" of the upwelled water in these eddies are rich in nutrients and so grow phytoplankton (microscopic algae). The eddies move towards the South Taranaki Bight. As they move, the nutrients in the water are used up so by the time they get to the South Taranaki Bight they are rich in phytoplankton.

By comparison with other parts of New Zealand, the greater Cook Strait region is very productive, with high levels of nutrients and phytoplankton that form the basis of the food chain and so are important for the fisheries.

As a result of the high phytoplankton levels, zooplankton (microscopic animals that feed on plankton) levels in the South Taranaki Bight can be more than four times as great as in all other New Zealand continental shelf areas, and six and a half times greater than the North Taranaki Bight.[56]

FIGURE 8: DISTRIBUTION OF ZOOPLANKTON (>0.2 MM) EXPRESSED AS THE LOGARITHM OF THE WET WEIGHT CONCENTRATION (MG.M-3) IN JANUARY 1980.



(Source: McComb 2004 from Kibblewhite et al., 1982).

"While scuba diving off Ohawe beach in August 2005, I noted that the water column, from the surface down to 20 m was thick with plankton (clearly jelly type with a black centre), some formed strings up to a metre in length." – Diver.

The wave environment

Introduction

The South Taranaki Bight has what is known as a 'high energy wave environment.' There are two main types of waves that influence the area:

- ocean generated waves, which have been formed far away; and
- wind generated waves, which are generated locally.

These two types of waves, along with other factors such as climate and topography, influence the wave environment both on and offshore.

Understanding ocean generated waves

The South Taranaki Bight has high exposure to waves that originate in the Tasman Sea and Southern Ocean. The waves tend to be 'long-period' waves which means that they tend to be larger and stronger compared to 'short-period waves' which are smaller and less energetic. They also are typically fairly uniform in shape and usually travel in sets, with some distance between each one. When measuring this distance in seconds, the time lapse between ocean waves observed in South Taranaki is around 12 to 14 seconds.[57]

How rough the waves are depends on the season. The waves are most energetic in August, and least energetic in February. Storm waves can occur any time of the year however.[58]

As these ocean waves from the west and southwest approach the coast, they lose height, get further apart and approach the Whanganui Coast more or less shore-normal (i.e. at right-angles to the seafloor contours). This occurs through a process known as wave refraction where the direction of a wave is changed when it moves into shallow waters at an angle to the seafloor contours. The shallow depths for considerable distances offshore influence this.[59]

Waves reaching the shore are still sufficiently large to subject the coast to a moderate to high wave energy attack.

Ocean generated waves contribute to long-shore drift

Although waves arrive more or less normal to the shore, there is an imbalance of wave energy between north and south[60]. This, combined with the coastal currents that also operate in the north-south direction, mean that there is a strong littoral movement of sediment down the coast in a southeast direction. [61,62]

Energy in the waves at Kai Iwi

The process of wave refraction reduces the energy a wave has. Therefore the less 'refracting' it does before arriving at the coast, the more energy will be left when it actually breaks on the shore. In this way one expert observed that the place that would be getting the maximum energy during westerly waves along the coast, is in the vicinity of Kai Iwi stream.[63]

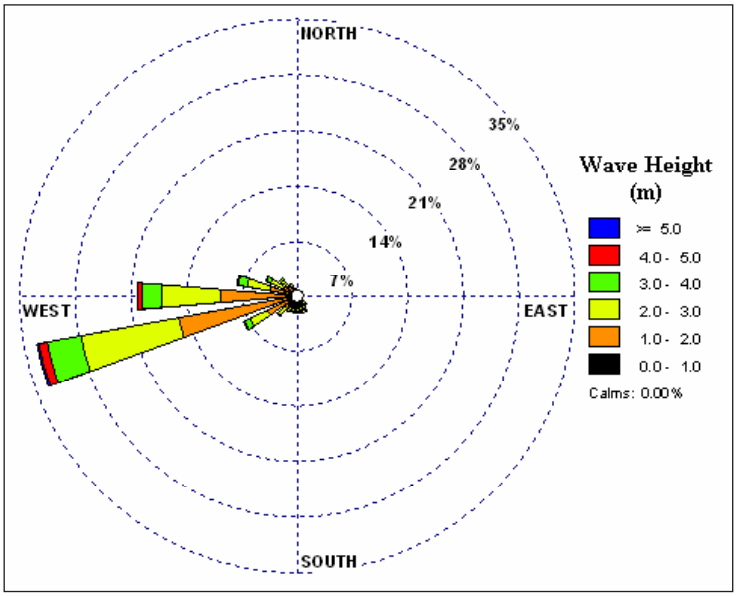
Understanding locally generated waves

The South Taranaki Bight is also exposed to locally generated waves, caused by the wind, predominantly from the southeast.[64] These waves are the ones responsible for the 'chop' to be seen on the sea in windy conditions.

General wave characteristics

The wave pattern along the coast is very regular, being dominated by southwest winds. Figure 9 illustrates that wave height is generally between 1 and 3m, although this can increase 3-fold during storms.[65]

FIGURE 9: ANNUAL WIND ROSE FOR THE ROLLING GROUNDS (OFF THE COAST OF PATEA) SHOWING WAVE HEIGHT AND WIND DIRECTION, DERIVED FROM AN 8-YEAR WAVE HINDCAST.



Source: P. McComb, Metocean Solution Ltd (ww.metocean.co.nz)

Wave characteristics at Ohawe

Based on information from a variety of studies, the characteristics of the waves at Ohawe have been described[66] (see Table 8).

TABLE 8: WAVE CHARACTERISTICS AT OHAWE

CHARACTERISTIC	SITUATION AT OHAWE
General wave environment	A mixture of locally generated storm waves and longer period ocean swells generated by storms to the south
Wave direction	Primarily from southwest to southeast This is due to wave refraction
How often it is calm	10% of waves are less than 1 m high
Average wave height	1.3 m high Waves 10.23 seconds apart. Breaking waves of 4 m height were observed
Dominant deepwater wave (most frequently occurring)	Approaches from south to south-west About 1.0 to 1.3 m high Waves 6–8 seconds apart
Average deepwater storm wave height	Wave height of about 2.7 m Some waves measured at 11m high

Source: Single, 1996

Wave characteristics at Whanganui

The characteristics of the waves at Whanganui have also been described by various authors. Even though the data allows only an incomplete comparison,

it is evident there are some differences with conditions at Ohawe. The features for which information was available are summarised in Table 9.

TABLE 9: WAVE CHARACTERISTICS AT WHANGANUI

CHARACTERISTIC	SITUATION AT WHANGANUI
General wave environment	Most (~75%[67]) waves appear to have been locally generated[68] Mean wave period is 10.1 s (range 3.5 s to 19 s)
Wave direction	~42% approach from the west ~24% from the south ~34% approach normal to shore[69]
Mean deepwater storm wave height	The Sedco rig offshore of Whanganui recorded a wave in excess of 10m.[70]

Source: Burgess, 1971; Macky, 1991; Shand & Shepherd, 2003.

How the waves impact on the seafloor

A number of 'bedforms' on the seafloor are attributed to the influence of waves and currents. Sand ridges, sand ribbons, mega-ripples and sand waves have been identified in depths of up to 60 m off Whanganui. These are the result of waves and currents. Research conducted in the 1970s suggested that such is the energy of waves and currents on this coast, that the waves have the potential to affect the seafloor at even greater depths. Waves have the potential to stir sediments on the inner and middle continental shelf (< 70 m deep) during annual storms and probably down to 130 m depth during the maximum 25 year storm.

Currents

The west coast of New Zealand is affected by a number of currents (Figure 6).[71] The warm D'Urville current flows west from the Tasman current into the South Taranaki Bight. This current has never been measured (P.McComb pers com).

Along this coast, about half of the currents are due to tide, the rest are caused by local winds and some coastal-trapped waves (P.McComb pers com).

"The southerly brings the clear water in." - Recreational diver.

Tides

The Cook Strait region is known for its unique tidal environment. When it is high water at one end of Cook Strait, it is almost low water at the other end. This results in a significant difference in sea level that then drives strong tidal flows through the strait and complex water circulation patterns to the west, up into this area.[72]

The central west coast of New Zealand has the highest tidal ranges. The Whanganui coast is characterised by a neap tidal range of 0.8 m and a spring tidal range of 2.4– 3.2 m. Neap tide is a tide that occurs when the difference between high and low tide is least, i.e. the lowest level

of high tide. Spring tides are the exceptionally high and low tides that occur at the time of the new moon or the full moon when the sun, moon, and earth are aligned.

This concurs with tide data given for the Waitotara area of between 2 and 2.5 m for spring tides and 1 and 1.5 m for neap tides.

"It's difficult to dive [the Traps] between tides because of strong currents – 4-5 knots at times. It's best to dive at the top or bottom of a tide and that hour either side of the tide changing." – Diver.

"Another feature of the Traps is that there can be murky water on top, but clear water further down."- Diver.

14 LANDFORM AND GEOLOGY

Prepared by Felicity Maxwell.

Overview

The 'volcanic coast'

The study area can be divided into two distinct geological sections. The western section of the study area – from Manaia down to the Waingongoro River, is strongly influenced by the volcanic cone of Mt Taranaki. It will be referred to as the 'volcanic coast'. Eruptions have built up a ring plain around the volcano. The sea cliffs in this section of the study area are composed of hard volcanic rock derived from Mt Taranaki.

There is also an extensive bouldery reef that extends some distance offshore in this section.

The 'papa-rock coast'

In the majority of the study area, from Castlecliff up to the Waingongoro River, the countryside comprises low hills of sedimentary rock, and uplifted terraces formed by the sea. The coastal cliffs are comprised of soft and easily eroded sedimentary rock - mainly mudstones and sandstones. This rock is commonly referred to as 'papa' rock, and so for the purposes of this report, this section of the study area will be referred to as the 'papa-rock coast'. The shoreline is one of sand beaches with some papa reefs.

In this chapter

This chapter contains the following topics:

- how the landscape was formed;
- coastal processes of the papa-rock coast ;
- features of the papa-rock coast; and
- features of the volcanic coast.

How the landscape was formed

Important geological phases

The geological evolution of the region occurred in several major phases. These include the laying down of the sedimentary rocks, followed by tectonic uplift and then the formation of marine terraces and river valleys. The eruption of Mt Taranaki was also important in structuring this area.

Deposition of sedimentary rocks

Several features are important in understanding how the deposition of sedimentary rocks has shaped the landforms and seafloor of South Taranaki. These include the South Taranaki Basin, the Taranaki Fault and the Whanganui Basin. These are described below.

The South Taranaki Basin

The land that forms the Taranaki Bight has not always been where it is now. Some 80–65 million years ago in the Cretaceous Period, when New Zealand started drifting away from Australia, a sequence of rocks began to accumulate on top of hard basement rock in a sedimentary basin that opened up between the two continents.[73]

That basin continued to develop and collect marine and terrestrial sediment over the following tens of millions of years. The basin, known as the South Taranaki Basin, is now situated westward of a major fault line called the Taranaki Fault.

The Taranaki Fault

The Taranaki Fault is buried several kilometres below the surface. If a line were drawn from the fault up to the surface, it would intersect the coastline near Hawera Township. Up to 7 km of sediment collected in the South Taranaki Basin next to this fault.[74]

The Taranaki Fault brings a ridge of hard basement rock called the Patea-Tongaporutu High to a relatively high level, next to the sedimentary rocks.[75]

The Whanganui Basin

From around 5 million years ago, in the Pliocene Period, when New Zealand was close to its present position, and subduction under the North Island had commenced, another sedimentary basin started to form. Subduction is the process by which one crustal plate (a piece of the earth's crust) is pushed or pulled under another.

Waiinu faultline, Waitotara Beach

Photo credit- A.Cox

This basin is known as the South Whanganui Basin. It is oval-shaped, and extends from the Taranaki Fault in the west to the Ruahine and Tararua Ranges in the east. From the north it extends from the volcanic plateau (where Mt Ruapehu is), to the Marlborough Sounds in the south.[76]

About half of the area lies offshore.[77] Up to 4 km of mostly marine sediments comprised of mudstones and sandstone, has collected in the deepest part of the basin.[78]

The South Whanganui Basin developed by the area progressively sinking to the south and rising to the north.[79] Geologists think that the development of the South Whanganui Basin is linked to subduction of the Pacific Plate under the North Island, which lies on the overriding

Australian Plate. The plate interface is apparently 'locked', and flexure or basin development in the Australian Plate is caused by major down-dragging by the Pacific Plate.[80]

During formation of the South Whanganui Basin, sedimentation continued in the area of the adjacent South Taranaki Basin, burying the older sediments it contained and also burying the Taranaki Fault.

Oil and gas field development

The conditions in the Taranaki Basin have provided all the requirements for oil and gas generation, with organic rich mudstones being the source of the oil. This is currently New Zealand's only oil and gas producing basin, and the resource has been developed over the past 45 years.[81]

Tectonic uplift

Tectonic uplift is a geological process most often caused by continental plates pushing against each other causing one plate to become elevated. Tectonic uplift has resulted in the marine rocks that were deposited in the South Whanganui Basin and over those of the South Taranaki Basin now being exposed on shore.[82]

The South Whanganui Basin continues to be uplifted at the northern and eastern margins, with continued subsidence and sedimentation to the south. Such tectonics result in a 'landward sediment source – seaward sediment sink' situation, which may result in sediment being transported off-shore.[83]

Formation of marine terraces and river valleys

Between 680 000 and 60 000 years ago, a number of seaward-facing terraces were formed by wave action at times of high global sea level,[84] cutting into the emerging shoreline.[85]

Waves eating away at the shoreline formed wave-cut benches backed by sea cliffs. A regime of net tectonic uplift[86] meant these benches, initially at sea level, were successively raised above sea level to increasing heights.

As each wave-cut platform formed, it collected its share of beach sediments – such as beach gravels, sand and shells. If sea level dropped, and when the surface was uplifted, it continued to collect sediments from the land – such as river gravels, wind-blown sand dunes, volcanic ash fall, peat and clay.

At times when sediment supply was reduced, the sediment layers stopped piling up, erosion planed off the top layers, and the terrace surface was formed.[87]

In response to the uplift, rivers also cut deep valleys through the terraces to reach the sea.

Eruption from Mt Taranaki

Mt Taranaki became active at some time before 130 000 years ago, erupting volcanic rock with a composition known as andesite. By about 100 000 years ago lahars (flowing from Taranaki) and breccias (rock composed of sharp-angled fragments embedded in a fine-grained rock) were reaching the South Taranaki coast, covering marine terraces along this end of the Taranaki peninsula, and the older mudstones and sandstones. Continued eruptions, up until the last major episode about 245 years ago have built up the Taranaki Ring Plain.

Recent geological history

Global sea level around New Zealand stabilised at its present level about 6500 years ago. Since then, the sea cliffs of South Taranaki have continuously retreated.[88] Beaches, reefs and sand dunes have formed, and the landscape has taken on its current form. There has been rejuvenation of some fault zones.[89]

The coastline is still actively uplifting. Uplift rates increase the further inland one goes from the present coastline. At Mowhanau Beach, the estimated uplift rate is 0.3 m/1000 years.[90]

The role of rivers and streams

Rivers and streams make their way to the coast, running over the Taranaki volcanic ring plain in the west, and through highly dissected mudstone and sandstone country in the east.

The smallest streams drop over the cliff edge in waterfalls. Larger streams and rivers break the line of cliffs – some having cut narrow gorges down to the sea, others have wider valleys bordered by river terraces.

At the mouths of some rivers, sand dunes have drifted inland. In a few places dunes or sandbars have allowed formation of shallow lagoons. Sand has also blown up onto the cliff tops and a considerable way inland forming large distinctive dunes. Offshore the seafloor is mainly sandy.

Coastal processes of the papa-rock coast

Geological features of importance

The geological features of importance along the mudstone and sandstone-dominated coast (the papa-rock coast) include uplifted marine terraces that extend from Hawera to Wanganui, continuous, and eroding, coastal cliffs and intermittent coastal reefs. Wind shaped rocks at Waitotara, a drowned forest and a couple of estuaries are also of scientific significance.

The uplifted marine terraces

A series of marine terraces that have been uplifted over time are a significant geological feature of South Taranaki.[91] They form a 20 km wide coastal strip from Hawera to Wanganui, with remnants occurring at up to 300 m altitude.[92]

This is New Zealand's most complete sequence of uplifted marine terraces, and are some of the best preserved in the world. They are rated as internationally important.[93]

Sites forming part of this terrace sequence include Kai Iwi, Nukumaru, Waitotara, Waiinu, Waitotara, and Tapuarau (Hawken's Lagoon and Dunes). Good examples of the terraces can be seen at Inaha Beach, the area southeast of Ohawe Beach, and the western end of Castlecliff.[94]

Continuous Coastal Cliffs

A sweeping line of cliffs of sedimentary rock, up to 60 m high in parts, extends southeastward from the Waingongoro River.

Approaching the Whanganui River, the cliff forms a siltstone bluff about 10 m high which was historically referred to as the 'North Head.'[95] The castle-like appearance of this headland to approaching mariners resulted in the town that developed nearby being called Castlecliff.[96]

The lower parts of these cliffs expose sedimentary rocks that were deposited over South Taranaki Basin sediments and in the adjacent South Whanganui Basin. An inspection of the cliffs reveals layers of mudstone and sandstone, some with fossil seashells, and also some limestone.

The layers of sediment that accumulated beneath the sea are generally tilted at a shallow angle of 3-70 to the southeast, so that as you move in that direction along the coastline, the layers you see at beach level get progressively younger.[97]

Higher in the cliffs, marine terrace deposits such as gravels, sand and peat, can be seen lying horizontally, capping the gently dipping older rocks.[98]

Some cliff exposures are scientifically important because they are the national reference sections for certain periods of geological time (i.e. the Waipipian, Mangapanian, Nukumaruan, Castlecliffian and Haweran Stages of the Pliocene and Pleistocene Periods).

Why the cliffs are eroding

All the sedimentary rocks in the cliffs are relatively young geologically speaking, so they are soft, unconsolidated, and easily eroded.[99]

Along most of the length of the South Taranaki Coast, the cliffs are retreating, as waves lapping at the cliff base at high tide destabilise the steep faces, which then fall away catastrophically. Compounding this process is groundwater seepage through the sea cliffs.[100]

There are abundant artesian springs arising from the cliffs.[101] Seepage intensifies after heavy rain. When the top layers are saturated, they are extremely sensitive to collapse. The fallen cliff material is dumped at the back of the beach and is eventually redistributed by wave action, perhaps contributing to the formation of offshore bars.

The fallen material provides temporary relief from further cliff erosion, as it keeps the waves away from the base of the cliff.[102]

Because of the fairly uniform and non-resistant nature of the rocks along the coast, promontories or sea stacks are seldom produced. If present they are small and short-lived features.[103]

"There were three islands just off Kai Iwi... they were still there in the 1950s. Now they are mostly eroded away. The remains of the first one still has steps carved in the back that used to be there when I was a boy... there was also a low island just off the Kai Iwi Beach – at the turn of the century it was low enough that people would swim stock up onto it." - Local resident

Three stacks, Kai Iwi, 1967

Photo credit – A.Cox

Promontories may form where there are more resistant layers, such as near Nukumaru, south of the Waitotara River mouth. A layer of more resistant limestone there erodes slowly compared to surrounding sandstone and siltstone.[104]

At Waverley Beach the sea has carved picturesque caverns and ravines from the mudstone in the cliff. Such features occur at zones of weakness, such as faults or joint planes.[105] There are a few fault zones intersecting the coastline. The strongest faults trend northeastward and displace beds downward to the east.[106]

How fast are the cliffs eroding?

Erosion of the sea cliffs is episodic, and will be more pronounced in some years than others. The mostly likely conditions for cliff failure are during episodes of prolonged heavy rain and onshore wave attack from the southwest.[107]

One slip could result in the retreat of the cliff edge by 2–15 m.[108]

The longer-term rate of change can be determined if the position of the cliff face over time is known. Cliff retreat rate has been reported to be 0.4–0.85 m/year in most places, occasionally in excess of 1 m/yr.

"There has been a freshening in the cliff erosion in the last five years – probably due to the reduction in sand supply from Taranaki. Sand used to blow inland into rivers and was then transported back to the coast. Longitudinal dunes used to march across Wanganui. Now that the sand isn't re-entering the system via the Whanganui River, there is evidence of river bank erosion on the true right bank." - Council officer.

A study made in 2003 of the coastline from Waitotara to Turakina, south of Wanganui, found the most severe erosion was along the sea cliffs of the Mowhanau Beach area. High tide and waves were frequently reaching the cliff base, and despite the drought conditions, ground water was observed

Cliff erosion in progress, Pukeroa reef, Hawera

Photo credit D.Govier

seeping from the sea cliffs, contributing to the numerous localised slope failures.[109] Severe erosion in this area since the late 1990s has put houses at risk.[110] The variability in cliff retreat at Mowhanau Beach over historical times is described in the following case study in the box below.

Mowhanau Cliff Retreat

A recent detailed study of coastal cliff retreat compared reliable early survey data to data collected in a new 1999 survey. Rates of retreat were calculated for localities around Mowhanau Beach (see table below). An average net rate of retreat up to 0.8 m/yr was found.

Between Kai Iwi and Mowhanau Streams, from 1962 to 1982 the cliff base advanced, contrary to the long term trend of retreat. This can be explained by the construction of a limestone rock revetment (a facing of stone to protect the cliff against wave erosion) prior to 1982, seaward of the cliff base.

Southeast of Mowhanau Stream, rates of retreat of the sea cliffs have varied significantly this century. As a consequence of cliff retreat, a concrete gun bunker established about 1940 on the cliffs has since collapsed onto the beach.

Around a small promontory southeast of Mowhanau Stream, cliff erosion has resulted in a limestone rock structure, probably constructed at the same time as the one in front of Mowhanau village, i.e. pre-1982, being left stranded on the beach.

Southeast from the small promontory, in a shallow bay, retreat has slowed over the last 50 years or so. This is thought to be

Bunker, Kai Iwi

Photo credit – A.Cox

a temporary situation, likely to accelerate once a remnant stack and small promontory have been destroyed by the sea. At present these provide temporary protection from the full force of the waves.

Coastal Cliff Retreat Rates in the vicinity of Mowhanau Beach

LOCATION	TIME SPAN	TIME (no. of years)	Retreat (m/yr)	Average net rate of retreat (m/yr)
Northwest of Kai Iwi Stream	1962–1999	37	0.10–0.38	0.2
Near Kai Iwi Stream	—	—	—	0.1
Between Kai Iwi and Mowhanau Streams	1902–1999	97	0.3–0.5	—
Southeast of Mowhanau Stream	1902–1999	97	—	0.4
Around a small headland southeast of Mowhanau Stream	1942–1999	57	0.39–1.26	0.8
Southeast from the small headland, in a shallow bay	1876–1982 1942–1999	106 57	— 0.3–0.4	0.8 0.3
Further southeast in deep bay	1942–1999	57	—	0.5
Further southeast	1942–1999	57	—	0.3

Source: Gibb, 1999.

Intermittent coastal reefs

At the base of the cliffs, waves have cut a platform into the sedimentary rock. Mainly this is covered in beach sand, which laps up to the foot of the cliffs. However, the more resistant layers of sedimentary rock occur as reefs at low tide, and may project locally through the sand.[111] At river mouths there are no platforms as the rivers cut deep channels (as much as 9 m for the Whanganui River) which are filled with recent sediment.[112]

The largest reef is off the coast of the Waitotara River mouth.[113] The low headland southeast of the river mouth is formed of shell-limestone

faulted against sandstone to the east. The limestone extends into the sea as a series of reefs that are well known fishing grounds.[114]

Extent and formation of beaches

All along this coast sandy beaches lap at the base of the cliffs.[115] Beach sand is moving constantly in a southeasterly direction within the breaker zone by a process called longshore drift.[116]

"The shoreline between Wanganui and Waitotara is shallower now. This area has filled up with sand. It has affected snapper surfcasting, also kahawai and gurnard.

You can see a second sand bar now. There are breaks on there. [We] used to be able to do long lining in there, and drive a boat onto the beach, but not now. There is sand up over the reefs. It affects mussels, kinas etc, thus snapper don't have them to feed on either." - Former commercial fisher.

The sand banks up against anything jutting into the sea that may be in the path of movement, such as natural headlands or man-made jetties, or the moles at the mouths of the Patea and Whanganui rivers. The long and wide beach at Castlecliff has formed in this way.[117] The mean rate of accretion at Castlecliff Beach over the 91 year period between 1879 and 1970 has been 5.05 m/yr.[118]

Moles at the mouth of the Whanganui River, circa 1910

Photo credit – Whanganui Regional Museum

These barriers have acted as barriers for littoral drift from the northwest to the southeast, with significant changes resulting.[119] By 1970 the shoreline had extended to approximately 550 m northwest of the river mouth. Thereafter a state of dynamic equilibrium existed, i.e. the shoreline has been relatively stable, with minor year to year fluctuation.[120]

On the southeast coast, erosion has occurred. The greatest rate of erosion occurred near the river mouth, resulting in shoreline retreat of approximately 200 m.[121]

For several kilometres northwest of Ototoka Beach, the beach is growing as a result of the net southeast longshore drift of sand being trapped updrift of a collapsed headland of relatively erosion resistant limestone.[122]

A consequence of the shore building out by sand accretion is that the stranded cliffs in these areas are protected from erosion. They become stable and not prone to further landslip when a slope of approximately 400 is reached.[123]

Where does the beach sand come from?

Beach sand is derived from coastal erosion and is brought down to the coast by rivers draining the sedimentary and volcanic hinterland.[124]

The beaches along the South Taranaki coast are known for their component of ironsand. The mineral composition of the sand indicates that it is derived from the volcanic rock of Mt Taranaki.

The proportion of ironsand decreases in a downdrift direction, away from Mt Taranaki, as this sand mixes with sediment brought down from the catchments comprising sedimentary rocks.[125]

Significant quantities of sediment are added from the major river catchments.[126]

For example, the Whanganui River at the southeastern boundary of the study area is 305 km long, flowing for much of its length through well-dissected sedimentary marine sediments.[127] At Wanganui the annual sediment yield is 486 tonnes per square kilometre.[128] The mouth of the Whanganui River is a major mixing area for sediments coming down the river and those moving by longshore drift down the coast.[129]

"The Patea Dam has reduced the amount of sediment coming down the river. The bar is inside now, instead of beyond. Lack of sand replenishment on the beaches is causing excessive cliff erosion." - Recreational fisher.

"The water is not as deep at the Patea wall." - Recreational fisher.

Beach boulders and wind-blown rocks

Boulders made of andesitic rock (a form of volcanic rock) litter the shore. They are derived from the marine terrace gravels at the tops of the cliffs.[130]

Erosion of these rocks by wind-blown sand has formed the Waitotara ventifacts, which are of considerable scientific importance.[131] Ventifacts are individual rocks, a few centimetres in size, that have been shaped by wind erosion. These fine-grained rocks are eroded by strong, unidirectional winds and generally develop blunt, high faces on the windward end and a keel on the top.

Sand dunes

Another feature of the South Taranaki Coast is the sand dunes. Large parabolic dunes have blown a considerable distance inland, occupying a coastal strip from Patea south into the Manawatu region.[132]

The oldest dunes are probably less than 5 000 years old. The youngest dunes, now active, are advancing northeastward perpendicular to the coast under the influence of two dominant directions of strong winds – westerlies and southerlies.[133]

Dunes cover large areas of the marine terraces.[134] At the Waingongoro River mouth the line of cliffs is breached to the extent that sand dunes extend some distance inland.[135]

At the Patea River mouth sand dunes are also present. This is the only locality where erosion of dunes has been noted.

There is a build-up of low dunes at Nukumaru Beach.

The sea cliff at Castlecliff loses height and disappears under a mantle of dunesand. Castlecliff is built on low dunes covering gravels of an old delta of the Whanganui River.[136] The newly accreted land seaward of the cliff at Castlecliff is characterised by sand dunes.[137]

Coastal sand dune habitat is recognised as being under considerable threat. Due to significant modification, for example the planting of pines and marram, and modification for farming, very few of the areas on the South Taranaki coast remain unmodified.[138] The area of active duneland in New Zealand has undergone a striking decline since the 1950s. Taranaki, for example, has lost 70.54% of active dune land since then.[139]

"There used to be sand dunes along this stretch (Okehu to Mowhanau). Older people have told me how they used to fish and camp in this area. 70 years ago the beach was similar to how it is now. This suggests a cyclic process of erosion and dune aggregation."- Local resident.

Drowned forest

At Waverley Beach, below high-tide level, a drowned forest is evident. It is thought that the forest died as a consequence of sea level rise between 7000 and 6500 years ago. Pollen analyses provide evidence of podocarp-dominated forest with common hutu and akeake. These are plants that typically enjoy very mild coastal climates, probably milder than today.[140]

At the estuary of the Waitotara River, totara trunks in an old soil profile submerged 1–3 m in the tidal estuary are about 1000 years old. These sub-fossilised totara stumps of a drowned forest give the river its name.

The drowning of this forest indicates minor subsidence in the vicinity and was probably due to tectonic activity (as global sea level has not changed in the last 6500 years.)[141]

Estuaries

The estuaries of the larger rivers display further features. For example, the Whenuakura Estuary comprises two lagoons, a sandbar, an island, and a tidal mudflat at the back of the inner lagoon. The estuary is bound to the northwest by a cliff and the southwest by sand dunes.[142]

Around the mouth of the Waitotara River are swampy lakes and lagoons caused by advancing dunes ponding small streams.[143] The Waitotara Estuary has high ecological importance and is recognised as being scientifically important.[144] It is considered to be one of the best representative estuaries in the region, in a region where there are few unmodified estuaries.[145]

Features of the papa-rock coast

The seabed

The seabed dips gently out to sea, reaching about a 50 m depth on average at what would be the outer boundary of the coastal marine area (out to 12 nautical miles).[146]

Factors influencing the seabed

The seafloor is influenced by a number of factors. These include the underlying geology, such as the formation of the Whanganui Basin and the eruption of Mt Taranaki, and current day processes, such as the transportation of sand and the influence of waves and tides. The processes discussed in the literature are explored here. They include:

- formation of offshore sand bars;
- transportation of sediment to the sea;
- sand waves on the seafloor; and
- drowned sand dunes.
- Formation of offshore sand bars

The dominant longshore drift is southeastward and beach sand is moving slowly, forming bars northwest of the mouths of smaller streams, which flow across its course.

The movement of the sand is delayed by these streams, but periodic changes in the outlets of a stream which breaks through the neck of a bar at times of flood, allow the sand of the bar to resume its southeastward movement.[147]

Formation of the Whanganui River bar

The Whanganui River mouth is of the bar-forming type.[148] The mouth of the Whanganui River is characterised by multiple bars – two or three subtidal sand-bars are usually present.

It has been suggested that a process of 'net offshore bar migration' is occurring at the mouth of the Whanganui River.[149]

It is thought that the process follows a 3-stage model: bar generation near the shoreline; bar maturity and systematic seaward migration across the inner nearshore; and finally bar dissipation (flattening out) and disappearance in the outer nearshore.

At Wanganui it is thought the bars undergo net offshore migration with the mean lifecycle of a bar being about 3 years.[150]

Transportation of sediment to sea

Most river-borne sediment reaches the sea during flood conditions when much of it may bypass the breaker zone to be dumped on the shelf. Once in the sea the two types of sand – the ironsand and the lighter sand – are deposited in different environments. The ironsand remains on or close to the coast to either help build up the beaches or to be blown inland to form dunes.

Some sand escapes seaward to a depth of about 15 m. The light sand escapes seaward and is sorted by storm waves and strong currents into its constituent sand and mud fractions. The resuspended mud is carried further offshore while the sand fraction remains on the inner shelf.[151]

Sand waves on the seafloor

The seafloor has been described as a sand wave environment. It comprises mostly fine grain sand and pockets of shell hash, in a rippled topography.[152]

The sandy seafloor is mobile. A mobile seabed exposed to waves and currents will not remain stable, and has the potential to be worked into sedimentary structures termed 'bedforms'. The terms to describe these structures include bars, dunes, anti-dunes, ripples, sand waves and ribbons.[153]

Sand ridges, sand ribbons, symmetrical mega-ripples and sand waves have been identified in depths up to 60 m off Wanganui in the South Taranaki Bight.[154] This gives the area a complex topography.[155]

Drowned sand dunes

An interesting feature of the seabed is a series of shore parallel ridges (aligned northwest–southeast) 23 km long, 4 km wide, 5–15 m high, and separated by flat seafloor, being several hundred metres to several kilometres apart. These structures are stable and formed on land (as dune systems) sometime between 12 000 and 9000 years ago. They have since been covered as the sea level rose to its present level.[156]

Rubble strewn platform

Another interesting seafloor feature described in the literature is a rubble-strewn platform that extends south from the Patea River into the Manawatu. It ranges from a few hundred metres to 6 km wide, and rises 25–30 cm above the surrounding seabed.[157] Aside from this description however there is little recorded about this feature.

The North and South Traps

The North and South Traps are two tall adjoining underwater pinnacles, located approximately 6 km offshore from Patea. They are an unusual feature of this sandy coast.[158] Again, detailed mapping information on the Traps is currently non-existent, although some preliminary habitat mapping work has recently been completed, using drop video cameras to identify different habitat types.

Features of the Volcanic Coast

In the western-most part of the study area, the influence of Mt Taranaki can be seen in the character of the cliffs, reefs and beaches along the coastline and on the seafloor itself. The seafloor is also characterised by the existence of ancient river channels.

Volcanic cliffs

Around the end of Taranaki Peninsula and extending along the southeast into the study area, the coastline is derived predominantly from volcanic lahar materials and breccia materials (rocks with fragments of volcanic rock embedded in a soft rock). The transition between this and the mudstone and sandstone dominated coastline is in the vicinity of the Kapuni Stream and Waingongoro River mouths.

The volcanic coastline is rugged, with cliffs varying from 5–25 m in height. Erosion rates for this area are low because the material in the cliffs is relatively resistant and the shoreline is protected by extensive reefs.

Volcanic rock reefs

The predominant feature along this stretch of the coast is the almost continuous, large boulder-platform reefs, which are left as the finer grain volcanic rocks are eroded away.[159] The reefs extend up to several kilometres offshore at a low gradient.[160]

Beaches of the southern ring plain

Beaches are cobble-gravel, generally of a pocket nature, located between the extensive reefs, or associated with stream or river mouths.[161]

The beach below cliffs at Manaia has accumulations of boulders, stones, pebbles and sand patches. The beach has the following three zones:

- a boulder platform with a steep upper shore 11 m wide of large stones which are mobile under wave action;
- a nearly horizontal platform 100 m wide of a few big rocks > 2 m diameter, boulders 0.25–2 m diameter, stones <0.25 m diameter, pebbles and sand patches; and
- a steeper sloped 'lower shore' section.

In much of the platform and most of the lower shore the stones are jammed tight or 'cemented' together and few are mobile.[162]

Seabed of the southern ring plain

A good view of the seabed off the volcanic ring plain area was obtained in February 2005 by the company Origin Energy. They surveyed the seabed as part of investigations and planning for a new pipeline between the proposed Kupe offshore platform (beyond the 12 mile limit) and the shore. Origin took digital video images along the proposed pipeline route, from the proposed tunnel entrance seawards for a distance of 2.65 km.[163]

At 1.2 km from the shoreline the seabed is dominated by eroded remnants of a volcanic debris avalanche deposit. Typically the intact (non-eroded) volcanic rocks along the Taranaki coast consist of fragmented material cemented together with mud and ash. Here, however, because of erosion, the gravels, cobbles and boulders have been reduced to a more rounded form. Patches of sandy seabed – highly mobile as evident by the presence

of wave-induced ripples – were also seen.[164]

The next 300 m was hard reef of intact volcanic rock comprised of angular cobbles and gravels, with some pockets of sand. No large boulders were observed on the hard reef.[165] These rocks are the margin of the debris avalanche. Beyond here the seabed is mudstone, typically covered by a thin veneer of sand, and occasional cobbles and boulders.[166]

Ancient submerged river channels

Ancient river channels called 'palaeochannels' exist off the Taranaki coastline. These were carved by rivers in the last Ice Age, 20 000 years ago, when the sea level was lower and the Taranaki coastline was 100 km south of where it is now.

These palaeochannels resulted in Origin Energy having to increase the depth of its horizontal drill hole from 20 m to 50 m below sea level.

15 BIOLOGY

Introduction

Species richness and abundance along the South Taranaki coast is low compared to other New Zealand coasts.[167] This is attributed to the rugged, high energy, physical environment, high sediment loads and eroding and mobile substrate.

The area contains species that are also found in other exposed coasts around New Zealand. Recovery from disturbance to the inter-tidal habitat has been reported to be slow.[168]

The marine biology of the papa-rock coast (described in chapter 14) differs from that of the volcanic coast due to the different geology of these areas.

A rich fishing ground is reported in one study. There is a major area of demersal (bottom feeding) fish, including snapper, tarakihi, blue cod and gurnard.

There is some conflict between those reports of a species poor environment, and those describing existence of a rich fishery. It may be that it is rich in terms of abundance, but lacking in the total number of species compared to elsewhere, e.g. the northern regions. Research to explore this along the papa-rock coast would be desirable.

Sandy areas, both on beaches and along the base of cliffs contain few marine species due to sand movement and frequent pounding by waves.

In this chapter

This chapter summarises existing literature on the plants and animals of the seashore, seabed and waters of the South Taranaki Bight, and some of the physical processes affecting them.

The geology of the area, the rock type, landforms and tectonics together with physical processes such as wind, rain, waves, tides and currents creates both the landforms that plants and animals live on, and the physical conditions they must contend with.

The following topics are in this chapter:

- the inter-tidal zone;
- the sub-tidal zone;
- fish;
- marine mammals; and
- birds.

The inter-tidal zone

Defining the inter-tidal zone

The inter-tidal zone is the area of the coastline that gets covered and uncovered by the tide, i.e. between the mean high water spring (MHWS) and low water spring. It includes areas that may be covered, or uncovered only by very high, or very low tides, e.g. spring tides and king tides.

Environmental conditions in the inter-tidal zone

The South Taranaki Coast is notable for the low level of intertidal plant and animal species richness and abundance, compared to other New Zealand coasts.[169] This has been attributed to the following factors:

- rugged physical environment;[170]
- high terrestrial sediment inputs into coastal waters due to rivers; draining sandstone, siltstone and mudstone catchments.[171] The effects on coastal water quality are most noticeable after significant rainfall;[172]
- nearshore coastal waters that are often turbid;[173]
- homogeneous substrate type;[174]
- rapidly eroding soft sandstone cliffs;[175]
- mobile sandy beaches;[176] and
- regular sand inundation of the reefs – both volcanic and papa.[177]

"The coast is always changing. There are a lot of reefs dominated by cliffs. Off Hawera, near the Fonterra outfall, there is always a dirty patch 100m off here where cliffs come down. The high tide erodes it, so the water is always dirty." - Council officer.

The inter-tidal zone of the papa-rock coast

The papa-rock coast is dominated by soft sedimentary rocks such as sandstone and mudstone. There are however, some areas where harder, more consolidated rock is exposed and forms rocky reefs. There are also areas where the cliffs protrude sufficiently far into the sea to allow an inter-tidal zone to establish.

Limitations about what is known

The only substantive work done in recent decades on this part of the coast includes work done for the company Origin Energy at Geary Road, and some of the Taranaki Regional Council monitoring sites. It appears from the literature that little work at all has been conducted on inter-tidal reefs south of the Tangahoe River.

Life on the rocks

Marine plants and animals found living on the base of protruding cliffs at Geary Road include:

Seaweeds (red and green algae), limpets, snails, little black mussels,

Photo credit – A.Cox

sea squirts, topshells, piddocks, chitons, perwinkles, tubeworms and barnacles.[178]

Of note at the Geary Road site were organisms living on large limpets, e.g. little black mussels, or algae. Isopods are common organisms throughout the study area.[179]

The boring activities of various animals may even contribute to the erosion of the sandstone and mudstone cliffs, although clearly the geological composition of the cliffs is probably more important to explain erosion.

Protruding reefs allow species to establish

A recent study found organisms on the base of the cliffs only where the cliffs protruded significantly into the sea from the main line of the coast. In these areas, where there was sufficient distance down the shore to allow inundation during mid to high tide, intertidal species were found in small depressions of the cliff face. Red and green algae (Enteromorpha species) were present around the high tide mark.[180]

Mussels at Waitotara

Earlier studies of the Waitotara area describe mussel beds exposed at low tide on the rock cut platform.[181]

One of these studies also infers a cover of diverse species. The author observes that the coast off Patea is not heavily populated by shellfish. Only small black mussels inhabit the rock platform at low tide. The report goes on to note that this platform supports a heavy cover of marine organisms which are an intricate part of the marine ecosystem and draw fish near to shore.[182]

Marine life of Waiinu Reef

At Waiinu, a reef noted as unique in this sand dominated area, the area is characterised by limestone rock outcrops extending from mean high water spring to 3–5 km offshore.[183]

Where the rock platform is backed by a sandy beach and low dunes, the little black mussel covers most of the raised areas. Other organisms include seaweeds - green algae such as *Ulva lactuca*, red algae and coralline algae; catseyes, whelks, limpets, chitons, green-lipped mussels and barnacles.[184]

Beyond the zone of little black mussels, a clean coralline turf covers most of the rock. Minor brown algae and green-lipped mussels are scattered through this turf. Many of the species associated with the little black mussel are also present.

The offshore reefs provide suitable habitat for many fish species including snapper, tarakihi, groper and trevally.[185]

Life on the sandy beaches

Exposed sand beaches typically support low numbers of organisms and have low species diversity in comparison to sheltered beaches, estuaries and rocky reefs.[186] This is because the sandy area between the rock platform and the cliffs is often shifting and pounded by waves at high tide.[187]

Although the presence of sandhoppers in sand burrows at the base of cliffs had been found in previous studies of the area,[188] none were found in the recent work done for Origin Energy at Geary Road.[189] No other creatures were found either.

Photo credit – L.Douglas

Finding no living creatures appears consistent with what others have observed, describing these habitats as 'devoid of life'.[190]

Work done a decade ago identified a wide variety of shells on Kai Iwi Beach. These included triangle shell, purple cockle, venus or sunset shell, tuatua, whelk, coarse dosinia, large dog cockle, horse mussel, plicate barnacles, cats eye, periwinkle, limpet, queen scallop, arabic volute, pink sunset shell, little black mussel, periwinkles, pipi, trough shell, and cockle.[191]

The inter-tidal zone of the volcanic coast

Only a small part of the study area, that north of Hawera, sits within what can be termed the volcanic coast. In this area, the cliffs and reefs are dominated by hard volcanic rock, and the beaches tend to be gravely.

Life on the rocks

Marine plants and animals found living on the rocky reefs include seaweeds (red and green algae, both encrusting and turf forming in nature), crabs, limpets, anemones, snails, little black mussels, sea squirts, topshells, piddocks, chitons, tubeworms, barnacles, periwinkles and limpets.[192]

Sand inundation common

The effects of sand inundation are evident in much of this habitat, with 'sand scour' zones of 30-40cm inhibiting growth to the higher parts of boulders.[193] The low species and biodiversity of the Inaha Road intertidal hard shore monitoring site, for instance, appeared to be the result of intermittent sand inundation and the presence of dense tubeworm colonies.[194] The location of these reefs – on the edge of the Taranaki

ring plain, yet exposed to the mobile sandy beaches to the east – makes it likely for these reef areas to be inundated with sand often.[195]

Life on the sandy beaches

Recent studies of the area confirm previous findings that there are few or no species living on the sandy shore in this part of the study area. [196]

Studies in North Taranaki on similar shoreline also indicate a decreasing trend in the number of organisms down the soft shore, with the lowest numbers at the low tide level. This trend appears to be associated with the increased exposure time to wave attack lower down the shore – a very mobile and abrasive environment. In addition, this part of the coast lacks seaweed and other drifting organic matter that otherwise would be deposited higher up the shore, providing habitat and a food source for intertidal species.[197]

The subtidal zone

Environmental conditions in the subtidal zone

The biology of the subtidal zone in the South Taranaki – Whanganui coast has been described as generally species poor, with a low abundance of organisms compared with other parts of New Zealand. This has been attributed to the following environmental conditions:

- intense wave action;
- high silt load delivered by the region's rivers;
- high average rainfall;
- substrate type, e.g. homogenous subtidal boulder reefs;
- high water turbidity in nearshore areas; and
- sand inundation of reefs.

Limitations about what is known

The seafloor studies upon which conclusions have been made are predominantly to the north and west of the study area. A number of these studies themselves have been hampered by poor visibility and inclement weather.

However a number of these studies, including those most recently conducted for Origin Energy, conclude that some areas are biologically significant for the South Taranaki Bight.

This suggests that further work is needed to better describe the subtidal environment of this area, particularly along the 'papa-rock' coast.

Subtidal zone of the papa-rock coast

Type of seafloor influences the subtidal biology

There are two main types of seafloor:

- rock and hard substrate; and
- soft bottomed areas, e.g. shell, sand or mud.

Rocky, predominantly inshore areas, such as the sedimentary rock platforms and other reefs such as the North and South Traps appear to be biologically significant for the South Taranaki coast.

These areas are home to animals and seaweeds with an 'encrusting' habit, possibly because of the interplay of high wave action, sediment loading and associated scour inhibits the growth of more erect species.

Sandy bottom areas support fewer species.

As a general rule, species numbers and diversity increase towards the shore, with the highest numbers in the nearshore area.[198]

Encrusting algae and seaweeds

Encrusting and small turfing red and brown algae and coralline algae (paint and turf) dominate the hard substrates of subtidal reefs. Large brown algae are uncommon, which is thought to be due to lack of sufficient light penetration.[199] Other seaweeds are present on most of the low rocks though are less abundant overall than coralline algae.

Turfing algal patches may be ephemeral, being more prevalent in summer months. It is noteworthy that these plants can cope with very low light conditions.[200]

Encrusting animals

Inshore reef and boulder habitats of the area support bryozoan and sponge communities.[201] Bryozoans are tiny colonial animals that generally build stony skeletons of calcium carbonate, superficially similar to coral.

In a study of animals living beneath boulders, numerous bryozoans have been found, whereas sponges were considered to be relatively rare.

Other animals

Molluscs are the most abundant mobile organisms on reef and boulder habitats. Various worms, barnacles, chitons, bivalves (mussels) and small gastropods occurred. Beneath rocks there were also three bivalves living in sand and gravel and at least three brittle star fish species.[202]

Common sponges and ascidians on hard rocks and some erect sponges were also present, which may be a function of increasing depth with increasing distance offshore.[203] Ascidians are sack-like marine filter feeders.

Offshore reefs a food source

Along the mudstone and sandstone dominated coast, good fishing grounds exist around reefs, which provide abundant food species for fish.[204]

Sizeable reefs out from Patea have been described as being responsible for some of the best fishing in Taranaki.[205] These 'rubble-strewn platforms' have been described as containing abundant food species for fish such as corals, bryozoans, sponges, crustacea, mollusca and polychaetes. These organisms are an intricate part of the marine ecosystem and draw the demersal fish such as snapper, tarakihi, blue cod and gurnard near to shore.[206]

North and South Traps

These two large adjoining reef systems are located approximately 6 km offshore from Patea. The area is an important marine habitat in a sandy environment. The tall underwater pinnacles are an unusual feature on a sandy coast. The reef has high ecological value, with forests of the seaweed Ecklonia and a high diversity and abundance of marine life present.[207]

Photo credit J.O'Leary

Photo credit J.O'Leary

Sandy seafloor

Animals that live in burrows or in the sediment on the seafloor are called infaunal species. The soft subtidal sediments (sands and silts) support a lower diversity of species and lower abundances in comparison to the stable reefs, with polychaete worms, heart urchins and hermit crabs being the most common fauna. Six common bivalve associations, which vary with water depth, have also been described.[208]

Sand-wave areas are dominated by bivalves, polychaetes and scavengers.[209] Polychaete worms are the most abundant organisms living in the sand, along with hermit and nut crabs and an amphipod.[210]

The low biological diversity is ultimately due to the mobile sediments.

In a quantitative survey of soft sediment habitats within the south Kupe region, a total of 64 species that lived in the sand were identified.[211]

Subtidal zone of the volcanic coast

While the boulders and rock platforms provide habitat for more marine life including paua and crayfish, compared with the sandy beaches to the southeast, [212] marine life tends to diminish beyond the edge of the volcanic debris as the seafloor tends to be mainly mudstone.

Work done off Opunake (just out of the study area, but typical of the volcanic debris reefs) described a variety of species, including some not reported further south.

Kelps have been reported as being present but never dominant. *Carpophyllum maschalocarpum* is the main species to around 5 m where it is replaced by *Ecklonia* radiata down to a depth of at least 20 m. Kelp stands have been estimated to be only 25 cm tall. The lack of large seaweeds may be due to the high turbidity in this coastal region – rough water and low light.[213]

One metre above the base of the boulders, attached organisms include some seaweeds, sponges, a mussel (not normally harvested by humans), a sedentary snail and several encrusting polyzoans.[214]

Molluscs are the dominant mobile species, which include limpets, top shells, chitons and paua. Sea urchins are also present,[215] although not as dense as in other parts of New Zealand with similar substrates. A reason put forward for this is the influence of wave height and sediment movement in nearshore areas.[216]

Fish

Overview

The fishes of the South Taranaki Bight are all species found in other parts of New Zealand. There are no known endemic species.

Reef fish diversity appears to be slightly lower than for other parts of New Zealand, and at least one study believes abundances to be generally lower as well.

As mentioned previously, zooplankton, or microscopic animal life is the basic food supply for fisheries and shellfish, and is at high levels in the South Taranaki Bight.[217]

Reef fish found in the South Taranaki Bight

Species found during formal surveys are common to exposed coasts in New Zealand.

Species described as the characteristic fish of Taranaki subtidal reef areas are shown in Table 10.[218]

TABLE 10: REEF FISH OF SOUTH TARANAKI

COMMON NAME	SCIENTIFIC NAME	RELATIVE ABUNDANCE
Blue cod	*Parapercis colias*	Most abundant species
Spotty	*Notolabrus celidotus*	
Scarlet wrasse	*Pseudolabrus miles* –	Slightly higher densities than spotty
Red moki	*Cheilodactylus spectabilis*	
Butterfly perch	*Caesioperca Lepidoptera*[219]	
Triple fin	*Forsterygion (Tripterygion) varium*	Variable triple fins were the most abundant of the five "blennies".[220]
Blue mao mao	*Scorpis violaceus*	Can reach high densities.[221]
Leatherjacket[222]	*Parika scaber*	

Large numbers of sharks were reportedly found in the area off Patea stretching down into the Manawatu in the 1970s.[223]

Limitations on what is known

A comparison of fish diversity among nine sites, of which the Taranaki coast was the most southern, found that the Taranaki coast had the lowest equal diversity, with a Northern Harbour site. Abundances of all species were generally low with the greatest mean density being approximately 12 per 500 sq m.[224]

At least one of the published studies from which these fish species were identified noted the difficulties associated with counting fish in conditions of different underwater visibility.[225]

The presence of Ministry of Fisheries' data showing commercial fishing resources, and the reports of fishers and divers contributing to this study suggests species may be more diverse than previously reported. Both the general lack of studies, particularly in the southern and eastern parts of the South Taranaki Bight, and the difficulties of studying the inshore area because of turbidity and unfavourable weather may be reasons why fish diversity appears under reported.

Kaimoana species

Resources that can be gathered from the shoreline, however, continue to be of great importance. A study by the Taranaki Catchment Commission of customary seafood (excluding fish) conducted in the early 1980s from Manaia southeastward as far as about Waverley, identified a number of edible species present (Table 11).[226]

TABLE 11: CUSTOMARY SEAFOOD

SEAFOODS MAORI NAME, ENGLISH NAME (WHERE IN COMMON USE)	SCIENTIFIC NAME
karengo (sea lettuce)	*Letterstedtia petiolata*
kina (sea eggs or sea urchin)	*Evechinus chloroticus*
karikawa (dark rock shell)	*Haustrum haustorium*
koiri (Neptunes necklace)	*Hormosira banksii*
kotoretore (sea anenome)	*Isocradactis magna*
koura (crayfish)	*Jasus edwardsii*
kuku (mussel)	*Perna canaliculus and Mytilus edulis*
ngakihi (also known as miti miti – limpet)	*Cellana ornata and Cellana radians*
papaka (crab)	*Hemigrapsus edwardsi*
paua	*Haliotis iris*
pupu (cats eye)	*Turbo smargdus*
rori (sea slug, or 'poor man's paua')	*Scutus breviculus*
wheke (octopus)	*Octopus Mauram*

Source: Taranaki Catchment Commission 1983, p 25.

Other edible species mentioned were:

Inanga (whitebait), Parengo (sea weed), Piharau (lamprey eel), Pipi (not common and usually very small) and Toke (worm, used as bait to catch tuna (eel).

Marine Mammals

Overview

Little is known about the movements of marine mammals through the South Taranaki Bight.[227]

Occasional sightings and strandings confirm their presence. It appears the area may have been of importance for whale breeding in the past.

Whales

Whales that have been observed off the New Zealand coast are usually observed on seasonal journeys between their breeding grounds in temperate and subtropical areas and the rich feeding grounds of Antarctica.[228]

Research by the Department of Conservation indicates that a branch of the winter migration route of whales travels up the South Taranaki coast from the Cook Strait region to Cape Egmont.[229] Department of Conservation sighting records include humpback whales and the occasional southern right whale in this general vicinity.[230]

Historically the area from Cape Egmont to Kapiti was thought to have been a breeding ground for southern right whales. Sightings of these whales today, however, are very rare. These whales have been seen along New Zealand coasts during winter when they come to breed and give birth to their young.

Whale and dolphin sightings

Whale species observed specifically within the South Taranaki Bight include:[231]

- humpback whales,
- southern right whales,
- sperm whales,
- pygmy sperm whales,
- beaked whales (Family Ziphiidae),
- pilot whales,
- orca, and
- common dolphins.

In all, 31 species of whales pass through the northern Cook Strait area on their migrations.[232]

Marine mammal strandings

Te Papa (the Wellington museum) maintains a database of marine mammals that have been stranded along New Zealand's coast. The following species have stranded along the South Taranaki – Whanganui coast:

- Andrew's beaked whale
- Arnoux's beaked whale
- baleen whale
- beaked whale
- bottlenosed dolphin
- common dolphin
- dusky dolphin
- false killer whale
- goose beaked whale
- Hector's dolphin
- humpback whale
- long finned pilot whale
- minke
- orca
- pygmy right whale
- pygmy sperm whale
- scamperdown whale
- Shepherd's beaked whale
- sperm whale
- straptooth whale
- striped dolphin.

South Taranaki important for rare whales and dolphins

Orca is classified in the Department of Conservation threat status as being nationally critically endangered. Southern right whales are classified as nationally endangered.

There are scant records of observations of Hector's dolphins (*Cephalorhynchus hectori*) within the area. The North Island Hector's Dolphin has just recently been recognised as a new subspecies, and is now known as the Maui's Dolphin (*Cephalorynchus hectori maui*). Maui's dolphins are generally found along the northwest coast of the North Island, between Taranaki and Dargaville, although the population is concentrated between Raglan and Manukau harbours. This dolphin is listed as nationally critically endangered by the Department of Conservation.[233]

In the 1930s, the existence of a new type of beaked whale, *Tasmacetus shepherdi* (or Shepherd's beaded whale), was discovered, following a stranding at Ohawe Beach.[234]

Between then and 1976, there were five more records of this species in the New Zealand region, and two from the eastern Pacific. This stranding information may suggest that the area is important for rarely seen or unusual species such as beaked whales as well as pygmy right whales, false killer whales and long-finned pilot whales although the data is not strong.[235]

Photo credit - DOC.

Tasmacetus shepherdi – whale discovered for first time at Ohawe beach

On November 7 1933, a beaked whale became stranded at Ohawe Beach. Following publicity of the stranding in the Hawera Star, Mr G Shepherd, the then Curator of the Wanganui Alexander Museum, visited the site to collect information from which to positively identify the species. Mr Shepherd recognised that it was unique and would be of value to science. He took care to document many of its features, and even brought home as many of the bones as he could, disguising the strong smell as best he could with wrappings and Lysol!

The creature was later written up by W.R.B Oliver, who found it to be a new genus and species. He named it "Tasmacetus shepherdi" in recognition of the work of Mr Shepherd in helping to positively identify it.

Source: Oliver, W.R.B., 1937.

Dolphin Sightings

DOLPHIN SIGHTING

Several Mowhanau residents, who were alerted by Janice Carson about 8.00 am on Thursday morning, were able to enjoy the sight of a large pod of dolphins swimming and cavorting about a mile off Kai Iwi Beach. It was estimated to be a pod of about 25 - 30 dolphins which was making its way slowly up the coast. Jim Campbell of DOC was alerted and hoped to have someone out in a boat to observe these wonderful creatures. Mowhanau residents have been asked to keep a coastal watch for any whales or dolphins as well as other marine animals. DOC is compiling records of their presence in these waters.

Source: Patea/Waverley Press, 3-4-05

Of concern to the Department of Conservation was an incident in November 2004, in which a mid-water trawler captured 20 dolphins (19 common and 1 bottlenose) in five tows in the South Taranaki Bight.

It was noted that this incident occurred adjacent to the range of the critically endangered Maui's dolphins. While there are no records of trawlers catching Maui's dolphins, trawling within their range must create some risk.[236]

In response to this particular incident, the companies involved agreed to take a number of steps to try to avoid such by-catch happening again.

Seals

The South Taranaki coast is used as a 'haul out' area for fur seals when they come ashore to rest. The origin of these seals is unknown. Seals are known to rest on the Maui platform structure, and it is likely that other

artificial structures, such as platforms for the proposed Kupe development will serve the same purpose.[237]

While seals breed at the Sugar Loaf Islands in northern Taranaki, it is unknown whether these seals forage in the waters of the South Taranaki Bight. It is feasible that they may predominantly forage in deeper water further out to sea, as information from satellite tracking reveals that seals, especially females, can forage up to 200 kilometres beyond the continental slope in water deeper than 1000 m.[238]

Birds

Overview

Bird diversity along the South Taranaki coast did not appear to be high from the literature. Seabirds known to inhabit the South Taranaki coast include little blue penguins, diving petrels, grey faced petrels, fluttering shearwaters, gannets, white fronted terns, a couple of different prion species (Fairy and broad billed) and a number of gull species. Arctic skuas have also been observed out at sea.

Estuaries are important bird breeding sites for oystercatchers, banded dotterels and pied stilts. They also play host to a number of migratory species. Cliffs provide habitat for some bird colonies, particularly black backed gulls. Beaches contain less bird diversity than the estuaries.

Estuaries important to birds

The South Taranaki coast contains a number of estuaries that are important for birds, even though most estuaries have been modified in some way. The most important estuaries for birds are the Whanganui River Estuary, the Whenuakura Estuary and the Waitotara Estuary.

Breeding birds that rely on these estuaries are oystercatchers and banded dotterels.

Estuaries provide impotent stop over spots for a host of migratory or seasonal visitors. Migratory species that have been observed in the estuaries in this area include: knots, godwits (e.g. bar-tailed godwit), cattle egrets, royal spoonbills, white herons, shags, waterfowl, wrybill, turnstone, eastern curlew and whimbril.[239]

The Whanganui River Estuary is noted as nationally significant for the threatened royal spoonbill.[240]

"Royal spoonbills migrate up and down NZ after breeding. They can be found in the salt marsh at the Patea River. Some people confuse these with kotuku (white heron)." - Local resident and naturalist.

The Waitotara Estuary is an important stop over point for migratory wading birds including royal spoonbill and banded dotterel, and international migrant birds including eastern bar-tailed godwit.[241]

Whenuakura Estuary

This estuary is in a relatively natural state with extensive mudflats. The area is important for wading birds, including some migratory species.

Species for which it has particular importance include the threatened

Caspian tern, rare variable oystercatcher, royal spoonbill, black-fronted dotterel and white-fronted tern.[242] Variable oystercatcher has been recorded nesting in this area.[243]

International migratory wading birds recorded here include turnstone, eastern bar-tailed godwit and knot. The Australasian gannet has also been observed.[244]

The mudflats provide good feeding areas for herons, stilts and other birds. Sand bars provide roosts for those species and gulls and terns.

Other birds that have also been observed here include white-faced heron, pied stilt, red-billed gull, welcome swallow, banded dotterel and black-backed gull.[245]

Beaches provide habitat for more common bird species

Birds that have been recorded on Waverley Beach[246] include the red-billed gull and the black-backed gull. Other species recorded are common in other habitats, such as skylark, blackbird, yellow hammer, chaffinch, goldfinch and sparrows.

The area from Nukumaru Beach to the crest of the foredune contains the largest and least damaged population of pingao in the Foxton ecological district.[247] It provides habitat for a number of common bird species listed above, and in addition, habitat for banded dotterels.[248]

Cliffs provide bird habitat too

The cliffs from Kai Iwi to Waiinu Beach, as well as Okehu Stream and Ototoka Beach, are noted for black-billed gull colonies, as well as presence of NZ pipit.[249]

The cliffs right along the coast between Patea and Manutahi are recorded as having black-backed gull colonies. Specific areas include the Kakaramea Powerhouse Cliffs (extending from Patea Beach to Manawapou River) and Tapuarau (Hawken's Lagoon).[250]

Other species that have been recorded along the sea cliffs in the study area were:[251] Australasian harrier, rock pigeon, silvereye, blackbird, skylark, chaffinch, spur-winged plover, dunnock, starling, gannet, variable oystercatcher, house sparrow, welcome swallow, magpie, yellowhammer and the NZ pipit.

16 RECREATIONAL FISHING

Overview

There are few accurate records about the recreational use of this area.[252] This is because quantifying recreational harvest is very difficult scientifically and there is considerable uncertainty around the accuracy of the available estimates. However, the Ministry of Fisheries continues to undertake a range of research projects to improve their ability to better estimate recreational take.

The paucity of published information on the recreational fishery at the scale of the South Taranaki coast compared to the importance placed on that fishery by those interviewed (in Part I of this report) suggests that far more information gathering or research on the state of the area's recreational fishery is required.

The area is reported as a rich fishery.[253] This is in contrast with the area further north around Cape Egmont, which is believed to support a more limited fishery.

In this chapter

This chapter summarises information, where available, on the following topics:

- what research is undertaken on recreational fishing;
- how information on the recreational catch is gathered;
- problems with the recreational catch estimates; and
- what the surveys show.

What research is undertaken on recreational fishing?

The Ministry of Fisheries gathers its recreational fishing statistics using quota management areas (QMAs). The area encompassing this study area is QMA 8,which takes in the central west coast of the North Island from Tirua Point in the north to Titahi Bay in the south.

How is information on the recreational catch gathered?

One method that has been used is the 'tag-ratio method' where a number of fish are tagged and then released, and then fish caught with tags by both recreational and commercial fishers are recorded. This method gave an estimation of 250 tonnes from QMA 8 in 1991.[254]

However, there were problems with this method with under-reporting or tags recovered by commercial fishing being reported as recreational catch.

The first national survey into recreational fishing was undertaken in 1995/96, followed by a second national survey in 1999/00.[255] These national surveys have been done by what is known as the telephone/ diary survey. Households are contacted by telephone and fishers are asked if they will keep a diary recording their fishing activity over a whole year.

In addition, surveys at boat ramps around the country are used to obtain data on the size and weight of individual species caught by recreational fishers. With the diaries and boat ramp information, an estimation of the numbers and weight of fish taken by diarists can be determined.

Problems with recreational catch estimates

However, difficulties arise when the estimate from the diary participants has to be extended to the whole population who went fishing. [256] These difficulties included problems with how fishers were recruited to fill in diaries and the use of a telephone interview to estimate the proportion of the population that fishes.[257]

The Recreational Technical Working Group (convened by the Ministry of Fisheries to look at this issue) concluded that the harvest estimates from the diary surveys should be used only with the following qualifications:

a) they may be very inaccurate;

b) the 1996 and earlier surveys contain a methodology error; and,

c) the 200 and 2001 estimates are implausibly high for many important fisheries.[258]

Because of the size of the reporting area and the way in which the data was collected, it is impossible to break down the area to consider recreational take just in relation to the study area. It is difficult to extrapolate from the national recreational surveys to just the South Taranaki area.

What the surveys show

The species described as being targeted by recreational fishers in "Area 8," the fisheries management area that includes the South Taranaki Bight include:[259] blue cod, kahawai, barracouta, flat fish, gurnard, red cod, snapper and yellow eyed mullet. In 1996, snapper, blue cod, yellow-eyed mullet and gurnard were the fin fish taken in greatest numbers by recreational fishers.[260] In 2000, the main fin fish species caught were snapper, blue cod, yellow eyed mullet, gurnard and tarakihi.

Crayfish are collected mainly while diving from private boats. Other shellfish collected in significant numbers include mussels, pipis and cockles. No scallops were gathered by recreational fishers according to the survey.[261]

It appears there may be higher numbers of people fishing.[262]

In QMA 8 recreational fishing is mainly undertaken from the shoreline or from private boats.[263]

The number of fishing trips undertaken by recreational fishers has a maximum during the summer months and quietens down from May to November.[264]

TABLE 12: RECREATIONAL HARVEST ESTIMATES FOR 1996 FOR SNAPPER, BLUE COD AND GURNARD.

SPECIES	FISH STOCK	NUMBER (ROUNDED TO NEAREST 1000)	TONNAGE RANGE	COMMERCIAL HARVEST (FOR 95-96 YEAR)	TACC (TOTAL ALLOWABLE COMMERCIAL CATCH) (FOR THE 95/96 YEAR)
Blue cod	BCO8	159 000	70-90	31	74
Red gurnard	GUR8	68 000	25-35	182	543
Snapper	SNA8	275 000	215-255	1558	1500

Source: Bradford et al, 1998

TABLE 13: RECREATIONAL HARVEST ESTIMATES FOR 1999-00 SNAPPER, BLUE COD, GURNARD, KAWAHAI AND CRAYFISH[265]:

SPECIES	FISH STOCK	NUMBER CAUGHT	ESTIMATED TONS	COMMERCIAL HARVEST (FOR 99/00 YEAR)	TACC (FOR 99/00 YEAR)
Blue cod	BCO8	232000	127-249	30	74
Red gurnard	GUR8	99 000	26-55	222	543
Snapper	SNA8	648 000	661	1604	1500

Source: Bradford et al, 1998

Fishing off Patea – a social study into the importance of the moles

A recent social survey reported that fishing from Patea is generally some of the best in Taranaki. This was attributed to sizeable reefs and a sustainable fishing regime lacking in pressure from commercial operations and a weather pattern that does not allow 'too much' fishing to occur.[266]

Kawahai

Kahawai are caught by a variety of recreational fishing methods and is one of the fish species more frequently caught by recreational fishers.[267]

The study area for this project falls into the FMA8 quota management area for kahawai (west coast of the North Island). As discussed above, obtaining accurate estimates for the recreational kawahai harvest have proven very difficult. A research project is underway to estimate recreational catches of kahawai using a mixture of aerial sightings and boat ramp surveys. This is being trialled in the KAH 1 quota management area in 2004-05 (upper east coast of the North Island) and a similar programme is proposed for KAH 8 in 2006-07.[268]

A survey carried out by the Recreational Fishing Council found that 47% of just over 2000 respondents felt that kahawai stocks had 'declined significantly' and 32% felt they had 'declined a little' over the previous five years.[269]

In 2005 the Minister of Fisheries decided to reduce the total allowable catch for all kahawai quota management areas by 10%.[270] Some recreational groups remain concerned about a perceived decline in the fishery.[271] Recreational fishers consider that kahawai stocks have declined in abundance, availability and size of fish in the main stocks over the long term and in recent years.[272]

Fishing for snapper in South Taranaki – a student's study

In 1997 a student study of the snapper fishery in the South Taranaki Bight was undertaken. The study found, as with many other parts of New Zealand, that hard data concerning catch rates specifically in the South Taranaki area was lacking.[273]

The 1997 study compiled information from written records held by members of the Patea and Districts Boating Club. This showed an overall decline in recreational snapper catch rates between 1981 and 1997, with a significant drop in catch after a good year in 1990.[274] Information from one local commercial fisher's records was also reported. This too showed a drop-off in the years following a good 1990/91 year.

At the local level, the perceived reason for this dip after 1990 was heavy fishing from pair trawlers which were reported to have taken an estimated 500-800 tonnes of snapper from the South Taranaki Bight area between Patea and Hawera during 1991/92.

The report noted that 'large trawlers with sophisticated equipment operating in a relatively small area are capable of taking fish in such quantities that it will lower the breeding stock and reduce fish numbers available in future years.'[275]

Future research into recreational use

The Ministry intends to do specific survey work in 2005/06 to try and better ascertain the actual recreational take.

17 COMMERCIAL FISHING PAST AND PRESENT

Overview

Fish and seafood have been caught and traded since the earliest settlements. With arrival of European settlers, the first significant coastal resource use was of whales. Development of a domestic fishing industry took quite a bit longer, not really becoming established until the 1960's. However, from early times the coast provided a valuable transport route. The commercial fishing industry has undergone changes brought about by fishing regulations that led to the quota management system. Information on commercial fishing is gathered from fishers' returns by the Ministry of Fisheries. As with the recreational fishing data, much of this information is gathered at a much larger scale than the study area.

In this chapter

This chapter contains the following topics:

- whaling in the 19th century;
- the ports of Wanganui and Patea;
- commercial fishing; and
- aquaculture.

Whaling in the 19th century

Industry at its height in 1830s

Shore whaling was one of New Zealand's earliest industries and at its height in the late 1830s. Onshore stations varied in size and typically involved both Maori and European in their operation.

Southern right whale targeted

The southern right whale was the preferred whale for shore-based whalers. It was easy to catch; floated after it was killed; and had a good amount of oil and baleen.[276]

Whaling took place between May and October, when southern right whales travelled up the east coast of the South Island, through Cook Strait and up to the South Taranaki Bight.

Poor practices led to rapid decline

The practice of hunting both mother and calf southern right whale directly contributed to the rapid decline of the species. In the mid 1840s Edward Jerningham Wakefield wrote:

"The success of the fisheries varies, of course, every season: but there is every reason to think that it is on the decline. The whales are, doubtless, unnecessarily thinned by the practice of killing the cows, and even the young calves, who do not survive the practice of making fast to them in order to catch their mother."[277]

South Taranaki whaling begins in the 1840s

In the South Taranaki area it appears whaling stations were not set up until the 1840s, when whaling was already on the decline. A station is thought to have existed at Wanganui, probably at South Beach.

Wakefield's account of the period 1839-1844 notes:

"Whales fill the whole 'Motherly' Bay extending along nearly 150 miles of coast, between Kapiti and Cape Egmont, ... In the 'Motherly' bay, as it is called, because they resort to it for calving, they have never been disturbed; and I have seen them in great numbers, basking outside the surf on the coast between Manawatu and Patea."

Wakefield probably wrote this part of his account of the area before onshore whaling had commenced from Wanganui, and possibly even before the Ngamotu (in New Plymouth) stations were established.[278]

In addition to the Wanganui station, there is a possibility there was also a whaling station near the mouth of the Kai Iwi Stream at Mowhanau, 15 km up the coast from Wanganui.

Whaling seen as a sign of progress

Although the whaling activities established were not that successful, the presence of a whaling station was touted as a sign of progress in a new settlement. Colonel Wakefield of the New Zealand Company in 1844 espoused the prospect of a successful whale fishery, noting that:

"Twenty tons of oil, and more than a ton of whalebone from R. Barrett's whaling establishment, have been shipped in the Urgent for Sydney."

A year earlier, in 1843, a census of the colony of Taranaki valued exports to New South Wales as detailed in Table 14.

TABLE 14: WHALE EXPORTS, 1843

COMMODITY	TONNAGE	VALUE
Oil (black whale)	6 tons and 150 gallons	88 pounds, 4 shillings and 3 pence
Whalebone	950 pounds	50 pounds 1 shillings and 0 pence

Source: Burgess, 1997

By the 1840s the southern right whale population around NZ waters had decreased drastically, as a result of overwhaling and the taking of female whales and their calves. After 1847 Wellington newspapers reported very little about whaling activities.[279]

Ports of Wanganui and Patea

Introduction

In the early days, goods were transported up and down the coast by ship. Ports were established at Patea and Wanganui to allow for this.

"Before the roads went in, coastal traders went up and down the coast." - Recreational fisher and diver.

The port at Wanganui

The Whanganui River had an important role in transportation for both native and colonial economies.[280] To improve operation of the port for vessels, jetties were constructed at the river mouth to prevent lateral migration of the channel and to increase depth.[281]

In 1884 and 1885 a 260 m long jetty was constructed. This ran from the silt stone bluff on the northwestern side of the Whanganui River mouth. In 1905 this jetty, referred to as the North Mole, was extended to 640 m. Additional extensions increased its length to 730 m by 1912 and 884 m by 1930.

Construction of the South Mole began in 1905 (670 m) and reached its final length of 975 m by 1912. During construction of the jetties the walls were raised only to low tide level. However, by 1940 the height had been increased to approximately 3 m above mean sea level.[282]

Patea port

The Patea River entrance is the site of the former Port of Patea that served the freezing works and town of Patea. The river entrance is bounded by two concrete block seawalls or moles which were constructed in the late 1800s and early 1900s.

"The walls at the Patea River were built in the 1890s. They were built for the cheese factory to ship goods up and down. After that, they were used for meat exports. This continued until the works shut down."- Recreational fisher and diver.

These moles run seaward a distance from the existing highwater mark of about 325 m on the southeast, or true left side, and about 112 m on the north, or true right side. There are also remnants of some other walls in the vicinity.[283]

In recent years, the condition of the moles has deteriorated to such an extent that it is likely the Patea River will break through behind the southeast mole and the entrance will be lost entirely. This is due to ongoing retreat of the coast to the southeast.[284]

Prevention works were recommended in 2003,[285] and in 2005, the South Taranaki District Council decided to proceed with the first stage.[286]

This will involve the reconstruction of an old wall on the southeastern riverbank between the end of the mole and a distance some 320 m upstream, in order to confine the river.[287]

The importance of the channel for fishing access was recognised in the decision to proceed with the works. It followed an impact assessment study that identified social and economic value in retaining a navigable channel in the Patea River.[288]

Future work includes repairs to the existing moles, a sea defence on the southeastern beach, and periodic sand dredging to improve entrance channel depths and to add sand back to the eroding southeastern beach.[289]

Commercial fishing

History

Throughout the 19th century and early 20th century, New Zealand's commercial fishing developed quite slowly. It was limited to inshore fishing grounds and was localised and small scale, using small boats, catching most fish by line or set nets.

Like other parts of New Zealand, commercial fishing in South Taranaki really started to develop following the establishment of the New Zealand Fishing Industry Board in 1964, which brought with it regulations and government support that encouraged new investors to enter the industry.[290]

A number of operators became active in South Taranaki, such as one enterprise illustrated below:

Wanganui Trawlers Ltd

Pam Williams together with her friend Gordon Swan established Wanganui Trawlers Ltd in 1965. The Company had a number of vessels built in Wanganui, including Stella Maris (their first vessel), Supernova (1967) and Galaxy (1969). Early on they also established a small processing factory.[291]

Whilst the fishing was very productive, bar and weather conditions meant that at certain times the fish had to be landed at Paremata and transported north for processing, particularly in the period August to October when strong westerly winds were often encountered off the Whanganui coast.[292]

During the early years, the vessels worked the South Taranaki Bight and also the west coast of the North Island, catching groper, snapper, tarakihi and gurnard.

By July 1972 Wanganui Trawlers Ltd was exporting 40% of its catch. Further expansion followed, and in 1975 the Company began exporting chilled fish to Sydney.

The establishment of NZ's Exclusive Economic Zone in 1978 opened up new opportunities.

The Company was allocated a percentage of deepwater resource, which it exploited through a joint venture company with the South Korean company Oyang Fisheries. The joint venture company was called Pacific Oyang Ltd. The company was instrumental in the development of NZ's deepwater fishing resources throughout the 1980s.

In 1992, the Company changed its name to Wanganui Seafoods Ltd, and by the mid 1990s, was processing 5,000 tonnes a year. Its squid product had a reputation for quality and was in demand overseas.[293]

It was sold to Sanford Ltd in 1994, a sad day for the company and particularly its founders Gordon Swan and Pam Williams.[294]

"The first groper was caught off Kai Iwi in about 1962." - Former commercial fisher.

Changes in fisheries management

From the late 1950s, foreign fishing boats started coming into New Zealand waters. At that stage NZ territorial waters extended just three miles offshore. The fishing industry continued to grow, but too many boats were chasing the same species.

Prior to 1965, New Zealand only controlled fishing within a 3-mile coastal limit. In 1965, a 9-mile fishing zone outside the 3-mile territorial zone was established. Many foreign fishing boats fished outside this 12-mile limit and New Zealand had no control over the fish taken from these waters. During these times, the New Zealand industry focused on a largely inshore fishery fished from relatively small trawlers and other vessels.

In 1978, New Zealand declared its 200-mile Exclusive Economic Zone (EEZ). This led to some control over foreign fishing. Foreign vessels were licensed and given quota for the main species.

By the late 1970s, many fishers were going out of business as their catch rates declined. By this time, foreign vessels were taking huge tonnages from the deeper waters around New Zealand.

Catches fell away again sharply after the Government cut back the level of foreign fishing, but picked up again as New Zealand companies got involved.

The introduction of the quota management system

In 1983 a new Fisheries Act was passed which allowed for the development of Fisheries Management Plans, for better regional management of fisheries.

The Act also excluded part-time fishers from the industry. Commercial fishers had to be earning more than $10 000 a year, or 80 percent of their income from fishing, to remain licensed.

"There were 74 commercial fishermen before [the] quota [system], now there is just one long liner and two gill netting." - Commercial fisher.

The Quota Management System was introduced in 1986. This fully established the concept of Total Allowable Catches and defined a process for bringing species into this management system. Individual Transferable Quotas (ITQs) were to be allocated on the basis of catch history. Catch levels dropped away again once ITQs were introduced. [295]

Today the fishing industry consists of three large corporate entities (Sealord, Sanfords and Talleys) and a number of smaller organisations, the majority of which lease rather than own fishing quota.[296]

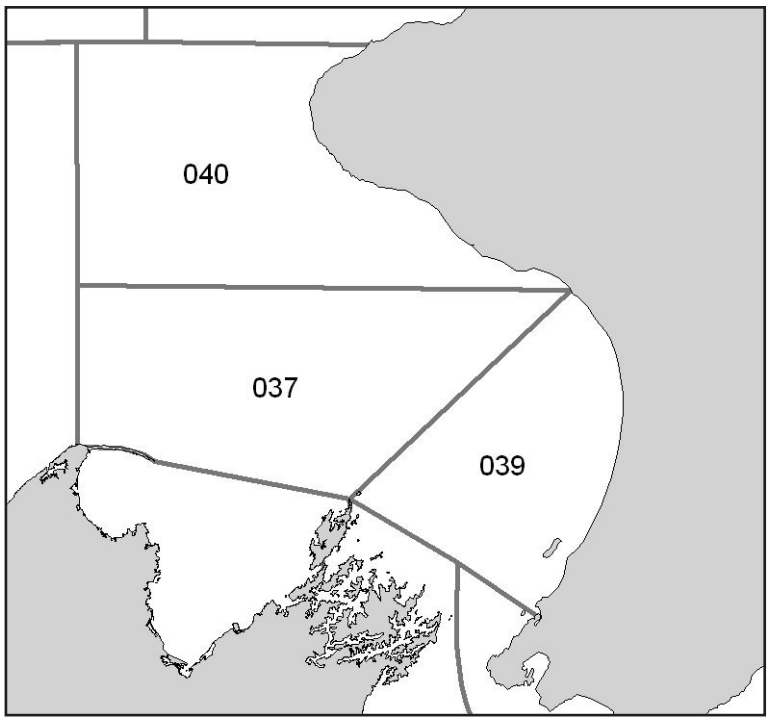
Maori are key stakeholders in the industry, and at 1999, owned about 40% of the quota.

In 1996 further changes were made to the Fisheries Act, providing for a stronger focus on overall ecological sustainability.[297]

Quota management areas

Quotas for particular species are established within quota management areas (QMAs), which are large areas of coastline. The QMA that encompasses the South Taranaki Bight is Area 8, or QMA 8.

FIGURE 10: STATISTICAL AREAS IN THE SOUTH TARANAKI BIGHT.



Source: Ministry of Fisheries

These provide the main framework for managing fish stocks.

Each QMA is split into smaller areas called fisheries statistical reporting areas (FSRAs).

The area of the South Taranaki Bight that this study is concerned with incorporates elements of two reporting areas, and is bounded by a third to the south (FSRA 39). The key units are statistical area 40 (most of the study area), and statistical area 37 (the southern most part of the study area) (Figure 10).

Fishing within each of these areas can be localised and can vary significantly from year to year as fish distribution changes.

Information gathered on the commercial fishery

The quota management system, established in 1986, relies on good quality catch information.

Commercial fishing vessels must provide certain information about where it is that they are fishing, and the catch that they have landed, including bycatch. The information gathered is used to help estimate fish stocks and to adjust quota levels.

The Ministry of Fisheries collects statistics about fish that is landed in the larger scale quota management areas (QMAs). Some fishing methods are also required to record the latitude and longitude of where they have landed their catch. For example, trawlers over 28m long record this information. Smaller trawlers however, are only required to note the fishing statistical area they have fished from.

Other research on commercial fishing

The Ministry of Fisheries primarily uses information gathered from fishers to estimate fish stocks and make changes to quota etc.

They also commission specific research on fish stocks of particular species. This research is usually species specific, although occasional studies, for instance into trawling impacts, may look at habitat overall.

Research into South Taranaki's fishery

No extensive surveys of the fishery resources on the continental shelf in this area were conducted until the 1970s. No new trawling surveys around the Southern Taranaki Bight have been undertaken since 1990.[298]

Research from bottom trawl surveys conducted by NIWA since that time show that the area supports a diverse assemblage of fish species. The most abundant species found included jack mackerels, barracouta, school shark, frost fish, tarakihi, rig, red gurnard, snapper, spiny dogfish and kahawai.[299]

Species targeted by commercial fishing

Species targeted by commercial and recreational fishers in the area[300] include all of the above species with the addition of blue warehou, blue cod, flatfish and the exception of frost fish and spiny dog fish which are generally regarded as a pest and dumped.

The most important deepwater species of statistical area 40 have been reported to be hoki and ling, whilst jack mackerel and barracouta are reported to be the most important pelagic fish in these waters.[301]

The main species caught within the South Taranaki Bight has not changed significantly since 1989, although a more diverse catch has been observed.

Jack mackerel has continued to dominate the catch statistics within the two zones along with barracouta and kahawai. Trevally was an important species from 1989 to 1992[302] however this species was not as apparent in the 1990 to 2003 catch statistics.

Blue mackerel, leather jacket, hoki, red cod, spotted dogfish, school shark, frost fish and warehou all formed part of the total catch in recent years.

Development of the snapper fishery

The commercial snapper fishery developed in the 1930s, with modest annual catches reported from 1930 – 1950.

Reported landings for the Snapper 8 fishery (North Island west coast) were 140 tons in 1931.

The records show a gradual increase in landings, with a sharp increase from 1973, the period during which commercial fishing expanded and notably pair trawling and Danish seine methods were introduced.[303]

Landing records show a high of 5,326 tonnes in 1976, after which total landings then sharply decline, down to 893 tonnes in 1986-87.

In 1986 the quota management system came into operation, and catch limits were set at a level intended to allow for stock rebuilding.[304]

By 1997, the Snapper 8 fish stock was increasing, but at 1997 was still only 81% of Bmsy (the biomass at which maximum sustainable yield can be supported).[305]

The catch limits set back in 1998, were, at the time, expected to see the snapper fishery rebuild to a point where the biomass was above BMSY.

However the Ministry of Fisheries has recently recognised that its rebuild strategy set in 1998 has not achieved the expected result, and that the current biomass of the stock is only about half of the target level.[306] In response the Ministry has reduced the total allowable catch in Snapper 8 be reduced to allow the stock to rebuild.

Rock Lobster fishery

The study area falls into the CRA 9 rock lobster quota management area. This fishery is geographically large. The fishery extends from north of Bruce Bay in the South Island to the Kaipara Harbour. Commercial lobster fishing is constrained to the northwest coast of the South Island and the area between Patea and Kawhia, in particular the Taranaki coastline. The 47 tonnes total allowable commercial catch (TACC) has remained unchanged since 1992.[307]

Area based restrictions to commercial fishing

The following area based restrictions apply to the South Taranaki area:[308]

- no commercial fisher shall use any Danish seine net in the lower North Island;[309]
- no commercial fishers shall take or possess any paua or mussels in the Whanganui River mouth area; and[310]
- shell fishing is prohibited between Tirau Point and the Whanganui River mouth.

There are a number of other, non-regulatory agreements also in force:

- voluntary ban on all pair trawling within four nautical miles of the coast; and
- voluntary ban on single trawling within two nautical miles of the coast from Cape Egmont to the north of the Rangitikei River.

Commercial fishing methods

Fishing methods evolve

By about 1980, line fishing and netting were the predominant inshore fishing methods along the South Taranaki coast. Trawling and purse seining (when a school of fish are encircled with a large net) occurred offshore, beyond 10 km, with the exception of Castlecliff, where trawling and purse seining occur about 5 km off the Whanganui River mouth.[311]

By the early 1990s, trawling, long lining, set netting and seining were the predominant fishing methods used in FSRA 40. [312]

Midwater trawling, bottom trawling and purse seining contributed the greatest proportion of yearly catch during 1990 to 2003,[313] as opposed to bottom trawling and set netting which contributed the greatest proportion from 1989 to 1992.[314]

Trolling and dredging has increased in status in recent years since the 1993 report with the yearly catches from these methods increasing.

Set netting and line fishing from smaller vessels continues to take place through the area. The pattern of fishing is determined primarily by the seasonal abundance of the prime target species.[315]

Trawling, long lining, set netting and seining are still the predominant fishing techniques used in these two zones, however there have been changes in fishing intensity using those various methods.[316]

Trawling

Trawling within the South Taranaki Bight

Trawling catch effort data enables a picture to be established of how much trawling is taking place in a particular area over a given period of time, as it is referenced to latitude and longitude points, for those trawlers over 28m in length. Smaller trawlers only record their catch by statistical area and so are not represented in Figure 11.

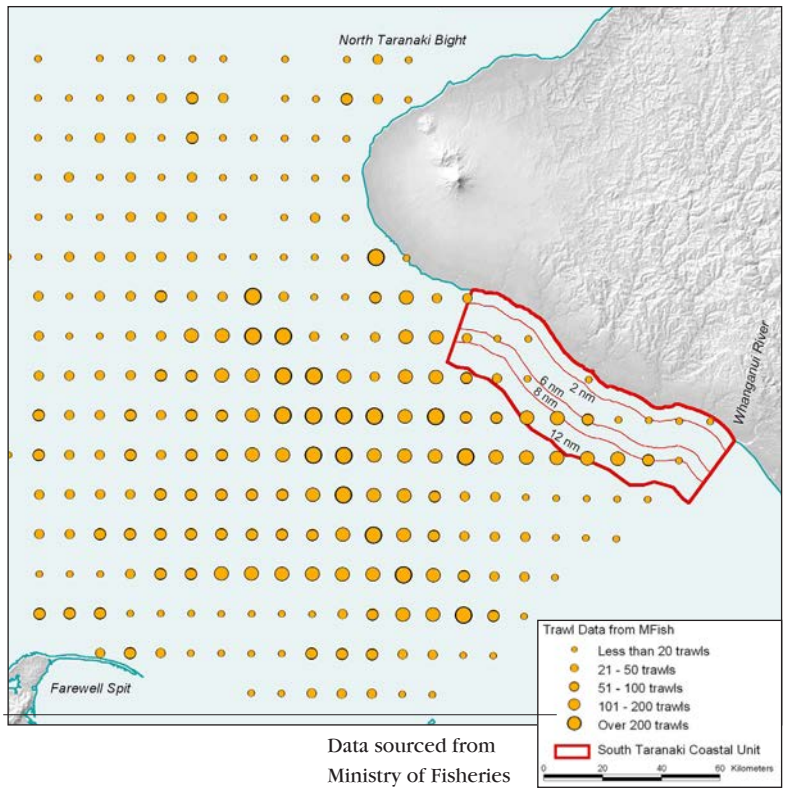
The catch effort illustrated in Figure 11 was based on all commercial fishing that had occurred within New Zealand's 200 nautical mile exclusive economic zones since 1990. It shows which sites are more frequently trawled.

The Ministry also collects other type of data such as volumes of fish landed.

Trawling intensity 1993-2003

The main trawling grounds on the South West Coast of the North Island lie between Kapiti Island and Wanganui.[317]

FIGURE 11: TRAWLING INTENSITY (OF VESSELS >28M)



Data sourced from Ministry of Fisheries

The data shows that trawling from large vessels is at greatest intensity about 30 km or so offshore in a band running southeast to northwest.

However, it is also clear that some trawling occurs within 2 nautical miles of the coast, well inside the study area.

Shift to mid-water trawling

The proportion of trawling to total fish catch is relatively unchanged. However there has been a shift within this method towards midwater trawling, which surpassed bottom trawling in 2000 as the dominant fishing method within the two main zones.

Midwater trawling has grown in popularity with the fishing industry. Bottom trawling catch statistics have gradually declined and bottom paired trawling has become almost extinct within the South Taranaki Bight, with no records of any catch taken by the technique over the last three years (to 2004).

Species targeted by trawling

Jack mackerel is the main target species of trawl vessels. Other important species include barracouta, trevally, tarakihi and kahawai.[318]

Most of the fishing for these species is by large foreign trawlers under charter, restricted to regions beyond 20 nautical miles from the coast, and thus outside the study area.

Trawling by smaller domestic vessels around and inshore of the area is primarily undertaken by smaller regional fishers (i.e. from Wanganui, Nelson, New Plymouth), and is restricted to some extent by the rock platform within five - ten kilometres of the coast.

The trawl surveys data provide very good information on the overall distribution of the main fish species as well as the main areas of abundance along the coast and the particular depths at which they are found.

Other fishing methods

Set netting

Small inshore vessels target the following species by set netting: rig, school shark, blue warehou and trevally.

Set netting is important to domestic vessels in these areas. It is seasonal, targeting species such as school shark, a species that is known to move into the inshore regions of the South Taranaki Bight in late spring - early summer.[319]

Species targeted by long lines

The catch from lining (bottom long line and trot line), particularly bottom long lining, is generally small and contributes to less than 5% of total yearly catch in FSRAs 040 and 037.

The yearly catch from lining in 1991 and 1992 comprised primarily of school shark, snapper, blue cod and gurnard.[320] These species have been described to be relatively abundant around and shoreward of the Kupe South site, and therefore likely to be an area fished by local domestic vessels.

Potting

The primary species collected by potting in statistical area 040 are rock lobster *(Jasus edwardsii)*. Paddle crabs are also caught by this fishing method.

Dredging

Dredging has occurred in the statistical area 37 since 1991, primarily for scallops. No commercial dredging is known from the statistical area 40.

Aquaculture

Taranaki has major constraints for each of the three established aquaculture species in NZ. However, technology is being advanced to enable aquaculture to occur on exposed coastlines (i.e. sub-marine structures). The established species for aquaculture in NZ are green shell mussels, salmon, and Pacific oysters.[321]

The constraints include:

- lack of sheltered water;
- bacterial loadings; and
- phytoplankton levels.[322]

Lack of sheltered waters

While some very large offshore aquaculture sites have been approved recently around New Zealand, the waters off Taranaki's coast are particularly exposed and high winds are frequent.

One report notes that when techniques for offshore aquaculture are established, with increased research and development, farming of shellfish and fin fish on Taranaki's open coast may become viable.[323]

Even when technology becomes available for offshore farms, they are likely to have higher operating costs than inshore farms. Offshore aquaculture is most likely to be used for filter feeding bivalves that require no feeding and relatively infrequent visits

Proximity to sheltered anchorages will affect travelling times, making the area around New Plymouth more favourable for offshore aquaculture than South Taranaki.

Bacterial loadings

River discharges will be a source of bacterial loadings that may cause restrictions on shellfish harvesting, mainly after heavy rainfall. Monitoring of shellfish quality would be prudent prior to aquaculture developments.[324] However, bacteriological water quality around Taranaki is regarded as excellent, with the location of any marine farms likely to be out of the influence of rivers.

Phytoplankton levels

Shellfish grown in coastal waters are limited by natural food availability. In one assessment of aquaculture opportunities in this area, phytoplankton levels were noted as being relatively low around the Taranaki coast compared to many other areas of New Zealand used for aquaculture. It further notes that phytoplankton levels will be a little higher in the northern Taranaki area, due to nutrients from the Waitara and Urenui rivers.[325]. This does not correspond with other information on nutrient levels in the South Taranaki Bight that are brought into the area through upwelling currents described in Chapter 13.

Constraints mapping project

The Taranaki Regional Council has recently undertaken a project to identify what constraints on aquaculture there are presently within the coastal management area. A GIS mapping exercise was undertaken where maps were produced of the Taranaki coastline and out to the 12 nautical mile limit.

High use and significant or important areas of the coast that can be considered to be constraints to the development of aquaculture were identified. The report identified that there were areas for which further research and consultation is necessary, such as commercial and customary fishing areas.[326]

18 MINERAL EXPLORATION

Introduction

There has been an extensive history into mineral – oil, gas, ironsand and limestone exploration and extraction in the South Taranaki-Whanganui coastal area. This chapter summarises that history.

Oil and Gas

The Taranaki Basin

The Taranaki Basin, both onshore and offshore, has been the main area where petroleum has been found in New Zealand.[327] New Zealand's only producing petroleum facilities are located in Taranaki.[328] The exploration for, and development of, these resources continues today.

The South Whanganui Basin

The South Whanganui Basin is thought to hold a petroleum resource at its deepest points.[329] The deep part of the basin brings together, in a favourable time and place, all essential ingredients for petroleum accumulation.[330]

Kupe Gas Development

In mid 2005, consent was granted to Origin Energy to commence the Kupe Gas Project north of Hawera. The project is sited toward the northern most end of the study area. This involves:

- constructing an unmanned offshore platform above the Kupe Gas Field;
- undersea pipelines to bring the raw gas and liquids to shore, and to take chemicals, power and a communications cable from the shore to the platform; and
- an onshore production station located at the southern end of Inaha Road. The pipes will go underground where they cross the beach.

The environmental effects on marine life are expected to be minimal, unless there is a catastrophic event such as a major earthquake. Some seabed disturbance is expected during construction.[331]

Development of the gas field will place restrictions on certain commercial fishing in the immediate area. The field's owners propose to create a 500 m-wide fishing exclusion zone along the entire length of the undersea gas pipeline from the shore near Ohawe to the production platform 30 km out to sea, and another exclusion zone 500 m around the platform. Restrictions are likely to be similar to those around the Maui pipeline where vessels greater than 9m in length will be prohibited from anchoring and trawling will be prohibited. There are to be no restrictions on small recreational fishing craft.[332]

Ironsand

Ironsands rich in titanomagnetite

West coast sands contain titanomagnetite, a mineral derived from the breakdown of Mt Taranaki volcanics, which give the sand its characteristic colour. The ironsands are found in beach and dune deposits, and offshore along 480 km of coastline from Kaipara Harbour in the north to Wanganui in the south.[333]

The titanomagnetite is sourced from volcanic rock from Mt Taranaki and the Taupo Volcanic Zone. The potential value of these ironsand deposits for the steel industry in New Zealand was recognised by early European settlers. The first attempts to smelt ironsands were in 1849, on the west coast of the North Island.[334]

The fine grain size and high titanium content defeated traditional blast furnace technology, and it wasn't until the 1960s that an alternative process was developed that allowed successful iron extraction.[335]

The possibility of an iron sand mining industry in the beach sands of the area to the west of Wanganui was recognised and documented.[336] Economic resources were identified including the 'Patea Dunesand' (the coastal strip from Manutahi to Waitotara, including Waipipi), and the coastal strip between Wanganui and Waitotara.[337]

The Patea Dunesand was reported to have an average titanomagnetite content of 20%. Titanomagnetite concentration is higher in beach than dune sand, because of the greater concentrating power of water.[338]

Waipipi ironsand mining 1971-1989

A mining operation was established at Waipipi in 1971.[339] This followed renewed demand from Japan for supplies of the mineral titanomagnetite, found in ironsand.[340]

The operation was a joint venture between Marcona Corporation of San Francisco and Viking Mining Company of NZ to mine and export the deposits.

The next 13 years saw some 13.8 million tonnes of concentrate delivered to Japan's six major steel producers.

The Waipipi deposit has been defined by exploration drilling to be continuous over more than 15 square kilometres averaging about nine metres in thickness.[341]

The Waipipi plant closed in 1987, having produced about 15.7 million tonnes of concentrate.[342] A small resource remains at the Waipipi deposit.[343]

"When the iron sand ore was being pumped into the boats it went in as a slurry. It was settled and the water sent over the side. It made a huge mess. There was dirty water for ages." - Recreational fisher and diver.

Future ironsand exploitation

In March 2005, Sericho Developments Ltd, a Melbourne-based company, was granted an exploration permit for a 455 hectare area on the coast south of Waverley. This is near the former Waipipi site, running between Okotoka and Whenuakura. The Company is looking at opportunities to supply the growing Chinese economy with alternative supplies of iron ore to overcome a current shortfall in supply.

Other mineral extraction

Limestone extraction at Nukumaru

Shellrock is extracted from a site that includes part of the Nukumaru Recreation Reserve, and has been for several decades. Limestone in the region is scarce so this outcrop is valuable.[344]

19 MONITORING THE COASTAL ENVIRONMENT

Introduction

Monitoring carried out by the two regional councils – Tarankai Regional Council and Horizons Regional Council relates to either monitoring the general state of the environment, or to monitoring the effects of consented activities.

Monitoring the quality of marine intertidal communities along the coast provides a direct measure of the ecological diversity or 'health' of coastal waters.[345]

Ecological diversity incorporates both the number of species present at a given area and the relative abundance of the different species present. Higher diversity is expected with improved water quality.[346]

This chapter discusses the state of environment monitoring carried out by the councils, monitoring of beach water quality and the monitoring of shellfish undertaken by the New Zealand Food Safety Authority.

What is state of the environment monitoring?

The Taranaki Regional Council (TRC) carries out monitoring for its 'State of the Environment' programme. This aims to measure both the current quality of the coastal environment, as well as changes over time.[347]

The programme involves monitoring of six 'hardshore' and two estuarine 'softshore' sites in Taranaki.[348] Of those monitoring sites, only one hardshore and one softshore site are within the study area (Table 15). These are:

- Waihi Reef – rocky shore site; and
- Waitotara Estuary – soft shore estuarine site.

TABLE 15: SUMMARY OF STATE OF THE ENVIRONMENT COASTAL MONITORING IN SOUTH TARANAKI

LOCATION	TYPE OF MONITORING	REGIONAL COUNCIL	RECORDS HELD SINCE
Waihi Reef	Hardshore marine ecological	TRC	1985
Waitotara Estuary	Softshore marine ecological	TRC	1995
Waiinu Beach	Beach bathing water quality (Enterococci)	TRC	1997
Waingongoro River mouth	Freshwater contact recreational water quality (E. coli)	TRC	1996
Castlecliff Beach	Beach bathing water quality (Enterococci)	Horizons	2005
Kai Iwi Beach	Beach bathing water quality (Enterococci)	Horizons	2005
Mowhanau Stream	Bathing water quality (E. coli)	Horizons	2005

Source: TRC, HRC.

State of the environment reporting by the Taranaki Regional Council also includes monitoring popular swimming beaches for bacteria concentrations, and some physical and chemical parameters.[349] The results are available on the council's website (www.trc.govt.nz).

Horizons Regional Council (HRC) monitors bacteria concentrations, and some physical and chemical parameters, in some popular swimming beaches and estuaries (Table 5). Shellfish are monitored on at least one beach in the study area.

What has the monitoring found?

State of environment monitoring in the Taranaki Region has indicated generally excellent coastal water quality, which compares well with other regions in New Zealand.[350]

Hard and softshore ecological monitoring show stable communities and hence water conditions (over the last 20 and last 10 years respectively – the period for which data is available).

The generally excellent coastal water quality found in Taranaki has been attributed to the following:

- few development pressures on the coast;
- a reduction in the number of point source discharges to the coastal marine area;
- improvements in waste treatment and disposal options; and
- an exposed coastline with a high degree of nearshore flushing.

"20 years ago, there were 7 discharges along the South Taranaki coast. Now there are 3. This includes amalgamation of the dairy plant effluent with treated wastewater from Hawera. As a result of the consent process and public involvement there has been a decrease in the areas potentially impacted by discharges." - Regional Council officer.

State of environment monitoring in the Whanganui region, although it has not been longstanding, has identified high bacteria levels at popular bathing sites. These include Kai Iwi Beach and Mowhanau Stream. Water quality is rated only 'fair' at Castlecliff.

Where are the gaps in state of environment monitoring?

Coastal marine ecological monitoring for 'State of the Environment' purposes is sparse. Only one 'hardshore' site and one 'softshore' or estuarine site, are being monitored in the study area. However, a large amount of knowledge exists through consent related monitoring. (See Chapter 20).

If further sites were included, not only would it lead to an increase in knowledge of marine communities along the South Taranaki coast, it would also help interpret changes that may be observed at the two currently monitored sites.

Bathing water quality is monitored at five sites along the coast (three beaches and two estuaries). All are popular recreational sites.

However, there are other sites along the coast that are close to settlements

and are known to be popular recreation areas that are not monitored, e.g. Waverley Beach.

No ecological monitoring of offshore marine sites in South Taranaki is being carried out.

Including such sites in the future, assuming such monitoring is technically feasible, could improve knowledge of what is there, and in the future, of changes and why they are occurring.

Diffuse discharges to the environment

It is likely that indirect discharges to the coast are occurring. These are sometimes called 'non-point source' discharges, as they can occur from more than one place.

Farm run-off containing agricultural effluent, fertilisers and herbicides may also affect the coast in this way. The riparian fencing and planting scheme undertaken by the Taranaki Regional Council goes some way towards reducing the amount of run-off entering waterways (refer to Figure 16 in Chapter 22).

The existence of, and risks posed by diffuse discharges could be investigated through strategic located state of the environment monitoring stations.

Rocky shore marine ecological monitoring – Waihi Reef

Long monitoring history at Waihi

There is a long monitoring history at the Waihi Reef site because it has also been used as the control (i.e. unimpacted) site for monitoring the effect of the Fonterra Whareroa/Hawera municipal combined discharge (discussed in the following chapter).

The Waihi Reef site is surveyed twice a year – in summer and in spring – and the results of the two seasons are analysed separately to remove any seasonal effects.[351]

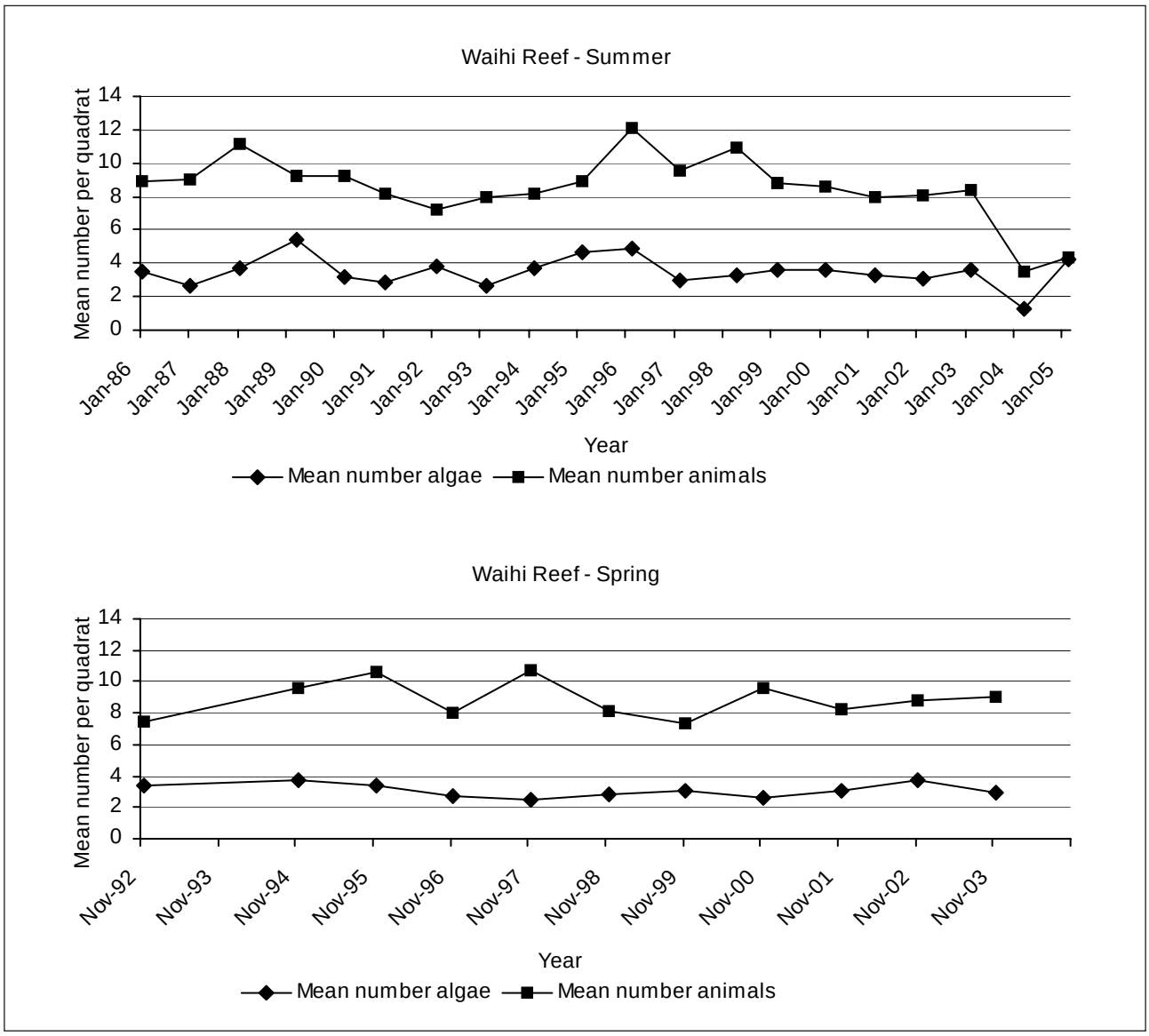
Results from monitoring the Waihi reef site

The results (Figure 12) show that some variation in ecological diversity has occurred on this reef over time. The variations are typical responses to local environment conditions, such as storms, sand inundation, high levels of suspended silt and freshwater influence from rivers after rain. For example the lower numbers of animals and algae observed in January 2004 were the result of sand inundation of the reef.

Over the last few years the weather conditions have been severe with large swells, rough seas and high rainfall events all having an influence on the coast. As a result, very turbid water is present nearshore, which is also present as a layer of silt which covers the reefs, smothering both marine life and rocks. The turbid water also reduces the level of light the seaweed needs to grow, which is not ideal for algal growth.[352]

The Waihi Reef site has generally had a lower level of diversity than other hardshore sites elsewhere in Taranaki. This may indicate that the

FIGURE 12: RESULTS FROM MONITORING THE WAIHI REEF



Source: TRC

South Taranaki coastline has a relatively lower level of ecological diversity than the North Taranaki coastline because of the differing environmental conditions that exist, such as substrate, exposure and sediment load.[353]

Softshore estuarine monitoring - Waitotara Estuary

Decade of monitoring at Waitotara

The Waitotara Estuary is one of two sites in the TRC estuarine monitoring programme. The other site is at the Tongaporutu Estuary in north Taranaki.

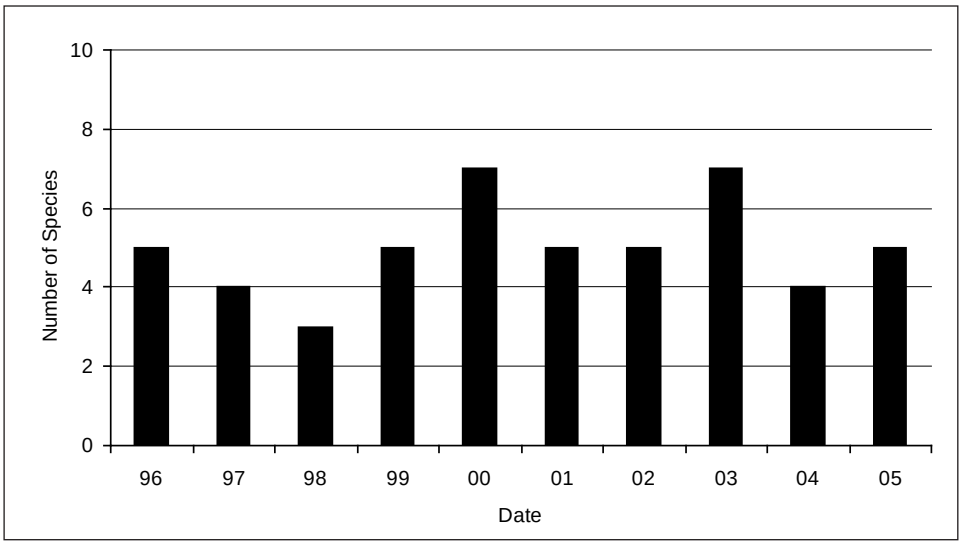
The ecology of the Waitotara Estuary is surveyed once a year, in autumn.[354] The results of the surveying over the last 10 years, since the monitoring commenced, are shown in Figure 13.

Waitotara estuary species abundance and diversity

The sand hopper is the most abundant species found, followed by the marine bristle worms. However, species dominance does change from year to year.[355]

Monitoring over the last 10 years has found healthy populations of juvenile pipis and cockles.[356]

FIGURE 13: SPECIES DIVERSITY FOUND IN THE WAITOTARA ESTUARY



Source: TRC

Fluctuations in diversity over time are evident. However, it appears changes have occurred to the ecological diversity and community structure of the Waitotara Estuary over time.

What happened to the estuary after the 2004 floods?

In February 2004 extensive flooding occurred in the Waitotara River which resulted in the whole lower catchment being underwater and a large inundation of silt. During 2004 the composition of the sediments in the estuary changed, going from a generally muddy habitat to a sandy habitat. As a result very few species were present, for example only 16 individuals were found in 12 core samples.

In 2005 this habitat changed back to a more mud dominanted environment. Only the sand hopper has come back in any great numbers, which demonstrates that it is not sensitive to its environment, but can adapt to changing conditions. In 2004 only 7 sandhoppers were found but in 2005, sandhopper numbers had increased dramatically and 4 640 were found!

Beach bathing water quality

Beach water monitored against national guidelines

Water quality is monitored at popular swimming beaches around South Taranaki. The programme monitors bathing beach water quality over time, and compares the water quality of bathing beaches against national

marine water quality guidelines. These are called the Microbiological Water Quality Guidelines for Marine and Freshwater Recreational Areas published by the Ministry for the Environment.

Sampling is undertaken at least 3 days after a flood to ensure consistency and minimise the effects of bacteria contamination from rivers. Samples are also taken at low tide, again to minimise the influence of nearby freshwater streams on the results.

Enterococci bacteria a key indicator

These national guidelines use Enterococci bacteria as the preferred indicator for the quality of marine waters.

Water samples are tested for the presence of Enterococci. This is a bacteria which indicates the possible presence of disease-causing organisms in water contaminated by human or farm effluent. [357]

The guidelines use the concentration of the bacteria as a measure of the risk to water users of contracting gastrointestinal and respiratory illness. Single sample Enterococci results are used to categorise beaches into one of four categories.[358] The four categories are given in the Table 16:

TABLE 16: BEACH WATER QUALITY SAFETY LEVELS

ENTEROCOCCI/100 ML	SAFETY CATEGORY	COLOUR
No single sample greater than 140 enterococci/100 ml	Surveillance	Green
Single sample greater than 140 enterococci/100 ml	Alert I	Yellow
Two consecutive single samples (resample within 24 hours of receiving the first sample results, or as soon as is practicable) greater than 280 enterococci/100 ml.	Action	Red

Source: Ministry for the Environment 2003.

Freshwater can be a contaminant source

Bacterial concentrations in bathing water are generally at levels not likely to be detrimental to human health. On a few occasions bacteria may reach 'alert' or 'action' concentrations. These times are likely to be when there is a greater influence from freshwater mixing with seawater.

The biggest risk to water quality at all beaches is the adverse effect of rivers discharging sediment and bacteria into the sea after high rainfall events.[359]

South Taranaki-Whanganui beaches that are monitored

Beaches that are monitored in this area are:

- Waiinu Beach;
- Castlecliff Beach;
- Kai Iwi Beach – Mowhanau Stream; and
- Ohawe Beach – Waingongoro River.

Waiinu Beach monitoring programme

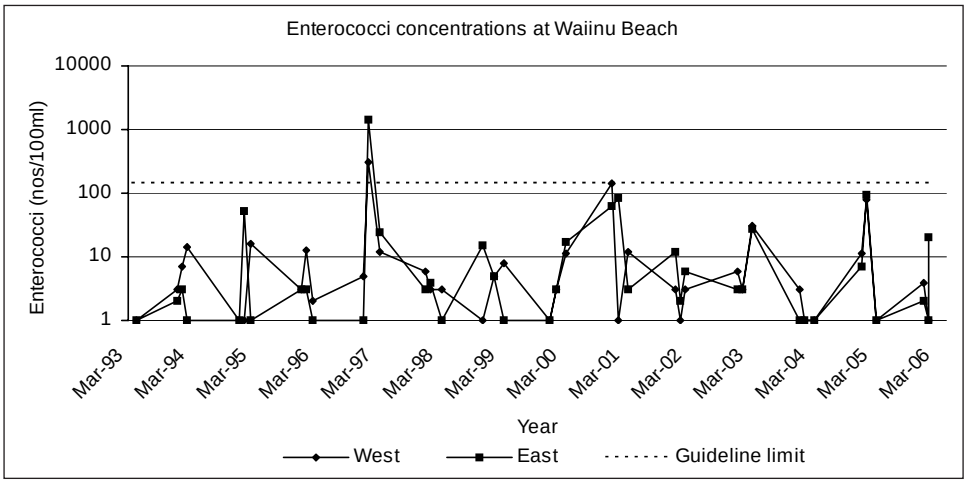
Treated domestic wastewater of up to 84 m3/day may be discharged from Waiinu Beach Settlement via seepage to land and groundwater.[360] The shallow groundwater receiving the treated effluent from the Waiinu Beach settlement flows toward the beach, more than 200 m away. The coastal seawater quality is therefore measured as part of monitoring the effectiveness of the effluent treatment system.

Monitoring carried out since 1992

Coastal water has been sampled each year since 1992 on three occasions over the summer months, at two coastal sites around Waiinu Beach.[361]

Each sample is analysed for faecal coliform bacteria, enterococci bacteria and conductivity.[362]

FIGURE 14: WATER QUALITY AT WAIINU BEACH MEASURED AS ENTEROCOCCI CONCENTRATIONS.



Source:TRC

Bacteria levels generally acceptable

Bacteria levels at Waiinu Beach, as can be seen from Figure 14, have generally been at acceptable levels for swimming and other contact recreation. Most samples collected since 1992 have been well below that level. These results suggest that Waiinu Beach is suitable for contact recreation (recognising the limited number of samples collected per season).[363]

Whilst these results show a stable, high quality environment, earlier monitoring carried out by the Rangitikei-Wanganui Catchment Board suggested that the Waitotara River may occasionally have a marked influence on Waiinu Beach coastal water quality. Samples with higher bacterial counts were correlated with lower salt concentrations, i.e. greater portion of freshwater influence from nearby rivers.[364]

Floods increase bacteria levels

Since 1992, bacteria counts have exceeded alert levels on only a few occasions. A common factor at these times has been heavy rain or flooding

in the catchment area, bringing bacteria and silt onto the beach.

During the 2003–04 monitoring period for example, enterococci counts were low for the first two inspections but were elevated for the March sampling period. The March sampling was undertaken following extensive flooding during February 2004, which deposited a large amount of silt and other debris into the sea. This is supported by the low conductivity result and the colour being very brown and turbid during the sampling period due to the influence of the Waitotara River and run-off from the land.[365]

Castlecliff Beach water quality 'fair'

Monitoring of Castlecliff Beach water quality commenced in 2005. Records, therefore, only relate to this year (Table 17).

24 samples were taken over the summer months. The sample median was 13 enterococci per 100 ml and the range was <2 to 300 enterococci per 100 ml.[366]

As a result, the beach has been graded on an interim basis as suitable swimming for recreation with a grade of 'good'.[367]

TABLE 17: CASTLECLIFF BEACH WATER QUALITY TESTING FOR 2005

NO. OF SAMPLES	LEVELS FOR SINGLE SAMPLE OF ENTEROCOCCI/100ML	SAFETY CATEGORY	COLOUR
22	< 140	Surveillance (good)	Green
1	>140 to <280	Alert II (satisfactory)	Amber
1	> 280	Action (unsatisfactory)	Red

Source: Horizons Regional Council, 2005.

Kai Iwi Beach water quality 'poor'

Monitoring of Kai Iwi Beach water quality commenced in 2005. Records, therefore, only relate to this year (Table 18).

24 samples were taken over the summer months. The sample median was 28 enterococci per 100 ml and the range <2 to 9000 enterococci per 100 ml.

TABLE 18: KAI IWI BEACH WATER QUALITY TESTING FOR 2005

NO. OF SAMPLES	LEVELS FOR SINGLE SAMPLE OF ENTEROCOCCI/100ML	SAFETY CATEGORY	COLOUR
18	< 140	Surveillance	Green
2	>140 to <280	Alert II	Amber
4	Two consecutive single samples (resample within 24 hours) > 280	Action	Red

Source: Horizons Regional Council, 2005.

The health risk of swimming at Kai Iwi Beach was slightly higher than at Castlecliff. It could be considered "safe" about 80% of the time. [368]

During summer the Mowhanau Stream was flowing across the area where people generally swim. This meant on occasions Horizons was sampling a mixture of seawater and low bacterial quality fresh water from the agricultural Kai Iwi Stream catchment.[369]

Mowhanau Stream 'very poor'

Monitoring of Mowhanau stream commenced in 2005 (Table 19).[370]

Mowhanau Stream is a high use site, because it is used as a safe area for children to play. It had the lowest interim rating of 'very poor'.

25% of the samples taken at this popular swimming site were either amber or green. Further investigation to determine the source of the bacteria is underway.[371]

The following results were recorded from 26 samples taken:

TABLE 19: MOWHANAU STREAM WATER QUALITY 2004/05

NO. OF SAMPLES	E COLI LEVEL	ALERT LEVEL	COLOUR
1	<260 E coli per 100 ml	Acceptable	Green
6	>260 and <550 enterococci per 100ml	Alert	Amber
19	>550 E coli per 100ml	Action	Red

Source: Horizons Regional Council, 2005.

Whilst health risk from recreational contact with this stream seems quite high, community and Public Health Unit feedback did not identify any serious issues related to stream use. Wanganui Public Health Unit indicated that they had had no confirmed cases of any notifiable illnesses attributed to the Mowhanau Stream.[372]

Microbiological quality was also poor in the nearby Kai Iwi Stream.

14 samples conducted over the summer recorded one green, one amber and 12 red results.

Ohawe beach – monitoring of water quality at the Waingongoro River mouth

The Waingongoro River drains an extensively farmed catchment. There are 198 dairy farms and point source discharges from dairy sheds and municipalities number more than 110.[373]

This site is immediately upstream from the river mouth at Ohawe Beach. Thus, this site is within the study area.[374]

This site is sampled every summer since the programme began in 1996/97.[375] Thirteen samples are taken over the course of each summer season at regular time intervals, at high tide. Three types of tests are

done. These are:

- Conductivity (this is a way of finding out how much salt is in the sample, so that the amount of freshwater influence can be taken into account);
- Bacteria (E. coli, Enterococci and faecal coliforms); and
- Temperature and turbidity (turbidity is a measure of how clear the water is).[376]

Water quality generally good at Ohawe beach

Based on the bacterial monitoring results, water quality levels for the Waingongoro River at Ohawe Beach are generally good over the last ten years.

Median E. coli bacteria number for the 2003/04 period was equivalent to that found in the previous season, continuing the general trend of improvement in bacterial water quality recorded over the last four seasons.[377]

However, since monitoring began, the alert and action concentrations of E. coli have been reached in some samples most summers.

A comparatively narrow range of E. coli numbers was recorded in the 2003/04 period. One of the thirteen samples that summer (taken on 9 December 2003) exceeded the alert concentrations. (1 sample is 8% of the 13 total samples). This elevated count followed shortly after a river fresh event in early summer. The concentration of bacteria at which action needed to be taken was not reached.[378]

Shellfish monitoring

The NZFSA (New Zealand Food Safety Authority) runs a programme to test shellfish and water samples from around the New Zealand coastline every week to make sure that shellfish are not contaminated with marine biotoxins from toxic algal blooms. Samples of water and shellfish are collected by health protection officers regularly. Public warnings are issued when shellfish are not safe to eat. This information can be found on the following web page: http://www.nzfsa.govt.nz/consumers/food-safety-topics/marine-biotoxin-alerts/index.htm (viewed 20 April 2006).

The South Taranaki Whanganui coast has on occasions, been closed for shellfish gathering because of a toxic algal bloom and the detection of high levels of Paralytic shellfish poison (PSP) in shellfish. Shellfish closures are put in place as a precaution when the levels of PSP reach unacceptable levels. Closures have been put in place over the summer of 2000, the summer of 2001 and between September and December 2003.

20 CONSENT MONITORING

Introduction

Under the Resource Management Act 1991, anyone discharging to the environment must have resource consent from a regional council, either Horizons Regional Council or Taranaki Regional Council, depending on the location. Monitoring is frequently required as a condition of such consents.

The purpose of this monitoring is twofold:

- to ensure the applicant responsible meets the conditions of its discharge consent; and
- to check on the impact the particular discharge might be having on the marine environment.

This chapter summarises the results of the environmental monitoring from the following discharges:

- Fonterra Whareroa/Hawera municipal combined outfall;
- Pacific Natural Gut String Company;
- Manaia Oxidation Ponds; and
- Patea Oxidation Ponds.

Those significant discharges that are not being monitored, for which current consents are held include:

- Wanganui wastewater treatment outfall.

TABLE 20: SUMMARY OF CONSENT MONITORING

LOCATION	TYPE OF MONITORING	REGIONAL COUNCIL	RECORDS HELD SINCE
Pacific Natural Gut String Company	Marine ecology	TRC	1989
Fonterra/Hawera municipal – Tangahoe River to Waihi reef	Marine ecology Shellfish tissue monitoring Beach Water quality (Enterococci)	TRC	1986
Manaia oxidation ponds	Marine ecological inspection	TRC	1998
Patea oxidation ponds (Patea river – 200m downstream of discharge)	Faecal coliform Samples analysed for water quality including enterococci and any visual effects of the discharge on the river.	TRC	1994
Wanganui wastewater	None	Horizons	

Source: TRC; HRC

Active coastal permits

There are 17 coastal permits active under the jurisdiction of Taranaki Regional Council within the South Taranaki study area and a small handful

under the jurisdiction of Horizons Regional Council (Table 20). The majority of these consents are for minor structures built within the coastal marine area, e.g. boat ramps. A few concern drilling and freshwater use associated with hydrocarbon exploration, also relatively minor, and four concern discharges to the environment. (Table 20)[379]

Unauthorised incidents

The number of unauthorised incidents on the coast is low. Of all incidents reported to the Taranaki Regional Council each year, only between 3% and 5% are coastal related, and the majority of incidents reported to Horizons in the coastal area are air/odour related.

Gaps in consent monitoring

The Taranaki Regional Council monitors all consents that have the potential to have any adverse effects on the environment such as discharges. More minor consents, such as for boat ramps or structures, are not monitored on an annual basis.

The Wanganui wastewater discharge off South Beach is not being monitored until the discharge is fully treated (July 2007). This falls within the Horizons Regional Council region, and falls just outside the study area.

Fonterra Whareroa/Hawera municipal combined discharge

Single largest discharge in South Taranaki

The only major discharge into the study area is the combined Fonterra Whareroa/Hawera municipal outfall. The Fonterra plant was formerly known as NZMP Whareroa and, before that, Kiwi Dairies Ltd.

Wastewater discharge is via a long pipe which extends 1845 m offshore.[380] It was constructed in 1997 and has been used by Fonterra since then to discharge at a maximum rate of 26,000 m^3/day.

In February 2001 the Hawera oxidation ponds were connected, allowing a treated municipal discharge of 10,000 m^3/day.[381]

Prior to the construction of the long outfall, both wastes were discharged onto the shoreline and nearshore zone, resulting in unacceptable environmental impacts.[382]

Ecological diversity and shellfish tissue monitored

Measures of ecological diversity and shellfish tissue monitoring are undertaken to monitor the impacts of the outfall on the surrounding environment.

Marine ecology improved since long outfall installed

Marine ecology in the vicinity of the former NZMP Whareroa discharge has greatly improved since the new outfall was built. Monitoring is undertaken annually on a joint basis with Ngati Ruanui.

Since 1997, yearly spring and summer survey results have generally shown

a considerable improvement in the health of the intertidal communities, primarily through a dramatic improvement in water quality. The evidence for this includes:

- An increase in ecological diversity;
- Decreased coverage of the seaweed Chaetomorpha sp.;[383]
- The disappearance of filamentous bacterial growths at the two most affected sites – at 30 m and 200 m southeast;[384]
- Disappearance of undesirable bacteria;[385]
- Increased coverage of desirable, common seaweeds and animals such as Corraline paint, Corraline turf, Ralfsia sp. and Ceramium sp.;[386]
- Fish observed from the camera surveillance of the outfall structure; and
- An observation that the area is becoming more popular with recreational fishers.

The two seaweeds Ulva sp. and Gigartina sp. are still very abundant. They are thought to be benefiting from the residual nutrients in the sediment. Over time it is expected that these seaweeds will decline in abundance to levels seen at other reefs.[387]

Environmental factors cause recent drop in ecological diversity

In spring 2003, all six monitoring sites, including the Waihi Reef control site, decreased in ecological diversity compared to the previous year. In the 2004 spring survey there was a further decrease at all sites sampled.

Species diversity and abundance dropped to levels below what was present before the long outfall was commissioned.

However, the control site could not be sampled in 2004 because the tide made it inaccessible.[388] The most recent results from the 2005 summer monitoring show diversity at most sites starting to recover (except for Pukeroa Reef).

This decrease in ecological diversity appears to be the result of environmental factors, rather than an effect caused by the Fonterra/ Hawera municipal combined outfall.[389]

The control site has also been affected, and high proportions of sand were observed in the sampling quadrats at times corresponding to the decreases in ecological diversity.

These environmental factors could be due to the rough seas experienced over the winter, and the increased turbidity of the water and sediment on the reef due to the large amounts of slips that had occurred along that stretch of coast. These slips have caused large clumps of clay and mud to be present out on the reef, which reduced the amount of suitable habitat for the intertidal animals to live on and under.[390]

Long term monitoring programme allows improvements to be tracked

The existence of a long term and consistent monitoring programme allowed changes in the marine environment around the outfall to be properly tracked.

Before construction of the outfall, at least 10 years of monitoring data had been collected. Since that time, a further 8 years of data has been collected. This information base has proved invaluable in meeting the aims of the monitoring programme, which are:

- To indicate any change in biological community structure attributable to the presence of the wastewater discharge via the outfall; and
- To determine any improvement in the adverse ecological effects previously attributed to the discharge through the old near-shore outfall. [391]

The sampling sites are those used for monitoring the Hawera municipal wastewater discharge, before it was connected to the Fonterra discharge pipeline.[392]

Shellfish tissue monitoring

Shellfish monitoring is undertaken along the coastline from northwest of the combined outfall, for several kilometres to the southeast (direction of longshore drift), as far as the Tangahoe River.

The aspects monitored include bacteria and trace metals.

Overall drop in bacterial levels

Since the Hawera wastewater was connected to the long outfall, faecal coliform bacterial levels in shellfish tissue have at most times been at acceptable levels to meet the recommended standard for human consumption (230 MPN/100 g). Prior to connection of the Hawera discharge, the recommended standard was exceeded more frequently.

The standard limits are still occasionally exceeded, but it is possible that this is due to the influence of the Tangahoe River flooding which has had very high levels of faecal coliforms on these occasions.

Trace metals not a problem

Levels of the trace metals cadmium, chromium, copper, mercury, nickel, lead and zinc in shellfish tissue have been monitored by TRC as part of consent compliance monitoring programmes for a number of years. Results show that trace metal concentrations in all samples collected at potentially impacted and non-impacted coastal sites have been consistently well below the Department of Health Food Regulations 1984 and recently gazetted New Zealand Food Standard 2001.[393]

Pacific Natural Gut String Company

Waste water discharged directly to coast

Since 1976[394], the small Pacific Natural Gut String Company Ltd has operated a processing plant on SH 45 west of Manaia, in the Kaupokonui catchment. This is just beyond the northern limit of the study area. Since the study area boundary is just to the southeast of the pipe outlet, which is in the direction of longshore drift, any effects of this discharge are reviewed here.

Wastewater is discharged from the plant directly into the Tasman Sea.[395] The waste includes various chemicals, storm water and animal products. The discharge runs along a pipe to the coast, exiting just a few kilometres to the west of the study area.[396]

Localised impact on coastal environment

The discharge has been monitored annually for the last 16 years by visual inspection and sampling. Chemical sampling has been of the effluent only, not the receiving waters. The receiving waters are however sampled as part of the Manaia oxidation pond discharge monitoring programme.

Although operation has predominantly been within the limits of the consent conditions,[397] monitoring during 2003 found that the discharge might be having an indirect effect on the reef ecology in the area.

There was a high silt level on the reef most likely caused by the discharge over the cliff suspending sediment and transporting it across the reef and into the rock pools where it was able to settle. Fewer species were present within the area of the discharge on the reef.[398]

Wider impact unlikely

Nevertheless, the effect described in 2003 was local, and monitoring in 2004 supported this, which found the reef was in a healthy state compared to other reefs around the coast, out of the influence of the discharge.

Manaia Oxidation Ponds

Treated effluent discharged to sea

The Manaia oxidation ponds discharge up to 330 m^3/day of treated sewage effluent into an unnamed stream, which then runs into the Tasman Sea.[399] This site is also just out of the study area for this project. The waste can also include Natural Gas Corporation Production Station wastes during emergency situations or low flow periods.

Marine ecological monitoring has been conducted on the receiving environment since 1998, at low tide, in the vicinity of the discharge. Inspections are carried out twice a year – in early summer and again in late summer.[400] The discharge and receiving waters are also sampled for bacteriological water quality at two sites, either side of the discharge, during winter, mid and late summer.

Localised impact on marine environment

Monitoring data collected since 1998 shows there to be an on-going localised effect on some marine species within the vicinity of the stream, as a result of nutrient enrichment.[401]

The discharge is also having an effect on the marine environment in terms of the silt loading on the reef. Silt acts like cement, sticking all the rocks together, which removes the under boulder habitat available for species to colonise.[402] Once the influence of the stream is absent,

there is no silt on the reef.[403]

The remaining reef has, for the duration of the monitoring, been typical, in diversity and abundance, of other Taranaki reef sites.[404]

The treatment system is in the process of being upgraded.

Patea Oxidation Ponds

Treated wastewater discharged to river

The Patea oxidation ponds discharge up to 450 m^3/day of treated wastewater into the Patea River less than 1 km upriver from the river mouth.[405]

Monitoring comprises water quality testing in the Patea River Estuary where several physical and chemical parameters are measured.[406] There is a minimal visual impact of the discharge on the receiving waters of the Patea River. Water quality surveys are undertaken three times each year.

Faecal coliform numbers (130–140 per 100 mls) are typical of the lower reaches of a large river draining a developed catchment. Monitoring has shown that the bacterial water quality measured downstream of the discharge is usually similar to that measured upstream of the discharge.

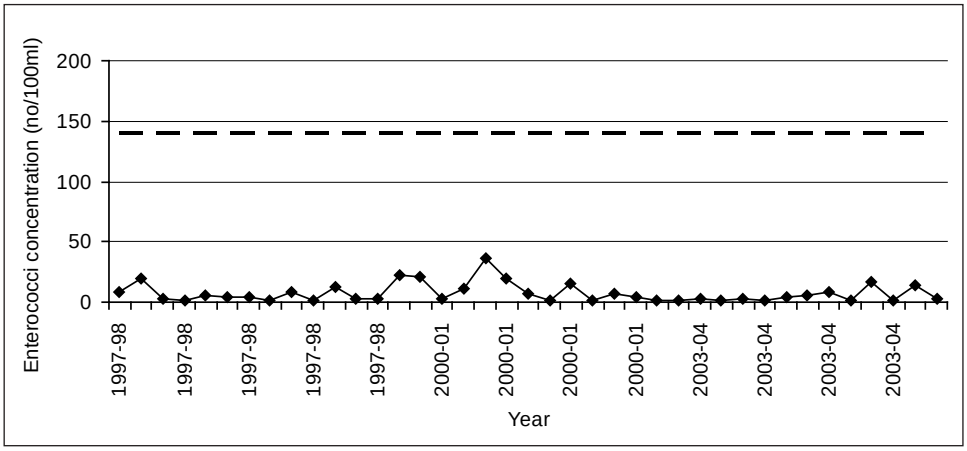
No significant impacts recorded

Bacterial numbers recorded below the discharge are well below the safe limit in the 2003 Guideline for Bacteriological Water Quality for Marine and Freshwater (MfE 2003) (Figure 15).

No significant impacts of the Patea treatment system on adjacent receiving waters were measured during the 2004-2005 monitoring period.

Nethertheless, the system is being upgraded as part of the consent renewal process presently underway.

FIGURE 15: ENTEROCOCCI CONCENTRATIONS AT PATEA BEACH 1997-2004



Source: TRC

Wanganui wastewater discharge

Wanganui wastewater scheme discharged to river and coast

The Wanganui wastewater scheme discharges up to 30 000 m^3/day of wastewater, including trade waste and partially treated domestic sewage, to the coastal marine area. The main discharge point is immediately to the southeast of the study area. [407] The wastewater is currently only partially treated (screened) but from 2007 it will be fully treated.

Discharges into the coastal marine area include three discharge points into the estuarine reaches of the Whanganui River (downstream from Cobham Bridge where it is zoned coastal marine area). These are used when storm water is overloaded. The main discharge point is at South Beach via an outfall pipe that takes the wastewater 1800 m off the beach.

The scheme itself also has other discharge points, but these are on the Whanganui River upstream of the coastal marine area.[408]

Periodic overflows pose health risk

When overflows occur, and raw sewerage is discharged into the river estuary (about 4% of the time), contact recreation may be rendered unsafe due to microbiological contamination. The storm water separation programme should, over time, reduce the number of these incidents.

Shellfish in the vicinity are likely to be unfit for human consumption.

No current monitoring programme

The discharges from the Wanganui wastewater scheme are not being monitored, so no quantifiable information is available on the impact of the discharges on the coastal marine area.

Future monitoring programme planned

A condition of the consent granted to the Wanganui District Council is that a monitoring regime be in place from 2007.

Monitoring will be required initially at five year, and later at ten year intervals. If non-compliance is found, monitoring may need to be conducted more frequently.

21 MANAGING THE COAST – WHO DOES WHAT?

Introduction

In New Zealand, the coastal marine area is managed under several different laws and several different agencies. This chapter describes these laws and the responsibilities and roles of the agencies that administer them.

The coastal marine area is defined in law as the area between the mean high water spring tide mark and the 12 nautical mile limit offshore.[409]

The uses of the coastal marine area that are managed include:

- fishing, in all its various forms;
- shellfish gathering and taking of kaimoana;
- aquaculture (fish farming);
- structures on, or in the seabed or the beach, e.g. wharves, platforms, pipelines;
- reclamations;
- discharges to the beach or sea, including to the air above the sea;
- mining or extraction from the beach or seafloor, e.g. taking sand;
- dumping of waste, e.g. sand or spoil; and
- using, damming or diverting seawater.

In this chapter

This chapter discusses the roles and responsibilities for the following organisations:

- Ministry of Fisheries;
- Regional Councils;
- Department of Conservation;
- District Councils; and
- Maritime New Zealand.

It concludes with a brief discussion on some recent multi-agency policy developments.

Ministry of Fisheries

What does the Ministry of Fisheries do?

The Ministry of Fisheries is the government agency responsible for the conservation and management of the fisheries, and carries out functions primarily under the Fisheries Act and associated regulations. The Ministry of Fisheries (MFish) was established as a stand-alone agency on 1 July 1995. MFish's primary purpose is to ensure that fisheries are sustainably used within a healthy aquatic ecosystem.[410]

MFish must consistently monitor the fisheries and advise the Government on all aspects of fisheries management. The Ministry is also responsible

for carrying out the Government's policies to manage and conserve fisheries, and to actively encourage compliance of fisheries regulations by all fishers.

The Ministry of Fisheries has responsibilities under the Fisheries Act 1996. This provides for the management of fisheries, including shellfish. Under this Act, MFish administer the fisheries quota management system and other tools aimed at ensuring sustainable fisheries.

The Fisheries Act specifies responsibilities and controls on the setting and allocating of quota, the establishment of appropriate fish harvesting methods, the setting of seasons and the setting of size limits.

Managing the total allowable catch

Fisheries management areas that encompass the South Taranaki coast study area include:

- Quota Management Area 8; and
- Fisheries Statistical Report Areas 37 and 41.

Customary fishing

The Ministry of Fisheries approves and enforces Maori customary fishing arrangements under the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992.

MFish is also responsible for the approval and enforcement of taiapure and mataitai. These are areas of special significance to tangata whenua, which they manage as a source of food, or for spiritual or cultural reasons. As yet, there are none of these local fisheries areas in the study area.[411]

Sustainability Measures Round

The Ministry of Fisheries provides the Minister of Fisheries with annual advice on sustainability measures and other management controls. These measures include total allowable catches, apportioning that catch among customary, recreational and commercial fishers, and regulations to manage the impacts of fishing on the environment which can be at a national, regional or local scale.

Regional councils

Regional council jurisdiction

Two councils have jurisdictions that fall within the South Taranaki coast study area. These are:[412]

- Taranaki Regional Council in the northwest; and
- Manawatu-Wanganui Regional Council (Horizons Regional Council) in the southeast.

The boundary between the two regions in the coastal marine area is a line extending from a site east of Waiinu Beach, being the southern edge of the Waitotara River catchment.[413] The council's seaward boundary is the 12 nautical mile limit.

What do the regional councils do?

Regional councils have coastal marine area responsibilities under two main Acts. These are:

- Resource Management Act; and
- Maritime Transport Act.

Under the Resource Management Act they must have a regional coastal plan. Its main role is to guide the decisions they make on coastal consent applications.

Under the Maritime Transport Act they must have an oil spill contingency plan to manage potential impacts on the environment.

Coastal plans under the Resource Management Act

A regional coastal plan must promote sustainable management of natural and physical resources in relation to the coastal marine area.[414]

The activities the coastal plan has to cover include structures, reclamation and foreshore works, air quality, extraction of sand, shingle and shell, taking, using, damming and diversion of water; discharges; and dumping of waste.[415]

The plan does this through identifying:

- issues to be addressed by the plan;
- objectives to be achieved that address those issues;
- policies and methods, including rules to be used to achieve the objectives; and
- the anticipated environmental results.[416]

Regional coastal plans in South Taranaki

The regional coastal plans of both regional councils became operative in 1997.[417] Taranaki Regional Council intends to begin a review of its regional coastal plan in 2006. Horizons Regional Council is reviewing all its regional plans in its 'One Plan' process, including its regional coastal plan. A draft 'One Plan' is expected to be notified in 2006.

Both regional councils have identified different management zones in their plans. These zones reflect environmental differences in parts of the coast. Different rules are applied depending on which coastal zone is involved.

In addition, the plans identify areas of 'outstanding natural value' as required under the Resource Management Act.

Outstanding natural areas recognised in regional coastal plans

The plan lists the following areas as being significant, and seeks to manage resource use and development in a manner that sees their values protected:

- Waitotara Estuary;
- Waiinu Reef;

- Waverley Beach;
- North and South Traps;
- Whenuakura Estuary; and
- Whanganui River Estuary.

Making decisions on coastal consents

Activities in the coastal marine area are managed and controlled through the resource consent process.[418]

A regional coastal plan can specify different classes of rules. These are set out in the table below. The system is designed to keep adverse impacts of an activity to a minimum. Applicants for coastal consents may well have to take steps to avoid or remedy any damage to plants, animals or the physical environment.

TABLE 21: TYPES OF RESOURCE CONSENT

ACTIVITY CATEGORY	DESCRIPTION	COASTAL CONSENT REQUIRED
Permitted activity	Can be done as of right if certain conditions are met	No
Controlled activity	Council must give permission but can specify controls	Yes
Discretionary activity	Council can say no and can specify controls	Yes
Non-complying activity	Council can say yes only if effects are minor, can specify controls	Yes
Prohibited activity	No consent can be granted	Activity not allowed

Source: TRC; HRC 1997.

Other regional council responsibilities under RMA

In addition to their specific responsibilities in the coastal marine area, other regional council responsibilities have a bearing on the coastal marine area. These include:

- soil conservation;
- management of rivers and lakebeds;
- management of surface and ground-water;
- management of hazardous substances; and
- management of natural hazards.

These need to be considered alongside coastal marine area management functions so as to achieve integrated management and consistency.[419]

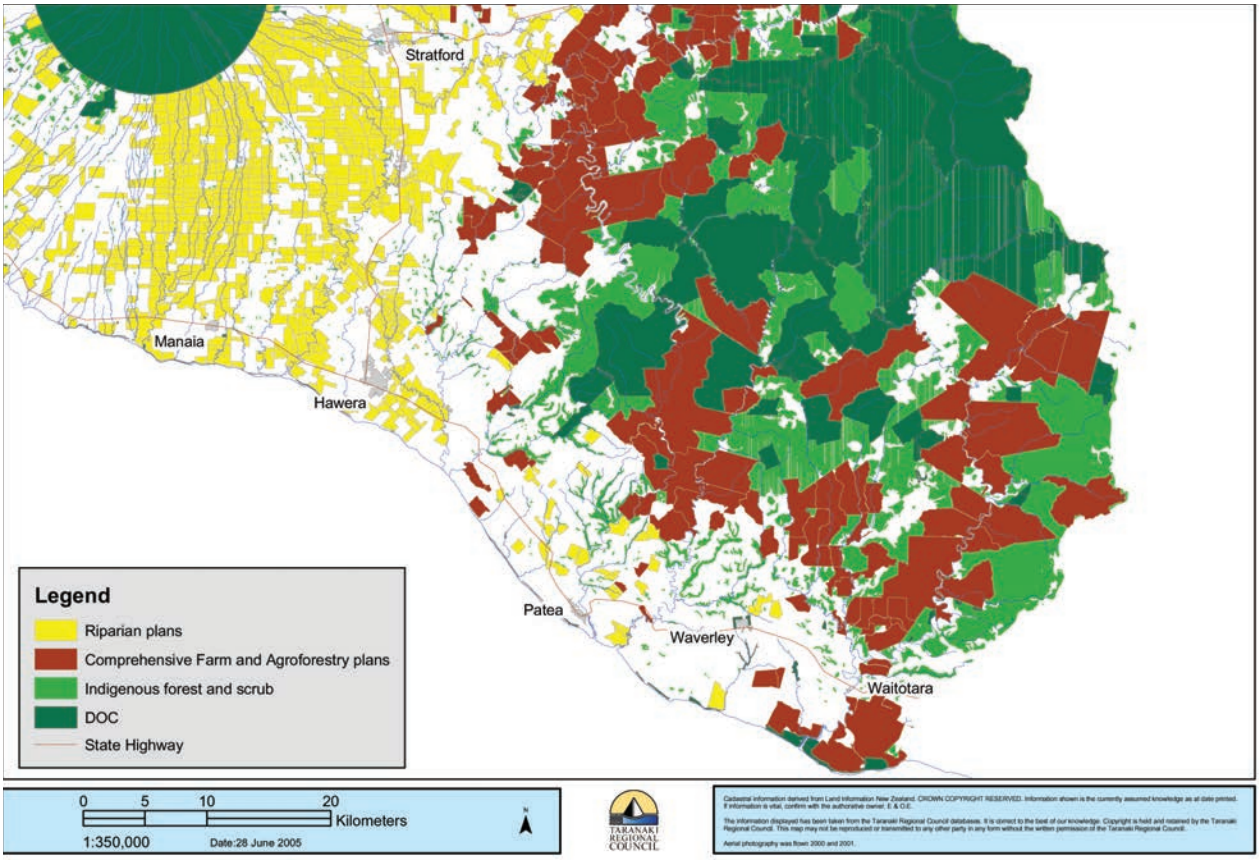
Land plan considers coastal impacts

An aspect of the Resource Management Act that is particularly important is the onus on those preparing plans to think about connections with the environment beyond just what their particular plan is for.

The Regional Freshwater Plan for Taranaki aims to improve inland water quality, which ultimately affects the quality of water discharged to the coastal waters. Significant parts of the Freshwater Plan deal with the control of discharges to rivers and streams. The plan also addresses *the effects of run-off into rivers from agricultural land by promoting activities such as stream bank riparian planting.*[420]

The Taranaki Regional Council has prepared riparian, agroforestry and comprehensive farm plans for a large part of the region (figure 16).[421]

FIGURE 16: RIPARIAN, AGROFORESTRY AND FARM PLANS PREPARED BY TRC



Source: TRC

Marine pollution regulations

Regional councils are responsible for enforcing the Resource Management Act (Marine Pollution) Regulations 1998.

These regulations deal with the dumping and incineration of waste and the discharge of sewage, garbage, ballast water and other wastes from ships and offshore installations.[422]

Maritime Transport Act responsibilities

Under the Maritime Transport Act 1994, regional councils must plan for, and conduct, if and when necessary, what is called a 'Tier 2' response (including wildlife response) to marine oil spills that might occur.

Regional councils are responsible for maintaining a team of trained staff to deal with such emergencies.

Oil spill planning and response has two action levels or tiers - 'Tier 1' contingency plans are developed by individual companies or operators and set out the response to small spills.

'Tier 2' contingency plans set out the response to large spills beyond the ability of a company or operator to contain.

Oil spill management plans for South Taranaki

Both regional councils have prepared a regional Tier 2 Marine Oil Response Plan. The objective of the Taranaki plan for example, is to safely mitigate the effects of a marine oil spill and, if possible, assist with the restoration of oil damaged environments.[423]

Department of Conservation (DOC)

Department of Conservation jurisdiction

The South Taranaki coast study area is located within the Wanganui Conservancy of the Department of Conservation.

Wanganui Conservancy covers the area from the Manawatu River to the Mokau River.

What does the Department of Conservation (DOC) do?

DOC has coastal marine area responsibilities under the following Acts:

- Resource Management Act (1991);
- Marine Mammals Protection Act (1978);
- Marine Reserves Act (1971);
- Conservation Act (1987);
- Wildlife Act (1953) and;
- Foreshore and Seabed Act (2004).

Responsibilities under the Resource Management Act (1991)

DOC is involved in implementing the Resource Management Act in the following ways:

- DOC prepared the New Zealand Coastal Policy Statement – a national policy statement covering activities within the coastal environment.[424] This national policy is currently being reviewed;
- DOC advocates for conservation values through making submissions on proposed regional coastal plans, and other planning documents (e.g. district plans), which deal with management of the coastal environment;[425] and
- the Minister of Conservation has the final decision making on activities that are described as 'restricted coastal activities' (a special type of discretionary activity). The day to day management of these is however the responsibility of the regional councils.

Marine Mammals Protection Act (1978)

This Act protects all marine mammals within New Zealand waters from human disturbance and harm.

The Department responds to calls about stranded marine mammals. This allows it to maximise the use of dead specimens for the benefit of conservation, science, and for cultural purposes.

DOC issues permits for marine mammal watching activities.

Under the Marine Mammals Protection Act, no person is allowed to hold a marine mammal in captivity or take any dead or live marine mammal from its natural habitat or other place. If a person kills or injures a marine mammal (in the course of fishing or fishing under license or permit granted under the Fisheries Act) they are required to report this to an officer of the Department of Conservation or Ministry of Fisheries.

Marine Reserves Act (1971)

DOC has a role in establishing and managing protected marine areas through the creation of marine reserves under the Marine Reserves Act 1971.

Under this Act, marine areas can be preserved if they contain underwater scenery, natural features, or marine life which is of such distinctive quality, or so typical, or beautiful, or unique, that continued preservation is deemed in the national interest.[426]

DOC objectives for marine protection in South Taranaki

The Wanganui Conservancy's objectives in relation to marine protected areas are:

- identifying, establishing and effectively managing a network of marine reserves and protected marine areas;
- increasing knowledge of marine ecosystems;
- increasing public support for protection of the coastal environment; and
- assisting and encouraging local groups to investigate and apply for reserves.[427]

There are no marine reserves or marine protected areas in the study area.

Some of these objectives have now been superceded by the Marine Protected Area Policy described in Chapter 22.

DOC responsibilities under other acts for the coastal marine area

DOC has responsibilities under other acts and regulations for activities in the coastal marine area. DOC should:

- advocate the conservation and protection of marine biodiversity and protection of habitats under the Conservation Act 1987;[428]
- manage the whitebait fishery under the Whitebait Fishing Regulations

1994;

- protect some animals and birds under the Wildlife Act 1953. Marine mammals and other marine fish and marine invertebrates are not covered by this Act; and[429]
- carry out responsibilities under the Foreshore and Seabed Act – to act on behalf of the Crown as 'landowner'. Responsibilities include weed control and fire fighting, and removal of "nuisances" - abandoned cars and dead livestock below MHWS.

District Councils

District council jurisdiction

Two district councils fringe the South Taranaki coast study area. These are:

- Wanganui District Council; and
- South Taranaki District Council.

What do district councils do?

District councils have no direct role in the management of the coastal marine area below the mean high water spring mark. However, they do have reserves management responsibilities where they manage reserves adjacent to the coastal marine area.

Furthermore, they are responsible for protecting the natural character of the coastal environment from inappropriate subdivision, use and development under the Resource Management Act 1991.

District Councils are responsible for the control of most effects of activities landward of the coastal marine area, including activities in the coastal environment (above mean high water spring mark).[430]

The boundary between the two district councils is at Nukumaru.

District planning under the Resource Management Act

District plans have been prepared for both district councils.

Both aim to protect the natural character of the coastal environment, while providing for the development of existing coastal settlements and activities and enhanced public access to the coast.[431]

District plans manage land use and issues of subdivision and natural hazards.

Special rules needed for coastal erosion risk

In 1999 it was recommended to Wanganui District Council that they define a Coastal Landslip Hazard Zone at Mowhanau Beach. This beach experiences severe erosion. Such a zone could be incorporated into both the council's Land Information Memoranda and the Proposed District Plan, including appropriate policies and rules to manage existing and future subdivision, use and development at Mowhanau Beach.[432]

In 2003 it was recommended council define Coastal Hazard Zones for all its existing coastal settlements as well as areas that have potential for coastal subdivision and areas where infrastructure could be at risk.

Extension of the Coastal Landslip Hazard Zones at Mowhanau Beach to include the mouths of Kai Iwi and Mowhanau Streams was also recommended.[433]

A 'Kai Iwi Beach Coastal Hazard Zone – (Overlay Zone)' appears in the Wanganui District Plan. Some activities are prohibited in this zone, others may be permitted, controlled, or restricted discretionary activities. Further provisions are made for the coastal environment in a 'Coastal Environment Special Management Zone', the boundaries of which are defined on maps accompanying the plan.

Maritime New Zealand

Under the Maritime Transport Act 1994, Maritime New Zealand (formerly the Maritime Safety Authority) is responsible for:

- maritime navigation and safety;
- marine pollution (e.g. Oil spill) prevention and response; and
- licensing the disposal of dredging spoil at sea (regional councils also issue permits for such activities).[434]

The Maritime Transport Act 1994 specifies nationwide restrictions relating to the discharge, transport and possession of harmful substances.[435]

Multi-agency policy developments

There are a number of national level initiatives that are being developed across agency boundaries that are of relevance to management on the South Taranaki coast. These are now discussed.

Oceans Policy

Beyond the 12 nautical mile limit fourteen government departments are involved in the marine environment, with at least 18 pieces of domestic legislation governing the ocean, and various other marine policy initiatives are still being promulgated.

To promote better integrated management of the marine environment, central government is currently developing an Oceans Policy. The policy will provide a clear statement of what New Zealanders, individually and collectively, value about the sea and coastline, and what relative priorities should be attached to different options at different times and in different places.[436]

The Offshore Petroleum Industry Environmental Practices Guideline

To encourage best environmental practice in the offshore petroleum industry, voluntary guidelines have been developed between central government and the industry by the Ministry for the Environment.

Parties are Biosecurity New Zealand, Department of Conservation, Maritime Safety Authority, Ministry of Economic Development, Ministry

for the Environment, Ministry of Fisheries, Petroleum Exploration and Production Association of New Zealand, and the Ministry of Foreign Affairs and Trade.[437]

Purpose

The purpose of this chapter is to set out the various management tools that are available for marine management that can be used for local level management.

Fishing Exclusions under the Fisheries Act 1996

The purpose of the Fisheries Act is to ensure sustainability and the Act's principles require the maintenance of biodiversity.

Fishing exclusions can be used to protect ecosystems when the threat is fishing related or fishing is the only activity in the environment. For example the primary biodiversity asset on seamounts (underwater mountains) is the seafloor community. Bottom-disturbing fishing methods are the threat. Closing the seamounts to fishing effectively protects the ecosystem from known threats.

Fisheries plans

Fisheries plans also offer a potential mechanism for stakeholder and community initiatives to protect, maintain, or restore habitats and ecosystems that are important for marine biodiversity.

Marine parks

Fishing exclusions under the Fisheries Act 1996 can be used by local communities to create 'marine parks' although there is no specific 'marine park' creating legislation. For example, the Sugar Loaf Islands Marine Protected Area was initially proposed by a local community group who prepared a report for the Ministry of Agriculture and Fisheries, who in turn established fishing regulations under the Fisheries Act 1983 which controlled commercial and amateur fishing in the area. It was only later, in 1991 that a special law was created for the Sugar Loaf Islands to protect them from the adverse effects of oil prospecting and development.

Customary fishing tools

The Kaimoana Customary Fishing Regulations only apply in an area when tangata whenua have appointed Tangata Kaitiaki (Maori Committee) for that area. Until that happens, the only rule allowing the taking of fish for customary purposes is Regulation 27 of the Fisheries (Amateur Fishing) Regulations 1986.

Customary fishing authorisations are to be made on a standard form prescribed by regulations, and must specify a number of conditions including the purpose, quantity and size of the fish to be caught, and the dates, location and methods of fishing. An authorisation may also include requirements to satisfy tikanga and local custom.

Tangata kaitiaki must keep records and provide quarterly reports to the

Ministry of Fisheries of authorisations, catches and locations. They may also have a role in Ministry management processes, including providing comment on the activities of commercial and recreational fishers, which might affect Maori customary fishing. They may develop management plans for tangata whenua for the fisheries in their rohe moana.

Mataitai reserves

The Kaimoana Regulations also cover the establishment of mataitai reserves. These reserves provide a tool for tangata whenua to manage all non-commercial fishing in some of their traditional fishing grounds.

Mataitai reserves are areas set aside as traditional fishing grounds where tangata whenua have a special relationship with the place. They are established under the Fisheries Act 1996 to recognise and provide for non-commercial customary food gathering by Maori. Maori and non-Maori may fish in mataitai reserves.

The process of establishing a mataitai can be lengthy and includes consultation with the local community and written submissions from commercial quota owners and recreational fishers. Once a mataitai is established, commercial fishing is excluded from that area.

The day after a mataitai is established, the only difference is that commercial fishing may not occur in a mataitai reserve unless recommended by the tangata kaitiaki. They can make bylaws restricting or prohibiting the taking of fish, aquatic life or seaweed in the reserve, if they consider this necessary for sustainable management.

Rahui – temporary closure of a fishing area

The Fisheries Act also provides for temporary closure of a fishing area, or for restriction or prohibition of particular fishing methods, to be declared under sections 186A and 186B.

These closures, restrictions or prohibitions may be imposed to recognise and make provision for the use and management practices of tangata whenua in the exercise of non-commercial fishing rights, to improve the availability or size (or both) of fish, aquatic life or seaweed resources, and to recognise customary fishing practice in a particular area. A restriction or prohibition on a particular fishing method may be imposed only if that method is having an adverse effect on the use and management practices of tangata whenua in the exercise of non-commercial fishing rights.

Consultation with interested stakeholders, including tangata whenua, environmental, commercial, recreational, and local community interests must be undertaken before a closure, restriction or prohibition may be imposed.

Taiapure reserve

Taiapure is a newly coined mix of Maori words for ‘coast’ and ‘procedure’. Taiapure may be established under the Fisheries Act 1996 in estuarine and coastal waters that have customarily been of special significance to any iwi or hapū as a source of food or for spiritual or cultural reasons.

A taiapure proposal from a local community must go through a complex process before the Minister of Fisheries may approve the establishment of the taiapure and appoint the management committee. This committee then makes recommendations to the Minister for regulations for the conservation and management of the fish, aquatic life or seaweed in the taiapure.

Regulations apply equally to tangata whenua, to Maori from other areas, and to non-Maori, for the control of fishing in the area. Commercial fishing may be allowed within a taiapure, but only if the management committee recommends this as part of the regulations.

Marine mammal sanctuaries

Sanctuaries can be established under the Marine Mammals Protection Act 1978 to protect particular marine mammal species (e.g. dolphins, whales, seals, sea lions) by establishing areas within which activities known to have adverse effects on a species are prohibited.

Marine Reserves under the Marine Reserves Act

The purpose of the current Marine Reserves Act (1971) is to set aside areas for the purpose of scientific study if they contain underwater scenery, natural features, or marine life which is of such distinctive quality, or so typical, or beautiful, or unique, that its continued preservation is in the national interest. The purpose of the proposed new Marine Reserves Act will be to protect and preserve areas in the marine environment for the conservation of marine biodiversity.

Applications for marine reserves (under the 1971 Marine Reserves Act) can be made by any university, any body appointed to administer coastal reserve land, any organisation with an objective of the scientific study of marine life, tangata whenua or the Director General of Conservation. Marine reserve applications go through a long complex process of information gathering and consultation before being considered by first the Minister of Conservation and then the Ministers of Fisheries and Transport.

"Guardians of Fiordland" model - an example of community initiated management

The Guardians of Fiordland's Fisheries & Marine Environment Incorporated were a group of commercial and recreational fishers, scientists and iwi. They prepared a marine conservation strategy for Fiordland's fisheries and marine environment in 2003 to address their concerns about the impacts of human activities on Fiordland's fisheries and marine environment.

The strategy is the result of an eight year process of discussion, consultation and negotiation and provides conservation management measures for the Fiordland marine environment.

The strategy was then implemented by government through the passing of the Fiordland (Te Moana o Atawhenua) Marine

Management *Act 2005* and the establishment of the Fiordland Marine Guardians, a new advisory committee responsible for providing advice to management agencies and ministers on the management of the Fiordland Marine Area. The members of the new Guardians group represent the various sectors of the marine area's users, including recreational and commercial fishers, scientists, the local iwi Ngai Tahu, environmentalists and tourist operators. Government agencies involved are the Ministry for the Environment, the Ministry of Fisheries, the Department of Conservation, and MAF Biosecurity along with Environment Southland.

The Fiordland Marine Management Act:

- recognises the local, national and international importance of Fiordland's marine environment;
- creates the Fiordland (Te Moana o Atawhenua) Marine Area, encompassing 882,000 hectares, including Milford and Doubtful Sounds;
- creates eight new marine reserves, totalling about 9430 hectares, adding to existing reserves, and increasing the percentage of the fiords area in marine reserves from 1 to 13 per cent; and
- provides for the more effective management of 'marine areas of special significance': areas identified by the Guardians for their special and ecologically fragile features.

Marine Protected Area Policy and Implementation Plan

At the end of 2005 the Ministers of Conservation and Fisheries released a marine protected area (MPA) policy[438] to establish a more strategic approach to marine protection. This policy envisions the establishment of regional based forums, consisting of representatives from the various interest groups, to look at available information and identify where 'marine protected areas' should be applied for.

The Government is strongly committed to protecting representative samples of the full range of marine habitats and ecosystems as part of a wider strategy to effectively conserve New Zealand's biodiversity.

Key components of the policy include first establishing a consistent approach to the classification of marine habitats and then the establishment of a protection standard that will be used to assess whether individual management tools or a combination of management tools provide sufficient protection to a site for it to be designated as a marine protected area.

The policy outlines processes for marine protected area planning that are based on a common approach to habitat and ecosystem classification and are directed by the priorities identified in the inventory process. Planning for offshore marine protected areas will be implemented at a national level, while planning for nearshore marine protected areas will be implemented at a regional level.

Both the nearshore and offshore processes will be designed to allow for constructive engagement with tangata whenua, user groups, and the

public to ensure that marine protected area planning is inclusive, without compromising biodiversity protection objectives. Both processes will be underpinned by a commitment to minimise the adverse impacts of new marine protected areas on existing users of the marine environment and Treaty settlement obligations.

A trial of the regional planning process is underway on the west coast of the South Island. A forum has been established there consisting of commercial, recreational and environmental interests, and is in the process of gathering information on the coast that will help it begin a process of identifying sites that should be included in a marine protected area network for the west coast of the South Island.

Part III Where to from here?

OVERVIEW

This project has highlighted the importance of the South Taranaki-Whanganui area for local residents, recreational fishers, commercial fishers and environmentalists. Drawing on many years of experience from those who contributed information for the project has identified that this area has an important fishery but that there have been significant and noticeable changes.

Even more importantly, this project has resulted in a greater understanding of stakeholders and issues associated with coastal management. Informal but important relationships have been established.

The review of the literature (Part II of this report) further highlighted a number of areas for which further research and information would be desirable.

Practically everybody, including those who felt that fishing had not changed, put forward suggestions for changing the management of the area – from changing rules to establishing forums to facilitate greater input from locals and resource users in how the area is managed.

In addition, this project has begun to establish open and positive relationships between the various users and managers of the coastal area. This in itself is an important outcome that needs to be maintained by ongoing communication.

In this chapter

This chapter identifies gaps in knowledge and information about the South Taranaki-Whanganui coastal marine area that became apparent during the course of this research.

It discusses the management suggestions put forward by respondents and recommends how these might be further worked on and followed up by both agencies and the community.

Future information gathering

Introduction

This project was initiated as an outcome from a coastal inventory project undertaken by the Department of Conservation and Taranaki Regional Council, which highlighted a lack of published reports for the South Taranaki coast.

Since the completion of that inventory, the application and environmental effects report for the Kupe pipelines and platform undertaken for Origin Energy have now become publicly available. The literature review undertaken for this project drew heavily on the work undertaken for Origin Energy.

Despite this, there are obvious gaps in available information which are discussed below.

Lack of information on the nature of the seafloor biology

In terms of the seafloor biology, both subtidal and intertidal, there is a paucity of published surveys available for this part of the coast, particularly the section of the study area described as the 'papa-rock coast' (from Castlecliff to the Waingongoro River).

In addition, despite being recognised as areas of importance in regional coastal plans, there is little information available on the biology of the estuaries within the area. Little information on bird communities of the estuaries has been published, although some observations may have been gathered by the Orthinological Society. Apart from some monitoring of sand and mud dwelling invertebrates undertaken by Taranaki Regional council in one estuary, information on other estuaries is definitely lacking.

Lack of information on the nature of the seafloor

There are anecdotal descriptions of features of the seafloor that are important for the biology of the area, however very few of these features have been formally mapped. Recreational fishers and divers have described in the course of this study areas of papa reef or rubble that are not depicted on any chart.

Mapping of the seafloor features, whilst examining uses of the various habitat types by fish or seafloor creatures, would be a valuable first step towards gaining a better quantitative picture of the area. Recent video camera mapping of the North and South Traps is a start[439].

Lack of information on the fish diversity and abundance

It is clear from the responses obtained from both recreational and commercial fishers that this area is of high significance both in terms of diversity and abundance of fish recorded. However, this does not tally with the very few scientific surveys that have concluded that the area generally has a paucity of species. Whilst studies into the local fish life have been hampered by visibility and weather, it is suggested that further local level research into fish diversity and abundance in this area is warranted.

Frequently research into fish stocks is undertaken at a much larger scale than the scale at which this project was targeted. It is impossible to take information gathered at the scale of say the entire west coast of the north island, and apply it to the area of interest. However, it is at the local scale that people are generally most interested.

Research into specific species, such as the spiny dogfish, was certainly identified by those interviewed as being necessary.

Lack of information on the recreational use of the area

This project has been one of the first to highlight the importance of the South Taranaki Bight for recreational fishing. However, the nature of the research was such that it was unable to quantify the level of recreational use, or obtain data on the frequency of use, areas most frequented, other

types of recreational activity etc. It is likely that more quantitative information is going to be required for future management.

Research into data held by local people – such as their fishing diaries or log books could be a method to better quantify recreational use of the area, catch rates and possibly changes to the fishery over time. A number of people indicated through this project that they would be happy to make this information available. This included commercial fishing information from former commercial fishers such as Audrey Cox.

Lack of information on current and historic customary use of the area

Nga Rauru and Ngati Ruanui were represented on the project team and consequently were able to provide excellent input to the project. Unfortunately however, Ngati Ruahine and Tupoho were less able to be involved due to other priorities and time pressures. The report highlighted a potential need for more marae-based information gathering on current and historic customary use of the area.

One alarming discovery through this project was that in some places elders are becoming reluctant to pass on traditional knowledge, because of a perception the resource might then be misused, and as a consequence it is becoming lost from even those within the iwi.

Recommendations for further information gathering

The following actions are recommended:

Undertake, as part of background work for the upcoming Taranaki and Horizons regional coastal plan reviews, research that will:

- describe the nature of the seafloor biology between Castlecliff and Waingongoro;
- describe the estuarine ecology for the Waitotara, Patea and Whenuakura estuaries; and
- survey and map the seafloor along the 'Papa rock' coast between Ohawe and Castlecliff.

Undertake, using fisheries research funds and other environmental funds to which this may be appropriate, research that will:

- describe the diversity and abundance of fisheries in the South Taranaki Bight;
- investigate the perceived proliferation of spiky dogfish and paddlecrabs;
- search out and analyse locally held fishing records;
- quantify recreational fishing taking place in the South Taranaki Bight; and
- quantify both historic and current customary use of the area.

Progressing ideas for management

Introduction

This research has highlighted that the South Taranaki-Whanganui coastal marine area is a highly significant area. People recognised the special nature of the coast and also that it could be vulnerable to a number of risks. At the least those interviewed on the whole sought that the area stayed the same; and some respondents sought that the sustainability of the area be improved, and/or its values and amenities enhanced.

Virtually all respondents put forward ideas to change or improve management of the area. The suggestions made are discussed below:

More local involvement wanted for fisheries management

A key theme arising when people were asked for suggestions for future management was a desire for more input at a local level to fisheries management. However there was no clear consensus on the form that this might take. As the research did not quantify, nor obtain views from respondents on what was already in place for facilitating local level management, a useful first step would be to do this.

The Ministry of Fisheries, for instance, runs a 'Fisheries Liaison Committee' which includes both recreational and commercial fishing interests and serves as a forum for raising concerns or ideas about research needs, quota levels, fishing rules etc. However, recent low attendance at these meetings seems to signal a lack of interest in such a local forum, and may lead to the end of the Wanganui Fisheries Liaison Committee. This is in direct contrast to the views expressed by many of those interviewed through this research.

A discussion by the project team, or a similar grouping of iwi, agency, industry and community representatives, could be a useful means of teasing out whether the results are simply because people don't know about the liaison committee, or because there is a perception (or possibly a reality) that it cannot enable local level management in the manner sought by many respondents.

In addition, the Ministry of Fisheries has set up regional recreational and customary forums (although at a far larger scale than this project) which could also potentially play a role in enabling greater local level management.

Both regional councils are looking to review their coastal plans in the near future. There may be an opportunity, through those coastal plan reviews, to incorporate aspects of the suggestions made for local level management. However, this would not deal with the management of fishing, which appeared to be of more concern to those interviewed.

Changing agency responsibilities

A related suggestion made by some respondents was for changes in the agencies responsible for the coast. There was a perception some would do a better job than others, and that there were both overlaps and gaps in management.

Effort into achieving more integrated management between the agencies with coastal management responsibilities could be a means of taking on board these suggestions in the short term, given any changes to agency roles may necessitate major policy and/or legislative changes before they are adopted.

This might take the form of more regular inter-agency meetings, and formalised involvement with plan and strategy development processes to ensure better integration. Delegations of authority may be another inter-agency option.

Improvements to enforcement

One of the matters behind the call by some for changes in agency responsibility was a perception that enforcement levels were inadequate, with some mentioning nearshore and inshore areas.

Whether in fact enforcement does actually need to be improved is a matter that requires further discussion, including discussion with those involved in the enforcement role, and those that perceive it to be inadequate.

More education required

A major theme that came through was for more education and awareness-raising. Two elements appeared important: firstly, education about the resource, the state of the resource and steps to manage it sustainably; and secondly, education about the various marine resource users, particularly commercial fishing practices and impacts. Proponents felt that such education would help improve understanding between recreational and commercial fishers.

This could be pursued through the following types of actions:

- publishing this report and disseminating it widely could be a way of raising awareness of the importance of the area;
- presentations on the key outcomes of the research could be made to various community groups;
- posters, pamphlets, videos, etc could be produced to educate people about the special values of the coast;
- information about commercial fishing boats, gear and practices could be circulated by the fishing industry;
- newspaper stories could be written about events happening in the area, or results of research undertaken, etc.; and
- a South Taranaki-Whanganui coastal newsletter or website could be developed.

More communication and consultation

Related to the education theme were many suggestions seeking greater communication between agencies, between agencies and the community and between the various sector groups (e.g. between Maori and other recreational fishers).

Some options for increasing communication could be:

- access to other research on the web, for example through the Taranaki Regional Council explorer website; http://www.trc.govt.nz/xplorer/xplorer.htm and the Horizons Regional Council site http://www.horizons.govt.nz/;
- regular information sharing through the project team, or some new but similar forum that continues to meet regularly (even if only annually), which could help to maintain and strengthen those relationships now forged, and enable cross fertilisation of ideas and issues; and/or
- a South Taranaki-Whanganui coastal newsletter or website as suggested above.

Suggestions for changes to management in specific areas, e.g. commercial and recreational fishing

Many different ideas for improving future management in specific areas were put forward. These included changes to management for:

- marine protection,
- recreational fishing,
- commercial fishing,
- customary fishing,
- coastal development,
- coastal erosion, and
- land uses.

The ideas put forward for each of these areas require evaluation and critique before recommendations are made in respect of them.

What could be a useful next step, would be to reconvene the project group or a group of similar composition, and at that meeting, or a series of meetings, workshop the suggestions made with the help of experts in a position to comment on the following aspects, in relation to each of the areas listed above:

- what mechanisms are currently in place, and how well they are working, for example, rahui in particular areas;
- what voluntary, policy or legal mechanisms exist to implement a suggestion, for example, land use rules in district plans as a means of reducing land use impacts on the coast; and
- what are the costs, benefits and practicalities of each suggestion, for example, the effectiveness or otherwise of changing fishing tackle in managing particular fish species?

Out of this, as a continuation of the 'action research' model used in this project, suggestions seen as having real promise could be identified and steps taken to work out how best they could be trialled and implemented.

This might take the form of exploring ideas from Part II of this report (chapter 11) which sets out some of the tools through which such alternatives might be implemented. Or, it could take the form of putting

forward suggestions to the appropriate agency for changes – e.g. those suggestions made seeking changes to land management, where it affects the coast, could be put to territorial local authorities and regional councils, for incorporation in upcoming plan reviews.

Recommendations for progressing management ideas:

The following actions are recommended:

Convene a meeting of those agencies involved in management of the coastal marine area, to:

- seek a commitment to continuing the project team to enable a further cycle of action research, so that the suggestions made here can be workshopped and evaluated, and from that, specific recommendations made by that group for future management of the coast;
- consider options for better integrating coastal management within and between agencies; and
- identify a means for reviewing enforcement levels and strategies in consultation with coastal users.

Convene a meeting, or meetings of the project team with the purpose of assessing the suggestions made in this chapter, including:

- deciding, after consideration of all the options, on the form and nature of 'local level management' to promote with relevant agencies;
- education and communication initiatives to be adopted separately or jointly by project team members;
- deciding on the future or otherwise of the project team, including whether any new, multi-group forum should be initiated; and
- forwarding copies of this report to relevant agencies, highlighting those suggestions and recommendations of relevance to them.

Appendix 1

FACE-TO-FACE INTERVIEW QUESTIONS

Preliminary questions:

1. Are you happy to have your name included in the list of people interviewed to go in the final report?
2. Would you like a copy of the final report?
3. How long have you lived in the South Taranaki area?

Current use of the coast:

4. How do you use the coast?
5. How long have you used this area?
6. How often do you get out?

Your experience of the coast

7. Tell us about the best day you've had out there.
8. What was your worst day?
9. What do you know of the history of fishing in this area, or the history of diving or of coastal resource use in this area?

Areas of Use

10. Where are you fishing/diving/gathering kai moana? (recorded on map)
11. Does where you fish/dive/gather kai moana change according to the weather?
12. What type of seafloor do you target?
13. Can you tell us what it's like down there?
14. What are the common fish caught / seen ?
15. What other species are you catching?
16. Where? (Indicate also on map)
17. What is it rare to catch?
18. Where?
19. [if applicable] What fishing gear are you using?
20. Who else is using the resource?

Changes

21. Is it easier or harder to catch fish / see marine life / gather seafood than in the past?
22. Why do you think this is?

23. What else has changed? (changes in who's fishing or gathering kaimoana, how they're doing it (technology), where they're doing it, weather, ocean etc), Why?

Marine Mammals

24. Do you ever see marine mammals when you are out on the coast?
25. What species? Where?
26. What mammals is it rare to see? Where?
27. What changes have you noticed in the species you've been observing? (numbers, location, different species etc), Why do you think this is?

Birds

28. What birds do you see when you are out on the coast? Where?
29. What is it rare to see? Where?
30. What changes have you noticed in the species you've been observing?
31. (numbers, location, breeding or not etc), Why do you think this is?

Customary questions (if applicable)

1. What is your iwi/hapu/whanau's association with this part of the South Taranaki coast?
2. How was the coast used in the past?
3. Where were kaimoana gathered?
4. How has this changed over time?
5. Where is kaimoana gathered now?
6. Who else is using the resource?
7. How were species managed traditionally?
8. How are they managed now?
9. Are these management approaches working?
10. [If not] what could be done to improve it?

Aspirations

32. What's important to you about the South Taranaki coast area?
33. Is anything at risk? Why?
34. [if a risk is identified] How would you like to see this dealt with?
35. What do you want the area to be like in the future?
36. Describe how you'd like it to be in the future
37. What do you want for its future management?
38. If people have different views about what they want for the coast, how could we reconcile these different views in the future?

Closing questions

39. What questions do you hope that the research we are doing will answer?

40. What other research do you think should be done?

41. Do you have written records about this area?

42. [If yes] Would you be prepared to make these available for further research?

43. Do you have photos of the area that could be used in our final report?

44. Who else could you recommend we talk to, who has a good knowledge of the South Taranaki Coast area?

Appendix 2

FISH COMMON TO SOUTH TARANAKI

In the absence of specific research about fish species of the area, the following information has been summarised from Paul (2000), Francis (1988) and Andrew and Francis (2003). Information on fish growth, maturity and reproduction can be highly variable between geographic areas, and may not be directly applicable to the South Taranaki coast. However, in the absence of more specific information, the following background information is included:

Snapper/ Tamure

- Snapper occupy a range of habitats, including rocky reefs and areas of sand and mud bottom.

Photo credit – S.Sammons.

- They are predators and consume a variety of invertebrates, particularly crustaceans. Large snapper have powerful teeth and can eat paua, mussels, limpets, paddle crabs and kina.
- They congregate before spawning and move on to the spawning grounds, usually in November-December where they release many batches of eggs throughout these months, although the spawning season may extend to March.
- All snapper begin life as females – during 3rd and 4th years, about half of them change sex to become males.
- Larvae live as plankton for a short time. Young fish school in shallow water and sheltered areas and move out to deeper water in winter.
- Snapper first reach maturity from 20 to 28 cm long at three to four years of age, and can live up to 60 years.
- Snapper over 4 kg are between 40 and 50 years old.
- Snapper from the west coast of the North Island grow faster and reach a larger average size than elsewhere.

Rig

- Other names include spotted dogfish, gummy shark, smoothhound and pioke (sold as lemonfish).
- They are common in shelf waters around NZ to depths of 200m.
- The adult population enters shallow water during spring and summer.
- During autumn there is a return migration towards the outer shelf

Photo credit – S.Sammons.

– considerable movement along the coast.

- Growth rate and reproductive rate probably slow.
- They feed on crabs, burrowing worms and other invertebrates.

Spiny dogfish

- Other names include southern dogfish, spurdog, spineback or spiky.
- It occurs world wide in cool temperate seas.
- The average size is 70-100cm, reaches 125cm.
- It is common off south and east coasts of South Island, ranging north in winter to lower half of North Island.
- Females come to shallow areas to pup.
- They feed on a variety of fish and invertebrates, including squid.
- Growth and reproductive rates probably low.
- Considerable nuisance to commercial and recreational fishermen.
- Dangerous to handle when alive – the fin spines can be jabbed painfully into an arm or hand.

Red Gurnard

- They are generally found on open sandy bottoms, rather than near reefs.
- Spawning season is spring and summer. Spawning grounds are widespread, although localised over the inner and central shelf
- Growth is rapid initially – fish mature at 4 yrs – then growth slows. They have a high mortality rate – few live beyond 10 years.
- They feed on crustaceans, especially small crabs and shrimps. The pectoral fins are used to locate food. They 'walk' on the bottom using their sensory feelers – when these feelers come in contact with prey they scare them into the open and snap them up.
- The large pectoral fins are spread to give stability when

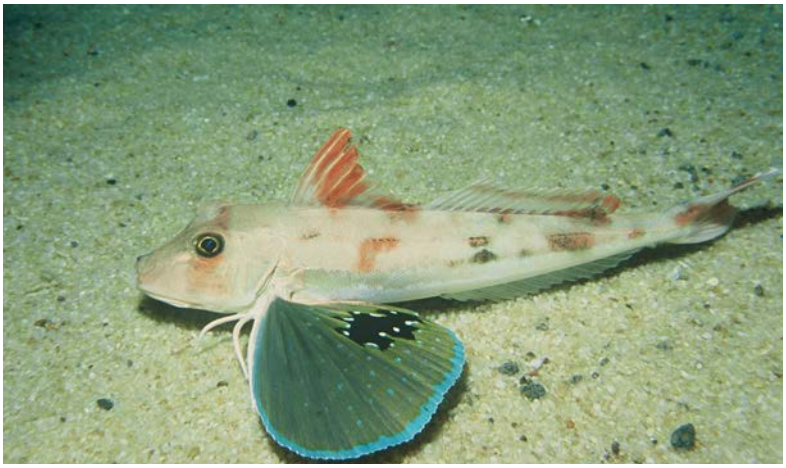


Photo credit
– DOC Image Library

swimming, but also used by gurnard displaying to each other, or for flashing open to scare off predators.

Blue cod

- Colouring varies depending on age and sex – they mature as either males or females, but some females eventually change sex to become males. All blue-coloured fish are males, but brown-coloured fish may be either sex. Females reach 25 cm before changing sex.

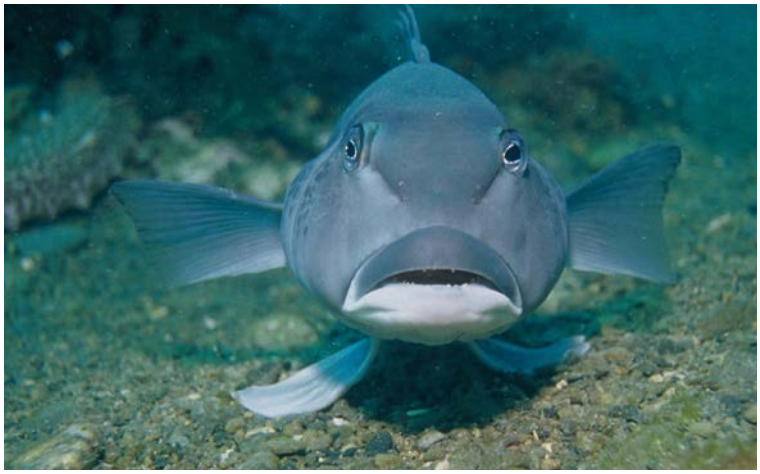


Photo credit
– DOC Image Library

- Depth range extends from shallow (as juveniles) out to depths of 150m – usually on or near reefs, although small adults occur over more open seafloor where there is some encrusting bottom life.
- Spawning takes place from late winter to early summer – probably on the central to outer shelf .
- Young fish appear on shallow reefs in summer, grow rapidly in the first year, then there is a moderate growth rate (although this varies according to habitat).
- They probably live 10-15 years.
- They are voracious predators, feeding on wide range of bottom-living animals – although they feed on anything.
- Large male cod are territorial – at certain times of year thought to be migratory – perhaps almost schooling.
- They are easily approached under water by divers – sometimes swim up to divers and nip their fingers and ears.

Tarakihi

- They have a distinctive black band across the neck or shoulder (hence the Australian name 'jackass').

Photo credit
– DOC Image Library

- They are common all around NZ.
- As larvae, they float around the ocean for 7-10 months, then settle out as juveniles on reefs or rough ground, then as adults they school in 100-250m deep water.
- Spawning takes place in late summer and autumn, and there are important nursery grounds known in Manawatu.
- Growth rate is slow – average adult age of 10-20 years. They have been recorded to about 50 years.

- They feed on wide variety of small invertebrates – have small mouths and weak teeth power, so can't eat hard-shelled animals, preferring instead to suck worms and other small animals from the sand or mud.

Kahawai

- They school by size and ages - schools of 20-35cm juveniles are common. Adult schools contain mixed ages.
- They are present throughout NZ but more abundant about and north of Cook Strait.
- They live in a variety of habitats – from estuaries to open waters off shore. They seem to prefer inshore shallow waters.
- They are known to be strongly migratory, although seasonal patterns are not understood, and are likely to vary from year to year.

Photo credit
– DOC Image Library

- They are probably late summer spawners but little is known.
- Growth rate is moderate – adults are, on average, 5-15 years old and can reach 25 years.
- They feed on variety of pelagic animals – crustaceans and small fish. They are found to feed exclusively on single prey species if present locally.
- They are sturdy, powerful fish that put up a fight for recreational fishers.

Hapuku (pronounced hapuka) or Groper

- They are likely to be slow growing and long lived. Average size 80-100 cm, reaching at least 150 cm, weight increases rapidly with length – 80 cm fish = 6-10 kg, 120 cm fish – 25-30 kg.
- They occupy a wide depth range, from reefs and pinnacles a few metres below the surface, to the open seafloor at 400 m deep. They have been heavily fished, so now rarely seen shallower than 40 m and then only at remote places.
- They are migratory although little is known of their movements.
- Spawning takes place in winter – but spawning grounds and location and behaviour of juvenile fish are unknown.
- They make spawning migrations in July-September in central New Zealand but the location of spawning grounds and details of migrations are unknown.
- They eat a variety of fishes, squid and large crustaceans, including crayfish. They have also been reported to consume large numbers of spiky dogfish (C.Duffy pers com).

Rock Lobster

- They are widespread around NZ – within depth range of 5-100 m.
- They are usually associated with reefs – but at certain times groups may be found on clear ground some distance from shelter.
- Large males prefer to mate with large females – large females have many more and larger eggs than smaller females. Females choose large males to shelter with.
- Crayfish court for several minutes or as long as 2-3 days before mating.

Photo credit – R.Guy (used with permission from S.Hornby

- Females moult between February and May. Mating takes place a few weeks later – eggs are then deposited under the tail and are incubated for 3-6 months. Very large females may brood as many as half a million eggs.
- Females gather together to release their larvae en-masse. The larvae drift freely in open waters for 10-20 months (growing through 11 further stages) before settling out near the shore as larvae and then moulting into juvenile lobsters.
- Moulting occurs frequently in small juveniles, twice a year for larger animals and once a year when mature.
- Every outer covering of the rock lobster moults, even the linings of the gills.
- Feeding is generally nocturnal, although rock lobsters have been observed foraging out in the open during the day in Te Rongokoko Marine Reserve at Gisborne. They eat a wide range of invertebrates and algae, preferring molluscs and crustaceans.
- Crayfish have no eyelids, so when exposed to bright sunlight – on a boat for instance – the visual pigment is rapidly destroyed and they are blinded for days or perhaps permanently.
- Most undertake seasonal inshore-offshore movements associated with moulting, reproduction and feeding. Large numbers of females move inshore during autumn to moult – with mating and egg laying taking place up to a month later. They then move into deeper areas to hatch their eggs.
- Large males may aggregate away from reefs during winter and summer – they form pods with their antennae facing outwards for protection during the day.

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