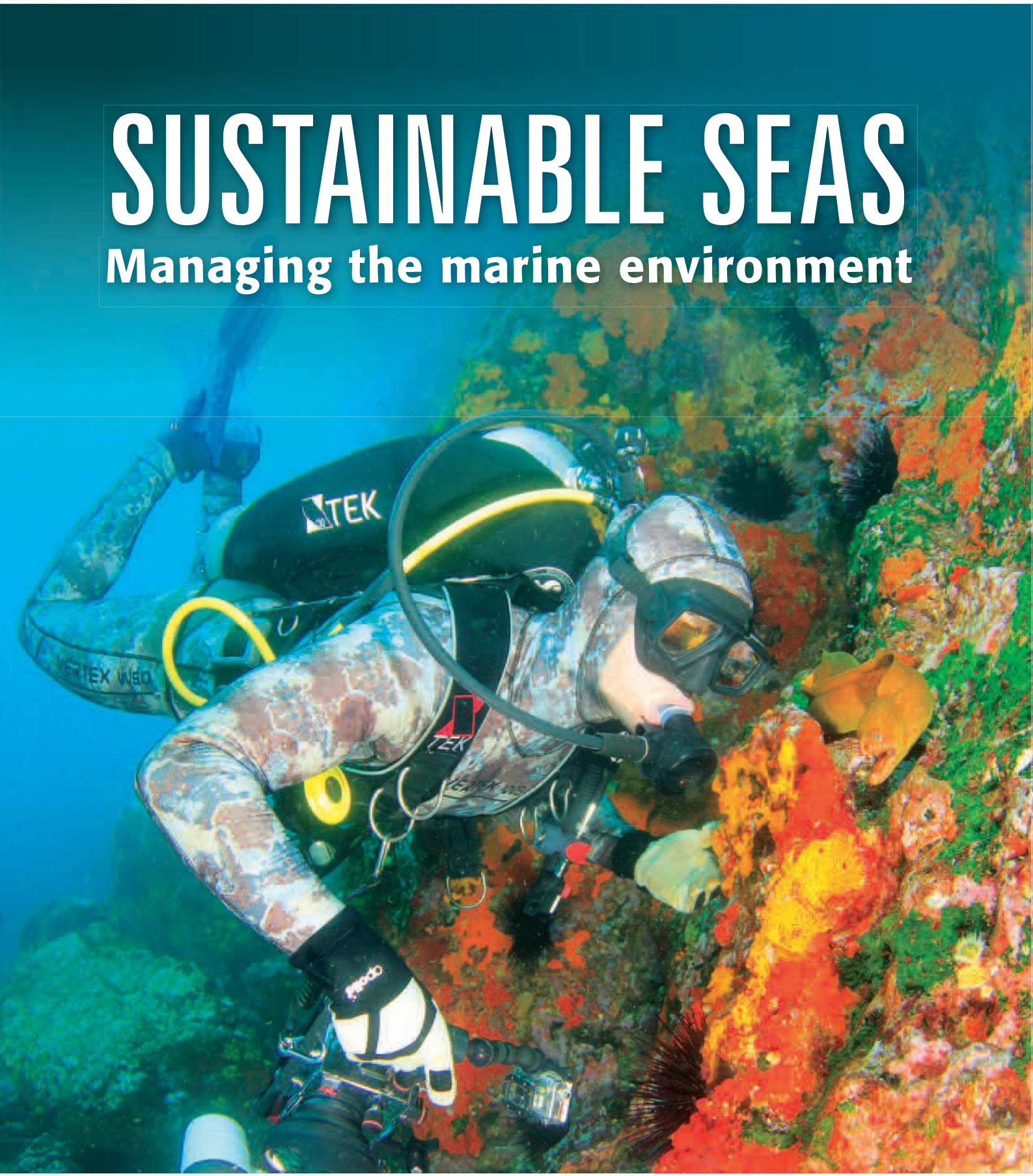
SUSTAINABLE SEAS

Managing the marine environment



Lucy Brake and Raewyn Peart

eds
ENVIRONMENTAL DEFENCE SOCIETY

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The ENIRONMENTAL DEFENCE SOCIETY is a charitable organisation which has been operating since 1971. It is comprised of resource management professionals who are committed to improving environmental outcomes throughout New Zealand. EDS has long sought to protect New Zealand's outstanding coastal and marine areas, through providing thought leadership and best practice guidance, and taking matters of national importance to the courts. This book is the latest in a series of publications on key environmental issues facing the country.

Further information about EDS and its work can be found at www.eds.org.nz.

Front cover: Marine studies student photographing underwater diversity at the Poor Knights Islands *(Daniel Sharp)*

Back cover: Diver enjoying school of demoiselle at Tuhua (Mayor Island), Bay of Plenty *(Daniel Sharp)*

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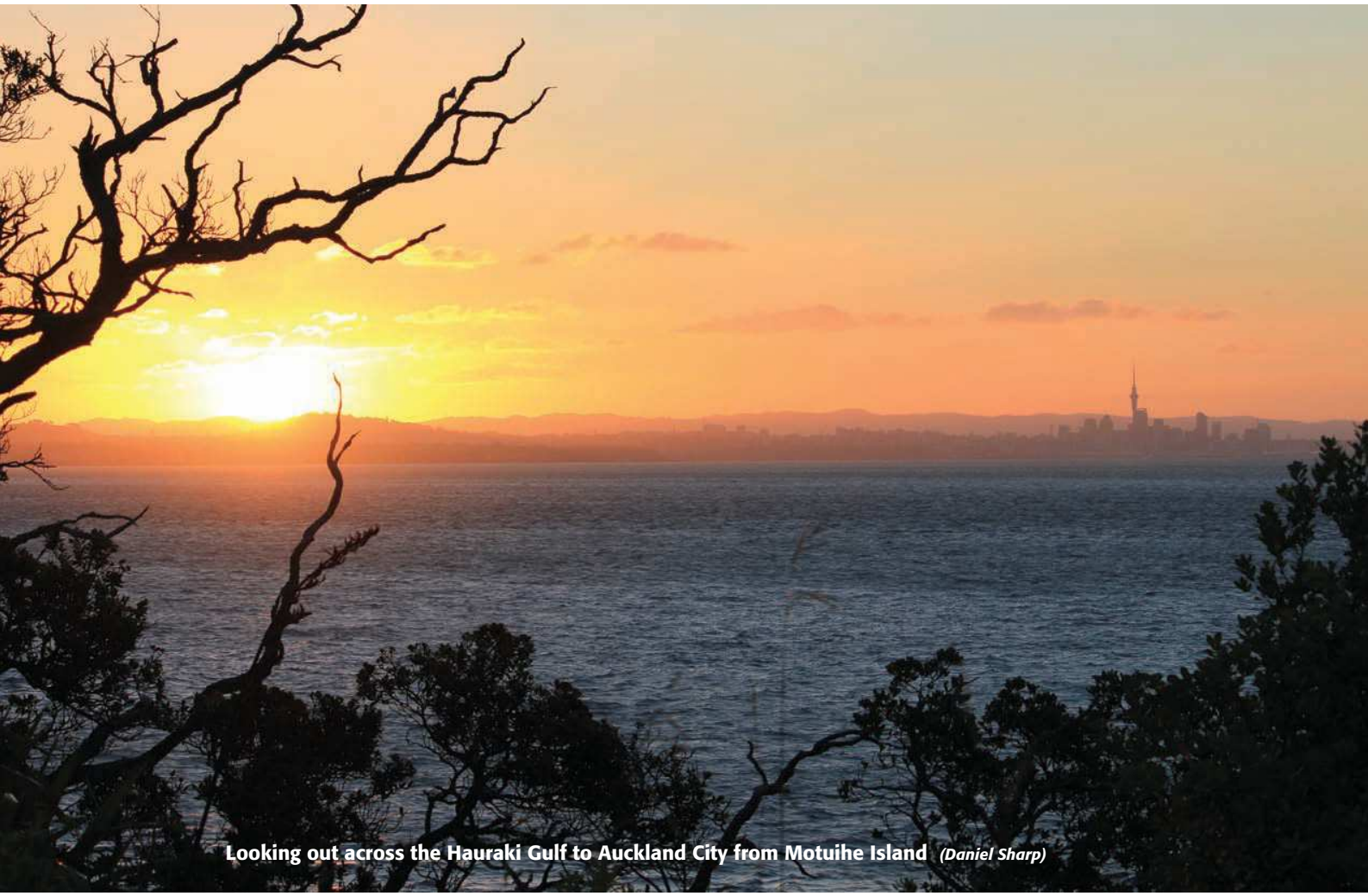

Looking out across the Hauraki Gulf to Auckland City from Motuihe Island ***(Daniel Sharp)***

For Tyler and Zach

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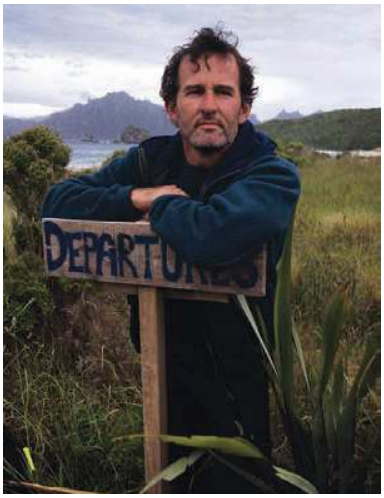
Preface

Blue is the new green.



As our attention shifts to the sea as the new resource frontier for energy, minerals, aquaculture, tourism and other components of a burgeoning 'blue economy', awareness deepens of the need to defend the marine environment from overexploitation. Hence the straight-to-the-point title of this timely book, *Sustainable Seas: Managing the Marine Environment*, which addresses the challenge of sustainable marine management head-on.

Conservation of the sea has lagged far behind that of land, in New Zealand as everywhere else in the world. While a third of Aotearoa's land is in conservation areas, less than one per cent of the coastal marine area around the main islands is protected by marine reserves.

Yet scientists say that some of the most serious impacts of climate change will occur in the marine realm. Rising sea levels, ocean acidification, higher sea temperatures — this menacing trio is already having a damaging impact on marine ecosystems, coastal land and human shoreline infrastructure, and the effects will worsen as the century proceeds. Some scientists are predicting mass extinctions in the oceans as a result.

If the goal is sustainability, the path must include understanding the environmental limits of the sea. One of the great difficulties in identifying those limits has been the invisibility of what goes on in the more than two-thirds of the planet that is ocean. Fortunately, this is changing, and with advanced underwater imaging and remote-operated vehicles even the deepest ocean trenches (including some in New Zealand waters) are revealing their secrets.

And what they show is startling: ecosystems of extraordinary diversity and often extreme fragility. Biologists tell us that four-fifths of New Zealand's total living diversity is marine, and most of it is found nowhere else in the world. This is a heritage that's as important to preserve as kakapo or kauri forests.

Sustainable seas demand responsible governance, which means integrated governance — not easy to achieve in New Zealand's case, where jurisdiction of the marine environment is apportioned among multiple agencies with multiple policies and pieces of legislation. When it comes to understanding and negotiating this jurisdictional thicket, *Sustainable Seas* could be called 'a guide for the perplexed'. It explores and explains relevant legislation and policy, as well as providing case studies and guides to best practice.

A particular focus is the new tool known as 'marine spatial planning', which is already showing its worth in the New Zealand setting. It is a way of resolving conflicts of use in the sea — between conservation and fisheries, fisheries and mining, aquaculture and amenity preservation, and so on — by taking an ecosystem-wide approach to marine activities. The aim is to apportion zones for various uses, and zones for protection, based on identifying the 'ecological backbone' of a marine area.

Despite tools such as marine spatial planning, there are genuine concerns that marine governance may not be adequately precautionary in the face of the significant demands of commercial development. The pressure to extract from the oceans will only increase, and strong voices are needed to speak for the blue wilderness.

My grandfather was a big game fishing captain in the Bay of Islands in the 1930s. Those were the days of catching a dozen marlin before breakfast. He used to speak of schools of kahawai and trevally stretching from one side of the Bay to the other. I will never see such schools, nor the monster black marlin that fed on them. And perhaps my grandchildren won't see the marine abundance I have had the privilege of seeing.

In my grandfather's day, it was inconceivable that ocean ecosystems could be endangered. The sea was an icon of permanence, a realm immune from lasting human damage, an inexhaustible larder.

We know differently now. What is required — and what this book speaks to — is an ethic of kaitiakitanga, that vital expression of reciprocity between human and non-human elements of the environment, between us and the encircling sea.

Kennedy Warne
Marine writer and editor-at-large of New Zealand Geographic *magazine*

Foreword

I would like to congratulate the Environmental Defence Society on the latest in a series of first-class environmental guides that the Society publishes.

Sustainable Seas: Managing the Marine Environment is a comprehensive examination of New Zealand's vast coastal and oceanic environment. For a relatively small country, New Zealand has jurisdiction over a very large area of sea. More than 20,000 kilometres of coastline borders a marine area extending over 5.8 million square kilometres. This is fifteen times larger than our land mass. This huge area has a rich biodiversity ranging from the sub-tropical to the sub-antarctic and has as much as 80 per cent of the country's biodiversity.

New Zealand should aspire to be a world leader in ocean management. We have the advantage of being a developed nation with a low population and a vast ocean. We have a strong cultural connection with the sea in both our Māori and European heritage. We also have a strong marine science sector.

We can be proud of our leadership in developing a sound quota management system for fisheries and for being one of the first countries in the world to create no-take marine reserves, but we have more to do. Improving New Zealand's system for marine protection is an important and current priority for the Government.

I am therefore happy to acknowledge the extensive effort EDS has undertaken to explain some ways to apply best practice management to our oceans. This guide provides individuals, communities and users of the marine environment with knowledge and insight into decision-making processes, and how they can participate constructively and effectively in them, either as an applicant or a submitter.

I welcome EDS's effort to bring together environmental and development interests in oceans management and to promote the approach that any development within the marine area is well considered and undertaken in a way that minimises effects on our environment.

Hon Dr Nick Smith
Minister for the Environment

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- Richard Wells, Fisheries Specialist, Deepwater Group Limited
- Dave Woods, Programme Manager, Precision Seafood Harvesting

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List of abbreviations and acronyms

EEZ	Exclusive Economic Zone
EEZ Act	Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012
EEZ Amendment Act	Exclusive Economic Zone and Continental Shelf (Environmental Effects) Amendment Act 2013
EEZ Permitted Activities Regulations	Exclusive Economic Zone and Continental Shelf (Environmental Effects – Permitted Activities) Regulations 2013
EPA	Environmental Protection Authority
Heritage NZ	Heritage New Zealand Pouhere Taonga
NIWA	National Institute for Water and Atmospheric Research
NZCPS	New Zealand Coastal Policy Statement 2010
MARPOL	International Convention for the Prevention of Pollution from Ships
PADI	Professional Association of Diving Instructors
QMS	Quota Management System
RMA	Resource Management Act 1991
SOPAC	Secretariat of the Pacific Community
UNCLOS	United Nations Convention on the Law of the Sea

List of legislation referred to

Biosecurity Act 1993
Biosecurity Reform Act 2012
Conservation Act 1987
Continental Shelf Act 1964
Crown Minerals Act 1991
Environment Act 1986
Environmental Protection Authority Act 2011
Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012
Exclusive Economic Zone and Continental Shelf (Environmental Effects) Amendment Act 2013
Exclusive Economic Zone and Continental Shelf (Environmental Effects – Non-Notified Activities) Regulations 2014
Exclusive Economic Zone and Continental Shelf (Environmental Effects – Permitted Activities) Regulations 2013
Fiordland (Te Moana o Atawhenua) Marine Management Act 2005
Fisheries Act 1996
Fisheries (Benthic Protection Areas) Regulations 2007
Fisheries (Kaimoana Customary Fishing) Regulations 1998
Fisheries (Quota Operations Validation) Act 1997
Fisheries (South Island Customary Fishing) Regulations 1999
Harbours Act 1950
Hauraki Gulf Marine Park Act 2000
Health and Safety in Employment (Petroleum Exploration and Extraction) Regulations 2013
Heritage New Zealand Pouhere Taonga Act 2014
Kaikoura (Te-Tai-o-Marokura) Marine Management Act 2014
Local Government Act 2002
Local Government Amendment Act 1989
Local Government (Auckland Transitional Provisions) Act 2010
Māori Commercial Aquaculture Claims Settlement Act 2004
Māori Fisheries Act 2004
Marine and Coastal Area (Takutai Moana) Act 2011
Marine Mammals Protection Act 1978
Marine Mammals Protection Regulations 1992
Marine Reserves Act 1971
Marine Reserves Regulations 1993
Maritime Transport Act 1994
National Parks Act 1980
Queen Elizabeth II National Trust Act 1978
Reserves Act 1977
Resource Management Act 1991
Resource Management (Marine Pollution) Regulations 1998
Subantarctic Islands Marine Reserves Act 2014
Submarine Cables and Pipelines Protection Act 1996
Sugar Loaf Islands Marine Protected Area Act 1991
Te Ture Whenua Act 1993
Town and Country Planning Act 1977
Treaty of Waitangi (Fisheries Claims) Settlement Act 1992
Wildlife Act 1953

Section One

Overview of marine management in New Zealand

John Dory, Alderman Islands *(Daniel Sharp)*

Porae, Poor Knights Islands, Northland *(Daniel Sharp)*

1

New Zealand's marine environment

'The sea, the great unifier, is man's only hope. Now, as never before, the old phrase has a literal meaning: we are all in the same boat.'

JACQUES YVES COUSTEAU

Snapper and demoiselle, Poor Knights Islands, Northland ***(Daniel Sharp)***

Contents

Introduction

Oceans are enormously important to human lives. Water covers more than 70 per cent, or just over 365 million square kilometres, of the globe. The Pacific Ocean alone is 25 per cent larger than all the world's land areas combined. By volume, oceans account for more than 99 per cent of all living space on earth. All water on earth is ultimately connected and interlinked. The oceans drive our climate and rainfall, replenishing lakes and rivers, which in turn drain back into the sea.[1]

New Zealand is fortunate to have a very extensive and diverse marine area. It is home to numerous plant, invertebrate, fish, marine mammal and seabird species. The identity of many of these species, and the interactions between them, are still not fully understood. This makes the effective management of the marine environment a considerable challenge.

Physical marine area

Size

For a relatively small country, New Zealand has a long coastline, and jurisdiction over a very large area of sea. There is approximately 19,000 kilometres of coastline for the mainland, increasing to 20,500 kilometres when the offshore islands and the Chatham Islands are included. This coastline borders a marine area extending over 5.8 million square kilometres (see Figure 1.1). New Zealand's Exclusive Economic Zone (EEZ) is estimated at 4 million square kilometres and its Extended Continental Shelf covers around 1.7 million square kilometres. The EEZ is 15 times larger than the country's land area, and the EEZ combined with the continental shelf is 21 times as large.[2]

But the marine environment is considerably larger than this two-dimensional figure indicates. It also has a substantial third dimension, extending down from the surface of the sea, to the seabed. Although the sea is relatively shallow in coastal areas, where the land abuts the continental shelf, 75 per cent of New Zealand's marine area has depths of more than 1 kilometre. The deepest place is within the Kermadec Trench, some 10 kilometres from the surface.

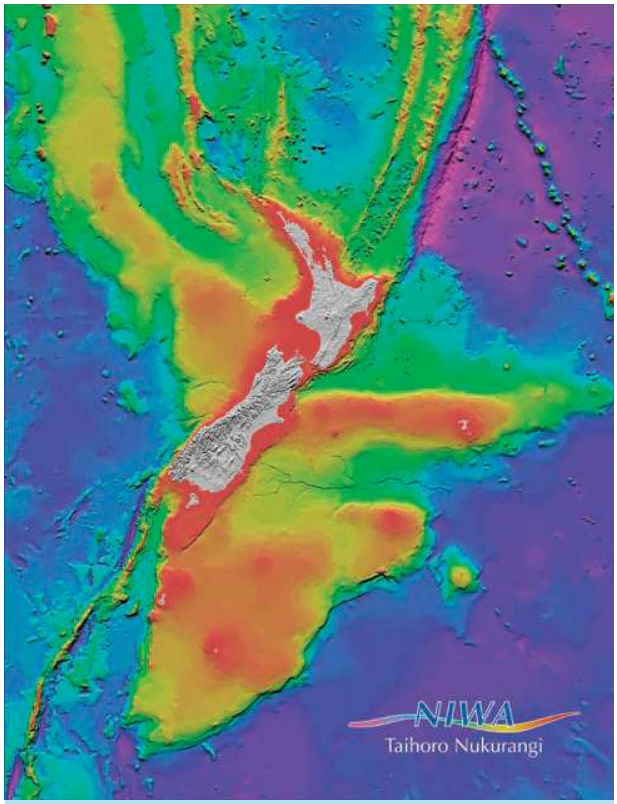


Figure 1.1 Topography of New Zealand's marine area *(NIWA)*

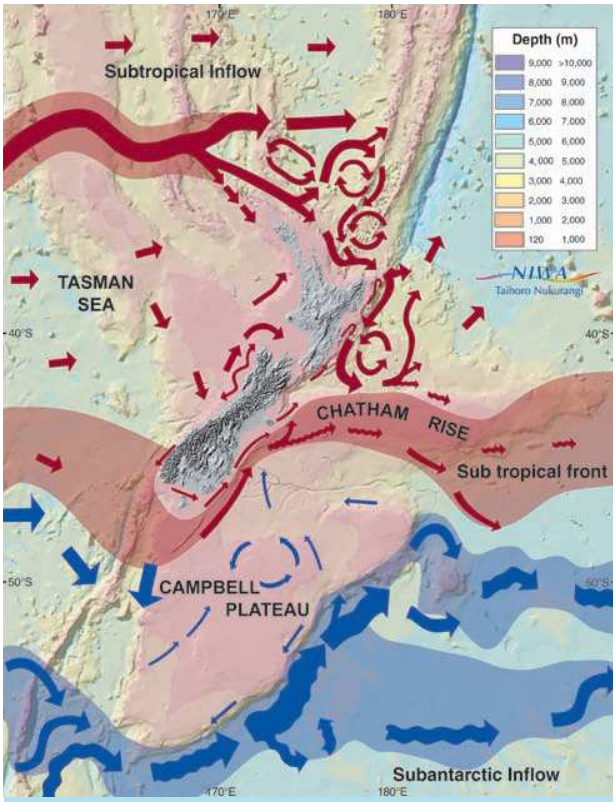


Figure 1.2 Ocean currents around New Zealand *(NIWA)*

Topography

New Zealand's seabed has a very diverse topography. This is because the country sits astride two colliding tectonic plates. The movement of the plates has resulted in arcs of volcanic activity and the uplift and depression of large areas of coastal land and seabed.

Many coastal features have been formed from the remnants of volcanic activity including cones, sunken craters and lahars. New Zealand's seabed features chains of underwater volcanoes and deep ocean trenches and ridges. The mountains which are entirely under the sea are called 'seamounts'.

Closer to land, the New Zealand coastline is punctuated by many estuaries and harbours. These shallow sheltered areas were formed after the last ice age, when the rising seas flooded river valleys and other low-lying areas. They have continued to infill with sediment washed off the land.

Rocky reefs have formed around the more exposed parts of the coast, with soft rock being eroded away by waves to form bays, and harder rock remaining as headlands and reefs. Sand spits and barrier islands are also common around the coast, forming across the mouths of harbours and bays, where rivers have dropped their sediment load.

Movement of water

In terms of the sea itself, New Zealand's marine area is influenced by two major bodies of oceanic water: subtropical surface water which travels from the central Pacific Ocean via the eastern coast of Australia; and subantarctic surface water which originates from the Southern Ocean.

Both of these water bodies move in an easterly direction and they meet along a subtropical front which bisects the southern part of New Zealand's marine area. This oceanic meeting point is located along the same latitude as Fiordland on the west coast and along the Chatham Rise to the east (see Figure 1.2). It is a very productive area for marine life, particularly over the Chatham Rise. More localised currents move the water around the New Zealand coast.

Marine habitats

The marine environment is subjected to intense geological processes, which have led to the formation of some unique marine habitats, including chains of underwater volcanoes and deep oceanic trenches. It is a highly interconnected system, with ocean currents transporting species over large distances, and lifecycles extending over wide geographic areas. As a result, marine habitats vary considerably, with geology, ocean currents and climate affecting distribution.[3]

New Zealand has a high diversity of marine habitats, some of which are particularly important to the ecological health and productivity of the marine area. A broad-scale gap analysis of marine protected areas in the territorial sea (the marine area extending out to 12 nautical miles from land), prepared by the Department of Conservation and the then Ministry of Fisheries in 2011, provides some useful information on the location of different marine habitats, including maps.[4]

Mangrove-flanked estuaries, such as the one shown here at Pataua, Northland, provide important habitat for juvenile fish and seabirds *(Raewyn Peart)*

Estuaries

An estuary is a partially enclosed body of water, that is either permanently or periodically open to the sea, and that is affected by both runoff from the land and inflow from the sea.[5] Estuaries are located in the brackish water at river mouths and are one of the most ecologically productive

marine habitats. New Zealand has around 300 estuarine systems interspersed along the coastline. They cover over 100,000 hectares, and provide a home for a wide range of species, including mangroves, seagrasses, saltmarsh plants, invertebrates, algae and phytoplankton.

There are many different habitat types within an estuary, such as unvegetated sand and mudflats, as well as vegetated habitats like mangrove and seagrass. They provide spawning and nursery areas for fish and shellfish species. In addition, estuaries are a critical habitat and food source for migratory wading birds, some which travel to New Zealand from as far afield as Alaska each year.

Rocky reefs

Rocky reefs are common in nearshore areas around New Zealand's coast. Intertidal reefs are rocky areas of the coastline which extend between spring low water mark and the spring high tide mark. They include a variety of habitats, differentiated by exposure and aspect, and host a wide range of organisms including algae, crustaceans, molluscs (shellfish) and polychaete worms (small worms).

The Hauraki Gulf, the northeast coast of Northland, the east coast of the North Island (near Gisborne), the southwest tip of the South Island and the west coast of the Chatham Islands are all important areas for intertidal rocky reefs. Shallow subtidal rocky reefs, to a maximum depth of 50 metres, are found around many parts of the New Zealand coastline. Fiordland, East Cape and the Chatham Islands stand out as being particularly important areas for subtidal rocky reef habitat.[6]

Many reefs are covered in rich algal forests, which can contain several large kelp species and smaller brown, red and green seaweeds. These provide important habitats for a wide range of sea creatures, including over 2,000 species of invertebrates, which are permanently attached to the rocks. Many of these species are only found in New Zealand.

The presence of lush seaweed beds on rocky reefs is generally associated with high biodiversity because the beds provide food and refuge for other small organisms. These creatures, which include crustaceans, molluscs and polychaetes, primarily live amongst kelp. They provide an important trophic (the feeding position of an organism in the food chain) link between the seaweed, as a primary producer, and predatory fishes, nearly all of which feed on the small rocky reef animals as juveniles.[7]

Intertidal rocky reefs, such as the one shown here at Pig Bay, Motutapu Island, are important habitats in the Hauraki Gulf *(Raewyn Peart)*

Marine algal forests, such as the one shown here at Tūhua (Mayor Island) in the Bay of Plenty, are important habitats for a wide range of sea creatures *(Daniel Sharp)*

Soft sediments

Supporting a wide variety of organisms, soft sediment habitats cover 70 per cent of the world's seafloor, and are found throughout New Zealand harbours, estuaries and open coastal environments. They play a key role in marine ecosystem functioning.

Bottom-dwelling animals burrow within the sediment column (up to 2 metres below the sediment surface in the case of some crabs and shrimps). Because sediment is an accumulation of particles that have settled to the seabed, it is generally rich in organic matter. Soft sediments are inherently complex: bacteria, microalgae and invertebrates all influence oxygen and nutrient concentrations simultaneously, via direct and indirect pathways.[8]

The sediment–seawater interface is permeable, so water fills the small gaps between particles and carries oxygen into the sediment. The concentration of oxygen in pore water decreases rapidly with depth in the sediment, so animals living beneath the surface must maintain access to an oxygen-rich supply through maintaining open pores. Also, concentrations of nutrients (released by the breakdown of organic matter by bacteria) are generally much greater in pore water than they are in overlying seawater. The nutrients in pore water act as a fertiliser for algal growth, and the algae can only flourish with a combination of both sunlight and essential nutrients.[9]

Many animals burrow in soft sediments including this tube worm living within a scallop bed at Ahuahu (Great Mercury Island), Hauraki Gulf *(Daniel Sharp)*

Biogenic reefs

A biogenic reef is composed of the hard parts of living and dead organisms which create structure above the seafloor, and is a highly specialised habitat. Such reefs often occur in areas of strong water movement where there is a good food source and little sediment deposition.[10] Biogenic reefs are formed by colonial tube worms, bivalves such as oysters and mussels, sponges, corals, bryozoans and coralline algae, and can form extensive areas of three-dimensional structures up to 2 metres tall. Formations such as horse-mussel beds and mangrove habitats are also classed as biogenic reefs.[11] These living reefs are important as they provide refuges for juvenile fish and a stable home for other marine life in an otherwise featureless seabed.

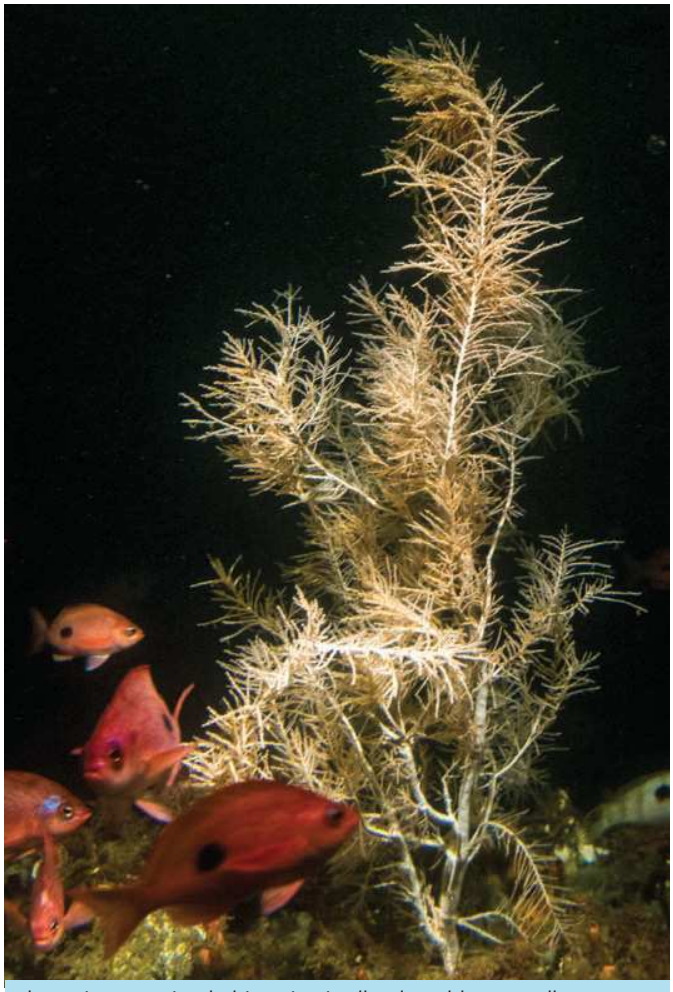
The distribution of known biogenic reefs around New Zealand is patchy, but they are primarily found in the far south of New Zealand on the Catlins coast and around Stewart Island; in the middle of New Zealand from Kaikōura across to the northwest tip of the South Island, in Cook Strait, and along the Kapiti and Wairarapa coasts, East Cape and the east coast of Northland. Stewart Island and the Chatham Islands support the greatest proportions of biogenic reef habitat in New Zealand.[12]

One of the most biodiverse biogenic reef habitats in New Zealand is rare, and occurs where gravel lying on the seabed is intermixed with the hard calcium remains of shellfish and bryozoans. These areas are called 'calcareous gravels' and are home to rich thickets of bryozoans and sponges. A very ecologically important area of these gravels occurs around the northern tip of the North Island near Spirits Bay, where more than 330 species of bryozoans and 220 species of sponges have been found. They also occur near the southern coast of the South Island, off the Otago coast, in the Foveaux Strait and in Tasman Bay.

Fiords

A fiord is a steep-sided valley that has been carved out by glaciers and then flooded by the sea. The freshwater input comes from the surrounding landscapes, via waterfalls and runoff from the mountains and native forests. In New Zealand fiords, the copious rainwater leaches through the rich humus of the beech forest and results in a yellow-coloured layer of freshwater overlaying the denser seawater. This reduces the light levels within the fiords and has resulted in normally deep water species living closer to the surface.

Fiordland has 14 fiords of varying depths reaching up to over 400 metres. The unique climate, vegetation and topography in this area has resulted in some specialised underwater habitats. Species living within the fiords are tolerant to the freshwater layer and reduced light levels.[13] Spectacular large tree-like black corals and sea pens, normally only present in deepwater, can be found growing there.



The unique marine habitats in Fiordland enable normally deepwater species, such as the black coral shown here (appearing white), to grow in shallow waters *(Raewyn Peart)*

Seamounts

Being enormous underwater structures (usually defined as over 1,000 metres high), seamounts in the deep waters of New Zealand's EEZ are of considerable scientific interest, often hosting unusual or unique groups of organisms and a biodiversity disproportionate to their size and area.[14] These environments are not only widely recognised as areas of high productivity, but are also regarded as a fragile habitat because of their poor ability to recover if damaged.

Seamounts can support a very diverse range of life. They provide a hard stable surface for sessile plankton feeders to attach to, and act as oases within large plains of seabed covered in low-lying soft mud. Animals attached to the seamounts receive their primary energy supply from nutrient-rich water, which wells up around the flanks of the large structures as they intercept the ocean currents. In addition, tiny invertebrate prey (zooplankton) which are transported along in the currents become trapped on the seamounts. The seamount communities are also fed by detritus and faecal pellets drifting down from organisms which live closer to the surface. The high productivity of these areas attracts large congregations of fish, which in turn attract other species to the surrounding waters, such as sperm whales and sea birds.[15]

Seamount ecosystems are complex and varied. Many harbour their own unique endemic species. Since the mid-1990s, National Institute of Water and Atmospheric Research (NIWA) scientists have studied a variety of seamount habitats in New Zealand, including those of the Chatham Rise and the southern Kermadec volcanic arc. They found species and taxonomic diversity to be high. A 2004 study of Northland Plateau seamounts recorded 396 species of macro-invertebrates on two seamounts. At least 17 per cent of the species (Bryozoa alone) recovered by the survey are currently undescribed for the New Zealand region, including six genera entirely new to science.[16]

Hydrothermal vents

Hydrothermal vents are commonly found near volcanically active places such as areas where tectonic plates are moving apart. As hydrothermal fluids pour out of the vent and react with cold, oxygenated seawater, a number of rapid chemical reactions take place. These ultimately form metal-rich chimneys which provide an important environmental niche for deep-sea marine life.

Hydrothermal vents support complex ecosystems of unusual organisms that have developed unique biochemical adaptations to high temperatures and the highly toxic (to land-based creatures) environment. The fluids emanating from the vents contain chemicals that feed microbes at the base of a unique food web that survives without any interaction with the sun.[17] These microbes use chemicals such as hydrogen sulphide to provide the energy source that drives their metabolic processes. They ultimately support a wide range of other organisms such as tubeworms, shrimp and mussels.[18]

Scientists have recently discovered new forms of life deep under the sea within these vents. Despite the often very high temperatures, large numbers of micro-organisms grow around the vents, typically as bacterial mats. Many animals are unique to particular vent sites and are not seen even a few hundred metres away.[19] Deepwater hydrothermal vents in the Kermadec Islands support extensive beds of giant vent mussels, which are unique to the area, and which in turn provide habitat for deepwater crabs and an endemic eel-like fish.

Marine species

As much as 80 per cent of New Zealand's total biodiversity lives in the sea.[20] It is estimated that there might be up to 65,000 different marine species, of which only 25 per cent have been described.[21] Marine research is significantly behind its terrestrial counterpart, making assessment of ecological health and measurement of biodiversity difficult because information is so scarce.[22] However, we do know that the high diversity of marine habitats within New Zealand's waters is critical to the ecological health and productivity of the marine area, and is relied on by an extraordinarily high number of species.

New Zealand is considered internationally to be an important contributor to global marine diversity. For example, endemic species include:

- About 95 per cent of the 733 known sponge species
- 84 per cent of bivalves and gastropods (types of marine molluscs)
- 75 per cent of ascidians (commonly known as sea squirts)[23]

The greatest biodiversity of fish and invertebrates is found along the northeast coast of the North Island, where known hotspots of species endemism and/or species diversity occur at the Three Kings Islands, in the soft sediment assemblages of Spirits Bay (Piwhane) and Tom Bowling Bay (over 700 invertebrate species).[24]

In a recent paper by marine biologist Dennis Gordon, it was recorded that the animal kingdom Animalia[25] (including fish and invertebrates) is by far the richest in species numbers in New Zealand with 13,415 marine species, followed by Chromista (including algae) with 2,644 species, Plantae (mostly red and green seaweeds) with 702 species, Fungi with 89 and Protozoa[26] with 43 species.[27] Gordon noted that seaweeds comprise approximately 900 species, including at least 109 that are new to science and not yet described.[28]

Plankton

Plankton comprises the largest group of organisms in the ocean. The term refers to organisms that rely on the movement of the water to carry them around, because the vast majority of plankton are too weak to swim against the current. They are divided into two basic groups: phytoplankton (or plant plankton) and zooplankton (or animal plankton). Phytoplankton are the primary producers for the oceans. Around half of worldwide primary productivity is achieved by these microscopically small organisms which grow and divide in the ocean.[29] The animal components of plankton are the zooplankton.

Plankton are believed to be the most important life form on Earth. Through photosynthesis, phytoplankton convert water and carbon dioxide into organic material and oxygen. They are at the base of the oceanic food chain, and without them few other life forms in the ocean could exist.[30] Plankton are also responsible for manufacturing a significant amount of the Earth's oxygen.

Specific species of plankton occupy particular marine habitats, with each species being uniquely adapted to factors such as light, temperature, turbulence and salinity. Plankton are sensitive to their environment and a change in concentration can indicate a subtle environmental change. They are often highly responsive to nutrient levels, temperatures, pollution, food that is not nutritious, levels of light and increased predation.[31]

Algae and seagrasses

Algae are an ancient group of primitive plants that support major marine food webs. In contrast, seagrasses are flowering plants (angiosperms) whose ancestors once lived on land. One prominent and important temperate zone seagrass is eelgrass which provides excellent habitat for grazing animals. These fast-growing plants form the base of a rich and productive food web.[32] In New Zealand there is one main species of seagrass (*Zostera capricorni*) which primarily grows in intertidal areas but which can also grow in areas permanently submerged, where the water is sheltered and clear.

Subtidal seagrass beds, such as the one shown here at Slipper Island in the Bay of Plenty, provide important habitat for juvenile fish *(Daniel Sharp)*

The distribution of algae is generally clearly zonated within the marine environment. Yellow, white and grey lichens (a combination of fungi and bacteria) all live within the zone which is both wet and dry. Green seaweeds are common in the upper intertidal zone, whilst brown algae are found closer to the low-water line. Red seaweeds are found below the brown-seaweed zone and the large kelps are found in the subtidal zone.

Invertebrates

This is a highly diverse group of species, including sponges, worms, shellfish and echinoderms. The sessile animals living on rocky reefs harvest plankton and organic particles from passing seawater. They include sponges, hydroids, corals, anemones, bryozoans, tube worms and barnacles.

Hydroids, jellyfish, corals and sea anemones belong to the group Cnidaria and are among the simplest of marine invertebrates. Jellyfish may consist of individual organisms or colonies of individuals, some of them specialised for tasks such as feeding, stinging and reproduction.[33] The name 'coral' is given to a variety of animals which grow in colonies and have skeletons made of calcium carbonate or horny material. The largest invertebrate seafloor species on the planet, the bubblegum coral, lives in New Zealand waters. True (or 'stony') corals may be solitary (cup corals, to which most New Zealand species belong) or colonial (reef-building corals). Their skeletons are made up of calcium carbonate and are external to the body. Black corals, of which there are 58 species in New Zealand waters, belong to a different group than the true corals. They have hard, protein-based skeletons with tiny polyps. Mostly they live in deep water, but in Fiordland, the black coral *Antipathella fiordensis* can live in relatively shallow depths.[34]

Bryozoans are fascinating creatures, which have been variously referred to as lace corals, moss animals or sea mats. These animals form coral-like groupings on rocky and gravel areas, which in turn provide shelter for other invertebrates and juvenile fish. Nearly 1,000 different species of bryozoans are found within New Zealand's marine area and most of these are unique to the country.

In contrast to the sessile animals, other invertebrates move around the rocky reef to feed. These include herbivores, such as kina and top shells, which graze on seaweed, and carnivores, such as octopus, starfish, crayfish and crabs. The reef is also home to

New Zealand has a vast array of fascinating marine invertebrates including anenomes seen at Great Mercury Island (left and right), jellyfish seen at Tūhua (Mayor Island) (centre) *(Daniel Sharp)*

brightly coloured sea slugs (nudibranchs), shellfish-type animals which have evolved to live without shells. Some sea slugs protect themselves with stinging cells recycled from their prey.

There are numerous types of shellfish found in New Zealand's marine environment. Of these, many bivalves, such as mussels, cockles, oysters, pipi and scallops, feed by straining plankton from the water. Some species of bivalves can reach phenomenal densities at over 20,000 per square metre. Most bivalves are sedentary or slow-moving animals. Some, such as pipi and cockles, spend their life buried in seafloor sediment, while others like oysters and mussels remain anchored to one spot by attaching themselves to rocks and solid structures.[35] Scallops, on the other hand, can move quickly through the water if they sense danger.

Seamounts can support very large deepwater sponges and corals that may live for hundreds of years. In these habitats, sponges can reach several metres in height and corals have been found growing up to 10 metres tall. Deepwater coral banks, large sea fans, sea pens and sponges are particularly vulnerable as they are fragile and slow-growing. Once destroyed, coral formations appear to need 200 to 400 years to recover to some degree but will never be quite the same if their endemic species have been lost.[36]

Fish

Fish are found in all kinds of marine habitats. Rocky reefs support some 250 species of reef fish. Some of these, including parore, silver drummer and butterfish, graze on seaweed. Others including maomao, trevally and demoiselle sift plankton from the seawater. Other fish commonly targeted by fishers, including snapper, blue cod, kahawai, John Dory and moki, predate on smaller fish and invertebrates living in the rocky reef environment or on adjacent areas of sediments. Some unusual species also make New Zealand's rocky reefs their home including sea horses and sea dragons. The sea horse species found in New Zealand is one of the largest in the world. The sea horses anchor themselves to seaweeds or other structures on the reef with their prehensile tails, and ambush their food, mainly crustaceans. Male sea horses incubate fertilised eggs in a specialised pouch.

Bottom-feeding fish such as flounder, terakihi, snapper, red cod and warehou predate on common residents of coastal soft sediments including a variety of worms, crabs, shellfish, starfish, sea urchins and sea cucumber. Some fish, such as the stargazer, completely bury themselves in the sand and pounce on unsuspecting passers-by.[37] Seamounts offer a refuge for deepwater fish species including orange roughy, black oreo and black cardinalfish.

Many of the fish found in New Zealand waters are present in other parts of the world. However, there are a number of fish species that are very rare, and found only in certain habitats, such as the morse-code leatherjacket which is generally only spotted in the Kermadec Islands.[38] There is a much higher level of endemism in New Zealand rock pool fish which are less mobile. It is thought that 62 per cent of New Zealand's 94 species of rock pool fish are only found in this country.[39]

Fish are an important food source for marine mammals and birds, as well as for the larger predatory migratory fish species. New Zealand waters are visited by numerous migratory fish and they provide a critical habitat for many of them. Species such as the southern bluefin tuna and striped marlin migrate seasonally across the vast ocean basins.

Snapper, shown here at the Poor Knights Islands, Northland, are carnivorous and prey on small fish and invertebrates whereas the smaller two spot demoiselles surrounding them feed on plankton *(Daniel Sharp)*

Marine mammals

New Zealand's seas are a marine mammal 'hotspot'. It is estimated that just under half of the world's total number of dolphin and whale species are found in New Zealand. There are five different species of dolphin that live year round in New Zealand's coastal waters, including the common dolphin, dusky dolphin, bottlenose dolphin, Hector's dolphin and orca. There are a few other species living in offshore waters. New Zealand is home to one of the smallest dolphins in the world, the Hector's dolphin. This species is threatened with just over 7,000 remaining. The Maui's dolphin, which is a subspecies of the Hector's, is only found along the west coast of the North Island. There are as few as 55 adults of this critically endangered dolphin remaining.

Species of whale, including the humpback and blue whale, migrate through New Zealand waters. Other species such as the Bryde's whale and southern right whale breed here. A small population of around 40 to 50 Bryde's whales resides in the Hauraki Gulf year round, with a further 150 visiting seasonally. The species is classified as nationally critical in New Zealand, although there are secure populations overseas.

New Zealand fur seals and sea lions are part of the other main group of marine mammals found in New Zealand's waters, the pinnipeds. It is estimated that up to two million fur seals lived around the New Zealand coastline before humans arrived. Their population was decimated by hunting but is now recovering. The endemic and threatened New Zealand sea lion breeds in the Auckland Islands and can be seen around southern coasts, including the Catlins and Otago Peninsula. Southern elephant seals and leopard seals are occasional visitors to New Zealand beaches, travelling up from subantarctic and antarctic waters.

New Zealand has a rich variety of marine mammals including the bottlenose dolphin (top), New Zealand sea lion (centre) and orca (bottom) *(Raewyn Peart)*

Seabirds

New Zealand has been referred to as the 'seabird capital of the world'. This is because more species of seabirds breed here than in any other country. There are thought to be more species of seabirds in New Zealand than land birds. Thirty-five species of seabird only breed in New Zealand.

New Zealand's seabirds range from the large southern royal albatross, which can have a wingspan of over 3 metres and which spends most of its time at sea, to the small and critically endangered New Zealand fairy tern, which nests on Auckland and Northland beaches.

New Zealand is thought to have more species of seabird than land bird, including the flesh-footed shearwater shown here near the Mokohinau Islands in the Hauraki Gulf *(Raewyn Peart)*

Seven species of penguin can be found in New Zealand, with four of these breeding on the mainland (yellow-eyed, white-flippered, Fiordland-crested and blue). The blue penguin is the smallest penguin species in the world and can be found along the coasts of the North and South Islands. The largest penguin in New Zealand is the distinctive yellow-eyed penguin, which nests along the south-east coast of the South Island, and on subantarctic islands further south.

Marine productivity

New Zealand's marine environment is influenced by its geological history, its isolation, and the action of major ocean currents. Longer-term weather cycles affect New Zealand's oceans. Together, the atmosphere and the rotation of the earth drive major ocean circulation patterns and climate systems across the world, affecting deepwater and surface currents, sea temperature, sea levels, seawater chemistry, and the productivity of our oceans.[40]

Productivity is a measure of the amount of life that can be supported in a given area. It is driven by the availability of nutrients and light for phytoplankton growth and reproduction.[41] There are a number of key processes that are responsible for marine productivity levels. Upwelling occurs where the deep, cold ocean water rises to the surface, both in the open ocean and along coastlines. This water is replacing ocean surface water pushed away from the land by offshore winds. The water coming from the deeper ocean is naturally rich in nutrients, primarily nitrate and phosphate. This helps to fertilise the surface water and promotes phytoplankton growth, ultimately resulting in high biological productivity in these areas.[42] There is a reverse of the process called downwelling, where the wind pushes surface water towards the coast where it eventually sinks down.

Natural inflows of nutrients and sediments into coastal ecosystems are an important part of biological, physical and chemical cycles in New Zealand's inshore area. These are derived both from deepwater upwellings and inputs from the land. Such cycles are the basis for productivity in these areas, although excess nutrients coming from the land can cause eutrophication, which in turn results in oxygen depletion and acidification of seawater. The productivity of the offshore ocean area is primarily influenced by major oceanic currents.[43]

As discussed previously, habitats contribute to marine productivity in different ways and to differing degrees. For example, estuaries are highly productive environments. They have a continuous source of nutrients from their freshwater inputs and are important sites of nutrient recycling in the coastal environment. Nutrients within the estuary are used by plants such as algae, seagrasses, seaweeds and mangroves and they enter other parts of the food web when these plants are grazed on by invertebrates. When the plants, or parts of them die, nutrients are recycled within the estuary by the actions of invertebrates and bacteria.[44]

Different species contribute to marine productivity in various ways. For example, seagrass and kelp store nutrients in their biomass for a long time, including nitrogen and phosphorous compounds transported by rivers from agricultural areas to the sea. This means that they function as a kind of biological purification system in coastal ecosystems.[45]

Food webs and lifecycles

Food webs are complex networks through which energy and materials move within and among trophic levels in an environment, from microbes all the way through to top predators.[46] Marine food webs or chains refer to a group of organisms linked through feeding relationships. All of the plants and animals living in the sea, from algae to whales, form part of the marine food web. In addition, marine life is intricately linked to the physical processes within the ocean, including factors such as temperature and sunlight.

Some species will spend all their lives in one habitat whereas others will use a range of different habitats during their lifecycle. For example, adult snapper generally spawn their eggs in highly productive areas close to estuaries and harbours, such as the Hauraki Gulf. The juvenile snapper move into sheltered coastal areas to mature, and then once they have grown to adult size, they often move further out to sea. Studies have shown that the larvae of longfin eels actually hatch far away from New Zealand, possibly near Tonga, and one tagged female longfin eel took 161 days to swim from Canterbury's Lake Ellesmere to a point 160 kilometres north-east of New Caledonia.[47]

The wide variety of lifecycles for different species, from spawning and pupping, to migrations over vast distances, means that taking an ecosystem approach to understanding food webs is critical. This looks at the relationships between all species using the oceans, rather than considering species as independent entities.[48] An ecosystem approach recognises that all species are interlinked, so that a change to one species will have an impact on other species in the food web to some degree. One example of this is fish stock productivity, which is dependent on recruitment of small fish into the fishery, and this in turn is dependent on the availability of food and suitable habitats to enable juvenile fish to avoid excessive predation.[49]

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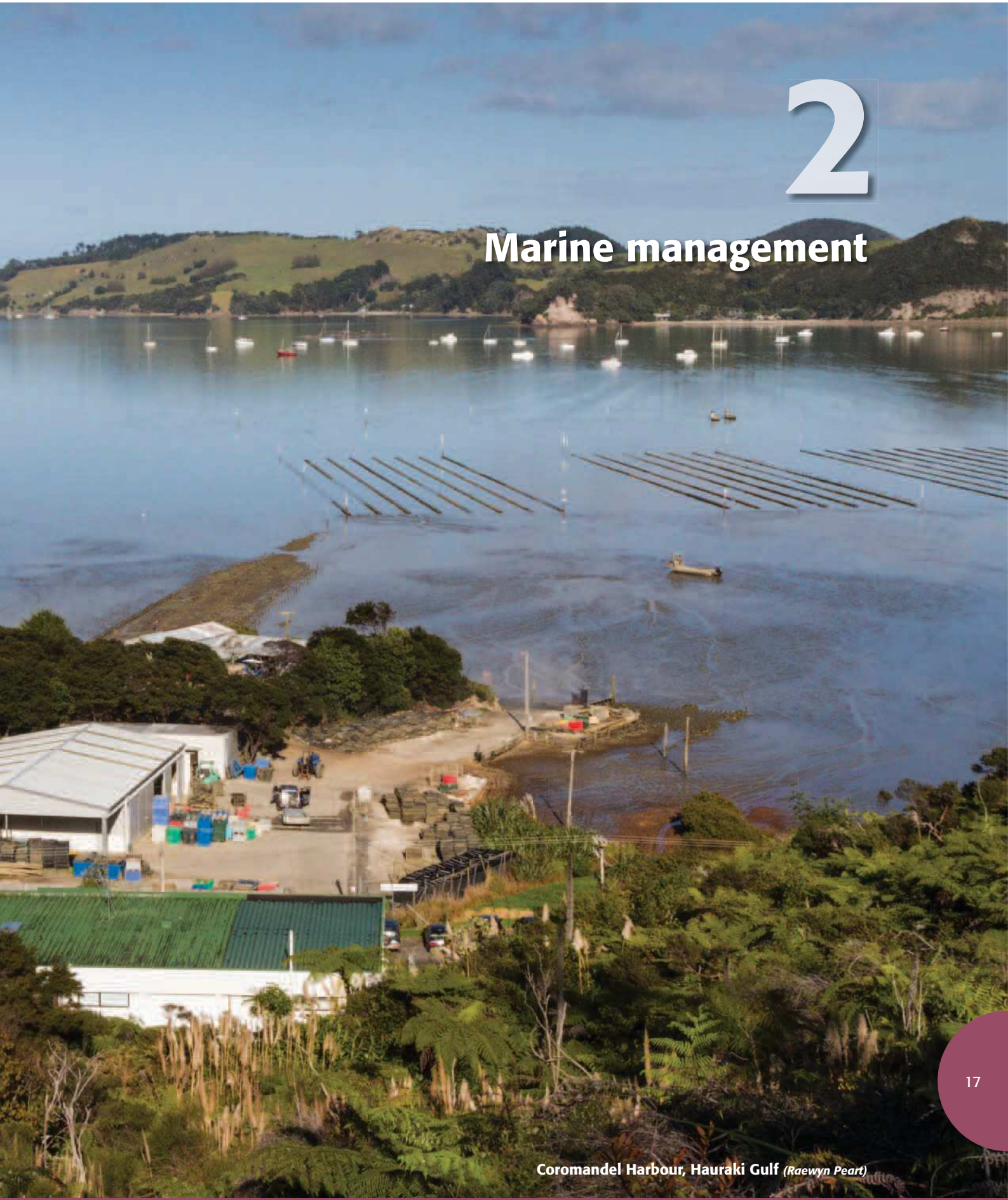
2

Marine management



Coromandel Harbour, Hauraki Gulf *(Raewyn Peart)*

Contents

Introduction

New Zealand's marine environment is managed within a complex and overlapping legislative framework which has developed over the past 50 or so years. This chapter provides an overview of the agencies currently involved in managing the marine environment and the legislation which is used to guide their activities.

Maritime areas

Management of the sea is governed internationally by multilateral treaties, the foremost being the United Nations Convention on the Law of the Sea (UNCLOS). Under UNCLOS, New Zealand exercises different jurisdictional powers over four defined maritime areas: the territorial sea, the contiguous zone, EEZ and the continental shelf – see Figure 2.1.

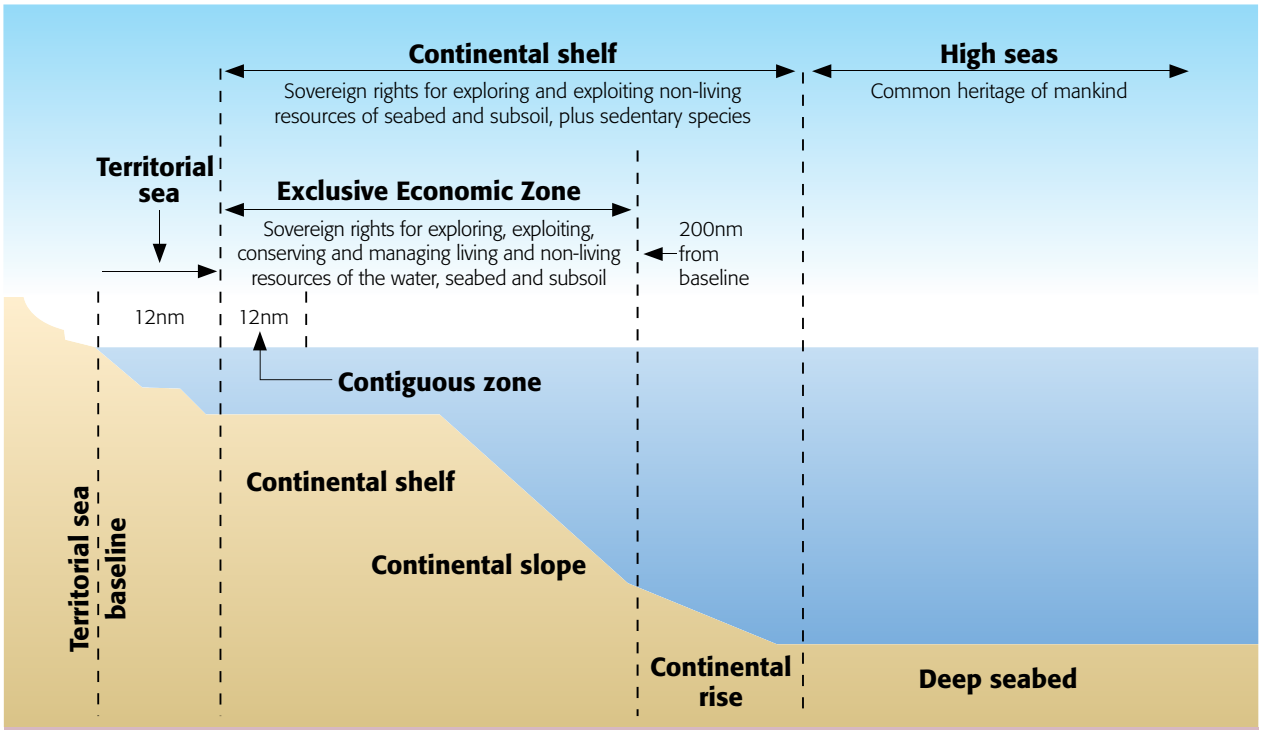


Figure 2.1 Maritime jurisdictions under UNCLOS

The territorial sea is part of New Zealand's sovereign territory. This means that the government's power to govern this marine area is the same as on land, although other states have rights established under international law, such as 'innocent passage' of their vessels. The territorial sea comprises the marine area within 12 nautical miles of low-water mark. In New Zealand, it encompasses 167,650 square kilometres.[1]

The contiguous zone lies on the seaward side of the territorial sea, extending from 12 to 24 nautical miles from the low-water mark. It overlaps with the EEZ. This is not part of New Zealand's territory. But under UNCLOS, in addition to the rights New Zealand has in this area as part of the EEZ, it has the right to police the area to prevent or punish infringements (of customs, fiscal, immigration or sanitary laws and regulations) in its territory or territorial sea.

The EEZ is the largest of New Zealand's marine areas, covering an area which extends from the outer edge of the territorial sea to 200 nautical miles from the low-water mark. In some places, the EEZ extends over the edge of the continental shelf into deep ocean areas.

The EEZ is not part of New Zealand's territory, but under UNCLOS, New Zealand has sovereign rights for the purpose of exploring, exploiting, conserving and managing all of its living and non-living natural resources. These resources include marine life, oil, gas

and minerals, and energy produced from water, currents and winds. Other countries retain the freedom of navigation and over-flight and can lay submarine cables and pipelines within New Zealand's EEZ.

Where the outer edge of the continental shelf (which includes the continental slope and rise) extends beyond the EEZ, New Zealand has more limited rights. These only cover the exploitation of minerals, gas and other non-living resources within the seabed and subsoil as well as sedentary species on the seabed, but excluding mobile fish. When taking non-living resources such as minerals and petroleum from this part of the continental shelf, payments must be made to the International Seabed Authority. This authority was established, under UNCLOS, to control activities within areas of the seabed outside national jurisdiction.[2]

The United Nations Commission on the Limits of the Continental Shelf confirmed the boundary of New Zealand's continental shelf in 2008 (see Figure 2.2). It includes approximately 1.7 million square kilometres of seabed outside the existing EEZ (about six times the area of our land mass).[3] Because some parts of New Zealand's EEZ and continental shelf overlap with areas claimed by other countries, the boundaries need to be agreed by treaty. New Zealand has signed a treaty with Australia to settle joint maritime boundaries but has yet to conclude maritime treaties with Fiji, Tonga and France (regarding New Caledonia).

The water column outside the territorial sea and EEZ of New Zealand and other countries is the high seas. All states have 'freedom of the high seas' which includes freedom of navigation, overflight, laying cables and pipelines, constructing artificial installations, fishing and scientific research.

The seabed and subsoil beyond the continental shelves of New Zealand and other countries is called 'The Area'. This is vested in humankind as a whole and administered by the International Seabed Authority. No state can claim or exercise sovereignty or sovereign rights over the Area.

Under international treaty, New Zealand has jurisdiction over an extensive marine area, but other nations retain rights of passage through the area, including that where this ship, seen here leaving Otago Harbour, is registered *(Raewyn Peart)*

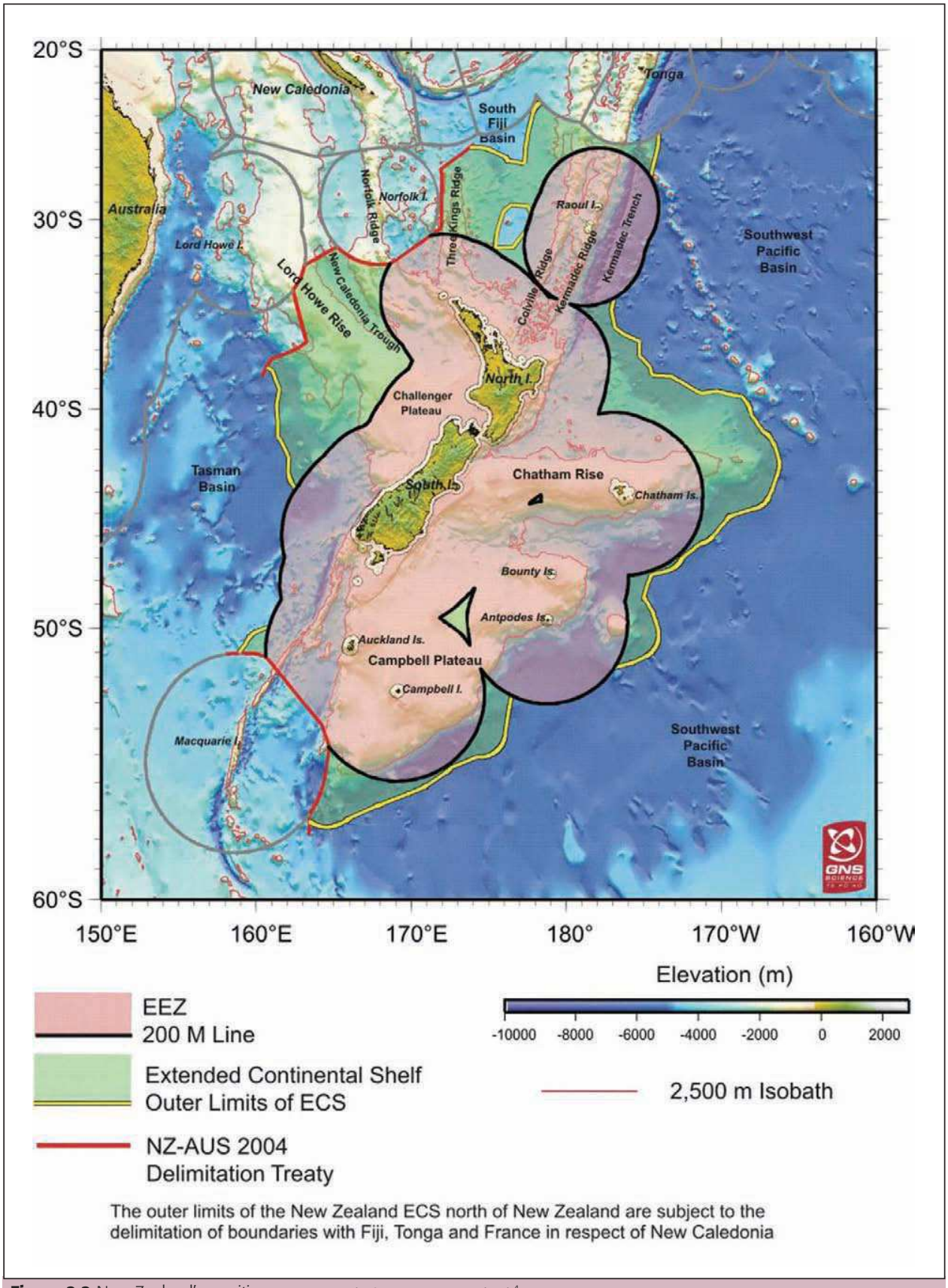


Figure 2.2 New Zealand's maritime areas *(Land Information New Zealand)*[4]

Marine management agencies

Marine management in New Zealand is split amongst multiple management agencies with overlapping responsibilities (see Figure 2.3).

Agency/organisation	Areas of management focus	Key legislation
Minister and Department of Conservation	Conservation of natural and historic resources Protected species Marine protection Coastal management	Conservation Act 1987 Marine Mammals Protection Act 1978 Marine Reserves Act 1971 Resource Management Act 1991 Wildlife Act 1952 Marine and Coastal Area (Takutai Moana) Act 2011 Reserves Act 1977 Fisheries Act 1996 Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012
Minister and Ministry for Primary Industries	Fisheries Aquaculture Biosecurity	Fisheries Act 1996 Treaty of Waitangi (Fisheries Claims) Settlement Act 1992 Fisheries (Quota Operations Validation) Act 1997 Māori Fisheries Act 2004 Māori Commercial Aquaculture Claims Settlement Act 2004 Biosecurity Act 1993
Minister of Energy and Resources and Ministry of Business, Innovation and Employment	Allocation of minerals and petroleum resources	Crown Minerals Act 1991 Continental Shelf Act 1964
Minister and Ministry for the Environment	Environmental policy development, including regulations under EEZ legislation	Resource Management Act 1991 Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012 Environmental Reporting Act – when enacted
Environmental Protection Authority	Specified activities in the exclusive economic zone and extended continental shelf including minerals and petroleum activities	Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012
Maritime New Zealand	Shipping and marine pollution Oil spill preparedness and response	Maritime Transport Act 1994
Regional Councils	Catchment and marine management (excluding fisheries) to 12 nautical miles Regional marine pest management	Resource Management Act 1991 Local Government Act 2002 Reserves Act 1977 Biosecurity Act 1993

Agency/organisation	Areas of management focus	Key legislation
Territorial authorities	Land use and subdivision	Resource Management Act 1991 Local Government Act 2002 Reserves Act 1977
Heritage New Zealand Pouhere Taonga	Protection of historic heritage places	Heritage New Zealand Pouhere Taonga Act 2014
Iwi and hapū	All coastal and marine resources	All the above legislation Co-management agreements

Figure 2.3 New Zealand coastal and marine management agencies

Minister and Department of Conservation

The Department of Conservation was established by the Conservation Act 1987. Its prime role is to manage Crown-owned conservation land and to protect and rehabilitate endangered indigenous species and habitats. The Department is also tasked with advocating for the conservation of natural and historic resources generally, amongst other things. The definition of 'natural resources' in the Conservation Act is very wide and includes living organisms, habitats, ecosystems, landscapes, landform and geological features. The New Zealand Conservation Authority provides oversight of the Department's work and gives advice to the Minister and the Director-General of Conservation.

The Minister and Department of Conservation play a significant role in the protection of marine habitats and species. The Minister approves the establishment of marine reserves (with the concurrence of the Ministers for Primary Industries and of Transport) under the Marine Reserves Act 1971 and marine mammal sanctuaries under the Marine Mammals Protection Act 1978. Once created, these areas are managed by the Department of Conservation. The Department administers the Wildlife Act 1953 which provides protection for seabirds and some marine species. The Department is also involved, in conjunction with the Ministry for Primary Industries, in managing the impacts of fishing activity on protected marine species such as dolphins, sea lions, seals and seabirds.

The Minister of Conservation has a specific role in the management of coastal land and the territorial sea under the Resource Management Act 1991 (RMA). The Minister developed the New Zealand Coastal Policy Statement 2010 (NZCPS) which guides, and in some cases directs, the planning and decision-making functions of councils within the 'coastal environment'. This includes

The Department of Conservation plays a significant role in the protection of marine habitats and species including activity within marine reserves such as water taxis *(Raewyn Peart)*

the coastal marine area which extends from mean high water springs[5] to the outer edge of the territorial sea, and land near the coast that is influenced by the sea (although the extent of the landward boundary is not defined in the RMA).

The Minister approves regional coastal plans to the extent that they apply to the coastal marine area. The Department of Conservation is the unitary authority for the Subantarctic and Kermadec islands, so is responsible for writing and implementing the regional coastal plans for these marine areas. The Department may also become involved in making submissions on plans and resource consents under the RMA as part of its advocacy role and to support the Minister's wider coastal management responsibilities.

Minister and Ministry for Primary Industries

The Ministry for Primary Industries was established in 2012 as a result of a merger between the former Ministry of Fisheries and Ministry of Agriculture and Forestry. The Minister and new Ministry manage fisheries resources under the Fisheries Act 1996, which include fish, shellfish, seaweed and other aquatic life. The Minister determines a wide range of matters including what quantity of fish can be caught and what controls are placed on where, when and how fishing is to be undertaken. The Ministry supports the Minister's decision-making role by commissioning research, managing stakeholder inputs and providing advice. In addition the Ministry also enforces fisheries regulations.

The Ministry is also the Government's principal advisor on aquaculture. The Minister plays a role in the allocation of space for marine farms. This is through determining requests for stays on new applications and for aquaculture applications to be processed and heard together. The Minister has the power to amend aquaculture provisions in regional coastal plans through regulation.[6] The Minister also assesses whether a proposed marine farm will have an undue adverse effect on fishing. The Ministry maintains a register of fish farms, which is managed by FishServe on its behalf.

The Minister for Primary Industries (along with the Minister of Transport) has a concurrence role in deciding whether or not proposed marine reserves should be established under the Marine Reserves Act. The Minister applies the decision-making criteria in section 5 of the Act. For fisheries, this includes determining whether declaring the area a marine reserve would interfere unduly with commercial fishing or recreational usage in the area. If concurrence is not provided, the proposed marine reserve cannot be created.

The Ministry for Primary Industries is also charged with leadership of the New Zealand biosecurity system under the Biosecurity Act 1993, taking over the role of the former Biosecurity New Zealand. This includes preventing new organisms from entering the country and eradicating or controlling them once they have arrived.

The Ministry for Primary Industries manages the harvest and sale of New Zealand's fisheries resources, including the fish sales shown here on the Akaroa wharf, Banks Peninsula *(Raewyn Peart)*

Minister of Energy and Resources and Ministry of Business, Innovation and Employment

The Minister of Energy and Resources manages the allocation of minerals resources within New Zealand's marine area. The Minister is supported by the Ministry of Business, Innovation and Employment which, through New Zealand Petroleum and Minerals, processes prospecting, exploration and mining permits, collects royalties and enforces mining regulations.

Minister and Ministry for the Environment

The Ministry for the Environment was established under the Environment Act 1986. It is the principal advisor to the Government on environmental matters within New Zealand and on international matters that affect the country's environment. The Ministry is responsible for developing environmental policy and it assists with legislative amendments.

In the marine area, the Minister is responsible for recommending regulations promulgated under the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012 (EEZ Act) to the Governor-General.

The Ministry also has responsibilities for environmental reporting. The Environmental Reporting Bill, expected to be passed in 2015, requires the Ministry for the Environment and Statistics New Zealand to publish a domain report on one of five environmental domains (air, atmosphere and climate, freshwater, land and marine) every six months and a synthesis report (providing an analysis of cross-domain trends and interactions) every three years. The Bill does not require new information to be generated but relies on collation of existing data.

Environmental Protection Authority

The Environmental Protection Authority (EPA) is a crown entity established in 2011 under the Environmental Protection Authority Act 2011. It is governed by a Board whose members are appointed by the Minister for the Environment. The EPA is responsible for processing consents for matters of national significance under the RMA, the management of the Emissions Trading Scheme and the regulation of hazardous substances and new organisms. The EPA also has a key role in the marine area under the EEZ Act as the agency responsible for determining marine consent applications.

Maritime New Zealand

Maritime New Zealand is governed by an independent board appointed by the Governor-General on the recommendation of the Minister of Transport. It manages shipping and marine pollution under the Maritime Transport Act 1994. The management of waste dumping and discharge from ships and offshore installations in the EEZ and continental shelf, which was previously undertaken by Maritime New Zealand, has recently been transferred to the EPA.

Maritime New Zealand develops, on behalf of the Minister of Transport, and enforces marine protection rules aimed at preventing pollution incidents. It maintains the country's marine oil spill response strategy. It also supports New Zealand's engagement with the International Maritime Organization.

Maritime New Zealand is responsible for managing shipping within New Zealand waters, as shown here at the Port of Auckland *(Raewyn Peart)*

Regional councils

Regional councils are democratically elected bodies constituted under the Local Government Act 2002. There are 11 regional councils throughout the country whose boundaries broadly coincide with water catchment areas. In addition, there are six unitary authorities, which carry out the role of both regional and territorial authority.[7]

Regional councils have a broad role in managing the marine environment through their jurisdiction under the RMA over both catchments and activities in the coastal marine area (the area from mean high water springs to the edge of the territorial sea). The scope of the RMA is broad and it encompasses the environmental impacts of all activities except where they are specifically excluded. The main exclusion in the marine area is the taking, allocation or enhancement of fisheries resources for the purpose of managing fishing or fisheries resources controlled under the Fisheries Act.[8] Council management of the marine environment under the RMA is overseen by the Minister of Conservation.

Regional councils prepare regional policy statements and plans under the RMA, which can have a major impact on the way the marine environment is managed. These include regional policy statements, which provide an overview of regionally significant

issues, regional coastal plans, which apply to the coastal marine area and sometimes set out objectives and policies relating to coastal land, and regional plans which can address catchment issues such as runoff into the marine area.

Regional councils are consent authorities for coastal permits, which apply to activities within the coastal marine area. They also determine in the first instance water and discharge permits within catchments, and these can address runoff from land into the marine area amongst other things.

Regional councils play a role in biosecurity management under the Biosecurity Act 1993. Historically this role has been primarily on land with less involvement in the marine area. More recently, however, councils have taken on a stronger marine biosecurity role.

Some regional councils manage regional parks which border the sea under the Reserves Act 1977 and other legislation. Regional council activities and expenditure are guided by long-term council community plans prepared under the Local Government Act 2002.

Territorial authorities

Territorial authorities, which include both city and district councils, are also democratically elected bodies constituted under the Local Government Act. There are 61 territorial authorities operating throughout the country in addition to the six unitary authorities.[9]

These bodies have a more limited role in marine management under the RMA, being primarily focused on land subdivision, use and development. This role is significant, however, as land development can have major impacts on the marine environment, particularly through generating sediment and contaminated runoff. Territorial authorities prepare district plans under the RMA and make first-instance decisions on subdivision and land use consents.

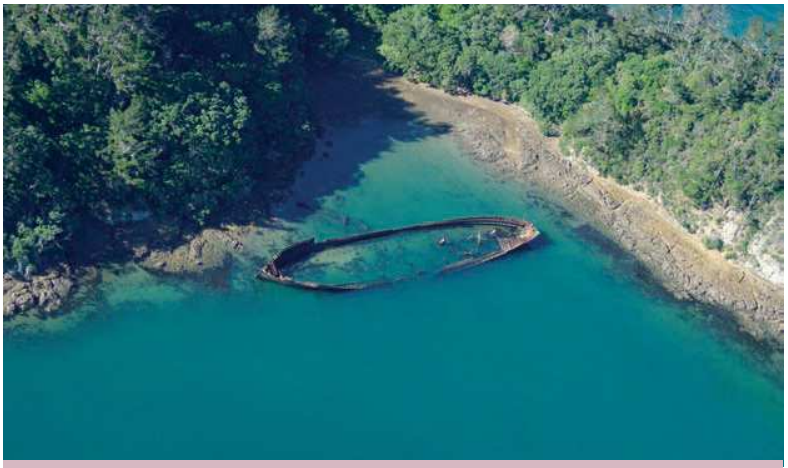
Many territorial authorities manage coastal reserve land and esplanade reserves under the Reserves Act. Similar to regional councils, the activities and expenditure of territorial authorities is guided by long-term council community plans prepared under the Local Government Act. These plans can have a significant impact on the marine environment as they determine the levels of expenditure on infrastructure such as stormwater and wastewater treatment facilities. The Local Government Act also empowers territorial authorities to implement bylaws to regulate the management of stormwater and wastewater systems.

Heritage New Zealand Pouhere Taonga

Heritage New Zealand Pouhere Taonga (Heritage NZ), previously named the Historic Places Trust, is an independent body established under the Heritage New Zealand Pouhere Taonga Act 2014.

Heritage NZ is charged with identifying, recording and protecting historic heritage areas throughout New Zealand including sites within the marine area. It maintains a register of historic and wāhi tapu places and has a direct consenting role in relation to archaeological sites. Heritage NZ also directly manages some historic places and buildings.

The Act also continues the Māori Heritage Council, which advises Heritage NZ, and advocates for Māori heritage issues.



Heritage NZ is responsible for identifying, recording and protecting marine historic heritage such as the hulk of the *Rewa* at Moturekareka Island, Hauraki Gulf *(Kevin L Jones)*

Iwi and hapū

Iwi and hapū are increasingly applying contemporary forms of kaitiakitanga in the coastal environment through greater involvement in management decision-making. The meaning and implementation of kaitiakitanga is described more fully in Chapter 4: Kaitiakitanga. As well as engaging in kaitiakitanga through statutory processes and co-governance agreements, iwi and hapū are becoming major marine resource managers in their own right through fisheries, aquaculture and individual iwi settlements.

Marine management legislation

The key pieces of legislation relating to the marine environment are shown in Figure 2.4 and described in the following sections.

Management area	Legislation	Spatial area	Managing authorities
Resource management	Resource Management Act 1991 (including New Zealand Coastal Policy Statement 2010)	Catchments, islands and territorial sea	Minister of Conservation Regional councils Territorial authorities
	Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012	Exclusive economic zone and extended continental shelf	Minister for the Environment Environmental Protection Authority
	Hauraki Gulf Marine Park Act 2000	Hauraki Gulf territorial sea, islands and catchments	Hauraki Gulf Forum members
Fisheries	Fisheries Act 1996 Treaty of Waitangi (Fisheries Claims) Settlement Act 1992 Fisheries (Quota Operations Validation) Act 1997 Māori Fisheries Act 2004 Māori Commercial Aquaculture Claims Settlement Act 2004	Freshwater, territorial sea and exclusive economic zone	Minister for Primary Industries Supported by Ministry for Primary Industries
Mining	Crown Minerals Act 1991 Continental Shelf Act 1964	Land, territorial sea, exclusive economic zone and extended continental shelf	Minister of Energy and Resources Supported by Ministry of Business, Innovation and Employment through New Zealand Petroleum and Minerals
Marine pollution, except that managed by the EPA	Maritime Transport Act 1994	Territorial sea and exclusive economic zone	Maritime New Zealand
Biosecurity	Biosecurity Act 1993	Land and territorial sea	Minister for Primary Industries Supported by Ministry for Primary Industries
Marine protection	Marine Reserves Act 1971 Marine Mammals Protection Act 1978 Wildlife Act 1952 Fiordland (Te Moana o Atawhenua) Marine Management Act 2005	Territorial sea Territorial sea and exclusive economic zone Land, territorial sea and exclusive economic zone Fiordland (Te Moana o Atawhenua) Marine Area	Minister of Conservation Supported by Department of Conservation Fiordland Marine Guardians (advisory)
Historic heritage	Heritage New Zealand Pouhere Taonga Act 2014	Land and territorial sea	Heritage New Zealand Pouhere Taonga

Management area	Legislation	Spatial area	Managing authorities
Coastal reserves	Reserves Act 1977	Land	Department of Conservation Regional councils Territorial authorities
Marine and coastal area	Marine and Coastal Area (Takutai Moana) Act 2011	Marine and coastal area	Ministry of Justice responsible for administering protected customary right and customary marine title applications Minister of Conservation has various administrative functions not conferred on a local authority or other person

Figure 2.4 Summary of marine management legislation

Resource Management Act

Most activities that have an environmental impact on the territorial sea, with the major exception of fishing, are managed under the RMA. These include land-based activities which impact on the marine area such as farming, forestry and urban development; activities within the marine area such as boating and aquaculture; and major marine works such as reclamation, dredging and the construction of wharves, jetties, sea walls and outfalls.

Part 2 of the RMA provides a purpose and set of principles to govern all management under the Act. The purpose of the RMA is to promote 'sustainable management' of natural and physical resources. This is defined in the legislation to mean (section 5(2)):

> *… managing the use, development and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety while –*
>
> *(a) Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonable foreseeable needs of future generations;*
>
> *(b) Safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and*
>
> *(c) Avoiding, remedying or mitigating any adverse effects of activities on the environment.*

The exclusion of minerals in subsection (a) means that finite mineral resources can be exploited without concern about retaining them for future use. However, the consent authority is still required to assess if the mining activity would promote the sustainable management of natural and physical resources in other respects.

Matters of national importance identified in section 6 of the RMA, which decision-makers are required to recognise and provide for, and which are relevant to marine management include:

a) the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use and development;

b) the protection of outstanding natural features and landscapes from inappropriate subdivision, use and development;

c) the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna;

d) the maintenance and enhancement of public access to and along the coastal marine area, lakes, and rivers;

e) the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, wāhi tapu, and other taonga;

f) the protection of historic heritage from inappropriate subdivision, use, and development;

g) the protection of protected customary rights.

The Māori-related provisions in Part 2 of the RMA, which have been utilised extensively, are section 6(e) which relates to the relationship of Māori with the marine area; section 7(a) which requires decision-makers to have particular regard to kaitiakitanga; and section 8 which requires decision-makers to take into account the principles of the Treaty of Waitangi.

Management of the coastal environment at a regional and local level is carried out within the framework established by the NZCPS and other policy and planning documents within a planning hierarchy established under the RMA. The NZCPS is discussed further below. The National Policy Statement for Freshwater Management 2014 (Freshwater NPS) is discussed in Chapter 17: Catchment-based activities.

Regional policy statements, regional plans and district plans must give effect to the policies contained within the NZCPS. The phrase 'give effect to' means 'implement'. It is a strong directive that creates a firm obligation to take action. The NZCPS is more than a '[list] of potentially relevant considerations, which will have varying weight in different fact situations' and its specific and unqualified policies (such as Policies 11, 13, and 15) 'provide environmental bottom lines'.[10]

Regional policy statements provide an overview of resource management issues throughout the region and identify policies and methods to achieve the integrated management of natural and physical resources. They cover all the catchments and the territorial sea within a council's jurisdiction, so can embrace a mountains-to-the-sea management approach.

Regional coastal plans apply to activities in the marine area below mean high water springs. These usually include the identification and 'zoning' of some marine areas for protection as well as for specific activities such as ports, wharves, marinas, moorings and marine farms. Other activities not specifically provided for are usually assessed against a set of criteria that are laid out in the plan.

Several regional councils have prepared regional coastal environment plans that extend over the land and water portions of the coast. They typically contain objectives and policies which apply to the whole area, but the rules apply only to the coastal marine area, leaving district councils to develop rules to control land-based development within the guidance provided by the regional plan.

Regional councils may prepare other regional plans to assist them to carry out their functions under the RMA. These functions include the management of soil conservation, air quality, water quality and quantity, and biodiversity. The management of soil and freshwater, in particular, can have significant effects on the marine environment which is the ultimate receiving environment for most discharges from land.

Territorial authorities are charged with controlling the 'effects of the use, development or protection of land', including effects within the land portion of the coastal environment but not in the marine area. Provisions in the plans control activities such as subdivision and the building of houses and structures. Rules may determine the location, density and design of development that is likely to be permitted within the catchment and on the coast. They may also control activities such as vegetation clearance and earthworks which can generate sediment which ends up in the marine area.

The objectives, policies and rules in regional and district plans determine whether or not a consent is required before an activity can commence and the criteria that will apply when considering resource consent applications. Unlike the case with the use of land, most activities within the coastal marine area cannot be undertaken unless expressly authorised by a provision of a regional coastal plan or a resource consent.

The Resource Management Act controls most activities within catchments and the territorial sea including those shown in this image of Ngunguru in Whangarei District *(Raewyn Peart)*

New Zealand Coastal Policy Statement

The NZCPS sets out a number of objectives and policies to be applied to the coastal environment. These relate to a wide range of matters including the precautionary approach, integrated management, aquaculture, ports, reclamation, biodiversity, natural character, landscapes, surf breaks, heritage, public access, water quality and coastal hazards. These policies are discussed in detail in Section Two of this Guide where they relate to specific activities.

The following objectives and policies have particular importance for managing the marine environment.

Biodiversity

Objective 1 of the NZCPS seeks to protect representative or significant natural ecosystems and sites of biological diversity in the coastal environment. This objective also seeks to maintain the diversity of indigenous coastal flora and fauna. Other elements of Objective 1 are important for coastal biodiversity including 'maintaining or enhancing natural biological and physical processes', and 'maintaining coastal water quality'.

NZCPS, Objective 1

To safeguard the integrity, form, functioning and resilience of the coastal environment and sustain its ecosystems, including marine and intertidal areas, estuaries, dunes and land, by:

- maintaining or enhancing natural biological and physical processes in the coastal environment and recognising their dynamic, complex and interdependent nature;
- protecting representative or significant natural ecosystems and sites of biological importance and maintaining the diversity of New Zealand's indigenous coastal flora and fauna; and
- maintaining coastal water quality, and enhancing it where it has deteriorated from what would otherwise be its natural condition, with significant adverse effects on ecology and habitat, because of discharges associated with human activity.

Policy 11 requires district and regional plans to protect indigenous biological diversity in the coastal environment. There is an internal hierarchy built into the Policy. It requires the avoidance of all adverse effects of activities on the matters referred to in part (a) which includes species that are listed in New Zealand and internationally as threatened or at risk. Significant adverse effects are to be avoided and other adverse effects are to be avoided, remedied or mitigated on the matters listed in part (b). The focus of these matters is on the protection of important habitats. Policy 11 protects threatened species as well as ecosystems. Marine managers now need to familiarise themselves with the New Zealand Threat Classification System lists and the International Union for Conservation of Nature and Natural Resources lists.[11]

Under the NZCPS, councils are required to avoid adverse effects of activities on marine reserves, including through the generation of sediment. Fine sediment from rivers flowing into Mercury Bay has been identified as a potential threat to the Te Whanganui-A-Hei (Cathedral Cove) Marine Reserve on the Coromandel Peninsula *(Raewyn Peart)*

NZCPS, Policy 11: Indigenous biological diversity (biodiversity)

To protect indigenous biological diversity in the coastal environment:

a. avoid adverse effects of activities on:
   i. indigenous taxa[4] that are listed as threatened[5] or at risk in the New Zealand Threat Classification System lists;
   ii. taxa that are listed by the International Union for Conservation of Nature and Natural Resources as threatened;
   iii. indigenous ecosystems and vegetation types that are threatened in the coastal environment, or are naturally rare[6];
   iv. habitats of indigenous species where the species are at the limit of their natural range, or are naturally rare;
   v. areas containing nationally significant examples of indigenous community types; and
   vi. areas set aside for full or partial protection of indigenous biological diversity under other legislation; and

b. avoid significant adverse effects and avoid, remedy or mitigate other adverse effects of activities on:
   i. areas of predominantly indigenous vegetation in the coastal environment;
   ii. habitats in the coastal environment that are important during the vulnerable life stages of indigenous species;
   iii. indigenous ecosystems and habitats that are only found in the coastal environment and are particularly vulnerable to modification, including estuaries, lagoons, coastal wetlands, dunelands, intertidal zones, rocky reef systems, eelgrass and saltmarsh;
   iv. habitats of indigenous species in the coastal environment that are important for recreational, commercial, traditional or cultural purposes;
   v. habitats, including areas and routes, important to migratory species; and
   vi. ecological corridors, and areas important for linking or maintaining biological values identified under this policy.

4 Taxa – as defined in the Glossary.
5 Examples of taxa listed as threatened are – Māui dolphin, Hector's dolphin, New Zealand fairy tern, Southern New Zealand dotterel.
6 Naturally rare – as defined in the Glossary.

Hector's dolphins, such as the one shown here in Akaroa Harbour, Banks Peninsula, are specifically protected under the NZCPS and councils are required to avoid the adverse effects of activities on them *(Raewyn Peart)*

Biosecurity

In terms of protecting marine biodiversity, Policy 12 recognises the importance of marine biosecurity. It requires regional councils to control, as far as practicable, activities which could cause harmful aquatic organisms to be released or spread. It identifies a number of activities which might cause this including the introduction of marine structures, vessels, dredging and aquaculture.

NZCSP, Policy 12: Harmful aquatic organisms

1. Provide in regional policy statements and in plans, as far as practicable, for the control of activities in or near the coastal marine area that could have adverse effects on the coastal environment by causing harmful aquatic organisms[7] to be released or otherwise spread, and include conditions in resource consents, where relevant, to assist with managing the risk of such effects occurring.
2. Recognise that activities relevant to (1) include:
   a. the introduction of structures likely to be contaminated with harmful aquatic organisms;
   b. the discharge or disposal of organic material from dredging, or from vessels and structures, whether during maintenance, cleaning or otherwise; and whether in the coastal marine area or on land;
   c. the provision and ongoing maintenance of moorings, marina berths, jetties and wharves; and
   d. the establishment and relocation of equipment and stock required for or associated with aquaculture.

7 Harmful aquatic organisms – as defined in the Glossary.

Water quality

Many of the issues associated with degradation of marine water quality are the result of land use and discharges within catchments. This means that coastal water quality is primarily managed through provisions in regional plans applied above mean high water springs and through the resource consent process. Policies 21, 22 and 23 are discussed further in Chapter 17: Catchment-based activities.

The Freshwater NPS also guides the management of freshwater prior to it entering the marine environment. This is also discussed in more detail in Chapter 17.

The biosecurity risk created by marinas, such as the one shown here at Gulf Harbour, Auckland, is specifically addressed by the NZCPS *(Raewyn Peart)*

Poorly performing septic tanks can pollute the marine environment, and did so at Kawakawa Bay, Auckland *(Raewyn Peart)*

Natural character

Objective 2 of the NZCPS sets out a vision for the preservation of the natural character of New Zealand's coast. It recognises the 'characteristics and qualities' that contribute to natural character and the importance of identifying areas where development is inappropriate and where these characteristics and qualities should be protected. It also encourages restoration of the coastal environment. Preserving natural character requires maintaining natural processes, elements and patterns. In addition, it requires the integrity, functioning and resilience of the coastal environment to be preserved.

NZCPS, Objective 2

To preserve the natural character of the coastal environment and protect natural features and landscape values through:

- recognising the characteristics and qualities that contribute to natural character, natural features and landscape values and their location and distribution;
- identifying those areas where various forms of subdivision, use, and development would be inappropriate and protecting them from such activities; and
- encouraging restoration of the coastal environment.

There are a number of policies which set out how natural character should be preserved, for example effective catchment management will be required to effectively address the discharge of nutrients and sediment from land which can significantly reduce the natural character of the coastal marine environment. Policy 13(1)(a) includes the need to 'avoid adverse effects of activities on natural character in areas of the coastal environment with outstanding natural character' and Policy 13(1)(b) includes the need to 'avoid significant adverse effects and avoid, remedy or mitigate other adverse effects of activities on natural character in all other areas of the coastal environment'. This recognises that many activities in the marine environment can have an impact on natural character, including aquaculture, structures and mining. Policy 14 sets out the ways that restoration or rehabilitation of the natural character of the coastal environment should be achieved.

NZCPS, Policy 13: Preservation of natural character

1. To preserve the natural character of the coastal environment and to protect it from inappropriate subdivision, use, and development:
   a. avoid adverse effects of activities on natural character in areas of the coastal environment with outstanding natural character; and
   b. avoid significant adverse effects and avoid, remedy or mitigate other adverse effects of activities on natural character in all other areas of the coastal environment; including by:
   c. assessing the natural character of the coastal environment of the region or district, by mapping or otherwise identifying at least areas of high natural character; and
   d. ensuring that regional policy statements, and plans, identify areas where preserving natural character requires objectives, policies and rules, and include those provisions.
2. Recognise that natural character is not the same as natural features and landscapes or amenity values and may include matters such as:
   a. natural elements, processes and patterns;
   b. biophysical, ecological, geological and geomorphological aspects;
   c. natural landforms such as headlands, peninsulas, cliffs, dunes, wetlands, reefs, freshwater springs and surf breaks;
   d. the natural movement of water and sediment;
   e. the natural darkness of the night sky;
   f. places or areas that are wild or scenic;
   g. a range of natural character from pristine to modified; and
   h. experiential attributes, including the sounds and smell of the sea; and their context or setting.

The natural character of the coastal environment is protected under the NZCPS. This includes the natural movement of water and sediment and absence of artificial structures, as shown here at Mitimiti, Northland *(Raewyn Peart)*

NZCPS, Policy 14: Restoration of natural character

Promote restoration or rehabilitation of the natural character of the coastal environment, including by:

a. identifying areas and opportunities for restoration or rehabilitation;

b. providing policies, rules and other methods directed at restoration or rehabilitation in regional policy statements, and plans;

c. where practicable, imposing or reviewing restoration or rehabilitation conditions on resource consents and designations, including for the continuation of activities; and recognising that where degraded areas of the coastal environment require restoration or rehabilitation, possible approaches include:

   i. restoring indigenous habitats and ecosystems, using local genetic stock where practicable; or

   ii. encouraging natural regeneration of indigenous species, recognising the need for effective weed and animal pest management; or

   iii. creating or enhancing habitat for indigenous species; or

   iv. rehabilitating dunes and other natural coastal features or processes, including saline wetlands and intertidal saltmarsh; or

   v. restoring and protecting riparian and intertidal margins; or

   vi. reducing or eliminating discharges of contaminants; or

   vii. removing redundant structures and materials that have been assessed to have minimal heritage or amenity values and when the removal is authorised by required permits, including an archaeological authority under the Historic Places Act 1993; or

   viii. restoring cultural landscape features; or

   ix. redesign of structures that interfere with ecosystem processes; or

   x. decommissioning or restoring historic landfill and other contaminated sites which are, or have the potential to, leach material into the coastal marine area.

The NZCPS addresses the restoration of natural character including the decommissioning or restoring of historic landfills such as this one on the Kaiaua coast, Firth of Thames *(Raewyn Peart)*

Coastal landscapes

Policy 15 provides guidance on how landscapes in the coastal environment are to be managed:

- It directs councils to 'avoid adverse effects' of activities on outstanding natural features and outstanding natural landscapes
- Councils are to avoid 'significant' adverse effects on all other natural features and natural landscapes
- Outside of outstanding natural features and landscapes, and where adverse effects are not significant, councils must 'avoid, remedy or mitigate' adverse effects

This means that landscapes in the coastal environment have higher protection under the law than those found elsewhere. It also means that the case law applying to coastal landscapes prior to the NZCPS coming into effect in 2010 may not be fully applicable with a higher standard of protection now required.

NZCPS, Policy 15: Natural features and natural landscapes

To protect the natural features and natural landscapes (including seascapes) of the coastal environment from inappropriate subdivision, use, and development:

a. avoid adverse effects of activities on outstanding natural features and outstanding natural landscapes in the coastal environment; and

b. avoid significant adverse effects and avoid, remedy, or mitigate other adverse effects of activities on other natural features and natural landscapes in the coastal environment; including by:

c. identifying and assessing the natural features and natural landscapes of the coastal environment of the region or district, at minimum by land typing, soil characterisation and landscape characterisation and having regard to:

   i. natural science factors, including geological, topographical, ecological and dynamic components;

   ii. the presence of water including in seas, lakes, rivers and streams;

   ii. legibility or expressiveness – how obviously the feature or landscape demonstrates its formative processes;

   iv. aesthetic values including memorability and naturalness;

   v. vegetation (native and exotic);

   vi. transient values, including presence of wildlife or other values at certain times of the day or year;

   vii. whether the values are shared and recognised;

   viii. cultural and spiritual values for tangata whenua, identified by working, as far as practicable, in accordance with tikanga M ori; including their expression as cultural landscapes and features;

   ix. historical and heritage associations; and

   x. wild or scenic values;

d. ensuring that regional policy statements, and plans, map or otherwise identify areas where the protection of natural features and natural landscapes requires objectives, policies and rules; and

e. including the objectives, policies and rules required by (d) in plans.

Outstanding natural landscapes, such as on the Purerua Peninsula in the Bay of Islands, have few structures and are highly protected under the NZCPS *(Raewyn Peart)*

Precautionary approach

Policy 3 of the NZCPS requires that a precautionary approach be taken when effects from proposed activities are uncertain, but could be significantly adverse. There is a particular focus on taking such an approach when dealing with resources that are vulnerable to climate change. This is a key approach that is recognised as part of the Rio Declaration on Environment and Development 1992. The Department of Conservation, through its document 'NZCPS 2010 Guidance Note Policy 3: Precautionary approach', has suggested that the application of the precautionary approach requires a risk management rather than risk assessment approach. It is when the risk of potential significant adverse or irreversible environmental effects cannot be adequately assessed (because of uncertainty about the nature and consequences of human activities or other processes) that a precautionary approach becomes appropriate.[12]

A precautionary approach is required to be taken under the NZCPS to the use and management of coastal resources potentially vulnerable to the effects of climate change, such as the dune systems shown here at Ocean Beach, Hastings *(Raewyn Peart)*

The implementation of Policy 3 requires a prudent avoidance approach to be taken where the individual or cumulative effects of an activity are uncertain. Adaptive management is one approach which can be applied in some cases of uncertainty but not all. It will not be appropriate, for example, where there is risk of irreversible change, or resources of very high value might be threatened. The New Zealand Biodiversity Strategy 2000 defines adaptive management to include 'structured learning by doing'.[13] The Strategy notes that adaptive management is most useful when large complex ecological systems are being managed and management decisions cannot wait for final research results.

NZCPS, Policy 3: Precautionary approach

1. Adopt a precautionary approach towards proposed activities whose effects on the coastal environment are uncertain, unknown, or little understood, but potentially significantly adverse.
2. In particular, adopt a precautionary approach to use and management of coastal resources potentially vulnerable to effects from climate change, so that:
   a. avoidable social and economic loss and harm to communities does not occur;
   b. natural adjustments for coastal processes, natural defences, ecosystems, habitat and species are allowed to occur; and
   c. the natural character, public access, amenity and other values of the coastal environment meet the needs of future generations.

Requirement to 'avoid' adverse effects

Where an area has outstanding natural character or is an outstanding natural landscape, Policies 13 and 15 require any adverse effects to be avoided. In addition Policy 11 requires adverse effects to be avoided on a range of species and habitats. In practice, this means that consent should not be granted for activities which impact on these species or values of these areas.[14] This is supported by a recent Supreme Court decision on a salmon farming proposal, which determined that plan changes must give effect to Policies 13(1)(a) and 15(a) of the NZCPS and avoid adverse effects on outstanding natural landscapes.[15] This case is discussed further in Chapter 10: Aquaculture.

Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act

The regulatory regime provided by the EEZ Act is designed to cover previously unregulated activities beyond the 12 nautical mile jurisdiction of the RMA. The EEZ Act was not intended to duplicate controls that regulate the fishing industry, maritime transport, the allocation of petroleum resources, and the response to oil spills.[16] Most other activities that have an environmental impact on the EEZ or continental shelf are managed under the Act, including petroleum and minerals activities. The legislation is very new and at the time of writing there had been no appeal to a higher court to help interpret how the provisions should be applied.

The EEZ legislation, including examples, is discussed in detail in Chapter 3: Exclusive Economic Zone legislation.

Hauraki Gulf Marine Park Act

As well as being managed under the RMA and other legislation, the Hauraki Gulf has its own dedicated piece of legislation – the Hauraki Gulf Marine Park Act 2000. This legislation seeks to improve the environmental management of the Gulf through achieving better integration of the numerous statutory authorities which impact on the area and providing better recognition of the relationships of tangata whenua with the Gulf. Boundaries of the Hauraki Gulf Marine Park are shown in Figure 2.5.

The Act establishes a Hauraki Gulf Marine Park and a Hauraki Gulf Forum. Members of the Forum include representatives of the Ministers of Conservation, Primary Industries and Māori Affairs, seven representatives of Auckland Council, five representatives of other local authorities, and six representatives from the tangata whenua of the Hauraki Gulf and its islands appointed by the Minister of Conservation.

Functions of the Forum include integrating the management of the Gulf, facilitating communication, co-operation and co-ordination of members' statutory functions exercised within the Gulf, preparing a list of strategic issues, determining priorities for action on each issue and publishing a report on the state of the environment every three years.

When undertaking its functions, the Forum must have particular regard to the historic, traditional, cultural and spiritual relationship of tangata whenua with the Gulf. Day-to-day management of the Gulf continues to be carried out by individual statutory agencies.

The Act sets out matters of national significance and management objectives in sections 7 and 8 which are to be incorporated into decision-making affecting the Gulf under other legislation. Under the RMA, these must be treated as though they were a national policy statement and given 'effect to' by all regional policy statements, regional plans and district plans which apply within the Gulf area. In addition, consent authorities must have regard to the objectives when considering an application for a resource consent within that area.

Sections 7 and 8 seek to promote the protection and enhancement of:

- The life-supporting capacity of the Gulf's environment
- The historic, traditional, cultural and spiritual relationship of tangata whenua with the Gulf
- The Gulf's natural, historic and physical resources
- People's relationship to, use and enjoyment of, these resources

Figure 2.5 Hauraki Gulf Marine Park *(Auckland Council)*

When setting or varying any 'sustainability measure' within the Gulf under the Fisheries Act, the Minister for Primary Industries must 'have regard to' sections 7 and 8.[17] Statutory bodies undertaking powers and functions affecting the Gulf under a range of other legislation must also 'have particular regard to' these provisions.[18] This includes the Fisheries Act, the Conservation Act, the Biosecurity Act, the Heritage New Zealand Pouhere Taonga Act, the Local Government Act, the Marine Mammals Protection Act, the Marine Reserves Act, the Wildlife Act and the Reserves Act.

A marine spatial planning process, called SeaChange, is currently underway for the Hauraki Gulf. A Stakeholder Working Group is working collaboratively to deliver a marine spatial plan for the Hauraki Gulf by June 2015. This is discussed further in Chapter 7: Marine spatial planning.

Hauraki Gulf Marine Park Act, sections 7 and 8

7 Recognition of national significance of Hauraki Gulf

(1) The interrelationship between the Hauraki Gulf, its islands, and catchments and the ability of that interrelationship to sustain the life-supporting capacity of the environment of the Hauraki Gulf and its islands are matters of national significance.

(2) The life-supporting capacity of the environment of the Gulf and its islands includes the capacity—

(a) to provide for—

(i) the historic, traditional, cultural, and spiritual relationship of the tangata whenua of the Gulf with the Gulf and its islands; and

(ii) the social, economic, recreational, and cultural well-being of people and communities:

(b) to use the resources of the Gulf by the people and communities of the Gulf and New Zealand for economic activities and recreation:

(c) to maintain the soil, air, water, and ecosystems of the Gulf.

8 Management of Hauraki Gulf

To recognise the national significance of the Hauraki Gulf, its islands, and catchments, the objectives of the management of the Hauraki Gulf, its islands, and catchments are—

(a) the protection and, where appropriate, the enhancement of the life-supporting capacity of the environment of the Hauraki Gulf, its islands, and catchments:

(b) the protection and, where appropriate, the enhancement of the natural, historic, and physical resources of the Hauraki Gulf, its islands, and catchments:

(c) the protection and, where appropriate, the enhancement of those natural, historic, and physical resources (including kaimoana) of the Hauraki Gulf, its islands, and catchments with which tangata whenua have an historic, traditional, cultural, and spiritual relationship:

(d) the protection of the cultural and historic associations of people and communities in and around the Hauraki Gulf with its natural, historic, and physical resources:

(e) the maintenance and, where appropriate, the enhancement of the contribution of the natural, historic, and physical resources of the Hauraki Gulf, its islands, and catchments to the social and economic well-being of the people and communities of the Hauraki Gulf and New Zealand:

(f) the maintenance and, where appropriate, the enhancement of the natural, historic, and physical resources of the Hauraki Gulf, its islands, and catchments, which contribute to the recreation and enjoyment of the Hauraki Gulf for the people and communities of the Hauraki Gulf and New Zealand.

Fisheries Act

The Fisheries Act governs fisheries management throughout New Zealand's territorial sea and EEZ. The purpose of the Act is 'to provide for the utilisation of fisheries resources while ensuring sustainability'.[19]

'Ensuring sustainability' is defined in the Act as meaning:

- Maintaining the potential of the fisheries resources to meet the reasonably foreseeable needs of future generations; and

- Avoiding, remedying, or mitigating any adverse effects of fishing on the aquatic environment

'Utilisation' is defined as meaning 'conserving, using, enhancing, and developing fisheries resources to enable people to provide for their social, economic and cultural wellbeing'. This means that the purpose of the Act includes both utilisation and conservation of fisheries resources.

Three environmental principles are to be taken into account when decisions are made under the legislation:[20]

- Associated or dependent species should be maintained above a level that ensures their long-term viability
- Biological diversity of the aquatic environment should be maintained
- Habitat of particular significance for fisheries management should be protected

In addition, four principles are to be taken into account when making decisions under the Act:[21]

- Decisions should be based on the best available information
- Decision-makers should consider any uncertainty in the information available in any case
- Decision-makers should be cautious when information is uncertain, unreliable, or inadequate
- The absence of, or any uncertainty in, any information should not be used as a reason for postponing or failing to take any measure to achieve the purpose of the Fisheries Act

The harvest of fisheries resources in New Zealand is managed under the Fisheries Act. Recreational fishing is often managed through restrictions on the size and number of fish taken, as shown here *(Daniel Sharp)*

The High Court has held that it is sufficient for the Minister to be accurately informed as to what information is available, and at what cost and in what timeframe. The Minister need not actually obtain that information. However, if the Minister decides not to base his or her decision on the best available information there would have to be a reasonable basis for not doing so.[22]

There are three main categories of fishing activity which are managed under the legislation: commercial (discussed in Chapter 9: Management of fisheries), customary non-commercial (discussed in Chapter 4: Kaitiakitanga) and recreational (discussed in Chapter 16: Marine recreation and tourism).

Crown Minerals Act

The Continental Shelf Act 1964 previously governed the allocation of rights to prospect and mine for minerals in the seabed and subsoil of the continental shelf. However, from 24 May 2013 no further licences were granted under that Act[23] and the Crown Minerals Act 1991 now applies to all new applications.[24] The purpose of this legislation is to 'promote prospecting for, exploration for, and mining of Crown owned minerals for the benefit of New Zealand.'

This Act is discussed further in Chapter 11: Sand mining, Chapter 12: Deep sea minerals exploration and mining, and Chapter 13: Oil and gas exploration and mining.

Maritime Transport Act

The Maritime Transport Act 1994 is primarily focused on the safety of shipping. The Act does not have an explicit purpose, but it does state that the objectives for the Minister of Transport under the Act are to contribute to an 'integrated, safe, responsive, and sustainable transport system' and to 'ensure New Zealand's obligations under conventions are implemented.'

The Act provides that 'harmful substances shall not be discharged or escape' into the sea or seabed within the EEZ or continental shelf except in accordance with marine protection rules. Marine protection rules made under this Act provide for both marine safety and pollution prevention within the coastal marine area and EEZ. Oil spill preparedness is funded by an industry levy, the Oil Pollution Levy, which is required under the Act. The Levy is collected to run New Zealand's maritime oil pollution preparedness and response system.

This Act is discussed further in a number of chapters in Section Two of this Guide where relevant to particular activities in the marine environment.

Biosecurity Act

The transport of invasive species into New Zealand waters by shipping, and their eradication or management after arrival, is primarily controlled under the Biosecurity Act. The jurisdiction of the Act was extended to apply to the EEZ in 2012. The Act is discussed further in Chapter 5: Marine biosecurity.

Marine Reserves Act

The Marine Reserves Act, administered by the Department of Conservation, provides for the establishment of marine reserves. These are spatially defined marine areas where fishing and other activities are excluded to maintain the areas in their natural state. There are currently over 30 marine reserves in New Zealand. The legislation is discussed further in Chapter 6: Marine protected areas.

The Marine Reserves Act enables the creation of no-take marine reserves where marine life is maintained in its natural state, such as in the Cape Rodney-Okakari Point marine reserve shown here *(Raewyn Peart)*

Marine Mammals Protection Act

Marine mammals are managed by the Department of Conservation under the Marine Mammals Protection Act. A permit is required to 'take' (the definition includes to harm, harass, injure and attract) a marine mammal in captivity or to remove one from its natural habitat. Any fishing operation using a purse seine net is required to incorporate an escape panel or aperture in the net which allows any dolphin or porpoise to readily escape.[25] When a marine mammal is accidentally injured or killed, the legislation provides a defence against prosecution, so long as the incident is reported to the relevant authority.

The legislation makes provision for the preparation of population management plans for marine mammal species. Where a species is threatened, such plans can determine the maximum allowable level of fishing-related mortality for the species that would 'allow the species to achieve non-threatened status as soon as reasonably practicable, and in any event within a period not exceeding 20 years'. Such plans require the approval of the Minister of Conservation and the concurrence of the Minister for Primary Industries before they take effect. The Minister for Primary Industries considers the impact of the plan on commercial fishing. No population management plans have been approved since these provisions were inserted into the legislation in 1996. In their absence, provisions in the Fisheries Act have been used to manage the effect of fishing on protected species (discussed in Chapter 9: Management of fisheries).

Marine mammal sanctuaries can be established by the Minister of Conservation under the Act for the purpose of protecting, conserving and managing marine mammals and these are managed by the Department of Conservation. There are currently six marine mammal sanctuaries: Auckland Islands, Banks Peninsula, Catlins Coast, Clifford and Cloudy Bay, Te Waewae Bay and West Coast North Island.[26] The *New Zealand Gazette* notice for a marine mammal sanctuary specifies the restrictions that apply to activities within the sanctuary. For example, the West Coast North Island marine mammal sanctuary puts in place restrictions on seabed mining activities and acoustic seismic surveying.

Wildlife Act

The Wildlife Act identifies protected species and it is an offence to hunt or kill such species within the territorial sea or EEZ.[27] However, protected species may be captured, injured or killed inadvertently or as part of any fishing operation and the legislation provides a defence against prosecution when this happens, so long as the incident is reported to the relevant authority.

Wildlife Act protected species

Species protected under the Wildlife Act include:[28]

- black coral (all species in the order of Antipatharia)
- gorgonian coral
- stony coral
- hydrocorals
- oceanic whitetip shark
- basking shark
- deepwater nurse shark
- white pointer shark
- whale shark
- manta ray
- spinetail devil ray
- giant grouper
- spotted black grouper
- marine reptiles such as turtles and sea snakes and marine birds

The Wildlife Act protects most seabirds, including this pied shag drying its wings at Coppermine Bay, Kawau Island, Hauraki Gulf *(Raewyn Peart)*

All seabirds are protected under the Act except for the black-backed gull. Sooty shearwaters (mutton bird), grey-faced petrels (northern mutton bird) and the black, little and pied shag may be killed subject to conditions set by the Minister of Conservation and their chicks can be legally harvested by iwi and mana whenua at identified sites.

Fiordland (Te Moana o Atawhenua) Marine Management Act

The Fiordland (Te Moana o Atawhenua) Marine Management Act 2005 implements the Fiordland Marine Conservation Strategy completed in 2003 by the Guardians of Fiordland's Fisheries and Marine Environment. This group consisted of commercial fishers, recreational fishers, charter boat operators, iwi, environmentalists and scientists. The legislation created eight new marine reserves

within the fiords covering an area of 103 square kilometres, or one per cent of the Fiordland marine biogeographic region. The Fiordland Marine Guardians have an ongoing role as government-appointed advisors to oversee monitoring and management of the area.

The Fiordland (Te Moana o Atawhenua) Marine Management Act provides a framework for the management of the Fiordland marine area including Doubtful Sound which is shown here *(Raewyn Peart)*

Heritage New Zealand Pouhere Taonga Act

Historic marine sites and places can be protected either under the Heritage New Zealand Pouhere Taonga Act or the RMA. Some sites and places are protected under both pieces of legislation. There are numerous marine heritage sites throughout New Zealand including wāhi tapu, submerged sites and structures, shipwrecks and historic anchorages. Most marine heritage sites have yet to be identified. For example, there are over 2,000 known shipwrecks around the coast of which only 150 have been located.[29]

Archaeological sites are protected under the Heritage New Zealand Pouhere Taonga Act and can only be modified or destroyed if an authority (permit) is first obtained from Heritage NZ. Archaeological sites are defined in the legislation as:

> *… any place in New Zealand, including any building or structure … that*
>
> *(i) was associated with human activity that occurred before 1900 or is the site of the wreck of any vessel where that wreck occurred before 1900; and*
>
> *(ii) provides or may provide, through investigation by archaeological methods, evidence relating to the history of New Zealand.*

Other marine heritage sites can be protected under the RMA, through listing them in the regional coastal plan and including protective rules. Few plans, however, provide protection for marine cultural heritage. District plans can provide protection for land-based marine heritage (such as buildings that had connections to fishing or whaling) through scheduling and relevant protection rules. Heritage orders only take effect through district plans, which apply above mean high water springs, so such orders are not applicable to marine heritage.

Reserves Act

The Reserves Act has a number of purposes, including:[30]

- Providing for the preserving and managing areas of public enjoyment
- Ensuring, as far as possible, the survival of indigenous species
- Preserving representative samples of nautral ecosystems and landscapes
- Promoting the protection of the coast's natural character

Reserves can be established on the coast (and inland) under the Reserves Act and these can help protect catchment areas draining into the sea. Reserve land is categorised on the basis of its primary purpose as either recreation, historic, scenic, nature, scientific, government or local. Each reserve is required to have a reserve management plan and to be managed in accordance with the purpose for which it is classified.

The Reserves Act also provides mechanisms for the protection of privately-owned land including the declaration of protected private land, the establishment of conservation covenants and the establishment of Ngā Whenua Rāhui kawenata on Māori land.

Land-based reserves can assist with marine management, especially where land and marine reserves are contiguous. This is the situation at Tawharanui, Auckland, where a predator-free regional park is contiguous with the Tawharanui marine reserve *(Craig Potton)*

Marine and Coastal Area (Takutai Moana) Act

The Marine and Coastal Area (Takutai Moana) Act 2011 established a new regime for the recognition of customary rights and title over the common marine and coastal area. The legislation defines a 'common marine and coastal area' which includes the marine and coastal area, excluding existing freehold title and areas owned by the Crown as conservation areas, national parks or reserves. It states that the common marine and coastal area has a 'special status' and that neither the Crown nor any other person owns, or is capable of owning it.[31] Every person has the right to enter, pass over, and engage in recreational activities in the common marine and coastal area.[32]

This legislation is discussed in detailed in Chapter 4: Kaitiakitanga.

Marine management and climate change

The potential impacts of climate change are well established. A recent report by the Intergovernmental Panel on Climate Change[33] outlined future risks and opportunities for adaptation to climate change. It identified key risks in relation to the ocean and the coast as including:[34]

- the distributional shift of fish and invertebrate species
- decrease in fisheries abundance and catches at low latitudes and within coastal boundary systems
- reduction in biodiversity through coastal inundation and habitat loss due to sea level rise
- changes in precipitation and the frequency of extreme weather events
- increase in risks to infrastructure through increased frequency and intensity of flooding and coastal erosion due to sea level rise

These risks gave rise to a need to adapt to climate change, as well as to pursue measures to reduce or remove atmospheric greenhouse gas emissions.

The RMA and the EEZ Act allow for the consideration of climate change effects except in relation to the discharge of greenhouse gas emissions. The effect of climate change on marine systems is therefore something that councils and the EPA should consider when exercising their role in marine management.

The NZCPS addresses some aspects of climate change adaption (in Policies 24 to 26), requiring councils to identify coastal hazards, to discourage the use of hard protection structures and to enhance natural defences amongst other things.

Councils are required, under the RMA, to have particular regard to 'the benefits to be derived from the use and development of renewable energy' under section 7(j). This includes marine energy generation, and indicates that such projects should be given favourable consideration (although not necessarily approved if environmental impacts are unacceptable).

In addition, the National Policy Statement on Renewable Electricity Generation 2011 requires councils to provide for the development, operation, maintenance and upgrading of new and existing renewable energy generation activities which utilise tidal, wave and ocean current energy resources to the extent applicable within the region.[35]

No marine energy projects have been built in New Zealand as yet, although consent has been granted to Crest Energy to install 200 underwater tidal turbines within the Kaipara Harbour.

Marine areas can contribute to the mitigation of climate change through capturing and storing carbon (carbon sequestration). Carbon can be stored in marine plants (such as mangroves, seaweeds and seagrass) and in the calcium carbonate shells and structures of invertebrates. In New Zealand the productive shelf waters of the Hauraki Gulf, oceanic frontal regions such as the Chatham Rise, and areas with dense shellfish, mussel and tube-worm beds have been noted as being particularly significant.[36] Impacts of activities on the ability of the marine area to store carbon is also something which decision-makers may consider.

Marine biodiversity offsetting

Marine biodiversity offsetting is a tool to address residual effects of development on marine biodiversity where they cannot be adequately avoided, minimised or remedied. A biodiversity offset aims to create at least equivalent biodiversity benefits on the same site or elsewhere, and to apply to similar types of biodiversity to that which is impacted. The goal is to achieve no net loss and ultimately a net gain of biodiversity in the marine area.[37] Biodiversity offsetting seeks to address the residual impacts of an activity once available avoidance, mitigation and remediation measures are taken.[38] Offsetting is not appropriate where irreplaceable ecological values might be lost at the impact site.

There's no specific requirement for marine biodiversity offsetting in New Zealand at present. However, it can potentially be applied under the RMA and the EEZ Act, as part of the consenting process. The Department of Conservation has recently prepared a non-statutory guidance document on biodiversity offsetting called 'Guidance on Good Practice Biodiversity Offsetting in New Zealand'.[39] The guidance does not consider offsetting in the offshore marine environment. However, lessons can be drawn from the approaches to offsetting in terrestrial ecosystems.

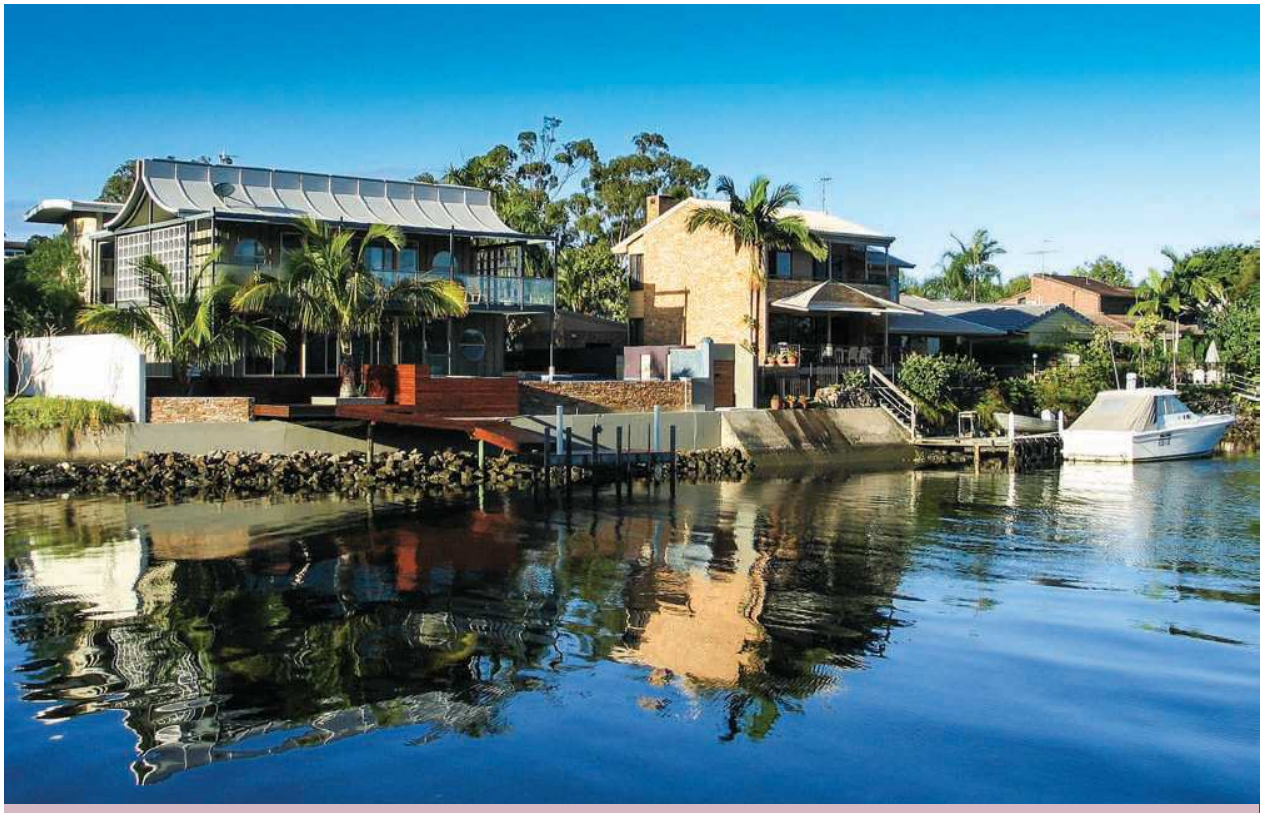
Queensland Marine Fish Habitats Offset Policy

The Queensland Government Environmental Offset Policy provides the principles for biodiversity offsetting in Queensland. This is supported by four specific policies, one of which is the Marine Fish Habitats Offset Policy.[40] This particular policy sets out the requirements of Fisheries Queensland for environmental offset conditions to counterbalance permanent or temporary impacts or loss on fisheries resources or fish habitat. It applies to fisheries development approval decisions under the Fisheries Act 1994 and Sustainable Planning Act 2009.[41]

The principles specified for biodiversity offsetting include:[42]

- Offsets will not replace or undermine existing environmental standards or regulatory requirements, or be used to allow development in areas otherwise prohibited through legislation or policy
- Environmental impacts must first be avoided, then minimised, before considering the use of offsets for any remaining impact
- Offsets must achieve an equivalent or better environmental outcome
- Offsets must provide environmental values as similar as possible to those being lost
- Offset provision should minimise the time-lag between the impact and delivery of the offset
- Offsets must provide additional protection to environmental values at risk, or additional management actions to improve environmental values
- Offsets must be legally secured for the duration of the offset requirement

Fisheries Queensland assesses all impacts of proposed marine fish habitat losses and gains through a mitigation and offset hierarchy of 'avoid, minimise, mitigate and offset'. All approved, temporary or permanent fish habitat losses require the use of offsets to balance residual impacts. This helps to ensure that there is no net loss.



The Queensland Government applies a mitigation and offset hierarchy to development that impacts on fish habitat, which the Noosa canal development shown here has the potential to do *(Raewyn Peart)*

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2 See http://www.isa.org.jm/en/about
3 http://www.mfe.govt.nz/issues/oceans/jurisdictional.html
4 http://www.linz.govt.nz/hydro/projects-programmes/continental-shelf/undersea-image
5 The term 'mean high water springs' is not defined in the RMA. *The New Zealand Nautical Almanac* defines it as 'the average of the levels of each pair of successive high waters during that period of about 24 hours in each semi-lunation (approximately every 14 days), when the range of the tide is greatest (Spring Range).'
6 RMA 1991, section 28B
7 http://www.localcouncils.govt.nz/lgip.nsf/wpg_URL/Profiles-Councils-by-Type-Index?OpenDocument
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3 Exclusive Economic Zone legislation

The EEZ Act governs a range of mining activities within the EEZ, including the sampling of manganese nodules which is shown here ***(Secretariat of the Pacific Community, 2013b – Photo courtesy of BGR)***

Contents

Introduction

The EEZ Act came into force on 28 June 2013 and applies to certain activities taking place in the EEZ and extended continental shelf. The activities are primarily related to disturbance of the seabed, including petroleum and mineral exploration and production, aquaculture, marine energy generation, and carbon capture and storage. These activities and their effects are described in more detail in Section Two of this Guide. The Act does not apply to fishing activity or shipping.

The EEZ Act sets up a management and decision-making framework for managing the environmental effects of these activities. Within this framework, the Governor-General is empowered to make regulations to cover technical matters, including classifying activities as permitted, discretionary or prohibited. Permitted activities can proceed, subject to compliance with any relevant conditions. Prohibited activities are effectively banned and no consent can be issued for them. Discretionary activities are subject to a marine consent application process, which is administered by the EPA.

The EPA is responsible for deciding applications for marine consents, monitoring compliance with the EEZ Act, enforcment, promoting public awareness of the requirements of the Act, and performing any other function specified in the Act. The Decision-Making Committee members, who consider marine consent applications, are appointed by the EPA and must include one EPA Board member. Information about current marine consent applications is available on the EPA website.[1]

The EEZ Act framework is closely based on that of the RMA. However, there are a number of important differences. For example, the classification of marine activities in the EEZ Act is defined in regulations which are promulgated with some (but limited) public involvement. In contrast, under the RMA, regional and district plans determine the classification of activities and the plans are developed through an open public process including appeal rights. Another difference is that the EEZ Act requires notification requirements to be defined in regulations instead of being determined on a case-by-case basis by the consent authority.

Purpose and principles

Purpose

The purpose of the EEZ Act, which is relevant to all decisions made under it, is to promote the 'sustainable management' of natural resources of the EEZ and continental shelf. Sustainable management is defined to mean:[2]

> *… managing the use, development, and protection of natural resources in a way, or at a rate, that enables people to provide for their economic well-being while—*
>
> *(a) sustaining the potential of natural resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and*
>
> *(b) safeguarding the life-supporting capacity of the environment; and*
>
> *(c) avoiding, remedying, or mitigating any adverse effects of activities on the environment.*

The EEZ Act purpose is deliberately very similar to that of the RMA. Parliament considered that utilising a well-understood purpose would provide certainty for stakeholders and provide some consistency of approach between decision-making within the territorial sea and outside of it.[3] Similar to the RMA purpose, subsection (a) excludes minerals, thereby enabling exploitation without regard for the need to retain minerals for future use.

However, Parliament deliberately chose not to carry across the exact RMA purpose. Although the EEZ Act purpose has many similarities to that of the RMA, there are a number of differences including:

- The definition of 'environment'
- No references to 'physical resources', 'communities', 'social wellbeing', 'cultural wellbeing' or 'health and safety' in the EEZ Act purpose
- No equivalent to sections 6 (matters of national importance), 7 (other matters) and 8 (Treaty of Waitangi principles) of the RMA in the EEZ Act
- No equivalent to the EEZ Act information principles in the RMA

Under the EEZ Act, 'the environment' is defined to mean the natural environment, including ecosystems and their constituent parts and all natural resources of New Zealand, the EEZ, the continental shelf, and the waters beyond. This definition is much narrower than the RMA definition of 'environment' which also includes physical resources (e.g. buildings and infrastructure); people and communities; amenity values; and social, economic, aesthetic and cultural conditions. The focus of the EEZ Act on the natural environment and its resources reflects the fact that people and communities have fewer links to the EEZ and continental shelf (because of the distance from shore) and there are very few man-made physical resources there.

Interpretation of the purpose of the EEZ Act

The EPA-appointed Decision-Making Committee, hearing a marine consent application for sand-mining off the North Island's west coast by Trans-Tasman Resources, noted that 'Parliament could have chosen to carry across the RMA definition of sustainable management but has not done so.' As a result, the Committee was careful to consider the evidence and submissions in light of the EEZ Act's purpose, not that of the RMA. It stated:

> *… it needs to be understood that the many differences between the EEZ Act and the RMA – of which the purpose is but one – mean that the large body of case law and understanding that has built up in relation to the interpretation of the RMA's provisions cannot be applied uncritically to the different environment and statutory contest of the exclusive economic zone and continental shelf.*[4]

The term 'economic wellbeing' in the EEZ Act purpose is broader than simply the 'monetary values associated with the activity for which consent is sought'. It includes 'the direct and indirect values of those resources as used by others or for their intrinsic and ecosystem services values'.[5]

The Supreme Court has recently recognised that sections 6, 7 and 8 of the RMA give 'further elaboration' to the purpose of the RMA.[6] The matters listed in sections 33 and 59 of the EEZ Act (see box below), which guide decision-making, are the closest equivalent to those sections of the RMA, but lack a similar hierarchy.

Information principles

Sections 34 and 61 of the EEZ Act set out 'information principles' which the Minister for the Environment and the EPA are required to apply when making decisions. Section 34 applies to the development of regulations and section 61 to the consideration of marine consent applications.

EEZ Act, section 34 Information principles applying to regulation making

1. When developing regulations under section 27, the Minister must—
   (a) make full use of the information and other resources available to him or her; and
   (b) base decisions on the best available information; and
   (c) take into account any uncertainty or inadequacy in the information available.
2. If, in relation to the making of a decision under this Act, the information available is uncertain or inadequate, the Minister must favour caution and environmental protection.
3. If favouring caution and environmental protection means that an activity is likely to be prohibited, the Minister must first consider whether providing for an adaptive management approach would allow the activity to be classified as discretionary.
4. In this section, best available information means the best information that, in the particular circumstances, is available without unreasonable cost, effort, or time.

EEZ Act, section 61 Information principles applying to the consideration of marine consent applications

(1) When considering an application for a marine consent, the Environmental Protection Authority must—

(a) make full use of its powers to request information from the applicant, obtain advice, and commission a review or a report; and

(b) base decisions on the best available information; and

(c) take into account any uncertainty or inadequacy in the information available.

(2) If, in relation to making a decision under this Act, the information available is uncertain or inadequate, the EPA must favour caution and environmental protection.

(3) If favouring caution and environmental protection means that an activity is likely to be refused, the EPA must first consider whether taking an adaptive management approach would allow the activity to be undertaken.

(4) Subsection (3) does not limit section 63 or 64.

(5) In this section, **best available information** means the best information that, in the particular circumstances, is available without unreasonable cost, effort, or time.

These provisions require the EPA to make full use of its powers to request information, obtain advice, and commission reviews or reports when considering an application for marine consent. This places a positive obligation on the EPA to seek out further information where there are gaps or inadequacies in the information provided in the marine consent application. The EPA is also required to base its decisions on the best available information. If information is uncertain or inadequate, the EPA must favour caution and environmental protection, and must consider whether an adaptive management approach[7] would allow an activity to be undertaken.

Best available information

Best available information is defined to mean 'the best information that, in the particular circumstances, is available without unreasonable cost, effort, or time'.[8] This is about ensuring the Decision-Making Committee has 'the right amount and quality of information to be able to make a good decision'. It means that the Committee may not be able to rely on the information presented by participants in the process and may need to obtain additional information if necessary.[9] Gaps and uncertainties in the information do not present a difficulty in terms of the requirement to base a decision on the best available information as 'gaps and uncertainties arise because the necessary information to remedy these does not exist. It is not a case where important and relevant information is known but has not been shared'.[10]

Favouring caution and environmental protection

The requirement that the decision-maker must favour caution and environmental protection where the information available to the decision-maker is uncertain or inadequate is a strong direction. Oxford Dictionaries' definition of 'favoured' is 'preferred or recommended'.[11] This means that, when the caution requirement is triggered, environmental protection must be preferred over other matters. This is consistent with the purpose of the EEZ Act which expressly contemplates environmental protection.

This requirement differs from a similar statement in the Fisheries Act 1996: 'the absence of, or any uncertainty in, any information should not be used as a reason for postponing or failing to take any measure to achieve the purpose of the Act'.[12] The purpose of that Act is 'to provide for the utilisation of fisheries resources while ensuring sustainability'. In comparison, the caution requirement in the EEZ Act is clearly heavily weighted towards environmental protection.

This caution requirement in the EEZ Act also differs from the precautionary approach as expressed in international law through Principle 15 of the Rio Declaration 1992: 'in order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation'. Significantly, the EEZ Act does not require 'serious or irreversible adverse effects' before the caution requirement is triggered.[13]

Application of cautionary approach

The Trans-Tasman Resources Decision-Making Committee determined that there was considerable uncertainty in the information provided to it as to both the nature of the environment and the way the mining operation might affect it. It also found information on how Māori existing interests would be addressed to be inadequate.[14] As a result, the Committee was required to favour caution and environmental protection. It stated that this requirement is 'an absolute one' and 'this direction is not to be traded off against the attainment of economic wellbeing'. The Committee noted that section 10(3) makes it clear that applying the information principles is one of the ways the purpose of the EEZ Act is to be achieved.[15]

Adaptive management

If favouring caution and environmental protection means that an activity is likely to be refused, the EPA must then turn its mind to adaptive management, and consider whether such an approach would allow the activity to be undertaken. The Environment Court has described adaptive management as an:

> … *experimental approach to management, or 'structured learning by doing'. It is based on developing dynamic models that attempt to make predictions or hypotheses about the impacts of alternative management policies. Management learning then proceeds by systematic testing of these models, rather than by random trial and error. Adaptive management is most useful when large complex ecological systems are being managed and management decisions cannot wait for final research results*.[16]

The Environment Court has identified the following features of adaptive management (in relation to a marine energy project):[17]

- Stages of development are set out
- The existing environment is established by robust baseline monitoring
- There are clear and strong monitoring, reporting and checking mechanisms so that steps can be taken before significant adverse effects eventuate
- These mechanisms must be supported by enforceable resource consent conditions which require certain criteria to be met before the next stage can proceed
- There is a real ability to remove all or some of the development that has occurred at that time if the monitoring results warrant it

The EEZ Act requires the decision-maker to 'first consider' whether an adaptive management approach would allow the activity to be undertaken.[18] The necessary implication is that there are situations in which an adaptive management approach would not allow the activity to be undertaken.

In the RMA context, the Supreme Court has set out the following factors to consider when determining whether an adaptive management approach would or would not allow the activity to be undertaken:[19]

a) The extent of the environmental risk (including the gravity of the consequences if the risk is realised)

b) The importance of the activity (which could in some circumstances be an activity it is hoped will protect the environment)

c) The degree of uncertainty

d) The extent to which an adaptive management approach will sufficiently diminish the risk and the uncertainty

The Supreme Court referred to (d) as '[t]he vital part of the test' and accepted that the following matters must be satisfied for an adaptive management approach to sufficiently diminish the risk and the uncertainty:[20]

- Good baseline monitoring about the receiving environment
- The conditions provide for effective monitoring of adverse effects using appropriate indicators
- Thresholds are set to trigger remedial action before the effects become overly damaging
- Effects that might arise can be remedied before they become irreversible

Application of adaptive management

The Trans-Tasman Resources Decision-Making Committee agreed that the Supreme Court's approach is applicable to adaptive management under the EEZ Act.[21] Trans-Tasman Resources did not propose an adaptive management approach that would enable the activity 'to commence on a small scale or for a short period so that its effects on the environment and existing interests can be monitored'. This was because the applicant considered that 'in order for the operation to be commercially viable, the ability to mine the whole area of the application was required'.[22] Instead, Trans-Tasman Resources proposed an approach which involved:[23]

- Qualitative environmental performance objectives (specified in the consent conditions)
- Pre-operational baseline monitoring
- A process for developing quantitative 'trigger indicators or values' which would inform compliance with environmental performance objectives
- Operational monitoring
- Management of operations to achieve the identified environmental performance objectives

The Trans-Tasman Resources Decision-Making Committee assessed the approach against the Supreme Court's four-step test (set out above). The Decision-Making Committee concluded that 'the proposed Environmental Performance Objectives do not provide sufficient certainty, clarity or robustness on which to form the foundation of an appropriate adaptive management approach'. The Committee was also concerned 'that, without the option of a scale or staged implementation, the applicant has not provided any compelling adaptive management alternatives should the environmental objectives not be met'.[24]

International obligations principle

New Zealand does not have full sovereignty beyond 12 nautical miles but relies on rights gained under UNCLOS to regulate activities in the EEZ and continental shelf area covered by the EEZ Act. International obligations are therefore particularly relevant to management of New Zealand's EEZ and continental shelf.

Section 11 of the EEZ Act provides that the Act continues or enables the implementation of New Zealand's international obligations in the marine environment, including those under UNCLOS[25] and the Convention on Biological Diversity 1992.[26] The section also implies that other relevant international conventions would be relevant including the International Convention for the Prevention of Pollution from Ships 1973 (MARPOL),[27] and the Convention on the Prevention of Marine Pollution by Dumping Wastes and Other Matter 1972 (the London Convention).[28]

EEZ Act, section 11 International obligations

This Act continues or enables the implementation of New Zealand's obligations under various international conventions relating to the marine environment, including —

(a) the United Nations Convention on the Law of the Sea 1982:

(b) the Convention on Biological Diversity 1992.

When the EEZ Bill was first introduced to Parliament, it contained a clause which required the Act to be interpreted and applied in accordance with international obligations.[29] The clause was deliberately amended due to concerns that international obligations would be utilised to interpret the legislation in a manner that was not considered by Parliament. In addition, it was argued that inclusion of such a clause would create a substantial risk of appeals against decisions under the EEZ Act, on the grounds of inconsistency with international obligations.[30]

Interpretation of the international obligations principle

When the Permitted Activity Regulations were released in 2013,[31] Greenpeace New Zealand and Forest and Bird lodged a complaint with the Regulations Review Committee that the regulations were not in accordance with the general objects and intentions of the EEZ Act and specifically section 11. The Regulations Review Committee rejected this argument and determined that section 11 does not require that regulations made under the EEZ Act must not breach international obligations.

The Trans-Tasman Resources Decision-Making Committee reached a similar conclusion in the context of a marine consent application … *in our view, the relevant decision-making criteria and information principles to which we must direct ourselves reflect the nature of New Zealand's international obligations… Indeed, that is what section 11 indicates. We do not agree that New Zealand's international obligations require additional consideration to be applied in addition to the decision-making criteria and information principles contained in the EEZ Act.*

Treaty of Waitangi provisions

Unlike section 8 of the RMA, the EEZ Act does not contain a general Treaty of Waitangi principles provision. Instead section 12 identifies aspects of the EEZ Act which 'recognise and respect the Crown's responsibility to give effect to the principles of the Treaty of Waitangi', including provision for a Māori Advisory Committee, iwi feedback on regulations, consideration of existing interests, and notification to iwi about consent applications that may affect them.

EEZ Act, section 12 Treaty of Waitangi

In order to recognise and respect the Crown's responsibility to give effect to the principles of the Treaty of Waitangi for the purposes of this Act,—

(a) section 18 (which relates to the function of the Māori Advisory Committee) provides for the Māori Advisory Committee to advise the Environmental Protection Authority so that decisions made under this Act may be informed by a Māori perspective; and

(b) section 32 requires the Minister to establish and use a process that gives iwi adequate time and opportunity to comment on the subject matter of proposed regulations; and

(c) sections 33 and 59, respectively, require the Minister and the EPA to take into account the effects of activities on existing interests; and

(d) section 45 requires the Environmental Protection Authority to notify iwi authorities, customary marine title groups, and protected customary rights groups directly of consent applications that may affect them.

It is clear from section 12 that the Crown's responsibility to give effect to the principles of the Treaty of Waitangi has both procedural (the way decisions are made) and substantive (the interests of Māori in the outcome of the decisions made) dimensions.[32]

Interpretation of Treaty of Waitangi principle

The Trans-Tasman Resources Decision-Making Committee distinguished between notification and consultation, and noted that the EEZ Act does not expressly require marine consent applicants to consult with iwi however:

> … *in understanding and addressing existing interests, some level of consultation appears to us to be not just good practice but an important element in compiling a robust proposal. Further, a failure to consult adequately with tangata whenua/tangata moana may be seen as culturally offensive and disrespectful.*[33]

The Treaty of Waitangi provisions in the EEZ Act recognise the close association that iwi have with the marine environment, including through sailing offshore waka, as shown here at Napier *(Raewyn Peart)*

Restrictions on activities

When is a marine consent required?

The EEZ Act prohibits identified activities in the EEZ or continental shelf (see Figure 3.1) unless the activity is permitted by regulations, authorised by a marine consent, or an existing activity exemption applies.

- The construction, placement, alteration, extension, removal, or demolition of a structure on or under the seabed
- The construction, placement, alteration, extension, removal, or demolition of a submarine pipeline on or under the seabed
- The placement, alteration, extension, or removal of a submarine cable on or from the seabed
- The removal of non-living natural material from the seabed or subsoil
- The disturbance of the seabed or subsoil in a manner that is likely to have an adverse effect on the seabed or subsoil
- The deposit of anything or organism in, on, or under the seabed
- The destruction, damage, or disturbance of the seabed or subsoil in a manner that is likely to have an adverse effect on marine species or their habitat
- The construction, mooring or anchoring long-term, placement, alteration, extension, removal, or demolition of a structure or part of a structure
- The causing of vibrations (other than vibrations caused by the normal operation of a ship) in a manner that is likely to have an adverse effect on marine life
- The causing of an explosion

Figure 3.1 Activities which are restricted under section 20 of the EEZ Act[34]

The Exclusive Economic Zone and Continental Shelf (Environmental Effects) Amendment Act 2013 (EEZ Amendment Act) transfers powers to regulate discharges and dumping (excluding discharges from ships) which are currently regulated under the Maritime Transport Act. This transfer will take effect when regulations are made under the EEZ Act to classify discharge and dumping activities. When the transfer takes effect the new provisions of the EEZ Act will:

- Prohibit discharges of harmful substances into the sea or seabed, unless it is a permitted activity, authorised by a marine consent or an existing activity exemption applies[35]
- Impose a total prohibition on the dumping of radioactive, toxic or hazardous waste into the sea or on the seabed[36]
- Prohibit dumping of other waste unless authorised by a marine consent, authorised by an emergency dumping consent, or in accordance with section 248 or 249 of the Maritime Transport Act[37]
- Regulate burial at sea[38]

General duties

All persons carrying out activities in the EEZ or continental shelf also have a general duty to avoid, remedy or mitigate the adverse effects of the activity on the environment as well as a duty to provide training, supervision and resources to employees to ensure compliance with the EEZ Act.

Deep-sea drilling as part of scientific investigations, such as undertaken by this vessel, is a permitted activity within New Zealand's EEZ subject to compliance with a number of conditions
(Secretariat of the Pacific Community, 2013a – Photo courtesy of Elaine Baker)

Regulations

The EEZ Act allows regulations to be developed to:

- Classify activities as permitted, discretionary (notified or non-notified), or prohibited[39]
- Identify and provide for areas which are important or vulnerable or require particular management due to competing uses or cumulative adverse environmental effects (thereby allowing for marine spatial planning to be given legal effect under the EEZ Act)[40]
- Prescribe technical standards, methods or requirements[41]

The Governor-General may make regulations on the recommendation of the Minister for the Environment. The EEZ Act puts in place a process for the development of regulations which includes notifying the public, iwi authorities, regional councils and persons whose existing interests are likely to be affected by the proposed subject matter of the regulations. These parties must be given adequate time and opportunity to comment,[42] but no hearing is held. In addition, the Minister must have regard to any comments made and take into account the criteria identified in Figure 3.2.[43]

Criteria	Additional detail
Any effects on the environment or existing interests of allowing an activity with or without a marine consent	This is to include cumulative effects and effects that may occur in New Zealand or in the waters above or beyond the continental shelf beyond the outer limits of the EEZ
The effects on the environment or existing interests of other activities undertaken in the EEZ or in or on the continental shelf	This is to include the effects of activities that are not regulated under the EEZ Act and effects that may occur in New Zealand or in the waters above or beyond the continental shelf beyond the outer limits of the EEZ
The effects on human health that may arise from effects on the environment	
The importance of protecting the biological diversity and integrity of marine species, ecosystems and processes	
The importance of protecting rare and vulnerable ecosystems and the habitats of threatened species	
New Zealand's international obligations	
The economic benefit to New Zealand of an activity	
The efficient use and development of natural resources	
The nature and effect of other marine management regimes	This would include the RMA, the Fisheries Act and the Maritime Transport Act
Best practice in relation to an industry or activity	
The desirability of allowing the public to be heard in relation to the activity or type of activity	To be considered in relation to whether an activity is classified as permitted, discretionary, non-notified discretionary
Any other relevant matter	

Figure 3.2 Criteria the Minister must take into account when recommending regulations

The Minister must also:[44]

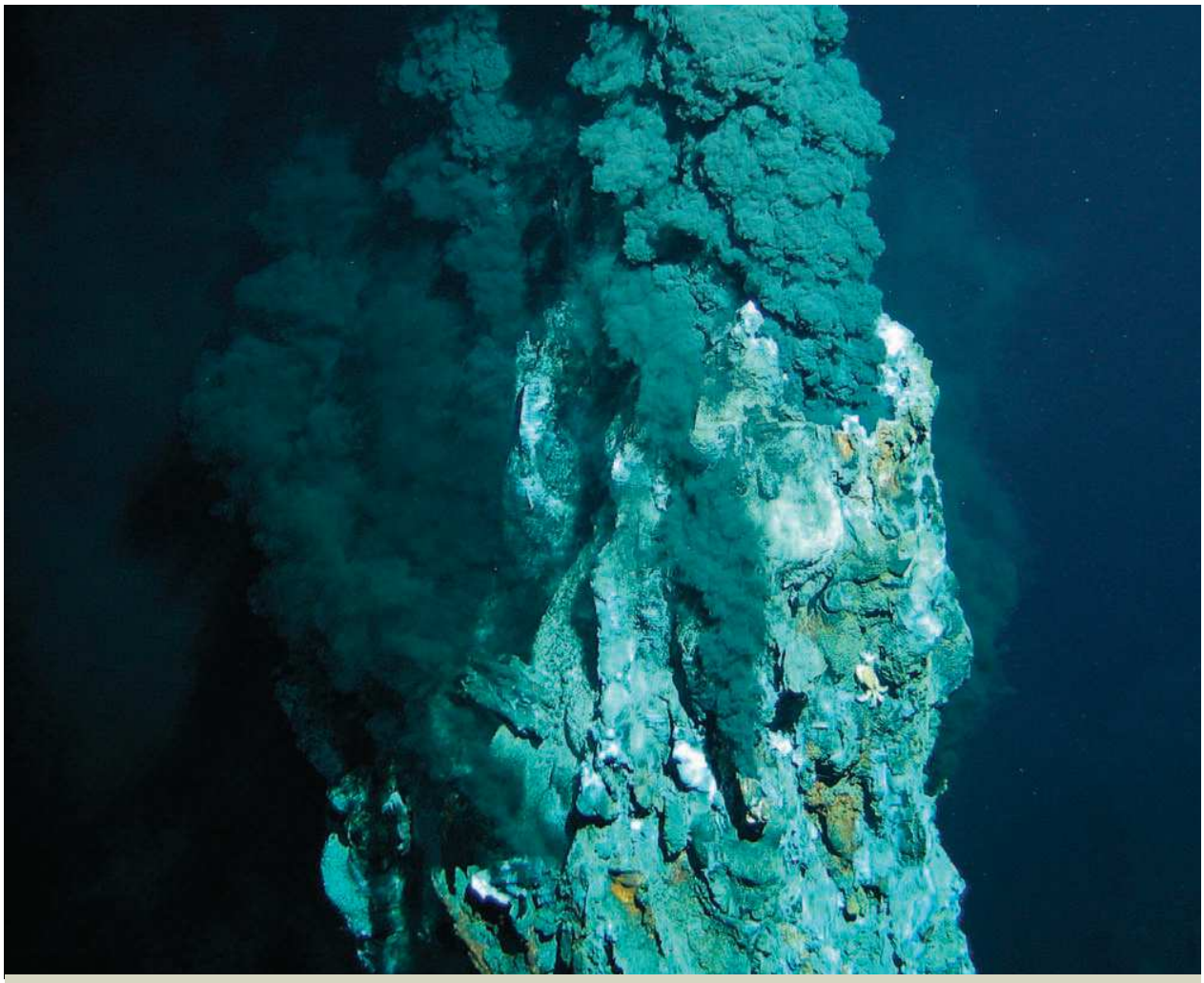
- Make full use of the information and other resources available to him or her
- Base decisions on the best available information
- Take into account any uncertainty or inadequacy in the information available

- If the information available is uncertain or inadequate, favour caution and environmental protection
- If favouring caution and environmental protection means that an activity is likely to be prohibited, consider whether providing for an adaptive management approach would allow the activity to be classified as discretionary

To date, regulations have only been promulgated to set fees and charges and to classify activities as permitted or non-notified discretionary (discussed below). At the time of writing, regulations were currently being drafted to classify discharges and dumping activities. However, the broad nature of potential regulations means that they could be used to provide for integrated and strategic management of the marine environment, similar to regional coastal plans prepared under the RMA. There are limitations, as the EEZ Act cannot be used to control all activities in the EEZ, including fishing and maritime transport.

The EEZ Act provides protections for existing and planned activities in the event of an amendment to the regulatory regime. An activity which was lawfully established as a permitted activity under the EEZ Act is classified as an 'existing activity' where the effects of the activity on the environment remain the same or similar in character, intensity and scale. If the regulations change so that the existing activity requires a marine consent, the activity may continue for six months (or a prescribed period) or, if a marine consent is applied for within that six-month period, until the application is determined.[45] This is similar to the existing activity provision for regional rules in the RMA.

Where new regulations come into force which prohibit an activity which was previously lawfully established as a permitted activity, or was authorised by a marine consent, the activity may continue for the duration of the consent if applicable or for a period prescribed by regulations.



Active hydrothermal chimneys which occur in association with deep-sea venting, such as shown here, are identified as sensitive environments under the EEZ Permitted Activity Regulations *(Secretariat of the Pacific Community, 2013c)*

Activity status

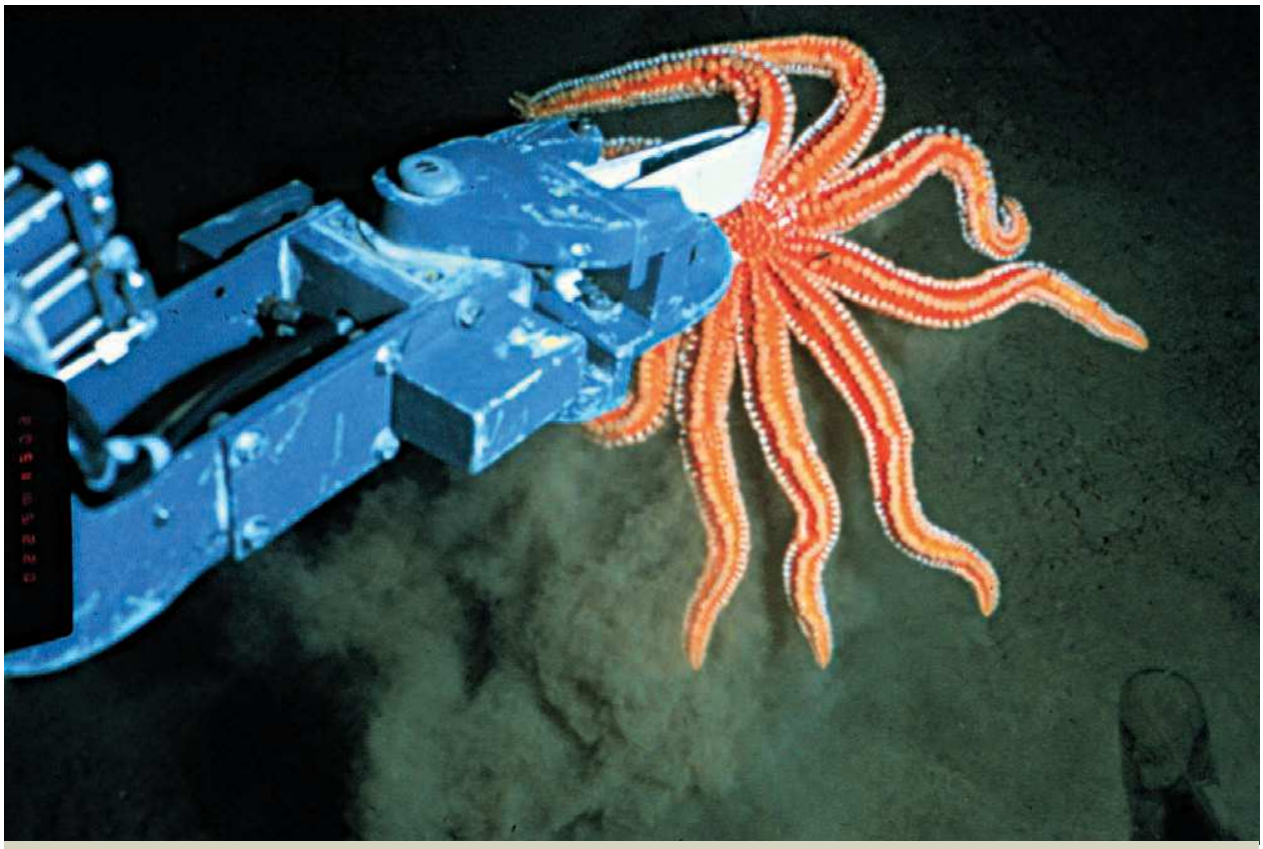
Regulations may classify activities as follows:

- Permitted – permitted activities may proceed provided they comply with the conditions specified in the regulations. The Exclusive Economic Zone and Continental Shelf (Environmental Effects – Permitted Activities) Regulations 2013[46] set out activities which are permitted and the conditions they must comply with.
- Discretionary (notified or non-notified) – discretionary activities may only proceed if a marine consent is granted. The Regulations[47] identify non-notified discretionary activities. All unspecified activities (identified in section 20) are also discretionary and will require marine consent.
- Prohibited – prohibited activities may not proceed under any circumstances. There are currently no regulations which specify prohibited activities, although the EEZ Act does not allow some dumping activities in any circumstances.

The current classifications are shown in Figure 3.3.

Permitted	Non-notified Discretionary	Discretionary	Prohibited
Marine scientific research Submarine cables Seismic surveys Prospecting for petroleum and minerals Exploration for petroleum and minerals, except petroleum drilling	Petroleum exploration drilling	All other activities identified in section 20 (see Figure 3.1)	Dumping of radioactive, toxic or hazardous waste

Figure 3.3 Status of activities under the EEZ Act



Seastar being picked up by the arm of a National Undersea Research Program submersible *(National Undersea Research Program)*

Permitted activities

Provisions applying to permitted activities are set out in the Exclusive Economic Zone and Continental Shelf (Environmental Effects – Permitted Activities) Regulations 2013 (EEZ Permitted Activities Regulations). The Regulations set out conditions which apply to permitted activities. In general these require the party wishing to undertake the activity to prepare an 'initial environmental assessment and sensitive environments contingency plan'. This must identify and describe any 'sensitive environments' that are likely to exist within the areas where the activity will be undertaken and then to assess ways of reducing impacts on them.

EEZ Permitted Activities Regulations, Schedule 2: Contents of plan

(1) An initial environmental assessment and sensitive environments contingency plan must—

(a) describe the activity concerned; and

(b) state the co-ordinates of the area within which the activity will be conducted; and

(c) describe in general terms (using the best available information) the environment likely to be encountered when the activity is being undertaken; and

(d) identify and describe any sensitive environments that are likely to exist within the area; and

(e) detail the methods that will be used to undertake the activity; and

(f) in relation to any sensitive environment that is likely to be encountered,—

(i) assess the feasibility of carrying out the activity in another location; and

(ii) assess, in the following order, the feasibility of measures that could be taken to—

(A) reduce the amount of contact with the seabed:

(B) carry out alternative lower-impact activities:

(C) change the methods of operation to lower the impact of the activity on the environment.

The EPA must notify iwi, hapū, customary marine title groups and protected customary rights groups as soon as practicable after receipt of notice that a permitted activity has commenced or has been completed.[48] The EPA must also monitor permitted activities to determine whether they are being undertaken in accordance with any conditions imposed by the Permitted Activities Regulations.[49]

Sensitive environments

Sensitive environments are identified in Schedule 6 of the Regulations[50] (see Figure 3.4). These set out indicators for determining if a sensitive environment is present. Sensitive environments were identified for incorporation into the regulations using the MarLIN method[51] developed by the United Kingdom's Marine Life Information Network. Sensitivity is dependent on the tolerance of a species or habitat to damage from an external factor, and the time taken for its subsequent recovery from the damage sustained. Assessments of tolerance take rarity into account, as the more rare a habitat is, the more an external factor is likely to damage a significant proportion of the habitat.

Habitat definitions were derived by NIWA in 2013 from available scientific literature and the field experience of staff undertaking research in these areas.[52] If a habitat or species is killed or destroyed by an external factor arising from human activities or natural events, and is expected only to recover over a very long period of time (10–20 years), then it would be considered to be highly sensitive. Similarly, if a habitat or species is adversely affected by an external factor arising from human activities or natural events (damaged) but is expected to recover in a short period of time (one to five years) then it would be considered to be of low sensitivity.

Anemones, which are endemic to a deepsea hydrothermal vent field
(Secretariat of the Pacific Community, 2013a – Photo courtesy NSF Ridge 2000 Program)

Environment	Description
Stony coral thickets or reefs	• Are most commonly found between 200 and 2,000 metres water depth and at temperatures between 4°C and 12°C • Are slow-growing and long-lived • Require a hard substrate for attachment as well as high nutrient and food supply for growth, currents or mixing to deliver the food and nutrients, and low sedimentation rates to allow efficient feeding and to avoid physical burial • Can provide habitat for some species of fish and invertebrates • Can produce three-dimensional matrix colonies that can coalesce to form 'reef', 'mound' or 'thicket' structures, extending over kilometres in length and up to 35 metres in height. Small patch reefs or thickets have been directly observed on many seamounts around New Zealand, including the Chatham Rise. • Are fragile and the biodiversity associated with these coral structures can be high • Are considered to be 'vulnerable marine ecosystems' that require protection from the impacts of deepwater fishing, drilling and mining
Xenophyophore beds	• Are made up of very large, single-celled protozoans (xenophyophore) • Live on the seabed and from complex clumps up to 25 centimetres in diameter made up of mineral grains, sponge spicule fragments and organic debris • Are associated with higher infaunal densities • Seven species have been recorded in New Zealand, three of which are endemic, and it is expected that more species will be recorded • Have been located on the eastern, northern and western continental slopes of New Zealand and on the Chatham Rise
Bryozoan thickets	• Are made up of suspension-feeding bryozoans (commonly called moss animals) that live in colonies, either on the seafloor or on algae, seagrass and animals • Individuals that comprise a colony are called zooids and are less than a millimetre in size • Colonies have varying growth forms and their size varies. They can get as large as 1,000 millimetres across. • Provide a larger surface area than the area of seafloor they occupy • Alter local physical processes such as current speed and trap sediments within their structures • Are particularly abundant and diverse in New Zealand with 27 species providing habitat over hundreds of square kilometres of seafloor
Calcareous tube-worm thickets	• Consist of clusters that result from the growth of intertwined calcareous tubes which form mounds or patch reefs • May occur on soft and hard seabed but generally need some hard substrate on which to establish • New Zealand has a number of tube-worm species that secrete tubes of calcium carbonate and they are most common in coastal waters, but occur at all depths • Are found from Taranaki south to Stewart Island but are likely to be rare in New Zealand's EEZ
Chaetopteridae worm fields	• A number of tube-worm species, which do not form calcareous tubes, reach sufficient sizes and/or densities to provide biogenic habitat for other species • In New Zealand, virtually nothing is known about the potential role of tube worms in forming biogenic habitat for other species • Fields of *Phyllochaetopterus socialis* are known off the east coast of the South Island though they may also occur around the North Island

Environment	Description
Sea pen field	• Are formed from colonial marine cnidarians • Occur on soft sediments in the deep waters where turbulence is unlikely to dislodge them and where there is a current to ensure a flow of plankton across their feeding polyps • Currently 31 species of sea pens are known from New Zealand waters, although 19 of those have not been formally described • Fauna associated with New Zealand sea pens have not yet been described
Rhodolith beds	• Are formed from free-living calcified red algae which form structurally and functionally complex habitats • Feature high benthic biodiversity supporting many rare and unusual species • Often coincide with productive fisheries and have been identified as important nursery areas for commercial species • Internationally rhodolith beds have been identified as critically important biodiversity hotspots, harbouring high diversity and abundance of marine animals and algae, in comparison with surrounding habitats • Are fragile and slow-growing (0.05–2 millimetres per year) • Very little information exists about the location, extent or ecosystem functioning of rhodolith beds in New Zealand • Are likely to occur in the EEZ at localities characterised by strong currents within the photic zone (layer that receives sunlight) to depths of 200 metres depending on water clarity, particularly around the margins of reefs or elevated banks
Sponge gardens	• Formed from sedentary, filter-feeding metazoans that utilise a single layer of flagellated cells to direct a water current through their bodies for the purposes of feeding and excretion • May occur on hard or soft substrate in many subtidal environments including shallow coastal rocky reefs, seamounts, hydrothermal vent systems and oceanic ridges • Well over 500 sponge species have been formally described from New Zealand waters but there are many more known, with new discoveries every year • Certain areas in New Zealand's EEZ have been identified as sponge 'hotspots', including the Three Kings, North Cape, Spirits Bay and offshore carbonate bryomol gravel banks
Beds of large bivalve molluscs	• Create biogenic structure in what may be an otherwise 'featureless' habitat • Their shells provide a substrate for settlement by organisms such as sponges and bryozoans, and shelter for mobile invertebrates and fishes • Create habitat heterogeneity and have an important role in ecosystem functioning • Influence biogeochemical processes such as regeneration of sediment-associated nutrients, and processing of these nutrients, thus making them available for water-column primary production. Sediment-derived nutrients are considered a major contributor to continental shelf production. • Are generally located at depths of less than 250 metres and are well represented off Northland, off the west coast of the North Island, and off south-eastern and southern-most New Zealand

Environment	Description
Macro-algae beds	• Occur on hard rocky substrates within the photic zone (layer that receives sunlight), to depths of 200 metres, depending on water clarity • Kelps beds are recognised as key contributors to reef ecosystems, providing highly structured three-dimensional habitats critical for other species • Within the EEZ, rocky reefs in the photic zone are very rare, and thus beds of macro-algae are likely to be equally rare • Have been recorded in the EEZ on the Mernoo Bank east of Banks Peninsula, on the Ranfurly Bank off East Cape, and on at least one seamount on the Kermadec Ridge
Brachiopod beds	• Some species form dense beds, two or three layers deep, with up to 1,000 individuals per square metre • In some areas dead brachiopod shells contribute to habitat complexity and provide abundant interstices for small invertebrates and fish • Occur throughout New Zealand at all depths • Known diverse or abundant brachiopod assemblages occur off the Three Kings Islands, off Ranfurly Bank (East Cape), on parts of the Chatham Rise where rare species are associated with coral thickets, and on areas of the Campbell and Bounty Plateaux
Deep-sea hydrothermal vents	• Occur where cold seawater percolates down through the seabed, is heated by geothermal energy, becomes buoyant and rises back up to the seabed. The hot water dissolves metals and sulphides from the surrounding rocks. • Venting can occur from point sources, from chimneys (made from precipitated minerals) or from cracks and fissures in the seabed. It can also occur as a percolation in a diffuse fashion through sands or muds. • Are associated with the subduction zone of the Pacific plate under the Australian plate to the north of New Zealand • Provide habitat for unique communities of organisms which are dependent on the sulphide-rich vent fluids that support chemosynthetic bacteria (primary producers which use chemicals, instead of light, to create energy) at the base of the food web • Vent specialists can only exist in close proximity to the active venting. They are surrounded by a distinct non-vent community at the periphery of the vent site. • Seabed communities found at hydrothermal vents are considered to be sensitive to physical disturbance. Their levels of endemism suggest that impacts to these habitats may have significant effects, including species extinction. • Some vent species in New Zealand waters are recognised by the Department of Conservation's Threat Classification System, including *Vulcanolepis osheai*
Methane or cold seeps	• Occur where methane-rich fluids escape into the water column from underlying sediments • Are usually associated with areas where gas hydrates (methane frozen within an ice matrix) occur within the sediments, generally in water depths of at least 500 metres • Most of these sites support live communities of obligate seep-associated fauna • Have been identified at many sites on the Hikurangi Margin along the east coast of the North Island. Clusters of active methane seeps have also been confirmed within five areas on the east coast of the lower North Island. • Much of the seep-associated fauna from the Hikurangi Margin appears to be new to science, or endemic to New Zealand seeps, suggesting the region may be a new biogeographic province for cold-seep fauna

Figure 3.4 Description of sensitive environments (*Adapted from MacDiarmid A et al., 2013*)

Seismic surveying

Seismic surveying is permitted if the person undertaking the activity complies with the Department of Conservation's 2013 'Code of Conduct for Minimising Acoustic Disturbance to Marine Mammals from Seismic Survey Operations'.[53]

The Code of Conduct defines Level 1, Level 2 and Level 3 surveys and requires mitigation actions which are commensurate to the level of risk.

Level 1 surveys involve high-power acoustic sources such as large-scale geophysical investigations employed in oil and gas exploration activities. These are subject to stringent requirements, which include the following:

- Generally, the Department of Conservation must be notified in writing at least three months in advance of the survey commencing
- A Marine Mammals Impact Assessment must be prepared. Particular attention must be given to 'Areas of Ecological Importance', which include marine mammal sanctuaries. Areas of Ecological Importance are identified on the Department of Conservation website.[54] A core component of the planning process is to limit surveys to the lowest practicable power levels that will achieve the geophysical objectives of the survey. There is no formal approval process but the Director-General will determine if the impact assessment is sufficient for the purposes of the Code of Conduct.
- Two qualified marine mammal observers must be on board the vessel undertaking the survey at all times. At least one must be on watch when the acoustic source is in the water. Seismic survey vessel crew cannot be considered qualified observers.
- Passive acoustic monitoring (which detects vocalising cetaceans) is required, along with two passive acoustic monitoring observers
- The acoustic source cannot be activated until visual observations and passive acoustic monitoring for at least 30 minutes indicates no marine mammals are present
- All sightings of marine mammals must be recorded and reported to the Department of Conservation. Additional measures may be required if the number of cetaceans encountered is greater than predicted.
- Start-up will be delayed or the source shut down if an observer detects a cetacean with a calf within 1.5 kilometres of the source, a 'Species of Concern' (which are listed in Schedule 2 of the Code of Conduct) within 1 kilometre of the source, or any marine mammal within 200 metres of the source

Seismic surveying within the EEZ is permitted if it complies with the Department of Conservation's Code of Conduct. This is designed to avoid adverse effects on marine mammals such as the Hector's dolphins in Akaroa Harbour shown here *(Raewyn Peart)*

Level 2 surveys are smaller-scale seismic investigations such as those associated with scientific research. These are subject to the same general mitigation requirements as Level 1 surveys with some differences such as:

- Seismic survey vessel crew can be considered qualified observers
- Passive acoustic monitoring is optional
- Start-up will be delayed or the source shut down if an observer detects a cetacean with a calf within 1 kilometre of the source, a 'Species of Concern' (which are listed in Schedule 2 of the Code of Conduct) within 600 metres of the source, or any marine mammal within 200 metres of the source

Level 3 surveys are small-scale and have noise levels lower than commercial shipping. They are not subject to the provisions of the Code of Conduct.

Scientific research, prospecting and exploration

The EEZ regulations permit marine scientific research, prospecting for petroleum and minerals and exploration for petroleum and minerals (excluding drilling for petroleum)[55] subject to the requirement that the party undertaking the activity must undertake a number of actions specified in the EEZ Permitted Activities Regulations (see Figure 3.5).

Prospecting and exploration within the EEZ, such as the sampling of seafloor massive sulphides shown here, is a permitted activity so long as it complies with a set of requirements *(Secretariat of the Pacific Community, 2013c – Photo courtesy of Nautilis Minerals)*

- Notify the EPA of the activity at least 40 working days before the activity commences
- Notify iwi, hapū, customary marine title groups and protected customary rights groups at least 25 working days before the activity commences
- Provide the EPA with a report detailing the notification to those groups, any response received, and the outcome of any dialogue entered into at least five working days before the activity commences
- Provide the EPA with details of any change that is proposed to the activity as a result of the notification process at least five working days before the activity commences
- At least five working days before commencing the activity, carry out an initial environmental assessment and provide this to the EPA with a sensitive environments contingency plan. Notify the EPA within 24 hours of the date on which the activity is commenced.
- Maintain a log book that includes details of the person(s) carrying out the activity, the activity, the location, every sensitive environment encountered including likely effects and measures taken to avoid, mitigate or remedy adverse effects, or a description of area if no sensitive environments are found
- Ensure all reasonable measures are taken to avoid, mitigate or remedy adverse effects of the activity on any sensitive environment encountered
- Ensure no more material is removed from the seabed or subsoil than is reasonably necessary to undertake the activity
- Ensure no person sells any non-living natural material removed from the seabed or subsoil for the purpose of the activity
- Notify the EPA within 24 hours of completing the activity
- Provide the EPA with a post-activity report detailing the activity undertaken, the dates, the location, estimates of the activity's environmental footprint (including an estimate of volume of material removed), a description of and the location of every sensitive environment encountered, details of action taken to avoid, remedy, mitigate adverse effects of the activity on every sensitive environment encountered and the reasons for choosing those actions

Figure 3.5 Requirements for scientific research, prospecting and exploration

Marine structures

The EEZ regulations permit the maintenance or repair of a marine 'structure' (which includes buildings, equipment and devices but does not include submarine pipelines).[56] The alteration, extension or removal of a marine structure is also permitted if the person undertaking the activity:

- Notifies the EPA at least 40 working days before the activity commences
- Notifies iwi, hapū, customary marine title groups and protected customary rights groups at least 25 working days before the activity commences
- Provides the EPA with a post-activity report detailing the activity undertaken, the dates, the location, and estimates of the activity's environmental footprint (including an estimate of volume of material removed)

Submarine cables

The EEZ regulations permit the placement of a submarine cable on or under the seabed, or the removal of a submarine cable from the seabed, provided the person undertaking the activity:[57]

- Notifies the EPA at least 40 working days before the activity commences
- Notifies iwi, hapū, customary marine title groups and protected customary rights groups at least 25 working days before the activity commences
- Notifies the EPA within 24 hours of the date on which the person commences the activity
- Notifies the EPA within 24 hours of the date on which the person completes the activity concerned
- Provides the EPA with a post-activity report detailing the activity undertaken, the dates, the location, and estimates of the activity's environmental footprint (including an estimate of volume of material removed)

Marine consent process

There are two marine consent process tracks for discretionary activities: notified and non-notified. The ways in which the public can become involved in a marine consent process are described in Chapter 8: Opportunities for public involvement.

In a notified marine consent process, the public is notified of the application, and is able to make submissions on it. The process involves lodgement, acceptance of the application as complete, public notification, submissions, a hearing and determination of the application (see Figure 3.6). The applicant or submitters may appeal the decision to the High Court on points of law.

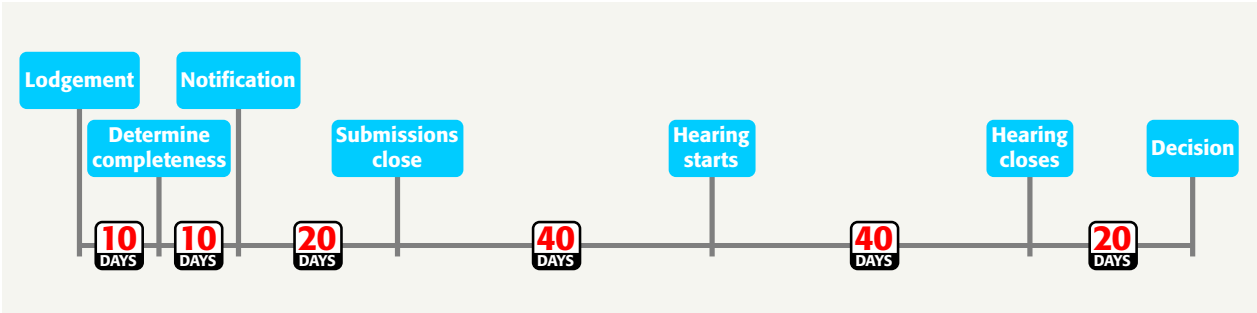


Figure 3.6 Flow chart of marine consent process

In a non-notified marine consent process, the public is not notified of an application, and is unable to make submissions on it. The EPA has up to 50 working days to assess and make its decision on the application, after determining that the application is complete.[58]

Application of marine consent timeframes

The *Trans-Tasman Resources Ltd Marine Consent Decision* noted that the EEZ Act establishes 'demanding timeframes for the processing of and decision-making on applications for marine consents' which are 'a source of considerable challenge for all parties'.[59] If you are participating in a marine consent process it is important that you are fully aware of the relevant deadlines and make the most of the time available.

Submissions on the Trans-Tasman Resources marine consent application initially closed on 19 December 2013 but this was extended until 28 January 2014. The applicant's expert evidence was lodged on 17 February and submitter's expert evidence was lodged on 24 February. The hearing commenced on 10 March and adjourned on 8 May so that the Decision-Making Committee could more fully consider the information provided during the hearing. The Committee exercised its delegated powers to extend the time period for completing a hearing and formally closed the hearing on 19 May. The decision was publicly released on 18 June 2014.

The following sections describe the marine consent process in more detail. They apply to both the notified and non-notified process tracks unless otherwise specified.

Application

An application for a marine consent must be lodged with the EPA and must include an impact assessment.[60] The impact assessment must be in such detail that corresponds to the scale and significance of the environmental effects and must:[61]

- Describe the activity for which consent is sought
- Describe the current state of the area where it is proposed that the activity will be undertaken and the environment surrounding the area
- Identify the effects of the activity on the environment and existing interests
- Identify persons whose existing interests are likely to be adversely affected by the activity
- Describe any consultation undertaken
- Include copies of any written approvals to the activity
- Specify any possible alternative locations for, or methods for undertaking, the activity that may avoid, remedy, or mitigate any adverse effects
- Specify the measures that the applicant intends to take to avoid, remedy, or mitigate the adverse effects identified

The level of detail must correspond with the scale and significance of the effects that the activity may have on the environment and existing interests. It must be sufficient to enable the EPA and persons whose existing interests may be affected to understand the nature of the activity, and its effects on the environment and existing interests.[62]

The EPA may return an application as incomplete, if it decides that it does not include any information that is required by the Act, or does not comply with the impact assessment requirements.[63]

Case law on the completeness of marine consent applications

In *Greenpeace of New Zealand Inc v The Environmental Protection Authority* [2013] NZHC 3482 Greenpeace sought judicial review of a decision by the EPA to accept as complete an impact assessment submitted by Anadarko. Greenpeace alleged that the EPA erred in law as the impact assessment included as an appendix the discharge management plan (required by Maritime New Zealand under the Maritime Transport Act 1994), but did not include its annexes, which included oil spill modelling reports, the emergency response plan, and the oil spill contingency and well control contingency plan. The High Court found that the EPA's role under section 41 does not involve any assessment of the merits of the content of the impact assessment, and is limited to assessing whether the application contains information about the required matters. The application for judicial review was unsuccessful.

Further information

The EPA may request an applicant to provide further information relating to the application. The EPA is required to provide a copy of any further information provided by the applicant to every submitter.

The EPA may commission an independent review of the impact assessment, or seek advice on any other aspect of an application for a marine consent, and must make any reports or advice available to the applicant and submitters.

Application of further information provisions

During the Trans-Tasman Resources marine consent process the EPA made two requests for further information. These can be viewed on the EPA website.[64] The EPA also commissioned independent technical reviews in relation to 10 topics and independent peer reviews in relation to seven topics. These can also be viewed on the EPA website.[65] The independent peer reviewers participated in expert conferencing and presented evidence to the Decision-Making Committee.

Notification

Notified discretionary marine consent applications will be publicly notified and any person may make a submission to the EPA within 20 working days of notification.

Non-notified discretionary marine consent applications will not be publicly notified. However, a copy of the application must be provided to iwi authorities, customary marine title groups and protected customary rights groups that the EPA considers may be affected by the application. The EPA may also serve a copy of the application on the following parties:[66]

- Ministers with responsibilities that may be affected by the activity for which consent is sought
- Maritime New Zealand
- Persons with existing interests that may be affected by the application
- Regional councils whose regions may be affected by the application

Pre-hearing dispute resolution

In the notified process, the EPA may request the applicant and submitters to meet to discuss matters in dispute or enter mediation to resolve a dispute on a 'without prejudice' basis. The person who conducts the meeting or mediation must report to the EPA, and the persons who were at the meeting or mediation, on the outcome of the meeting or mediation.

Hearing

Non-notified process

Where an application is processed on a non-notified basis, a hearing may be held if the EPA considers it necessary or desirable, but must be held if the applicant requests a hearing.[67] If a hearing is held, the applicant may speak and call evidence.

Notified process

Where an application is publicly notified, a hearing may be held if the EPA considers it necessary or desirable, but must be held if the applicant or a submitter requests a hearing. The hearing must commence within 40 working days of the close of submissions. The applicant and submitters must be given at least 20 working days' notice and the hearing must be completed within 40 working days after the first day of the hearing.[68] The EPA has discretion to extend specified time periods specified in the EEZ Act or in regulations and to waive a failure to comply with service requirements.[69]

The procedure for a hearing is determined by the EPA, but is required to be fair and appropriate in the circumstances. In determining an appropriate and fair procedure for a hearing, the EPA must avoid unnecessary formality, recognise tikanga Māori where appropriate, and receive evidence written or spoken in Māori.

At a hearing, the applicant and submitters who requested to be heard may speak (either personally or through a representative) and call evidence. No person may question a party or witness (i.e. undertake cross-examination) unless the EPA gives permission.

The EPA may require briefs of evidence to be provided prior to the hearing. In such a case, the applicant will need to provide briefs of evidence at least 15 working days prior, and submitters will need to provide briefs of evidence at least 10 working days prior. The EPA may direct that evidence and submissions be recorded, taken as read, limited to matters in dispute or may direct the applicant or submitters to present within a time limit.

Making a decision

The EPA may grant a consent (in whole or in part) or refuse an application. The EPA may refuse an application if it considers that it does not have adequate information to determine it. If the EPA grants the application, it may issue the consent subject to conditions. The decision on an application for a discretionary marine consent must be issued within 20 working days after the conclusion of the hearing. For non-notified discretionary activities, the decision must be made as soon as is reasonably practicable, and no later than 50 working days after the application is accepted as complete.

Decision-making criteria

When the EPA is considering an application for marine consent and submissions it must 'take into account' a number of criteria as identified in section 59(2) of the EEZ Act (see Figure 3.7).

- Any effects on the environment or existing interests of allowing the activity, including cumulative effects and effects that may occur in New Zealand or beyond our jurisdiction
- The effects on the environment or existing interests of other activities undertaken in the area covered by the application or in its vicinity, including the effects of activities that are not regulated under the EEZ Act and effects that may occur in New Zealand or beyond our jurisdiction
- The effects on human health that may arise from effects on the environment
- The importance of protecting the biological diversity and integrity of marine species, ecosystems, and processes
- The importance of protecting rare and vulnerable ecosystems and the habitats of threatened species
- The economic benefit to New Zealand of allowing the application
- The efficient use and development of natural resources
- The nature and effect of other marine management regimes
- Best practice in relation to an industry or activity
- The extent to which imposing conditions under section 63 might avoid, remedy, or mitigate the adverse effects of the activity
- Relevant regulations
- Any other applicable law
- Any other matter the EPA considers relevant and reasonably necessary to determine the application

Figure 3.7 Matters to be taken into account when condsidering a marine consent application

The requirement to 'take into account' matters in section 59(2) is a deliberate legislative contrast with the language 'recognise and provide for' which is used in section 6 of the RMA. 'Recognise and provide for' means that actual provision must be made for the listed matters. In contrast, the obligation to 'take into account' requires the decision-maker to consider each matter, to weigh it up with other relevant factors, and to give it the weight that is appropriate in the circumstances.[70]

There is no explicit internal hierarchy between the matters listed in section 59(2). The importance of each matter will vary depending of the factual context of each application, the nature of the environment, and the extent and nature of existing interests. However, the words 'the importance of protecting' indicate an emphasis is to be placed on the protection of the intrinsic value of important biological resources.[71]

The definition of 'effect' includes cumulative effects. Therefore, the specific reference to 'cumulative effects' in this subsection, in addition to its inclusion in the effects definition, emphasises the importance of considering cumulative impacts on the marine environment. There are two reasons why this emphasis is required. First, there are practical difficulties in identifying and managing cumulative effects such that it would be tempting to put such assessments in the 'too hard box'. Second, there are no planning

documents under the EEZ Act, and therefore less opportunity for strategic decision-making to provide a framing to consider individual proposals (although regulations to achieve this can be developed).

The term 'rare and vulnerable ecosystems' is not defined in the EEZ Act. This relates to ecosystems, as opposed to individual species. 'Rare' indicates that the ecosystem is not widespread. 'Vulnerable' indicates that an ecosystem may be sensitive to disturbance. The EEZ Act defines 'threatened species' as including 'any species that falls within the definition of threatened species in section 2(1) of the Biosecurity Act 1993, or is declared to be a threatened species or an at-risk species by the Minister of Conservation under section 19'.[72] On 11 July 2013, the Minister of Conservation declared the marine species listed in the New Zealand Threat Classification System, including dolphin, seabird, fish and invertebrate species, to be 'threatened' for the purpose of the EEZ Act.[73]

Where a replacement consent is being sought, the EPA must also have regard to the value of the investment in the activity of the existing consent holder. The requirement to 'have regard to' has a similar meaning to 'take into account'.

In considering an application, the EPA must not have regard to trade competition, the effects on climate change of discharging greenhouse gases into the air, or effects on the existing interests of persons who have given written approval to the activity.[74]

Environmental compensation

Current best practice environmental management utilises a 'no net loss' approach and uses environmental compensation to address effects which cannot be avoided, remedied or otherwise mitigated (discussed in Chapter 2: Marine management). Environmental compensation is commonly adopted for large projects consented under the RMA, despite there being no explicit provision for offsetting in that Act. Therefore, while the EEZ Act also does not expressly refer to compensation or offsetting, RMA experience suggests that environmental compensation may be an available approach for addressing effects of activities in the EEZ and continental shelf.

Consent conditions

The conditions that the EPA may impose include:[75]

- Providing a bond for the performance of any condition
- Obtaining and maintaining public liability insurance of a specified value
- Monitoring and reporting on the consent and the effects it authorises
- Appointing an observer to monitor the activity and its effects
- Making records related to the activity available for audit

Marine consent conditions will need to satisfy the Newbury principles (which are applicable to resource consent conditions) to be valid.[76] These are:[77]

- Principle 1 – conditions must be for resource management purposes
- Principle 2 – conditions must relate to the authorised development
- Principle 3 – conditions must be reasonable

In addition, marine consent conditions will be invalid if they are not certain and enforceable and within the consent authority's power to impose.[78]

Comment on marine consent conditions

Conditions need to have an evidential basis and be able to be reasonably achieved and monitored.[79] The Trans-Tasman Resources Decision-Making Committee was concerned that the extent of changes made to the proposed conditions throughout the hearing (with the final set provided with the closing submissions) meant that it was uncertain whether there was an evidential base for the conditions and whether they could actually and reasonably be achieved and monitored.

Cross-boundary activities

The EEZ Act provides for a joint application process for cross-boundary activities which are managed under both the RMA and the EEZ Act. A person who intends to undertake a cross-boundary activity may:[80]

- Prepare a joint consent application that complies with the requirements of the RMA and the EEZ; or
- Apply for a marine consent and a resource consent separately (either concurrently or at different times)

Where consents are applied for separately, the EPA may decide that the marine consent application ought to be processed and heard with an application for a resource consent. The EPA can only make such a decision before or during the processing of an application for marine consent. It is not clear whether this allows such a decision to be made after a marine consent hearing has commenced. The EPA also has the power to sever a joint application if the applications are sufficiently unrelated that a joint process is not necessary, the hearing processes are sufficiently different, or joint processing would not be administratively efficient.[81]

Any joint application process is to be administered by the EPA. However the EPA and the consent authority must make separate decisions based on the relevant criteria under the EEZ Act and RMA respectively. There is also a process set out for when an application for consent for a nationally significant cross-boundary activity has been referred to the Board of Inquiry.[82]

Comment on relevance of RMA documents

The Trans-Tasman Resources Decision-Making Committee noted that there is no requirement for marine consent applications to give effect to the RMA and its subordinate documents. However it observed that the proposed activity would cause effects in the coastal marine area and the NZCPS, regional policy statement and regional coastal plan give guidance as to the important values within the coastal marine area and how sustainable management (in the RMA sense) is to be achieved.[83] The Committee determined that the proposed activity would not satisfy the relevant policies of these documents. It stated:

> *While that finding does not preclude us granting marine consents under the EEZ Act … they provide important guidance as to whether the potential effects of the proposal, as mitigated, are acceptable in the marine environment.*[84]

Existing interests

The EEZ Act defines an existing interest to mean an interest in any lawfully established existing activity, any activity authorised by an existing marine consent or resource consent, the settlement of a historical or contemporary claim under the Treaty of Waitangi, or a protected customary right or customary marine title.[85] A consent application that is publicly notified must also be served on any iwi authorities, customary marine title groups or protected customary rights groups the EPA considers may be affected by the application and any other persons the EPA considers have existing interests that may be affected by the application.[86] When a marine consent application is considered, the EPA must take into account the effects on existing interests of allowing the activity and the effects on existing interests of other activities undertaken in the application area or in its vicinity.[87] When determining the extent of adverse effects on existing interests the EPA must have regard to: the area the activity would have in common with the existing interest; the degree to which the activity and the existing interest must be carried out to the exclusion of other activities; whether the existing interest can only be exercised in the area to which the application relates; and any other relevant matter.[88]

Exercising marine consents

Commencement and duration

A marine consent that has been granted commences when the time for lodging appeals expires and no appeal has been lodged, when the High Court determines all appeals, or when all appeals are withdrawn. A marine consent has a duration of 35 years unless otherwise specified in the consent.[89]

Review of marine consent

The EPA may review the duration or the conditions of a marine consent:[90]

1. At any time specified in the consent to deal with any adverse effects on the environment or for any other purpose specified in the consent
2. To ensure the conditions are consistent with regulations prescribing standards, methods or requirements

3. To deal with adverse effects on the environment that were not anticipated when the consent was granted or are of a scale or intensity that was not anticipated when the consent was granted
4. If the information provided by the applicant to the EPA contained inaccuracies that materially influenced the decision made on the application and the effects of the activity are such that more appropriate conditions are required
5. If information becomes available to the EPA that was not available when the consent was granted and shows that more appropriate conditions are required
6. If required by an order made following a person being convicted of an offence

The circumstances which allow the EPA to review consent duration or conditions are wider than those under the RMA. In particular, categories 3 and 5 above are not available under the RMA. This reflects the greater level of uncertainty in environmental management in the EEZ and continental shelf.

The EPA may change a condition, cancel a condition or impose a new condition. The EPA may cancel a consent if the review was commenced for any of the reasons identified at 3, 4, 5 or 6 above and the activity has significant adverse effects on the environment or existing interests.[91]

The EPA may extend the duration of a consent only if monitoring of the effects shows that the effects are minor or may be avoided, remedied or mitigated by imposing conditions. The EPA may shorten the duration of a consent only if the effects of the activity, or the scale or intensity of the effects, were not anticipated when the consent was granted and shortening the duration is the only way to avoid, remedy or mitigate the effects appropriately. In any case, the duration of the marine consent cannot extend beyond 35 years.[92]

The consent holder can also request the EPA to change or cancel a condition on marine consent. This application is determined in the same manner as an application for marine consent, unless it is limited to minor matters. It must be publicly notified unless it only affects some of the original submitters or existing interests or relates to minor matters.

Lapse and cancellation

A marine consent lapses on the date specified in the consent or five years after the commencement of the consent unless the consent is given effect to or the EPA grants an extension. A marine consent may be cancelled by the EPA if it has been exercised in the past but has not been exercised during the preceding five years.[93]

Transfer of marine consents

A marine consent may be transferred to another person, but not to another location.

Reconsenting

If a marine consent is due to expire, and the consent holder applies to the EPA for a new consent for the same activity at least six months prior to the expiry of the existing consent, the consent holder may continue to undertake the activity until the application is granted or declined and all appeals are determined.[94]

Offshore scientific research does not need a marine consent so long as a set of statutory requirements are met *(Raewyn Peart)*

Further reading and references

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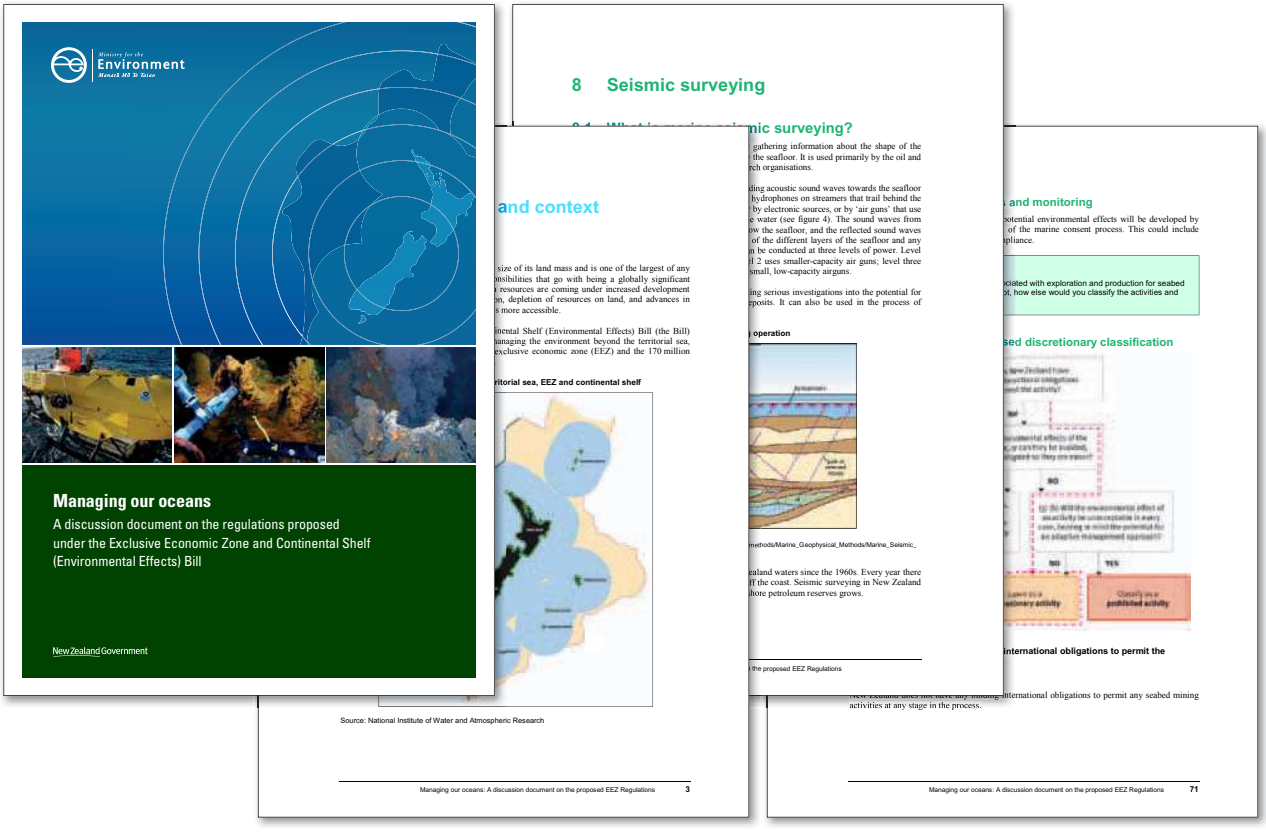

This discussion document, produced by the Ministry for the Environment, provides useful background to the classification of different activities within the EEZ under regulations

Endnotes

1 www.epa.govt.nz/EEZ
2 EEZ Act, section 10
3 Adams A, 2012, *Hansard*, 16 August, 2012, 682, NZPD 4492
4 *Trans-Tasman Resource Marine Consent Decision* (June 2014), at [86]
5 *Trans-Tasman Resource Marine Consent Decision* (June 2014), at [86]
6 *Environmental Defence Society Incorporated v The New Zealand King Salmon Company Limited* [2014] NZSC 38 at [25]
7 EEZ Act, section 64, defines an adaptive management approach as including 'allowing an activity to commence on a small scale for a short period so that its effects on the environment' can be monitored and 'the activity discontinued, amended or continued'
8 EEZ Act, section 61(5)
9 *Trans-Tasman Resource Marine Consent Decision* (June 2014), at [117] and [120]
10 *Trans-Tasman Resource Marine Consent Decision* (June 2014), at [123]
11 http://www.oxforddictionaries.com/definition/english/favoured?q=favoured
12 Fisheries Act 1996, section 10(d)
13 Trans-Tasman Resource Marine Consent Hearing Transcript, page 1931
14 *Trans-Tasman Resource Marine Consent Decision* (June 2014), at [138]
15 *Trans-Tasman Resource Marine Consent Decision* (June 2014), at [139]
16 *Golden Bay Marine Farmers v Tasman District Council* W19/2003 at [405]
17 *Crest Energy Kaipara Limited v Northland Regional Council* A132/09
18 EEZ Act, section 61(3)
19 *Sustain Our Sounds Incorporated v The New Zealand King Salmon Company Ltd* (2014) at [129]
20 *Sustain Our Sounds Incorporated v The New Zealand King Salmon Company Ltd* (2014) at [133]
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4

Kaitiakitanga

Ngāti Paoa waka at Karaka Bay, Auckland *(Raewyn Peart)*

Contents

Introduction

Iwi nationally are involved in a range of commercial sectors including tourism, property development, seafood and forestry. Māori own around half of the aquaculture industry and about one-fifth of the fishing industry. Some have interests in other marine ventures, such as marinas and marine tourism.

Such developments can be entirely consistent with kaitiakitanga, both in terms of protection of the environment, and in its utilisation. Often tensions arise within iwi regarding development proposals. Whereas a mainstream developer will endeavour to meet legislative constraints, an iwi will also need to ensure that its development aspirations meet its beneficiaries' expectations of commercial gain as well as the requirements of kaitiakitanga. This can produce a far more stringent set of conditions than other developers face.

Scope of kaitiakitanga

The connection between land management and impacts on the marine environment are critical to coastal Māori. Gathering kaimoana, both for sustenance and to provide for visitors, is an integral component of Māori life. When these resources are compromised by inappropriate development, a way of life is also compromised. 'Kaitiakitanga' is now part of the vocabulary of environmental managers in New Zealand, but is often not well understood.

There are statutory definitions of kaitiakitanga. However, unlike other terminology in environmental law, there is little case law or published best practice to guide practitioners in its application. The following description acknowledges the statutory definitions, but provides an understanding within a broader cultural context.[1]

The Ngai Tai Umupuia Te Waka Totara Trust exercising kaitiakitanga at Umupuia Beach, Auckland *(Raewyn Peart)*

Kaitiakitanga is already acknowledged in legislation and is defined as follows: '… the exercise of guardianship by the tangata whenua of an area in accordance with tikanga Māori in relation to natural and physical resources, and includes the ethic of stewardship' (section 2, RMA); and '… the exercise of guardianship; and, in relation to any fisheries resources, includes the ethic of stewardship based on the nature of the resources, as exercised by the appropriate tangata whenua in accordance with tikanga Māori' (section 2, Fisheries Act 1996).

Concern has often been expressed that present legal definitions do not fully express what kaitiakitanga is about, and that any attempt to define it in anything other than te reo Māori will always be insufficient.

The Aquaculture Steering Group offered the following ideas in order to generate discussion on the concept of kaitiakitanga. Kaitiakitanga contains many elements that can be described as:

- Mahi tapu – god-given and handed down through our tipuna
- Founded in whakapapa – the relationship between everything and everybody in the natural world. There is no distinction between people and their environment.
- Exercised on behalf of, and for the benefit of, all who are related through whakapapa
- A set of inalienable responsibilities, duties and obligations that are not able to be delegated or abrogated
- A web of obligations: to the taonga, to the atua, to ourselves and to our uri (descendants). Kaitiaki have a responsibility to provide for everyone and ensure everyone benefits.
- Independent of 'ownership' in a European sense. As on land, kaitiaki responsibilities are independent of others who hold 'ownership' or use rights under the law. For example, although as kaitiaki, iwi/hapū may 'own' only a percentage of the total marine farming space in a region under existing law, they still hold kaitiaki responsibilities over the whole area in accordance with tikanga
- Seamless and all-encompassing – making no distinction between moana (sea) and whenua (land)
- Given effect at whanau and hapū level
- Expressed in ways that are appropriate to the place and to the circumstances, according to tikanga
- Wider and more complex than existing legal definitions
- Given practical effect by exercising control over access to resources and sharing the benefits of the use of those resources
- Enabled through rangatiratanga, which includes the authority that is needed to control access to and use of resources, and to determine how the benefits will be shared. This means that it can be expressed in part through the concepts of 'ownership', 'property', 'title' or 'stewardship'. However, it is much wider than any of these.

Figure 4.1 Description of kaitiakitanga

There are a number of key messages in the description in Figure 4.1. Kaitiakitanga is integrated with the spiritual, cultural and social life of tangata whenua; is holistic across land and sea; includes people within the concept of environment; is locally defined and exercised; does not focus on ownership, but on authority and responsibility; and is concerned with both sustainability of the environment and the utilisation of its benefits. This concept of kaitiakitanga contains the purpose of the RMA (sustainable management of resources); and that of the Fisheries Act (sustainability and utilisation), but is broader than each of these concepts.

Traditionally, kaitiaki had a guardian and stewardship role for natural resources. Whilst individuals may have had specific roles, these were all exercised in terms of a collective responsibility determined through whakapapa and tikanga. The allocation and distribution of the benefits from those resources were further kaitiaki responsibilities. Tribal mana has, in most aspects of natural resources, been supplanted by legal ownership and statutory regulation. Adapting traditional kaitakitanga to today's changed circumstances is a major challenge for tangata whenua.

In practice, natural resources are managed either directly by those having formal legal ownership, or indirectly through the exercise of statutory authority. The proportion of land and resources owned by Māori is small compared with that in non-Māori private ownership and included in the Crown Estate. However, Māori ownership of resources is more significant in the marine area than on land.

This provides greater opportunity to exercise kaitakitanga in respect of marine resources.

Iwi as marine resource managers

In 2010, Māori were estimated to control up to 37 per cent of fisheries quota.[2] In addition, they own around 50 per cent of the aquaculture industry and this proportion is likely to increase as more space for aquaculture is created. Three iwi/Māori-owned (or part-owned) companies are among the five largest fishing companies in the country; Aotearoa Fisheries Limited,[3] Sealord Group Limited (50 per cent Māori ownership through Aotearoa Fisheries Limited) and Ngāi Tahu Fisheries Settlement Limited (100 per cent Ngāi Tahu-owned).[4]

There are 57 iwi (or groups of iwi[5]) recognised in the Māori Fisheries Act 2004. The distribution of fisheries assets to these groups is currently being implemented by Te Ohu Kai Moana.

Relevant legislative provisions

Many pieces of legislation which apply to the marine area have general provisions of relevance to the exercise of kaitiakitanga.

Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012

The EEZ Act does not contain legislative recognition of kaitiakitanga. The Act states that its provision for a Māori Advisory Committee, iwi feedback on regulations, consideration of existing interests, and notification of consent applications to iwi ensures the legislation gives effect to the principles of the Treaty of Waitangi (described more fully in Chapter 3: Exclusive Economic Zone legislation).[6]

The Māori Advisory Committee provides advice to the EPA on matters relating to policy, process and decisions of the EPA. The advice and assistance is given from a Māori perspective. Iwi authorities (as well as the public, regional councils and persons whose existing interests are likely to be affected) are notified of proposed regulations and given adequate time and opportunity to comment on them.

Iwi authorities, customary marine title groups[7] and protected customary rights groups[8] are to be notified of a marine consent application if the EPA considers they may be affected. Full rights of participation (along with everyone else) allow kaitiakitanga to be addressed in submissions and at hearings.

Affected iwi authorities, customary marine title groups and protected customary rights groups are to be notified of a marine consent application which is for a non-notified activity. Ministers, Maritime New Zealand, persons with existing interests that may be affected, and affected regional councils may also be notified. However, such notification does not include the right to make a submission on the application. Unless the EPA specifically requires information from groups notified (under section 44), there is limited opportunity for these Māori groups to give feedback, potentially inhibiting the ability of Māori to undertake their kaitiakitanga responsibilities.

When considering an application for a marine consent, the EPA must take into account any effects on existing interests of allowing the activity. This is particularly relevant to iwi fishing interests. The EPA must also have regard to any advice received from the Māori Advisory Committee.

Resource Management Act

The RMA includes a requirement for decision-makers to have particular regard to kaitiakitanga[9] and this provides a tool to assist with providing for 'the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, wāhi tapu, and other taonga' under section 6(e). In addition, section 8 requires decision-makers to 'take into account' the principles of the Treaty of Waitangi.

RMA, Section 8, Treaty of Waitangi

In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi).

The legislative recognition of kaitiakitanga in the RMA provides, in principle, an opportunity for the implementation of traditional practices as well as for greater public appreciation of their nature. Many tangata whenua resource management/kaitiaki units have

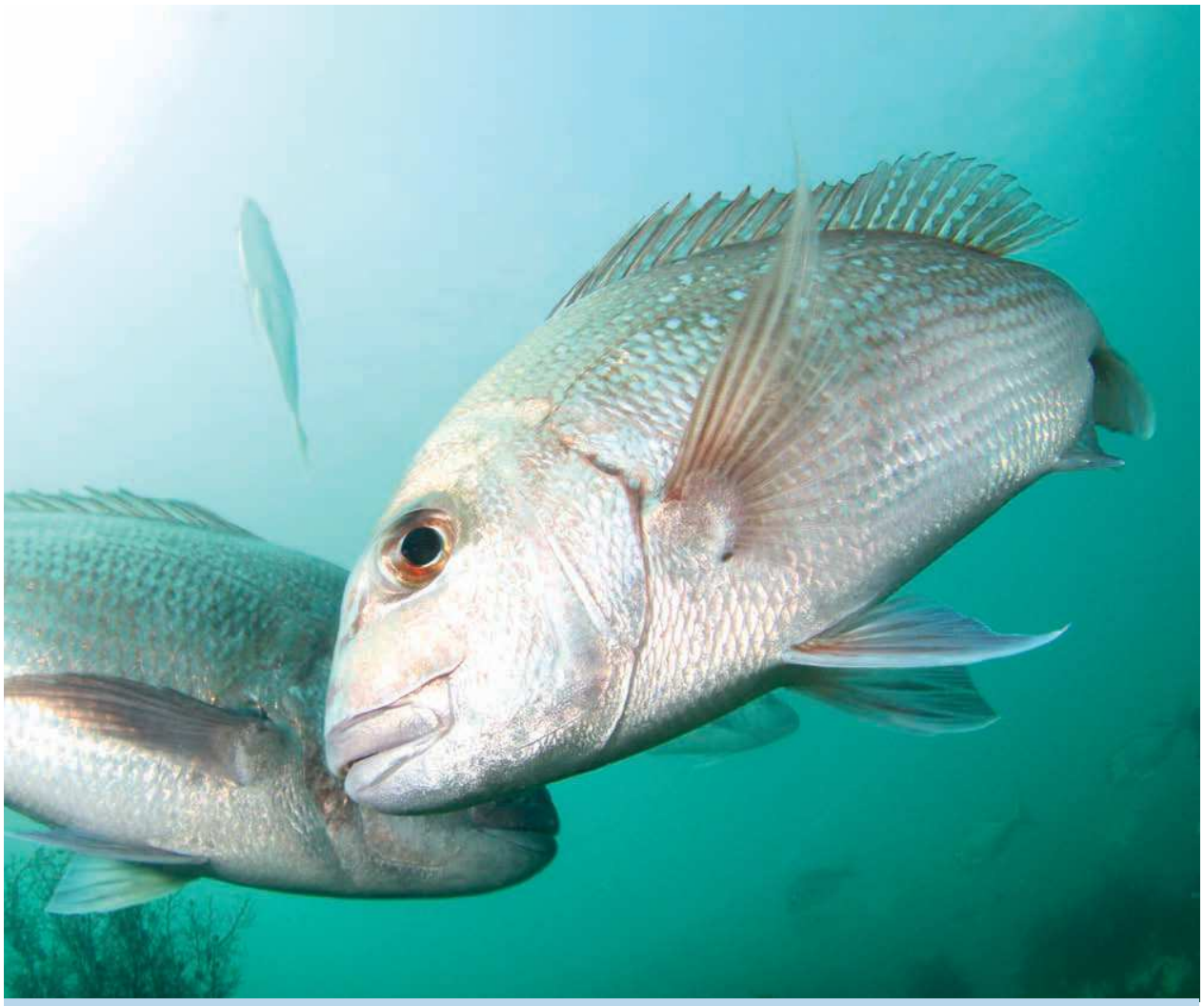
been established since the RMA came into force in 1991, and most public agencies now recognise that they have obligations to respond to them. Developers and their advisors also now have a greater appreciation of the nature of kaitiakitanga. In addition, the open public processes of the RMA have enabled public debate on the application of kaitiakitanga. However, because Māori organisations have frequently entered into RMA processes to defend their values in opposition to development or planning initiatives, kaitiakitanga has been characterised principally as a mechanism for conservation or protection. The utilisation aspect of kaitiakitanga is generally overlooked.

Māori Commercial Aquaculture Claims Settlement Act

Separate aquaculture settlement legislation, the Māori Commercial Aquaculture Claims Settlement Act 2004, requires 20 per cent of marine farm space created since 1992 to be allocated to iwi. The 2011 aquaculture law reforms provide for 'the 20% obligation' to be delivered through regional agreements which may include space, cash, or anything else that is agreed. The Minister responsible for aquaculture has a power to issue a *Gazette* notice to set aside space in the coastal marine area while regional agreements are being negotiated. These are called 'Aquaculture Settlement Areas'. Within such areas, authorisations will give iwi the exclusive right to apply for consent for aquaculture activities in that space.

Fisheries Act

The exercise of Māori fishing rights, and application of kaitiakitanga to them, is undertaken within the framework of the Fisheries Act and related regulations.



Māori have ownership of a substantial amount of fisheries quota, including for snapper, which is shown here *(Daniel Sharp)*

Customary commercial fishing rights

Māori have a long history in commercial fishing. They were trading in fish domestically prior to European arrival, and were actively involved in commercial fishing for provision to European explorers and settlers from Captain Cook's time onwards. Under the Treaty of Waitangi, Māori were guaranteed 'undisturbed possession' of their fisheries until they wished to dispose of them to the Crown.[10] Subsequent fisheries legislation and management regimes failed to uphold this guarantee. Over time, Māori found themselves largely dispossessed of their fisheries through depletion, habitat degradation and finally through the introduction of the Quota Management System (QMS) in the early 1980s which took away commercial fishing rights from part-time fishers, many of whom were Māori.

This brought the issue of Māori fishing rights to a head. The implementation of the QMS led to particular concern by Māori that rights to fisheries guaranteed under the Treaty of Waitangi were being alienated by the Crown. In 1987 the High Court granted claimants relief through an injunction on the further implementation of the QMS pending settlement of the claims.

At that time, the Waitangi Tribunal was already considering claims in respect of fisheries resources and the 1988 Muriwhenua report found that the Crown was in breach of Treaty obligations. Significantly, the Tribunal found that the QMS was a fit and proper system for the management of fisheries, but that allocation of rights had not recognised the Māori interest.

This finding led to the interim settlement of claims legislated in the Māori Fisheries Act 1989, which provided for 10 per cent of all existing quota to be provided to Māori by the Crown. As a result, government bought back 10 per cent of the quota shares it had given to fishers under the QMS, and transferred these to the Treaty of Waitangi Fisheries Commission, for the benefit of Māori.

A further report by the Tribunal on claims by Ngāi Tahu found a more extensive 'development interest' was inherent in the Treaty provisions and history of Māori fishing. This led to further negotiations between Māori and the Crown, culminating in the full and final settlement of commercial claims to fisheries in 1992. This involved government giving Māori a cash settlement that was used to buy half of New Zealand's biggest fishing company, Sealord. The government also agreed to give Māori 20 per cent of the commercial quota shares of any new species brought into the QMS.[11]

The result of these settlements is that Māori customary commercial fishing rights are managed under the QMS in the same way as other commercial fishing interests.[12]

Customary non-commercial fishing rights

Provision for Māori customary non-commercial fishing rights has been less well defined. The Waitangi Tribunal reports contain useful information on traditional fishing practices and associated rights. However there has as yet been no systematic investigation into the nature and extent of non-commercial customary fishing rights.

The legislation providing for the Sealords Deal also addressed non-commercial rights and interests to some extent. It provided that:[13]

- Māori non-commercial fishing claims would continue to give rise to Treaty obligations on the Crown
- The Minister would 'develop policies to help recognise use and management practices of Māori in the exercise of non-commercial fishing rights'
- The Minister should recommend the making of regulations 'to recognise and provide for customary food gathering by Māori and the special relationship between tangata whenua and those places which are of customary food gathering importance (including tauranga ika and mahinga mataitai), to the extent that such food gathering is neither commercial in any way nor for pecuniary gain or trade'

The Sealord legislation also provided that 'the rights or interests of Māori in non-commercial fishing' shall have no legal effect except to the extent that they are provided for in regulations made under the Fisheries Act. As a result, Māori rights to customary non-commercial harvest are now limited by regulatory provisions.

'Maori customary non-commercial fishing interests' are allowed for under the Fisheries Act 1996 when setting the total allowable commercial catch.[14] But the main mechanism for providing for such interests is through the provisions of the Fisheries (Kaimoana Customary Fishing) Regulations 1998 and the Fisheries (South Island Customary Fishing) Regulations 1999. These provide for Māori to manage 'customary food gathering' through the appointment of kaitiaki who can issue permits to authorise the harvest of fish in their area. Implementation of these regulations is still incomplete around the country and much of the current Māori non-commercial fishing activity is undertaken under the recreational fishing regulations (described in Chapter 16: Marine recreation and tourism). The fisheries regulations also provide for the establishment of mātaitai reserves which are discussed below.

Application of kaitiakitanga to Te Whata Kai o Rakihouia i Te Tai o Marokura – Kaikōura Marine Area

The Kaikōura (Te Tai o Marokura) Marine Management Act 2014 puts in place management measures for the Kaikōura marine environment. These were developed through a process spearheaded by Ngāti Kurī called to Korowai. The measures include a marine reserve, whale and New Zealand fur seal sanctuaries, five customary fisheries areas, an advisory committee and fishing regulations. The three mātaitai and two taiāpure reserves are open to recreational fishing, though may be subject to special rules as determined by their governing committees. The Act establishes the Kaikōura Marine Guardians. The Minister of Conservation and Minister for Primary Industries may appoint and remove members and may disestablish the group. The Guardians may provide advice on any biosecurity, conservation or fisheries matter related to Te Whata Kai o Rakihouia i Te Tai o Marokura — Kaikōura Marine Area to relevant Ministers. The Ministers are required to take the Guardians' advice into account.

Boundaries of the Te Taumanu o Te Waka a Māui Taiāpure in Kaikōura

Marine and Coastal Area (Takutai Moana) Act

In 2003, the Court of Appeal found that Māori customary rights in the foreshore and seabed had not been extinguished and that the Māori Land Court had jurisdiction to conduct investigations into the title of the foreshore and seabed.[15] The Crown's response was the enactment of the Foreshore and Seabed Act 2004. This reflected Government concerns that the great majority of New Zealanders understood that the foreshore and seabed was owned by the Crown on behalf of all New Zealanders. The Act vested ownership of the foreshore and seabed, except for those areas already in freehold title, in the Crown, while providing limited recognition of customary title through customary rights orders and territorial customary rights orders.

In its report on the Crown's Foreshore and Seabed Policy (known as Wai 1071), the Waitangi Tribunal found that the policy underpinning the legislation was in breach of the Treaty of Waitangi. It also failed in terms of wider norms of domestic and international law, including the rule of law, and the principles of fairness and non-discrimination against a particular group of people. Criticism was also voiced by the United Nations Commission on Human Rights which recommended that the Foreshore and Seabed Act be repealed.

Much Māori settlement was closely related to the marine environment, as shown here by the Hukatere Marae on the Kirikiri inlet, Kaipara Harbour *(Kevin L Jones)*

In response to the ongoing debate a review was conducted which led to the enactment of the Marine and Coastal Area (Takutai Moana) Act 2011. The new legislation defines a 'common marine and coastal area' which includes the marine and coastal area, excluding existing freehold title and areas owned by the Crown as conservation areas, national parks or reserves. It states that the common marine and coastal area has a 'special status' and that neither the Crown nor any other person owns, or is capable of owning it.[16] Every person has the right to enter, pass over, and engage in recreational activities in the common marine and coastal area.[17]

Marine and Coastal Area (Takutai Moana) Act, section 9, interpretation

Marine and coastal area:

(a) means the area that is bounded,—

(i) on the landward side, by the line of mean high-water springs; and

(ii) on the seaward side, by the outer limits of the territorial sea; and

(b) includes the beds of rivers that are part of the coastal marine area (within the meaning of the Resource Management Act 1991); and

(c) includes the airspace above, and the water space (but not the water) above, the areas described in paragraphs (a) and (b); and

(d) includes the subsoil, bedrock, and other matter under the areas described in paragraphs (a) and (b)

Any claims to the common marine and coastal area made before the commencement of the Act are to be transferred to the High Court whose jurisdiction to consider such claims is codified in the legislation. The Act also provides for recognition of customary rights through:

- Protected customary rights – a right that has been exercised since 1840 and continues to be exercised in accordance with tikanga by the applicant group and is not extinguished as a matter of law[18]
- Customary marine title – where the applicant group holds the specific area in accordance with tikanga, and has exclusively used and occupied it from 1840 to the present day without substantial interruption, or received it after 1840 through a customary transfer

The implications of these rights for coastal management include:

- The holders of customary marine title have greater rights of participation in plan-making and the protection of protected customary rights is a matter of national importance that must be recognised and provided for in all plan-making
- There are additional rights associated with notification. Local authorities are required to assess whether protected customary rights groups or customary marine title groups will be affected by a resource consent application, and give limited notification to groups where they are affected
- There are financial implications as no coastal occupation charge may be imposed on a protected customary rights group or customary marine title group
- The local authority is required to monitor the exercise of protected customary rights in its region
- There are limitations on other activities occurring in protected customary rights or customary marine title areas

Other statutes

The exercise of kaitiakitanga has been enhanced through recognition in a variety of statues. The Conservation Act does not refer to kaitiakitanga, but in section 4 requires that the 'Act shall so be interpreted and administered as to give effect to the principles of the Treaty of Waitangi'. While in principle this can empower kaitiakitanga, it has also led to conflict. For example, the Department of Conservation often works constructively with iwi on management of threatened species. But conflict has arisen over some marine reserve proposals where the protectionist approach of excluding all harvest is seen as being inconsistent with tangata whenua perspectives of customary fisheries rights. The permanence of marine reserves differs significantly from traditional marine management mechanisms such as rā hui. Under a rāhui, closure of harvest could be imposed to rebuild stocks, but rarely with permanence.

The Heritage New Zealand Pouhere Taonga Act 2014 does not specifically include reference to kaitiakitanga, but its purposes in section 3 and principles in section 4 include 'recognising the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, wāhi tupuna, wāhi tapu, and other taonga'. In practice much of the work of iwi resource management units is with heritage management, under both the RMA and the Heritage New Zealand Pouhere Taonga Act.

Waharoa (customary gateway) on the Rangitoto Wharf, Hauraki Gulf *(Raewyn Peart)*

Marine management tools

Mātaitai reserves

Mātaitai reserves can be declared under the Fisheries (Kaimoana Customary Fishing) Regulations or the Fisheries (South Island Customary Fishing) Regulations on application by tangata whenua. These are areas which are recognised traditional fishing grounds, with which tangata whenua have a special relationship. The reserve is managed by tangata tiaki/kaitiaki chosen by the tangata whenua. The tangata tiaki/kaitiaki can restrict or prohibit fishing in the mātaitai reserve by recommending bylaws. Although the bylaws apply to any person fishing in the area, fishing for the purposes of sustaining the functions of a marae may continue if authorised by the tangata tiaki/kaitiaki.

There is a clear process for establishing mātaitai, with an application being lodged by the tangata whenua or tangata tiaki/kaitiaki (who has been confirmed by the Minister) with the Ministry for Primary Industries. Before approving the application, the Minister must be satisfied that a special relationship exists between the tangata whenua and the proposed reserve, that the general management aims are consistent with the sustainable use of fisheries resources in the area, and that the area is an identified traditional fishing ground and is of a size which can be effectively managed by tangata whenua. In addition, the Minister must also be satisfied that the reserve will not unreasonably affect the ability of the local community to take fish for non-commercial purposes or prevent persons taking their quota or annual catch entitlement within the quota management area for that species.

Once a mātaitai reserve is established, commercial fishing is not allowed unless it is re-instated by regulation. The regulations must be recommended by the tangata tiaki/kaitiaki, and apply to specified species, restricted by quantity or time period. Māori and non-Māori may fish in mātaitai reserves.

Taiāpure and rāhui

Part 9 of the Fisheries Act also creates opportunities for the practical application of kaitiakitanga through the establishment of taiāpure and the temporary closure of fishing areas (rāhui). These recognise and make provision for the use and management practices of tangata whenua.

Maketū Estuary is part of a taiāpure established in 1996 *(Raewyn Peart)*

The purpose of taiāpure is to make better provision for the recognition of estuarine or littoral coastal waters that have customarily been of special significance to iwi or hapū either as a source of food or for spiritual or cultural reasons. A management committee representative of the local Māori community is appointed by the Minister for Primary Industries and it advises the Ministry on regulations to manage the area. These may include restrictions on the species and quantities that may be harvested, size limits, when fish may be taken, the fishing methods that can be used, and the areas from which species may be taken. Unlike in a mātaitai reserve, taiāpure allow commercial fishing.

Section 186A of the Fisheries Act provides for the temporary closure of fishing areas or restriction on fishing methods to recognise and make provision for the use and management practices of tangata whenua (similar to the traditional practice of rāhui). These provisions are used from time to time to allow depleted stocks to recover, often in the case of shellfish.

A rāhui was placed on the taking of green-lipped mussels in Ohiwa Harbour during 2008 *(Raewyn Peart)*

Mount Maunganui Mātaitai Reserve

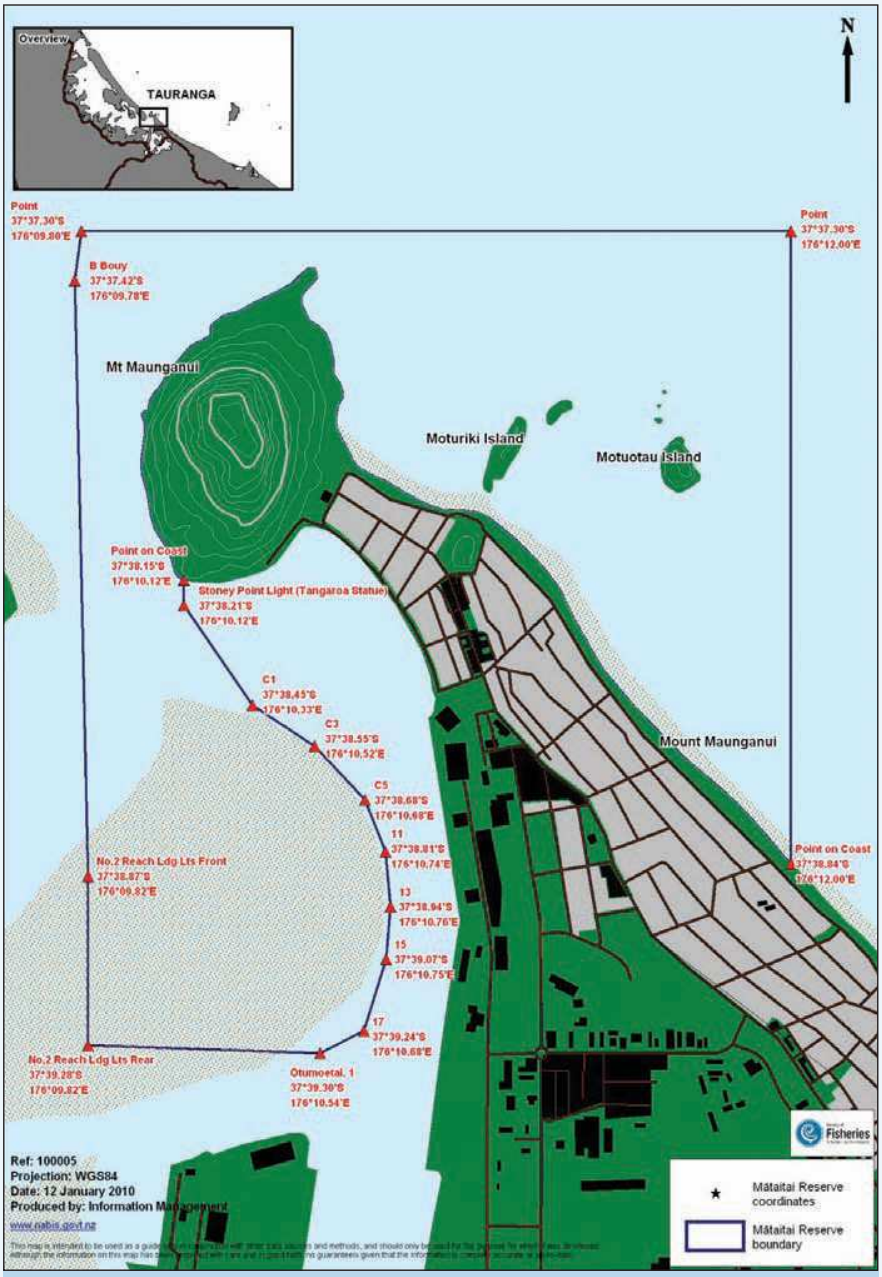
The Mount Maunganui Mātaitai Reserve, established in 1998, covers the waters surrounding Mount Maunganui and part of Tauranga Harbour. It recognises the strong and enduring connection that local hapū have with this area.[19]

The local Tauranga Moana, Ngaiterangi, Ngāti Ranginui and Ngāti Pukenga advise the Ministry for Primary Industries directly on how best to manage fishing in the reserve. Commercial fishing is banned within the 6 square kilometre reserve area, but recreational and customary fishing is still allowed, and recreational fishing does not require a permit from local Māori.

This mātaitai reserve is in place to allow the Tauranga Moana tribal groups to more effectively manage customary fishing in important traditional fishing grounds. For example, a temporary closure was put in place during the late 2000s for the taking of green-lipped mussels between Moturiki and Motuotau Islands to assist with the recovery of the population.

This initiative has helped improve public understanding of the relationship of local iwi with the area and enables tangata whenua to more effectively manage customary fishing through marine management tools. It demonstrates the need to be cognisant of wider community desires for use and management of a marine area and has offered the opportunity for public education about kaitiakitanga.

The grounding of the *Rena* in 2011 provided a valuable opportunity for testing the protection framework that has been put in place at the Mount Maunganui Mātaitai reserve. The *Rena* disaster is discussed as a case study in Chapter 15: Vessels. The response to clean up the oil that had arrived on the shores of the Mā taitai reserve was swift because of the known high values at the site. The site is now listed within the 'Bay of Plenty Marine Oil Spill Contingency Plan 2014' as a 'Site of cultural and spiritual significance to Iwi', with these resources being identified as 'At Risk'.[20] The '*Rena* Kaitiaki Impact Assessment' prepared in 2012 to provide the Rena Long-Term Environmental Recovery Team with a tangata whenua perspective on the impacts of the disaster noted that 'the oil and debris that came ashore in these areas is still having an effect on their confidence in the health of the kaimoana'.[21]



Boundary of Mount Maunganui Mataitai Reserve *(Ministry of Fisheries)*[22]

CASE STUDY

Port of Tauranga dredging consents

Consent was granted to the Port of Tauranga to dredge the seabed in order to widen and deepen shipping channels in 2013 *(Raewyn Peart)*

The Port of Tauranga is the largest export port by volume in New Zealand. The Port and its shipping channels are identified as regionally significant infrastructure in the Bay of Plenty Proposed Regional Policy Statement. The Port of Tauranga Limited holds consent to occupy areas of the coastal marine area to enable the management and operation of port-related commercial undertakings that it acquired under the Port Companies Act 1988. The consented area includes a 10 metre radius around navigation aids and a strip from 30 to 60 metres wide along the extent of the wharf areas at both Sulphur Point and Mount Maunganui.[23] In early 2013, the Minister of Conservation granted resource consent for the Port of Tauranga to dredge sediment in order to widen and deepen its shipping channels, creating space to provide access for larger vessels.

The decision came after the Port of Tauranga had spent $2.5 million in legal fees on its proposal since lodging a resource consent application nearly four years previously. The bid had been opposed by Ngāi Te Rangi, Ngā Potiki and Ngāti Ruahine through the Environment Court in 2011. An eventual decision to grant resource consent for the deepening was later appealed to the High Court by Ngāti Ruahine hapū member Lance Waaka. The court did not grant Mr Waaka leave to take a further challenge to the Court of Appeal, allowing the Minister to finally grant consent.[24]

The dredging project will widen and deepen the shipping channel from 12.9 metres to 16.0 metres depth at low water. Ships of up to 347 metres in length and 14.5 metres draught will be able to be accommodated in Tauranga Harbour.[25] The first stage of dredging will give access to ships with a capacity of 5,000 to 6,000 twenty-foot equivalent containers (TEUs). The biggest ships currently using the Port can carry around 4,500 TEUs. The second stage of dredging will accommodate 8,200 TEU ships, future-proofing the Port for the next 15 to 20 years. The expansion will also allow larger bulk cargo and cruise ships to visit Tauranga.

The Bay of Plenty Proposed Regional Coastal Environment Plan 2014 recognises that capital dredging is required for the Port of Tauranga to deepen or widen existing shipping channels or berths, or to establish new shipping channels or berths and that there is a potential for significant adverse effects when establishing new navigation channels or berths. The volume of dredgings from the Port of Tauranga makes full land-based disposal impractical. The dredged material will be predominantly clean sand, and the majority will be placed in existing offshore deposition sites which have been in use since 1968. There are also a number of near-shore sites that have been designed to replenish beaches at Mount Beach, Ocean Beach, and Pilot Bay.[26]

There are also further works proposed to complete, extend and/or upgrade the wharves, berth areas and navigation channels. The redevelopment work includes 170 metres of additional berth at Sulphur Point, two new container cranes, six additional straddle carriers and some reconfiguration of container storage and handling facilities.[27]

The resource consent conditions include the setting up of a trust with local iwi, the port and other stakeholders to set priorities and set aside funding for future harbour improvements. In addition, there is a minimum separation distance of the dredging from Te Kuia Rock (a sacred rock), the development of a Kaimoana Restoration Programme to mitigate the effects on local seafood especially the pipi beds, and the setting up of tertiary and post graduate research to promote better environmental health of the harbour. The Tauranga City Council is now in the process of preparing a resource consent application to the Bay of Plenty Regional Council to use some of the Port's dredged sand to renourish several harbour reserves including Kulim Park, Memorial Park, Fergusson Park and the Maxwells Road Esplanade Reserve to improve the coastal amenity in these high-use recreational areas.

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1 http://www.teohu.maori.nz/
2 Business and Economic Research Limited, 2010
3 Aotearoa Fisheries business comprises Moana Pacific Fisheries, OPC Fish and Lobster, Prepared Foods, Pacific Marine Farms and Kia Ora Seafoods
4 Inns J, 2013
5 Some groups of iwi, such as the 12 Hauraki iwi or the 11 Te Arawa waka iwi, have a single entity to represent them identified in statute
6 EEZ Act, section 12
7 A group to which a customary marine title order applies. A customary marine title order means an order of the Court granted in recognition of a customary marine title of a customary marine title group. Customary marine title exists in a specified area if the applicant group holds the specified area in accordance with tikanga, and has exclusively used and occupied the area from 1840 to the present day without substantial interruption, or received the area after 1840 through a customary transfer. Marine and Coastal Area (Takutai Moana) Act 2011, section 9
8 A group to which a protected customary rights order applies. A protected customary rights order means an order of the Court granted in recognition of the protected customary rights of a protected customary rights group. A protected customary right is a right that has been exercised since 1840, which continues to be exercised in a particular area in accordance with tikanga by the applicant group (the way it is exercised may evolve over time), and is not extinguished as a matter of law. Marine and Coastal Area (Takutai Moana) Act 2011, section 9
9 RMA, section 7(a)
10 http://www.fish.govt.nz/en-nz/Commercial/About+the+Fishing+Industry/default.htm
11 http://www.fish.govt.nz/en-nz/Commercial/About+the+Fishing+Industry/default.htm
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13 Treaty of Waitangi (Fisheries Claims) Settlement Act 1992, section 10
14 Fisheries Act 1996 section 21(1)
15 *Attorney-General v Ngati Apa* [2003] 3 NZLR
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17 Marine and Coastal Area (Takutai Moana) Act 2011, section 26
18 Marine and Coastal Area (Takutai Moana) Act 2011, section 51
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22 http://www.fish.govt.nz/en-nz/Maori/Management/Mataitai/default.htm
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24 http://www.nzherald.co.nz/business/news/article.cfm?c_id=3&objectid=10869461
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27 Bay of Plenty Regional Council, 2014

Ōnuku Marae, Akaroa Harbour, Banks Peninsula *(Raewyn Peart)*

5

Marine biosecurity

Invasive Mediterranean fan worm *(Sarah Faulwetter)*

Contents

Introduction

As an island nation in a global economy, New Zealand faces increasing threats to its marine biodiversity, ecosystems, public health and economy from unwanted pests and diseases. Biosecurity is a component of national security and is essential to protecting New Zealand's key economic and environmental assets.[1]

Exotic organisms can compete with, or prey on, other species, change habitats and damage ecosystems. They can affect recreational and customary values, and impact on the economy. They do this by competing with economically important native species and reducing overall biodiversity. Recent incursions of invasive marine aquatic species are highlighting the difficulties associated with managing aquatic pests once they reach our shores.

National leadership for marine biosecurity is the responsibility of the Ministry for Primary Industries, with responsibility for regional leadership sitting with regional councils. The Ministry's emphasis is on prevention, detection and immediate response. Other agencies, including regional councils and industry, are playing an increasingly active role in biosecurity management including undertaking longer-term management of incursions.

Invasive *Eudistoma elongatum* (sea squirt) on the Sandspit estuary in Auckland *(Roger Grace)*

Invasive marine species

Marine pests are species that are not indigenous to New Zealand which have been introduced to our waters by human activities (and less commonly through natural dispersal) and which have the potential to significantly damage marine ecosystems and species.

Many marine invasive species have become established in New Zealand. Some have been in the country for a long time, such as the Pacific oyster. Others are more recent arrivals, such as *Undaria pinnatifida* (Japanese kelp). Both the Pacific oyster and Japanese kelp are now well established and have been adopted into the country's aquaculture industry.

In 2008, 288 non-indigenous species were recorded.[2] These include algae (both large and microscopic), barnacles, crabs, bryozoans, sea squirts, mussels and other molluscs. Figure 5.1 shows the cumulative number of marine non-indigenous species discovered in New Zealand over time. It is worth noting that at least part of the significant rise in the number of detections between 2001 and 2010 is likely due to the active surveillance programmes put in place during that period, and greater awareness of the negative impacts of marine pests.

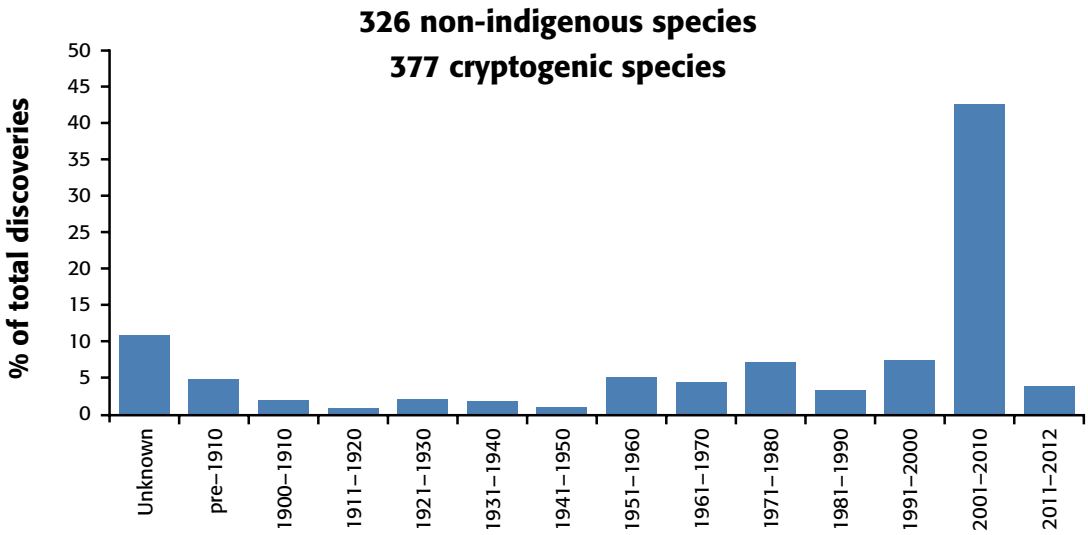

Figure 5.1 Marine non-indigenous species discovery in New Zealand *(NIWA, 2013)*
(Note: With constant taxonomic revisions these numbers can and will change)

Unwanted crab species

The Asian paddle crab (*Charybdis japonica*) was first reported in New Zealand in 2000. It is a very aggressive species and competes directly with New Zealand's native paddle crab. It was first noticed when some of the crabs were caught in flounder nets in the Rangitoto channel, on the outskirts of the Waitematā Harbour. It is now well established in the Auckland and Whangarei harbours, and appears to have displaced native crab species in these locations.[3]


Asian paddle crab *(Roger Grace)*

The European shore crab (also known as the European green crab, *Carcinus maenas*) is an unwanted organism that has not yet reached New Zealand. It is a highly adaptable invasive species with a wide tolerance to different environments, which makes it a significant threat to New Zealand's inshore habitats. It is a voracious predator which eats mussels, crabs, oysters, limpets, barnacles and worms, as well as juvenile crabs and shellfish, including scallops. The European shore crab has the potential to significantly alter ecosystems, causing mortality in native crab and shellfish populations, and it has been implicated in the decline of native shellfish populations overseas. There is a risk that juvenile crabs or crab larvae could be transported via ballast water to this country.[4]

The Ministry for Primary Industries has identified six unwanted marine organisms which are highly invasive and of particular concern, being the Chinese mitten crab (*Eriocheir sinensis*), Mediterranean fan worm (*Sabella spallanzanii*), Northern Pacific seastar (*Asterias amurensis*), European shore crab, Asian clam (*Potamocorbula amurensis*) and *Caulerpa taxifolia* (a marine aquarium weed). Of these, the fan worm has become established in New Zealand since it was declared an unwanted organism. There are also numerous diseases of fish, molluscs and shellfish that New Zealand is mostly free from and risks importing.[5] Some of these can have a devastating impact, such as the *Ostreid herpesvirus* (OsHV-1) which is discussed further in Chapter 10: Aquaculture.

The Ministry for Primary Industries, in collaboration with NIWA, has developed a new web portal called the Marine Biosecurity Porthole.[6] This provides access to surveillance and other records of marine pests in New Zealand waters. These data come from a range of sources including a national series of Port Biological Baseline Surveys and the results of a Marine High Risk Site

Surveillance programme (both discussed below), as well as NIWA's Marine Invasive Taxonomic Service (which identifies marine specimens on behalf of the Ministry) and other verified observations. This portal plays an important role in distributing information about current knowledge on non-native marine organisms in New Zealand.

Additional information on marine pests can be found at the Marine Biosecurity Porthole website.[7]

Styela clava, which is well established in New Zealand, competing with native species and fouling vessels and equipment
(Jeannine Fischer, Ministry for Primary Industries)

Impacts

Invasive marine pests can cause a number of negative environmental impacts. They often compete with native species for space and food, and some introduced species appear to be more aggressive competitors than native ones. By smothering areas of seafloor, some pests fundamentally change habitats.[8] Figure 5.2 provides a summary of some of the key impacts from particular species.

Species	Status in New Zealand	Impacts
Clubbed tunicate/ Leathery sea squirt *Styela clava*	Established	• Fast-growing and forms dense groups • Filter feeder that competes with native and aquaculture species for food (planktonic larvae) and space • Nuisance fouler of vessels, aquaculture and fishing equipment and other artificial structures
Mediterranean fan worm *Sabella spallanzanii*	Established	• Forms dense groups • Competes with native species for food and space • Negative impact on the establishment of new generations of some species, and on nutrient flow in the water column • Dense beds foul fishing equipment and aquaculture structures
Japanese kelp *Undaria pinnatifida*	Established	• Rapidly forms dense stands that overgrow and exclude native seaweed species • Nuisance fouling causes problems and increased costs for aquaculture

Species	Status in New Zealand	Impacts
Asian paddle crab *Charybdis japonica*	Established	• Aggressive crab that can out-compete native crabs for space and food • Threat to aquaculture as it preys on shellfish • Carries white spot syndrome virus which can infect native and farmed prawns, crabs and lobsters
Pyura *Pyura doppelgaengera* previously *P. praeputialis*	Established	• Forms dense populations or mats, and can survive in a wide geographical range • Could displace important native New Zealand species, including green-lipped mussels
Australian droplet truncate *Eudistoma elongatum*	Established	• Unsightly fouling of coastal environments and coastal marine infrastructure • Fouling nuisance for marine farming
Aquarium caulerpa *Caulerpa taxifolia*	Previously detected, not established in the environment	• Quickly spreads and smothers other algae, seagrasses and invertebrate communities • Out-competes native species for food or light and produces toxic compounds • Vast beds can destroy native species diversity and fish habitat • Tangles in nets and anchors • If aquarium caulerpa was to escape into the marine environment, there is a high risk of it establishing and severely damaging the marine environment
Asian clam *Potamocorbula amurensis*	Not detected	• Reduces planktonic food sources, causing decline in abundance and diversity of native species, and decline or collapse of commercial fisheries and farmed shellfish • Reaches extremely high population densities, altering the soft sediment community structure of an area by changing the sediment structure, and reducing the space available for other species
Chinese mitten crab *Eriocheir sinensis*	Not detected	• Burrowing weakens banks and causes accelerated erosion • Hosts liver fluke (*Paragonimus sp.*) that is harmful to human health • Consumes both plants and animals
European shore crab *Carcinus maenas*	Not detected	• Highly adaptable invasive species • Voracious predator – eats mussels, crabs, oysters, limpets, barnacles, worms, juvenile crabs and shellfish, including scallops • Potential to significantly alter ecosystems causing mortality in native crab and shellfish populations • Implicated in decline of native shellfish populations overseas, some of commercial importance
Northern Pacific seastar *Asterias amurensis*	Not detected	• Voracious predator of native species and economically important farmed shellfish • Potentially serious impacts on aquaculture, fisheries and wild shellfish populations

Figure 5.2: Summary of key impacts from particular invasive species
(*Adapted from the Ministry for Primary Industries* New Zealand's Marine Pest Identification Guide*, 2012*)[9]

Invasion pathways

Pathways are human activities that, intentionally or unintentionally, may move a harmful organism from one place to another.[10] The Biosecurity Act defines a 'pathway' as 'movement that is of goods or craft out of, into, or through a particular place in New Zealand or a particular kind of place in New Zealand, and has the potential to spread harmful organisms'.[11]

There are many marine pathways, but the most pressing issue facing marine biosecurity is increasing international shipping and the consequential transfer of non-indigenous species from one country to another via vessels.

Spread of Whangamatā sea squirt

The Whangamatā sea squirt (*Didemnum vexillum*) is a marine pest that was first seen in Whangamatā in 2001. It has quickly established itself in the Marlborough Sounds, Port Nelson, Golden Bay, Whangamatā and Tauranga. It is a leathery or spongy, light mustard-coloured sea squirt. It can look like wax dripping over a structure such as a rope or mussel line and can quickly smother sea life. The Whangamatā sea squirt can be spread over long distances by infected vessel hulls and marine equipment and as fragments in ballast water.[12]

Biofouling

Biofouling risk occurs when marine organisms attach themselves to the hulls of vessels overseas and are then transported into New Zealand waters on the vessel. Hull fouling is the process where organisms accumulate on a surface in the sea. In the initial stages, organic material sticks to the hull and is rapidly colonised by bacteria and microalgae forming a 'slime layer'. This layer is then colonised by larger organisms such as macroalgae, barnacles, bryozoans and tube worms, creating more complex fouling. Over time, as the complexity of fouling increases, habitat is created for other organisms such as isopods and crabs. As a result, invasive species can be transported around the world by vessels with fouled hulls. Many of these species are relatively benign, but some have caused major impacts. For example, the sea squirt *Didemnum vexillum* arrived in Picton on a vessel hull and has become a major marine pest in the Marlborough Sounds. Biofouling is the most common cause of marine pest invasions. Large structures which are towed into New Zealand waters, such as drilling rigs, can also create biofouling risks. Biofouling of vessels and structures (both international and domestic) moving around the country is also responsible for the spread of pests around New Zealand once they arrive here.

Undaria, shown here on a mooring line, has been spread around the country on fouled hulls
(Kath Blakemore, Department of Conservation)

Spread of *Styela* through biofouling on recreational vessels

In November 2013 a boat infested with the unwanted marine sea squirt *Styela clava* was found berthed in Tauranga Harbour. It was the second boat with the sea squirt attached to its hull that had been found in the harbour. One of the boats was moored in Pilot Bay and the other was berthed at Bridge Marina. Both boats had come from Auckland, where the sea squirt is established, without prior cleaning of their hulls.[13]

Spread of *Undaria* to Fiordland

The Asian seaweed *Undaria pinnatifida* has established in many parts of New Zealand over the last 20 years. However, much of Fiordland has remained free from this invasive marine pest. *Undaria* is an highly invasive seaweed that rapidly overruns native species, altering marine ecosystems. In April 2010 a single mature *Undaria* plant was found on a line mooring a barge to the shoreline in the remote Sunday Cove in Breaksea Sound.[14] Fiordland is a high-value area and the presence of *Undaria* in Fiordland is considered a threat to this globally unique marine environment. As a result of the discovery, and following consultation with stakeholders and tangata whenua, a response involving the Ministry for Primary Industries, the Department of Conservation and Environment Southland (lead agency) was initiated to eliminate *Undaria* from Fiordland. Joint agency decision-making is undertaken at both the strategic and operational level, with an equal three-way split of operational costs.

Ballast water

Another major pathway for the introduction of marine pests is the movement and discharge of ballast water. This is seawater that has been pumped aboard a ship to provide stability and manoeuvrability. If this seawater is discharged in a different port from which it came, it can disperse the eggs and larvae of exotic marine organisms, which are able to establish in the new marine environment after discharge.

Other sources of risk

The rapid growth of the aquaculture industry, some of which involves the movement of juvenile animals (spat and smolt) and equipment around the coast, can play a role in the domestic spread of non-indigenous species once they have arrived in New Zealand. The aquaculture industry has codes of practice and industry standards in place to reduce this risk, as discussed in Chapter 10: Aquaculture.

Another source of risk is the aquarium trade. Although there are industry standards designed to avoid the release of exotic organisms, there is still considerable risk associated with the spread of marine species if captive fish or algae are released into the wild. Import health standards and risk analysis have been developed to address and mitigate these risks (discussed further below).

Legislative framework

Biosecurity activities are guided and influenced by domestic law, as well as by international agreements and standards to which New Zealand is a signatory nation. These set out the legal framework for responses to marine biosecurity risks.

Biosecurity Act

The purpose of the Biosecurity Act is to enable 'exclusion, eradication, and effective management of pests and unwanted organisms'. The Act provides the framework for border controls aimed at preventing unwanted organisms from entering the country, for establishing surveillance to detect organisms once they have arrived, and for the control and eradication of pests once they have become established. The Biosecurity Act was amended to apply within the EEZ by the Biosecurity Reform Act 2012.

Biosecurity functions are split between the Ministry for Primary Industries, other government departments and regional councils. The Ministry oversees the implementation of the legislation, undertakes border control, manages national surveillance programmes, carries out responses to incursions and manages several national control programmes. Section 12A of the Act requires the Director-General to provide overall leadership in activities that 'prevent, reduce, or eliminate adverse effects from harmful organisms that are present in New Zealand' through:

- Promoting alignment of pest management within the whole biosecurity system
- Overseeing pest management and measuring overall system performance
- Facilitating the development and alignment of national pest management plans and national pathway management plans
- Promoting public support for pest management
- Facilitating communication, co-operation and co-ordination among those involved in pest management to enhance efficacy, efficiency and equity of programmes

The role of regional councils is to undertake monitoring and surveillance of established pests and to prepare and implement regional pest management strategies. At this point in time, only a few regional councils are actively monitoring and undertaking surveillance for marine pests. Regional councils are also required by the Biosecurity Act and the National Pest Management Plan of Action to provide leadership by promoting co-ordination of pest management between regions.

Part 3 of the Biosecurity Act deals with risks associated with the importation of goods and the entry of craft into New Zealand. A set of import health standards specify requirements to be met to manage risks associated with the importation of goods (discussed further below). These relate to the importing and exporting of plants, animals and other materials which may represent risk goods, including all products that are derived from plant or animal material.

The Biosecurity Act requires masters of craft arriving from overseas to give notice of when and where they will enter New Zealand so as to prevent uncleared goods leaving the vessel without authorisation from an inspector. The Biosecurity Standard 'Requirements for Vessels Arriving in New Zealand'[15] sets out additional rules.

Part 4 of the Biosecurity Act deals with surveillance and prevention and its purpose is 'to provide for the continuous monitoring of New Zealand's status in regard to pests and unwanted organisms'. Surveillance is essential for detecting pests and diseases before they become established in New Zealand. Early detection minimises the impacts of newly-introduced marine pests and diseases, and is especially important because the opportunity to respond and eradicate diminishes as more time elapses before they are detected.

Part 4 of the Act seeks to promote early detection through placing duties on all persons to undertake timely reporting of organisms not normally seen in New Zealand.[16] It also provides legal powers to enable the Ministry for Primary Industries to gather information on organisms' presence, to prevent them from spreading and to enable their identification. The Ministry undertakes several national surveillance programmes to aid early detection.

Ministry for Primary Industries surveillance programme

Biological baseline surveys for non-indigenous marine species were completed at 16 major ports and marinas of international entry between 2001 and 2007. An additional eight secondary ports and pristine locations have also been surveyed. The Ministry for Primary Industries now maintains a regular 'targeted surveillance programme' which surveys 11 high-risk locations biannually, in winter and summer, for a suite of target organisms.

Pest management is dealt with under Part 5 of the Biosecurity Act and its purpose is 'to provide for the eradication or effective management of harmful organisms that are present in New Zealand'. The Minister is currently developing a national policy direction to guide the implementation of these functions. Its purpose is to ensure that pest management activities provide the best use of available resources for New Zealand's best interests. Part 5 of the Act sets out the process for the development of a range of different pest management plans.

Mediterranean fan worm *Sabella spallanzanii (Polychaeta)* *(Sarah Faulwetter)*

Type	Circumstances		Lead intervention decision-maker responsible for bringing parties with the necessary powers, functions and resources together	Reason for role
Population management (Species-led management)	Pest not previously detected in New Zealand		Ministry for Primary Industries	Manages border, national high-risk site surveillance and national incursion responses
	Pest already in New Zealand and an objective has been set to eradicate or contain nationally		Ministry for Primary Industries	Leads national pest programmes and national surveillance
	Pest already present in New Zealand and there has been a decision not to eradicate or contain nationally	Pests affecting public goods, and either not previously in the region or established, but tools to manage are available	Regional council to coordinate joint decision-making with Crown agencies and interested parties (depending on nature of the pest)	Accountable for regional public interest and has regional capacity to act, but multiple interests and beneficiaries will likely be involved
		Pests affecting a specific sector, industry or private interest, and either not previously in the region or established, but tools to manage are available	Industry and/or interested parties to co-ordinate joint decision making with those best placed to provide support	Industry is the primary beneficiary but may need capabilities of other parties to be effective
	Pests widespread in the region and there has been a decision not to eradicate or contain regionally		Becomes site management issue (see below)	Widespread pests that are not the subject of pest-led programmes can only be managed in specific places to meet site managers' priorities
Pathway/ vector management	Prevention of pest establishment in New Zealand (at border activity – ballast water, biofouling, hitchhiker organisms, goods and containers)		Ministry for Primary Industries	Manages border, national high-risk site surveillance and national incursion response
	Risk to any national or regional value associated with inter-regional vector movement			Requires national focus as automatically multiregional
	Risk to coastal marine areas of the Subantarctic Islands and Kermadec Islands (risks associated with vectors, in particular vessels and their equipment)		Minister of Conservation	Minister of Conservation has the responsibilities, functions and powers of a regional council under section 30(1)(d) of the RMA for these specific areas. The Department of Conservation may act on behalf of the Minister.

Type	Circumstances	Lead intervention decision-maker responsible for bringing parties with the necessary powers, functions and resources together	Reason for role
	Risk to any national or regional value associated with intra-regional movement of vectors (e.g. of structures, equipment and vessels)	Regional councils	Have regional capacity and powers to act in the public interest
	Risk to any national or regional value associated with development of marinas, wharves, jetties and moorings and the ongoing maintenance of such facilities		Have powers under the RMA (e.g. can include conditions in resource consents)
	Risk to any national or regional value associated with dumping of organic material from vessels (within the 12 nautical mile limit and on land)		Administer the Resource Management (Marine Pollution) Regulations 1998
	Risk to any national or regional value associated with dumping of organic material from vessels and offshore installations in the EEZ (from the 12 to 200 mile nautical limit)	Maritime New Zealand	Has authority and responsibility in the EEZ under the Maritime Transport Act
Site/place management **(Management to protect values of specific places)**	Marine reserves, marine parts of wildlife management reserves and sanctuaries, reserves and national parks administered by Department of Conservation	Department of Conservation	Administers these protected areas under the Marine Reserves Act, Wildlife Act, Marine Mammals Protection Act, Reserves Act and National Parks Act
	Coastal marine areas of the Subantarctic Islands and Kermadec Islands	Minister of Conservation	Minister of Conservation has the responsibilities, functions and powers of a regional council of section 30(1)(d) under the RMA for these areas. The department may act on behalf of the Minister
	Marine protected areas administered by bodies other than the Department of Conservation	The primary administering body with the necessary powers	Marine protected areas can be established under various statutes with potentially multiple administering agencies. Some agencies will have the necessary administering powers and functions and others will not.

Type	Circumstances	Lead intervention decision-maker responsible for bringing parties with the necessary powers, functions and resources together	Reason for role
	Places recognised by formal regional policy as being of special value to regional communities (not being sites as above)	Regional councils	Accountable to regional community and have regional capacity and powers to act in the public interest
	Privately-owned structures occupying marine and other environments	Structure owners	Directly responsible as occupiers to meet rules under the Biosecurity Act and have capacity to act effectively on site in a way compatible with site use
	Other sites	Party or parties with the incentives to act and necessary powers to achieve desired objective for the site	Beneficiaries acting in their own interest

Figure 5.3 Default lead intervention decision-maker role for pests in the marine environment
(Ministry of Agriculture and Forestry and Biosecurity New Zealand, 2011)

Resource Management Act

Regional councils are responsible for controlling a number of activities in the coastal marine area which can affect biosecurity,[17] including the establishment of structures, in-water cleaning of vessel hulls, and the discharge and deposit of substances into the marine environment. The NZCPS requires regional councils to provide, in regional policy and planning documents, for the control of activities that could have adverse effects on the coastal environment by causing harmful aquatic organisms to be released or otherwise spread.[18] Resource consent conditions can also help to manage the risks of damage to the marine environment from such activities.

The invasive *Styela clava* growing in Northland *(Northland Regional Council)*

The activities identified in Policy 12 as likely to impact on the marine environment include:

- The introduction of structures likely to be contaminated with harmful aquatic organisms
- The discharge or disposal of organic material from dredging, or from vessels and structures, whether during maintenance, cleaning or otherwise; and whether in the coastal marine area or on land
- The provision and ongoing maintenance of moorings, marina berths, jetties and wharves
- The establishment and relocation of equipment and stock required for, or associated with, aquaculture

Figure 5.4 highlights the different ways marine pests are managed in New Zealand during the different stages of entry and incursion.

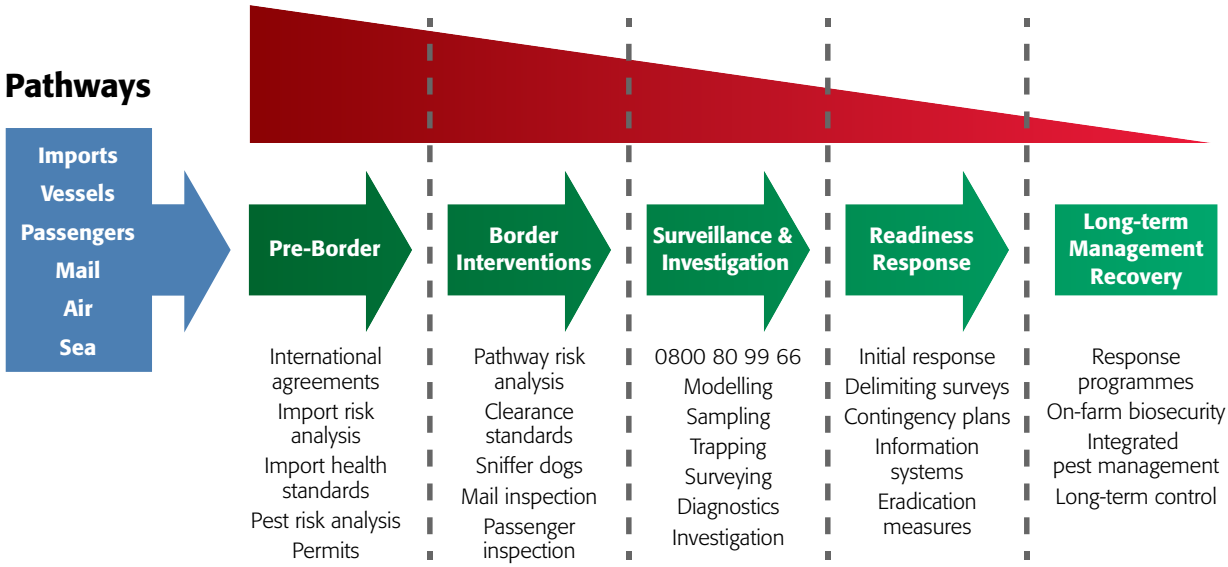

Figure 5.4 Tools used to manage marine pests *(Ministry for Primary Industries)*

Preventing arrival

The first line of defence is the prevention of new marine pests arriving into New Zealand waters. This requires both an international and a domestic approach. New Zealand is working with international organisations to develop measures for minimising the transfer of marine pests. There are also a number of unilateral tools which are used to prevent the entry of unwanted pests into New Zealand, including import health standards, risk analysis and craft risk management standards.

Import health standards

Import health standards apply to the import of items into New Zealand that pose a biosecurity threat. The standards seek to mitigate the risks associated with bringing items into New Zealand. They set out the requirements that must be met in the exporting country, during transit and during importation, before biosecurity clearance can be given.[19]

Risk analysis

An analysis of risk is the first stage in the development of import health standards. It involves the identification of pests and diseases that might be associated with a good, the likelihood of entry and establishment in New Zealand, and the potential impacts on the economy, environment and human health. Risk analysis is still an evolving discipline, but it is now an accepted basis under the World Trade Organization Sanitary and Phytosanitary Agreement for establishing international trading standards, where safety aspects of animal and plant products are concerned. New Zealand is one of the countries leading the way in establishing risk analysis procedures internationally.[20]

Ships' ballast water

The 'Import Health Standard for Ships' Ballast Water from all Countries' was issued in 2005. It applies to ballast water loaded within the territorial waters of a country other than New Zealand and intended for discharge in New Zealand waters. It outlines the requirements for any vessel discharging ballast water in New Zealand waters, including four options for vessels:[21]

- The ballast water must have been exchanged en route to New Zealand in an area free from coastal influences, preferably 200 nautical miles from the nearest land and in water over 200 metres in depth (this requirement is based on the assumption that species adapted to living in surface waters of the open sea are relatively unlikely to establish in New Zealand's coastal environment); or

- The ballast water must be freshwater (not more than 2.5 parts per thousand sodium chloride); or
- The ballast water must have been treated using a shipboard treatment system; or
- The ballast water must be discharged into an onshore treatment facility

The International Maritime Organization is the United Nations' specialised agency with responsibility for the prevention of marine pollution by ships. The Organization is the global standard-setting authority for the environmental performance of international shipping, with a role to develop a regulatory framework that is universally adopted and implemented. In 2008 New Zealand became party to the International Maritime Organization's International Convention for the Control and Management of Ships Ballast Water and Sediments 2004.

A key feature of the Convention is a stringent performance standard requiring new ships, and eventually all ships, to operate ship-board treatment systems to disinfect ballast water taken up in foreign ports. Also included are procedures for member countries to take enforcement action where the regulations are violated. A new Ballast Water Levy will be created to cover the cost of an inspection regime to confirm compliance with the Convention's requirements. This annual levy will apply to ships, both international and New Zealand-flagged, bringing ballast water from outside the country for discharge in New Zealand waters.[22] The Convention will come into force 12 months after ratification by 30 States, representing 35 per cent of world merchant shipping tonnage. As of 19 March 2013, 36 States have ratified the Convention, representing just over 29 per cent of the world merchant fleet tonnage. At the time of writing the Convention had not yet come into force.[23]

Biofouling on vessels

The 'Craft Risk Management Standard for Biofouling on Vessels Arriving to New Zealand' was released by the Ministry for Primary Industries in 2014 and will come into force on 15 May 2018. It specifies the requirements to be met in respect of biofouling on the submerged parts of vessels that have come from, or recently visited, coastal waters of another country. It includes a requirement that vessels arrive in the country with 'clean hulls'.[24] The Standard is aligned with the 2011 International Maritime Organization Guidelines for Biofouling Management which means that much commercial shipping is already compliant. The Ministry will be using the four-year lead-in period to work with vessel operators and communicate the different measures available to shipping lines and other parties to ensure compliance.

Ships arriving into New Zealand are prohibited from discharging untreated ballast seawater taken on board in another country within New Zealand's marine area *(Raewyn Peart)*

Identifying incursions

Surveillance for new marine pests

Surveillance is the process of systematically collecting, analysing and interpreting information about the presence or absence of unwanted organisms.[25] The Ministry for Primary Industries' marine biosecurity surveillance programme falls into three main groups: baseline, targeted and passive (see Figure 5.5).

Programme	Involves	Current examples
Historical – Baseline surveillance	• Obtaining baseline information at highest risk sites • Providing a benchmark against which the effectiveness of border control and other management practices can be measured	• Baseline surveillance for marine pests between 2001–03 and 2005 • Baseline surveillance has been completed on non-indigenous marine species at 16 major ports and marinas of international entry • An additional eight secondary ports and hubs have also been surveyed
Current – Targeted surveillance	• Focusing on a specific organism or group of related organisms • Can be designed as an ongoing programme or as a one-off survey • Maintain a watch for non-target, new-to-New Zealand organisms	• Five marine pests are currently targeted (Chinese mitten crab, European shore crab, Asian clam, *Caulerpa taxifolia* and Northern Pacific seastar) • Targeted surveillance programmes at 11 high-risk locations, biannually, for a range of target organisms
Current – Passive surveillance	• Asking all persons in New Zealand (including public and industry) to keep watch for unwanted pests and diseases • Investigating notifications of suspected unwanted pests and diseases • Monitoring and analysing trends in information relating to pests and diseases	• Targeted communication material such as lists of notifiable pests, diseases and unwanted organisms, and guides for vessel owners circulated to raise awareness and enhance passive surveillance • The Exotic Pest and Disease Hotline (0800 80 99 66) • Incursion Investigators

Figure 5.5 Marine biosecurity surveillance programmes

Marine investigations

An incursion is where an organism not previously known in New Zealand has been found and is considered likely to be part of a self-sustaining or breeding population. Re-invasion of a species that has already been eradicated or controlled is considered a new incursion.

The Ministry for Primary Industries has a dedicated team which follows up on suspected new marine pests. In 2013 there were 24 marine investigations carried out.[26] The incursion team is notified of suspected pests in the marine environment from a number of different sources, including scientists, surveillance programme laboratories, fishers, marine farmers, the general public, other parts of the Ministry, local government and other specialist groups. A notification usually comes through the Exotic Pests and Diseases Hotline which then passes the information on to the appropriate duty incursion investigator. In some cases, investigators will require samples to be submitted by the informant, and these will be sent to the Marine Invasive Taxonomic Service for species identification. The Investigation and Diagnostic Centre is responsible for investigating any suspected unwanted organism.

Responding to incursions

Response is generally about minimising the impacts of a new marine pest. Ideally this means that eradication is considered but it may also include options to contain or slow the spread, or suppress the population. The case study below on the marine sea squirt *Pyura doppelgangera* provides an example of responding to a new marine pest.

If a new marine pest is found, the Ministry for Primary Industries will determine the most appropriate response according to a decisions framework that has been developed.[27] The Biosecurity Response Knowledge Base framework contains processes, standards and other resources for leading and managing biosecurity responses in New Zealand.

A Response Prioritisation Tool has been developed which is used to help determine whether or not to initiate a response. The tool provides an opportunity to evaluate the importance of the risk organism in terms of economic, environmental, health and socio-cultural impacts. The complexity of the response is also evaluated, including:

- What is the current distribution of the organism in New Zealand?
- What is the ability of the organism to spread and establish?
- To what degree do the methods exist for detection?
- To what degree will movement controls slow the spread or contain the organism?
- Do methods exist to control or eliminate the organism?
- What level and skill of human resource is required and are they accessible?
- Are the tools and equipment required for taking action available or accessible?

Developing new eradication methods

Northland Regional Council is currently collaborating with a science provider to test the use of ultra-sonic sound as a way of destroying biofouling on structures and hulls. Developing such innovative technologies is an important part of arming the Council, and the region, with a suite of marine biosecurity protection tools.

Public involvement and partnerships

Members of the public play an important part in keeping the marine environment free of unwanted organisms, and preventing or reducing any damage these may cause, should they occur. There are three key ways in which the public can help to keep a watch out for invasive marine species:[28]

- Learn more about marine pests through accessing information and identification guides[29]
- Keep up to date with the biosecurity campaigns or activities underway within a local area
- Call the free Exotic Pests and Diseases Hotline on 0800 80 99 66

Boat owners have a particular responsibility for marine biosecurity, as fouled boat hulls are a major source of marine pest spread. The boat owner's guide to preventing the spread of marine pests provides some useful guidance.[30] Divers can also help, by reporting anything unusual they see in an area, or a marine pest from their own area in a new place they are visiting.

Effective action requires co-operation and partnerships. National and regional partnerships are proving to be successful in improving pest management performance in the marine environment.[31]

Fiordland marine biosecurity partnership

The Fiordland Marine Guardians, Ministry for Primary Industries, Department of Conservation, Ministry for the Environment and Environment Southland are working in partnership to achieve marine biosecurity protection for Fiordland. The Fiordland Marine Biosecurity Programme is focused on addressing ways marine risk organisms can be transported into Fiordland, with supporting measures around surveillance, agency co-ordination, and communications for education and behaviour change. The partnership has developed a Fiordland-specific boat cleaning education resource.[32]

Response to *Pyura* incursion[33]

In 2007 large ascidians (*Pyura doppelgangera*) were found covering some rocks in the Far North. By May 2009 these ascidians were covering a much wider area than the original detection site. Using the Biosecurity Response Knowledge Base, the Ministry for Primary Industries undertook an assessment of the potential impact of the invasion to New Zealand's core values. This indicated medium-level risks to the economy, the environment, social and cultural well-being and Māori values. The values at risk were assessed as outlined in Figure 5.6.

	Impact
Economic	• Medium risk to the aquaculture industry, in particular mussel farming • Approximately 80 per cent of the mussel spat that supplies the mussel industry is collected from the Ninety Mile Beach area, which is in the vicinity of the known location of the risk organism • The origin of the mussel spat supply is unknown, as is the contribution of intertidal mussel populations in the Far North to spat supply • The ascidian can form large, dense colonies, crowding out adult mussels in rocky intertidal areas • The local spat-collecting economy could also be impacted • Pyura could inadvertently be spread to mussel farms via the seaweed bearing the mussel spat
Environmental	• Medium risk to native marine species and ecological processes • In Chile, a similar non-indigenous *Pyura* species is now the dominant species in the mid-to-lower intertidal area with the native mussel confined to the mid-to-upper intertidal area • Observations in the Far North showed that *Pyura* was the dominant organism in some rocky intertidal areas, suggesting that it had the potential to cause local-scale ecological disturbance to rocky intertidal communities, including competing with mussels
Social and cultural well-being	• Medium risk • Recreational mussel gathering may be affected if *Pyura* displaces or significantly reduces mussel beds • Aesthetic values may be affected as *Pyura* forms dense mats, changing the intertidal landscape • On the other hand, the sea squirt may be used as fish bait, as is currently the case in Australia and South Africa for related species
Māori values	• Medium risk • Iwi in the Far North rely on locally harvested shellfish • Cape Reinga is spiritually significant and the proximity of the detection of *Pyura* is of concern to iwi

Figure 5.6 Impact assessment of the *Pyura doppelgangera* invasion

A survey was undertaken to determine the extent of the infestation. The survey showed *Pyura* was present at many locations on the west and eastern coasts of the Far North, suggesting the species had been present for some time prior to the initial detection. The Ministry decided that eradication could not be achieved, given the widespread nature of the incursion. However, local iwi and stakeholders were very concerned about the marine pest, and the Ministry decided to trial the feasibility of local elimination at three sites in the Far North beginning in 2010.

The field team comprised local iwi, who received training in marine biosecurity and field survey methods. The results of the trial suggested that periodic clearances of the ascidian could suppress the populations at specific sites. The Ministry, the Department of Conservation and Northland Regional Council contributed resources. The Te Hiku o te Ika Fisheries Forum, comprising representatives of mandated iwi organisations, participated throughout the trial. The Forum developed a marine biosecurity strategy for the Far North and is currently working with the Northland Regional Council to develop a long-term management plan for this marine pest.

Pyura has been found in the Houhora Harbour as well as in numerous other locations in the Far North *(Raewyn Peart)*

CASE STUDY

Response to spread of *Sabella*[34]

Mediterranean fan worm (*Sabella*) is an unwanted organism under the Biosecurity Act. It is a filter-feeding tube worm which can form dense colonies and has the potential to alter nutrient cycles and compete with native species for food and space. This fan worm grows rapidly in New Zealand waters, particularly in Auckland and Whangarei, where it infests vessel hulls, artificial structures and natural substrata. *Sabella* can potentially impact on marine farms and clog fishing nets and dredges.

The Mediterranean fan worm was first detected in Lyttelton Harbour *(Raewyn Peart)*

Sabella was first detected in Lyttelton in 2008 during a targeted surveillance programme. During eradication attempts in Lyttelton, populations of fan worm were detected in Auckland's Waitematā Harbour, at densities suggesting it was well established there. The Ministry for Primary Industries decided that it was no longer feasible to attempt eradication of the organism from New Zealand. Since eradication efforts were abandoned in the Waitematā Harbour, *Sabella* has dramatically increased its range there. Recent incursions to new regions, such as Whangarei, suggest that *Sabella* has been moved by vessels coming from Auckland. However, individuals from the small population in Lyttelton Harbour are removed when found during a targeted surveillance programme, and this population has remained small (typically, no more than one or two individuals are found during each six-monthly survey).

Under the National Pest Management Plan of Action, regional councils assume the default lead role when responding to incursions of marine pests that are already established in New Zealand. The Ministry has decided to support a number of regional councils where *Sabella* has recently been detected, as outlined in Figure 5.7. The current approach is aimed at slowing the spread of *Sabella* while a national marine pathways management plan is developed.

Region	Approach
Northland	• *Sabella* was discovered in Whangarei Harbour in 2012 • In early 2014, further populations of the fan worm were discovered at additional sites, after two years of attempted eradication • Approaches used to slow the spread of the fan worm include developing charters with local vessel haul-out operators and marinas, profiling vessels suspected of harbouring *Sabella*, and ensuring infested vessels are defouled as soon as possible • The Northland Regional Council has recently sought science advice on the feasibility of managing *Sabella* at infected sites in Whangarei to ensure that it is not spread from the harbour
Waikato	• The Waikato Regional Council and the Ministry for Primary Industries jointly responded to the detection of heavy infestations of *Sabella* on two barges moored in the Coromandel Harbour following a notification from a member of the Marine Farming Association in April 2013 • Urgent action was taken to remove the fan worms as the organism spawns over a prolonged period during winter • A detection survey over the wider area was undertaken to ascertain whether there was an established population • All detectable mature fan worms were removed from the barges and no fan worms were found on the substrate after thorough searches of the wider area • Barges were then moved to a region where fan worm was established • Surveillance later in 2013 detected a small colony of fan worms on a mooring block in the vicinity of where the infested barges had been, which was removed • Surveillance will continue in the harbour • Council will explore ways of collaborating with adjacent regional councils to minimise the risk of further incursions into Coromandel and other harbours within its jurisdiction

Region	Approach
Bay of Plenty	• A scientist conducting survey work in Tauranga Harbour detected a single *Sabella* on the rocky substrate of Pilot Bay and notified the Ministry in September 2013 • The Bay of Plenty Regional Council and the Ministry jointly responded to this detection and a delimiting survey was carried out at all high-risk sites in the harbour, including in the vicinity of the detection, moored vessels and moorings, wharves at the port and the two marinas during the next two months • A small number of *Sabella* were found in one of the two marinas and a single *Sabella* was found on the hull of a yacht moored in the vicinity of the original detection. The owner was contacted and voluntarily agreed to have the yacht urgently slipped and defouled. • During the Marine High Risk Site Surveillance programme in May 2014, a small number of *Sabella* were detected in the two marinas • The regional council quickly responded the following week, again with support from the Ministry, by surveying both marinas • Further *Sabella* were found in low numbers • The recent detection of *Sabella* suggests that some were most likely missed during the first survey, particularly where water visibility was low, as there are high levels of biofouling species in the marinas and the fan worms are small in size • The regional council has developed a marine biosecurity management plan to respond to future incursions of marine pests and to carry out surveillance programmes within the council's harbours
Nelson	• In November 2013, a single *Sabella* was found in the Nelson Marina during the Marine High Risk Site Surveillance programme • The Nelson City Council and the Ministry jointly responded and implemented a delimiting survey of the entire marina and other high-risk sites in and around the port during the same month as the initial detection • This survey found and removed 12 *Sabella* of varying tube lengths • The agencies decided to undertake a second survey prior to the 2014 winter, in case some animals were missed, which proved to be a prudent measure as a further 22 fan worms were found • The council has decided to continue surveillance for the fan worm over the next year. The total number of fan worms collected (less than 40), combined with the relatively confined area they were found (the central area of the marina), gives confidence that this incursion can be suppressed.
Marlborough	• In February 2014, a research scientist surveying fouled vessels in Waikawa Bay, Marlborough Sounds collected *Sabella* from a heavily fouled yacht on a mooring • The Marlborough District Council and the Ministry agreed to jointly respond to the incursion • The Council arranged to get the vessel slipped and defouled within two weeks of detection, with the agreement of the owners • Tracing showed the yacht had relocated from Auckland to Waikawa Bay approximately one to two years previously, suggesting that it had probably become infested in Auckland • A delimiting survey was undertaken in early April and all high-risk areas, including the Waikawa Marina, were inspected with no further *Sabella* found • The Marine High Risk Site Surveillance programme included the Waikawa Marina during June as part of its usual programme, with no detection of *Sabella* • Targeted surveillance for *Sabella* will search all the high-risk sites later in 2014

Figure 5.7 Regional responses to *Sabella* incursions

The four most recent incursions demonstrate that the goal of local elimination is more likely to be successful if surveys and removal of the *Sabella* are undertaken soon after detection and prior to reproductive maturity. However, the risk of incursions from newly-arriving infested vessels remains. Large numbers of mature *Sabella* were recently removed from the hull of a coastal freighter that travels between New Zealand ports. A combination of pathway management, readiness and response will be necessary to ensure *Sabella* does not spread and establish into new areas.

CASE STUDY

Northland's portable biosecurity treatment facility[35]

A large floating dock to treat hull biofouling has been built for the Northland Regional Council. A vessel can be brought into the dock and the gate is raised behind it enclosing all the seawater and preventing any marine pests escaping. The dock is 16 metres long and 5.5 metres wide with a 3 metre draft. It can accommodate a variety of vessel shapes, including many launch and small barge designs as well as yachts with a deep keel.

If a vessel hull is carrying a marine pest then the dock can be used to contain and treat the hull of the vessel before it spreads any further. Testing has been completed on the floating dock over the last year, which indicates that the dock can be a very effective and quick way of managing vessels which have hull fouling.

A marine pest treatment was recently undertaken in Auckland using the floating dock. A team of biosecurity staff from Northland Regional Council and NIWA scientists treated the hull of a vessel that was infested with the Mediterranean fan worm *Sabella* using the portable treatment facility. Aquaria trials have indicated that *Sabella* are very susceptible to chlorine over a short exposure time. Chlorine is known to disperse well in salt water and this treatment is quick and easier to administer once the vessel is enclosed within the dock. A resource consent was obtained to add chlorine to the water in the dock which was then left overnight to kill the *Sabella* (and other fouling). The treatment appeared to work very well and during the course of the day scientists were able to collect data regarding the survival of *Sabella* on the hull.

Most vessel owners are aware that clean hulls and fresh antifoul prevent marine pests from establishing and that slipping, cleaning and antifouling vessels on a regular basis will prevent marine pest transfer. However, in some remote harbours where slipping and cleaning facilities are not available (such as Whangaroa) the treatment dock can provide a safeguard which can be used in emergencies to treat an infected hull without moving the boat to another habour where facilities are available.

Northland now has two portable treatment facilities which have proven to be particularly useful in instances where there are no other facilities to slip a vessel, such as remote locations, bays or harbours that have no supporting infrastructure. This facility is expected to become a regular tool for dealing with biofouling on (smaller) vessels arriving in Northland ports and marinas from elsewhere in New Zealand and overseas.

Inflatable vessel quarantine facilities, such as the one shown in use at Westhaven, Auckland, can be used to treat the infected hulls of vessels in a variety of locations *(Northland Regional Council)*

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6 Marine protected areas

Diver enjoying school of demoiselle, Tuhua (Mayor Island), Bay of Plenty *(Daniel Sharp)*

Contents

Introduction

The identification of spatial marine areas is a useful approach to help preserve marine biodiversity as well as to maintain the overall health of the marine environment. Such areas commonly fall under the umbrella term 'marine protected areas'. This term is not currently defined in statute in New Zealand. However, the 'Marine Protected Areas Policy Statement and Implementation Plan' prepared jointly by the Department of Conservation and the former Ministry of Fisheries in 2005 has defined a marine protected area as being:

> *An area of the marine environment especially dedicated to, or achieving, through adequate protection, the maintenance and/or recovery of biological diversity at the habitat and ecosystem level in a healthy functioning state.*[1]

Government has adopted the objective of establishing a network of marine protected areas. In 2000 the Government released the New Zealand Biodiversity Strategy in order to fulfil, in part, the country's commitments under the Convention on Biological Diversity. As an action to achieve the objective of protecting marine habitats and ecosystems, the Biodiversity Strategy identifies 'a target of protecting 10 percent of New Zealand's marine environment by 2010 in view of establishing a network of representative protected marine areas'.

Marine protected areas can be designed to protect complete habitats and ecosystems within an area, or can be more specifically tailored to protect specific habitats such as seamounts. Spatial areas can also be used to protect specific species such as marine mammals or seabirds, although such areas are not included within the definition of marine protected areas set out in the Government's policy statement.

The Te Matuku Marine Reserve protects a diverse range of estuarine habitats and is important habitat for seabirds *(Raewyn Peart)*

Potential benefits of marine protected areas

Marine protected areas can have a range of ecological, social, cultural and economic benefits which are summarised in Figure 6.1. The extent to which these benefits can be achieved in practice is largely dependent on the location, design and ongoing management of the areas.

- Protection of biodiversity
- Increased productivity
- Increased resilience of the marine environment to damage from human activity, thereby safeguarding ecosystem services
- Provision of 'benchmarks' against which the impacts of human activities in other parts of the marine environment can be compared
- Improved fisheries through spillover of eggs, larvae and adult fish
- Protection of geological processes
- Protection of cultural values
- Increased opportunities for tourism and recreational activities
- Maintenance of New Zealand's 'green' international image
- Increased opportunities for education and science (this is the thrust of the Marine Reserves Act)

Figure 6.1 Potential benefits of marine protected areas

Protection of biodiversity and increased productivity

Somewhat surprisingly, there have as yet been no studies in New Zealand to establish the direct impact of marine reserves on biodiversity. However, research has conclusively shown that, where extractive activities are prohibited, abundance of previously exploited marine species in marine reserves can increase dramatically, and that this can occur within relatively short periods of time.[2]

Marine reserves can help to rebalance predator–prey relationships, and as a consequence reduce kina barrens, which are shown here in the Bay of Islands *(Raewyn Peart)*

An increase in the abundance of previously fished species can have a positive flow-on effect, through rebalancing predator–prey relationships, and the overall food web. For example, the increase in snapper and rock lobster within the Cape Rodney-Okakari Point Marine Reserve was associated with a marked decrease in the abundance of sea urchins (on which snapper and rock lobster prey), and a regeneration of kelp beds (on which the sea urchins prey). This, in turn, is thought to have increased productivity and diversity within the marine reserve. This is because kelp forests are major primary producers, support a richer and more diverse faunal community, and are 'central to ecosystem function and diversity.' Scientists have estimated that macro-algae primary productivity in the reserve has increased by 58 per cent over a 20 year period.[3]

Increased resilience and maintenance of ecosystem services

Well-designed marine protected areas can help to promote healthy ecosystems which are resilient and able to adapt to stresses because they are complex systems with inbuilt buffers. Resilience enables marine communities to better withstand pressures whilst still retaining their basic function, including the delivery of the ecosystem services upon which we all rely.[4] Critical services include climate regulation, oxygen production, nutrient recycling and production of protein for human consumption.

Benchmarking of environmental health

The complexity of marine ecological dynamics makes it hard for scientists to assess the impact of human-derived pressures on the marine environment.[5] Modelling can assist, but cannot provide all the answers. The establishment of areas in which specific activities are excluded can play an important role in providing 'benchmarks' or 'controls' against which human impacts and management of the rest of the marine area can be evaluated.[6]

In particular, because marine reserves exclude fishing, they can provide useful information on the characteristics of an unfished population, which can then be compared with those of the fished stock. This can provide an indication of the extent of change caused by fishing, and therefore help inform fisheries sustainability decisions.[7]

Fisheries spillover

Marine protected areas can potentially benefit commercial and recreational fishers by contributing to fish stocks outside the protected area. This can occur if harvestable-size stock moves from the closed area to open areas where they can be caught, or if eggs and larvae cross the boundary and establish outside the closed area.

The spillover of harvestable species from reserves is evident from the presence of fishers around the edges of the protected areas. For example, cray pots often line the reserve boundaries around the marine reserve at Leigh.[8] The likelihood of such spillover depends on the mobility and habits of the species concerned, conditions inside and outside the marine protected area, and the area's design (e.g. longer edges enhance the likelihood of spillover).[9]

Marine reserves can support denser populations of larger fish for resident species that are heavily fished.[10] A recent study of three marine reserves in the Greater Hauraki Gulf (at Leigh, Tāwharanui and Hahei) found that there were on average 13 times more snapper above the legal size limit within the reserves than outside them.[11] This has important implications for reproduction. Larger fish can produce far more eggs, per unit of body weight, than smaller fish. In addition, there is evidence that the larvae produced by larger fish have better survival rates.[12]

Great Barrier Reef Marine Park larvae spillover

A genetic study of adult and juvenile coral trout and stripey snapper within the Great Barrier Reef Marine Park demonstrated that the reserves contributed a greater proportion of the juvenile fish in fished areas than their size would indicate. The six reserves in the Keppel Islands comprised around 28 per cent of the reef habitat in the region but supplied around 50 per cent of the total recruited fish. The scientists concluded 'our findings indicate that adults in reserves were making a large contribution to the replenishment of populations on both reserve and fished reefs'.[13] Recent research at the Cape Rodney-Okakari Point Marine Reserve supports these findings, indicating that snapper larvae from the reserve make a strong contribution to surrounding fished stocks.[14]

Protection of geological features and processes

Marine protected areas can be used to protect geological features and processes identified as particularly unique or typical. This may be closely interlinked with the protection of the biodiversity they support. For example, deepsea vents are valued both as rare geological features and for the unique ecological communities which are dependent on them.

Protection of cultural values

The protection of marine space can be of considerable cultural value. For example, the establishment of Te Whanganui A Hei – (Cathedral Cove) Marine Reserve was supported by Ngāti Hei, because the area included tapu sites associated with tribal massacre. Ngāti Hei believed that the establishment of the reserve enhanced their mana. Likewise, the Sugar Loaf Islands marine protected area includes tapu sites for at-sea burials.

Te Tapuwae O Rongokako Marine Reserve

The local hapū at Whangara (Ngāti Konohi) supported the establishment of Te Tapuwae O Rongokako Marine Reserve on the Gisborne coast, and joined with the Department of Conservation to make the application. The reserve was seen as a valuable way to protect kaimoana and give back to Tangaroa.[15]

Increased recreational and tourism opportunities

Studies of the impacts of marine reserves in New Zealand have shown a range of tourism and recreation benefits. For example, the establishment of the Tonga Island Marine Reserve adjacent to the Abel Tasman National Park increased the recreational value of the area and, in turn, attracted greater numbers of visitors. In response, new accommodation enterprises have established, and there are growing numbers of water taxi operators. There has also been a significant growth in the number of kayak companies, from the two operating prior to the establishment of the marine reserve to at least 13 currently.[16]

Economic benefits of marine reserves

Significant economic benefits have been experienced from the Cape Rodney-Okakari Point Marine Reserve. An economic impact analysis undertaken in 2008 identified an estimated 375,000 annual visits to the reserve and the contribution of $18.6 million a year into the local economy. This was compared to the cost to the Department of Conservation of managing the reserve of around $70,000 per year.[17]

Increased opportunities for education and science

Marine reserves provide the opportunity for scientists to study marine communities which are largely intact, and which are not directly disturbed by fishing activity. For example, science undertaken in the Cape Rodney-Okakari Point Marine Reserve has made a major contribution to our understanding of rocky reef systems in New Zealand.[18]

Scientists are able to observe unharvested populations of fish in marine reserves. This is important to enable the development of understanding about the natural behaviours and population dynamics of fish species. In addition, reserves enable scientists to carry out longitudinal studies on individuals which are not possible where fishing takes place, as the individual studied will likely be lost to harvesting during the experiment.[19]

Educational facilities often co-locate with marine reserves, as the reserves provide an excellent place for students and members of the public to observe marine life. For example, the Goat Island Marine Discovery Centre is located near the marine reserve at Leigh and the Sir Peter Blake Marine Education and Recreation Centre is located adjacent to the Long Bay-Ōkura Marine Reserve.

Mechanisms to spatially protect marine areas

There are many types of spatially-defined marine areas which can be created under statute in New Zealand, and which may constitute marine protected areas. These include marine reserves, marine mammal sanctuaries, areas closed to selected fishing methods, marine parks, areas established under special legislation, areas of significant conservation value, areas to be avoided by shipping and cable exclusion areas. These mechanisms are summarised in Figure 6.2 and described in more detail in the following sections.

Traditionally, Māori used the temporary closures of rāhui, mātaitai and taiāpure to manage fisheries resources. While there is some overlap between the effect of rāhui and marine protected areas, their approach and purpose differs. Fully protected marine reserves impose permanent closures to fishing in order to protect biodiversity in the long term. Rāhui imposes a temporary closure to assist with the replenishment of kaimoana stocks so that they can be harvested in the future. As a result of these differences, proposals to establish marine protected areas can run into conflicts with manawhenua who wish to continue exercising traditional customary fishing rights.

Type of protection	Key features
Marine reserves *Marine Reserves Act 1971*	Purpose is for 'preserving them [areas of the sea] in their natural state as the habitat of marine life for scientific study' Cannot be created outside the territorial sea Only a small number of parties specifically identified in the Act can apply to create a marine reserve Can only be created if the Ministers of Conservation, Primary Industries and Transport agree Created by the Governor-General by Order-in-Council (meaning it must be approved by Cabinet) Provides a high level of protection – all fishing usually excluded Managed by the Department of Conservation
Marine mammal sanctuaries *Marine Mammals Protection Act 1978*	No specific purpose stated in the Act, but they are intended to protect marine mammals from harmful human impacts Can be created within the territorial sea and EEZ Created by the Minister of Conservation by *Gazette* notice. Requires the consent of other Ministers if they control any Crown-owned land, foreshore, seabed, or waters of the sea. May specify activities that may or may not be engaged in within the sanctuary, and may impose restrictions in respect of the sanctuary Managed by the Department of Conservation

Type of protection	Key features
Area-based fisheries restrictions *Fisheries Act 1996*	No specific purpose stated in the Act, but they can be used to avoid, remedy or mitigate any adverse effects of fishing on the aquatic environment Spatial fishing restrictions can be created within the territorial sea and EEZ Created by the Minister for Primary Industries by *Gazette* notice or Governor-General by Order-in-Council Can restrict or prohibit certain types of fishing activity Managed by the Ministry for Primary Industries
Areas of significant conservation value *Resource Management Act 1991*	Can cover any area within the territorial sea Created by inclusion of the area in a regional coastal plan with associated rules Managed by the regional council which enforces rules in the regional coastal plan and conditions on resource consents
Areas to be avoided by shipping *Maritime Transport Act 1994*	Purpose is to protect sensitive marine environments from the risks, principally of marine oil spills, posed by shipping operations Excludes ships in transit from entering defined marine areas Draft rules are initiated by Maritime New Zealand and approved by the Minister of Transport Rules are enforced by Maritime New Zealand
Protected areas *Submarine Cables and Pipelines Protection Act 1996*	Purpose is to protect submarine cables and pipelines Excludes fishing and anchoring within the protected area Enforced by Maritime New Zealand
Special legislation	Can be tailored to specific issues and conditions Initiated by Member of Parliament (usually the majority party) Approved by Parliament

Figure 6.2 Overview of mechanisms to spatially protect marine areas

Marcaciones Point, part of the Te Awaatu Channel (The Gut) Marine Reserve in Doubtful Sound which protects significant rock wall and deep-sea habitats *(Raewyn Peart)*

Marine reserves

Highly protected areas, called marine reserves, can be established in New Zealand under the Marine Reserves Act. These can only be created within the territorial sea.

The purpose of establishing marine reserves under the Act focuses on scientific study rather than preserving biodiversity. The long title of the Act states that it is 'nn Act to provide for the setting up and management of areas of the sea and foreshore as marine reserves for the purpose of preserving them in their natural state as the habitat of marine life for scientific study.'

Marine reserves are managed by the Department of Conservation with the aim of maintaining them as far as possible in their natural state. Section 3(3) of the Act provides that no person shall fish in a marine reserve unless specifically authorised. This means that they are usually 'no-take' areas. Other activities which could damage or remove features are also excluded. Boating, swimming and diving are usually permitted. The Marine Reserves Regulations 1993 apply to activities in marine reserves and address diving, anchoring, the use of vessels and scientific study within reserves.

Although non-commercial fishing can legally be permitted in a marine reserve, it is only currently permitted within a small part of the Kapiti Marine Reserve and is restricted to whitebaiting. Schedule 4 of the Crown Minerals Act specifically excludes mining activity from marine reserves (those declared a marine reserve under section 4(1) of the Marine Reserves Act).

An application to establish a marine reserve can only be made by a range of specified applicants, those being a university, a body administering a reserve adjacent to the coast, an organisation involved in the study of marine life and natural history, iwi or hapū with tangata whenua status over the area and the Director-General of Conservation. A significant proportion of marine reserves have been proposed by external applicants, including New Zealand's first at Cape Rodney-Okakari Point which was proposed by the University of Auckland. The process to establish a marine reserve is outlined in Figure 6.3.

A marine reserve may not be established if it would:

- Unduly interfere with any interest in land in or adjoining the reserve
- Interfere unduly with any existing right of navigation
- Interfere unduly with commercial fishing (within the broader marine area – commercial fishing will almost always be excluded from the marine reserve area itself)
- Interfere unduly with, or adversely affect, any existing usage of the area for recreational purposes
- Otherwise be contrary to the public interest

The Cape Rodney-Okakari Point Marine Reserve at Leigh was one of the first no-take marine reserves to be established in the world *(Craig Potton)*

- An application to create a marine reserve is lodged with the Director-General of Conservation
- Notice of intention to apply to create a marine reserve must be publicly notified in a range of newspapers
- Notice in writing of the application must also be given to owners of land adjoining the proposed reserve and other public bodies
- Members of the public have two months in which to lodge a written objection to the proposal with the Director-General of Conservation
- The applicant is given three months to answer the objections in writing
- The Director-General forwards the objections and answers received to the Minister of Conservation
- The Minister of Conservation decides whether any objection should be upheld. If the objection is upheld the marine reserve cannot be declared.
- The Minister of Conservation then decides if the reserve would be in the best interests of scientific study, if it would be for the benefit of the public and if it would be expedient. There are no appeal rights against the Minister's decision although it can be judicially reviewed.
- If the Minister decides to create the marine reserve, concurrence is sought from the Ministers of Transport and Primary Industries
- If concurrence is granted the Minister of Conservation recommends that the Governor-General makes an Order-in-Council creating the reserve

Figure 6.3 Process to establish a marine reserve

A list of current and proposed marine reserves, and information about them, can be found at the Department of Conservation's website.[20]

The Marine Reserves Act is currently under review and is likely to be replaced with legislation which will enable the creation of broader types of marine protected areas (rather than just marine reserves), improve the process for their creation, and enable fully protected areas to be created within the EEZ.[21]

The Mata Manua (Pollen Island) Marine Reserve in the Waitematā harbour has extensive shellbanks and is an important feeding ground for seabirds. The North-Western Motorway runs through the reserve *(Raewyn Peart)*

Marine mammal sanctuaries

Marine mammal sanctuaries can be established under the Marine Mammals Protection Act. The purpose of the Act as set out in the long title is the 'protection, conservation, and management of marine mammals within New Zealand and within New Zealand fisheries waters'. The sanctuaries are managed by the Department of Conservation.

Marine mammal sanctuaries are created by the Minister of Conservation declaring the sanctuary by notice in the *Gazette*. The consent of other Ministers must also be obtained if they control any Crown-owned land, foreshore, seabed, or seawater. Within 28 days after publication of the notice, members of the public may lodge written submissions with the Minister, who may vary, redefine or abolish the sanctuary after considering the submissions. The Minister may specify restrictions on activities that may take place in the sanctuary at the time the declaration is made. Activities which have been controlled in marine mammal sanctuaries include fishing, mining and seismic surveying.

The Akaroa Marine Mammal Sanctuary protects the endangered Hector's dolphin
(Raewyn Peart)

Area-based restrictions on fishing activity

Areas can be closed to specified types of fishing activity by the Minister for Primary Industries, under the sustainability provisions of the Fisheries Act, after taking into account the effects of fishing on any stock and the aquatic environment. Before making a decision to restrict or prohibit fishing in an area, the Minister must consult with stakeholders, and take into account any conservation or fisheries services and any relevant fisheries plan.

The process to impose a restriction on fishing activity will normally include the following steps:

- The Ministry for Primary Industries will prepare an Initial Position Paper
- The paper is publicly released and written submissions called for. Any person is able to make a written submission.
- Once the submission period has closed the Ministry summarises and considers the written submissions and prepares a Final Advice Paper
- The Final Advice Paper is forwarded to the Minister who makes a final decision. The decision is recorded in a short letter which sets out the decision and the reasons for it.
- The decision is then given effect to, either through a notice in the *Gazette* or by regulations promulgated under section 298 of the Fisheries Act

There are no appeal rights, but the decision can be judicially reviewed in the High Court.

Figure 6.4 Process to impose an area-based restriction on fishing activity

Numerous area-based restrictions have historically been placed on fishing activities, particularly in harbours and coastal areas. Many of these were not originally intended to provide marine biodiversity benefits, but were put in place to deal with issues such as conflicts between recreational and commercial fishers. They may, however, in practice result in improvements in biodiversity. More recently, restrictions under the Fisheries Act have closed 17 areas around and over seamounts (and other bathymetric features) and 17 large benthic protection areas (primarily) within the EEZ to dredging and trawling activity as a result of biodiversity concerns. These areas cover around 30 per cent of the EEZ which equates to more than four times the area of New Zealand's land mass.

Marine parks

Two marine parks were established under the now repealed Harbours Act 1950 and regulations under the Fisheries Act. These were the Tawharanui Marine Park in the northern part of the Auckland region and the Mimiwhangata Marine Park to the north. The Tawharanui Marine Park was declared a marine reserve in 2011. The fisheries regulations, which apply to the Mimiwhangata Marine Park, exclude all commercial and some recreational fishing. A third marine park was set up around the Sugar Loaf Islands off New Plymouth (which is now the Ngā Motu/Sugar Loaf Islands Marine Protected Area – see further discussion below).

A fourth marine park has been established under its own special legislation, the Hauraki Gulf Marine Park Act. This, amongst other things, establishes a Hauraki Gulf Marine Park which primarily consists of reserve land, Ramsar wetlands, foreshore and seabed owned by the Crown, marine reserves and seawater (but not marine life). Provisions in the legislation provide for council-owned and privately-owned reserve land to be added to the marine park with the consent of the owner. Taiāpure and mātaitai reserves may also be added to the park with the consent of the Minister for Primary Industries and the committee of management or tangata whenua.

Anyone administering an area within the Park must recognise and give effect to its purpose which is identified in the Act as:

1. To recognise and protect in perpetuity the international and national significance of the land and the natural and historic resources within the Park
2. To protect in perpetuity and for the benefit, use, and enjoyment of the people and communities of the Gulf and New Zealand, the natural and historic resources of the Park including scenery, ecological systems, or natural features that are so beautiful, unique, or scientifically important to be of national significance, for their intrinsic worth
3. To recognise and have particular regard to the historic, traditional, cultural, and spiritual relationship of tangata whenua with the Hauraki Gulf, its islands and coastal areas, and the natural and historic resources of the Park
4. To sustain the life-supporting capacity of the soil, air, water, and ecosystems of the Gulf in the Park

The legislation also establishes the Hauraki Gulf Forum and provides a set of management objectives which apply to the Gulf's coastal marine area, islands and catchments. These are described more fully in Chapter 2: Marine management.

Anchor Bay, part of the Tāwharanui Marine Reserve which was established in 2011, protects extensive rocky reef systems
(Raewyn Peart)

Areas protected by special legislation

Some areas are protected by other special legislation, which is tailored to each case, and does not have more general application. The Sugar Loaf Islands Marine Protected Area Act 1991 establishes the Ngā Motu/Sugar Loaf Islands Marine Protected Area covering an area of 8 square kilometres. The protected area is managed by the Department of Conservation. Mining is prohibited in the protected area and there are also restrictions on fishing activities under the Fisheries Act.

The Fiordland (Te Moana o Atawhenua) Marine Management Act establishes a Fiordland (Te Moana o Atawhenua) Marine Area and the Fiordland Marine Guardians which has an advisory and facilitative role, amongst other things. Members of the Guardians are appointed by the Minister for the Environment with the requirements that one member be nominated by Te Rūnanga o Ngāi Tahu, that at least five members are ordinarily resident in the Otago or Southland regions, and that the membership reflects a balanced mix of knowledge and experience in relation to the Marine Area. Unlike the situation in the Hauraki Gulf, the Fiordland legislation does not establish any common management objectives for the marine area.

Similar legislation now applies to Kaikōura. The Kaikōura (Te Tai o Marokura) Marine Management Act 2014 provides for the establishment of the Kaikōura Guardians who can provide advice to Ministers on matters affecting the Te Whata Kai o Rakihouia i Te Tai o Marokura/Kaikōura Marine Area which is identified in the legislation. Members of the advisory body are appointed by the Minister of Conservation and the Minister responsible for the administration of the Fisheries Act (currently the Minister for Primary Industries). The members of the advisory committee must represent certain interests and areas of expertise including Te Rūnanga o Ngāi Tahu, the Kaikōura community, biosecurity, conservation, education, environment, fishing, marine science and tourism. The Act also creates a number of marine protected areas and other management areas including a marine reserve, a fur seal sanctuary, a whale sanctuary, mātaitai and taiāpure.

Areas of significant conservation value

Areas of significant conservation value are sometimes spatially identified in regional coastal plans under the RMA, and measures such as protective rules to ensure that these areas are not adversely affected are specified. Usually activities such as aquaculture, marinas and moorings, reclamations and building structures are to be avoided in these areas.

Such provisions are included in plans after a public process, which involves the public notification of the proposed plan provisions, opportunity for written public submissions, some opportunity for cross-submissions and then a public hearing. Decisions of the council on submissions can be appealed to the Environment Court.

The Mahurangi Harbour has been identified as a significant marine ecological area in the Proposed Auckland Unitary Plan
(Raewyn Peart)

It is also possible for any person to lodge a private plan change to insert provisions into regional coastal plans identifying significant conservation areas and providing for their protection. Private plan changes go through a similar process, although they can be rejected by the council on a number of grounds.

Fishing methods, which have an impact on the marine environment, can potentially be restricted in regional coastal plans in order to promote sustainable management. Regional coastal plans cannot, however, 'control the taking, allocation or enhancement of fisheries resources for the purpose of managing fishing or fisheries resources controlled under the Fisheries Act 1996'.

Areas to be avoided by shipping

Areas to be avoided by shipping can be established under the Maritime Transport Act and are discussed in Chapter 15: Vessels

Cable protection areas

Protected areas can be declared under section 12 of the Submarine Cables and Pipelines Protection Act (see Figure 6.5 for an example). All fishing operations and anchoring are prohibited in such areas. This exclusion is not for environmental purposes, but is intended to protect cables and pipelines from damage. However, it may have the indirect effect of restricting activities which could also impact on biodiversity within the area.

Figure 6.5 Cable protection zones in the Hauraki Gulf *(Auckland Council)*

Wildlife management reserves

Reserves can be established under the Wildlife Act and can potentially extend into the marine area although this has yet to occur. However, co-locating wildlife and marine reserves can create land-to-the-sea protection. For example, the Westhaven (Te Tai Tapu) Marine Reserve is adjacent to the Westhaven (Whanganui) Wildlife Management Reserve. Effectively the estuary at Westhaven is therefore protected both as marine reserve and as a wildlife reserve. The marine reserve covers 536 hectares of tidal sandflats and channels within Whanganui Inlet, on the western coast of Golden Bay, and the wildlife management reserve covers over 2,112 hectares of tidal sandflats and channels not included in the marine reserve.[22]

Marine protected areas policy

In 2005 the Department of Conservation and former Ministry of Fisheries formally released a policy statement and implementation plan for marine protected areas. This was designed to provide a more strategic approach to identifying and creating the network of representative protected marine areas identified in the Biodiversity Strategy. The purpose of the policy is to 'protect marine biodiversity by establishing a network of MPAs [marine protected areas] that is comprehensive and representative of New Zealand's marine habitats and ecosystems'. The Ministry for Primary Industries and the Department of Conservation are jointly responsible for implementing the policy.

Marine classification

The policy takes a regional approach to the planning and establishment of a network of protected areas around New Zealand, although it is not aligned with regional council boundaries. A coastal and marine classification system, which identifies different types of marine habitat, has been developed, to help ensure that the network of marine protected areas is comprehensive and representative. Fourteen biogeographic regions have been identified (see Figure 6.6 for an example), which collectively cover the entire New Zealand marine area within the territorial sea (12 nautical miles seawards). They are intended to reflect major coastal biological patterns. These regions have been further classified, through the application of additional layering criteria, into 44 different types of habitat. The layering used to identify these areas included:

- Biogeographic region (14 regions)
- Environment (estuarine or marine)
- Depth (intertidal, shallow subtidal, deep subtidal)
- Exposure (low, medium, high)
- Substrate type (mud, sand, gravel, cobble, boulder, rocky, biogenic reef)

Marine protection tools

The policy provides that, in order to meet the requirements for a marine protected area, a management tool must enable the maintenance or recovery of the site's biological diversity at the habitat and ecosystem level to a healthy functioning state. In particular, the management regime must provide for the maintenance and recovery at the site of:

- Physical features and biogenic structures that support biodiversity
- Ecological systems, natural species composition (including all life-history stages), and trophic linkages
- Potential for the biodiversity to adapt and recover in response to perturbation

There are three types of protected area recognised in the policy based on the capacity of the tool to restrict human fishing and non-fishing impacts, with only Type 1 and 2 recognised as having sufficient protection to qualify as 'marine protected areas':

- Type 1: Marine protected areas that provide a high level of protection, including broad scope to restrict damaging activities (only marine reserves under the Marine Reserves Act)
- Type 2: Marine protected areas that provide only limited protection, but must as a minimum provide for prohibition of trawling, Danish seine netting and dredging
- Type 3: Other protection tools that are similar to marine protected areas , but which do not sufficiently protect biodiversity to meet the standard of Type 1 or 2 above. Type 3 areas are relevant when measuring progress toward the New Zealand Biodiversity Strategy target.[23]

Type 2 marine protected areas can include a wide range of protective mechanisms including cable protection zones, marine mammal sanctuaries, rules in regional coastal plans and provisions under the Crown Minerals Act, Maritime Transport Act and Biosecurity Act.

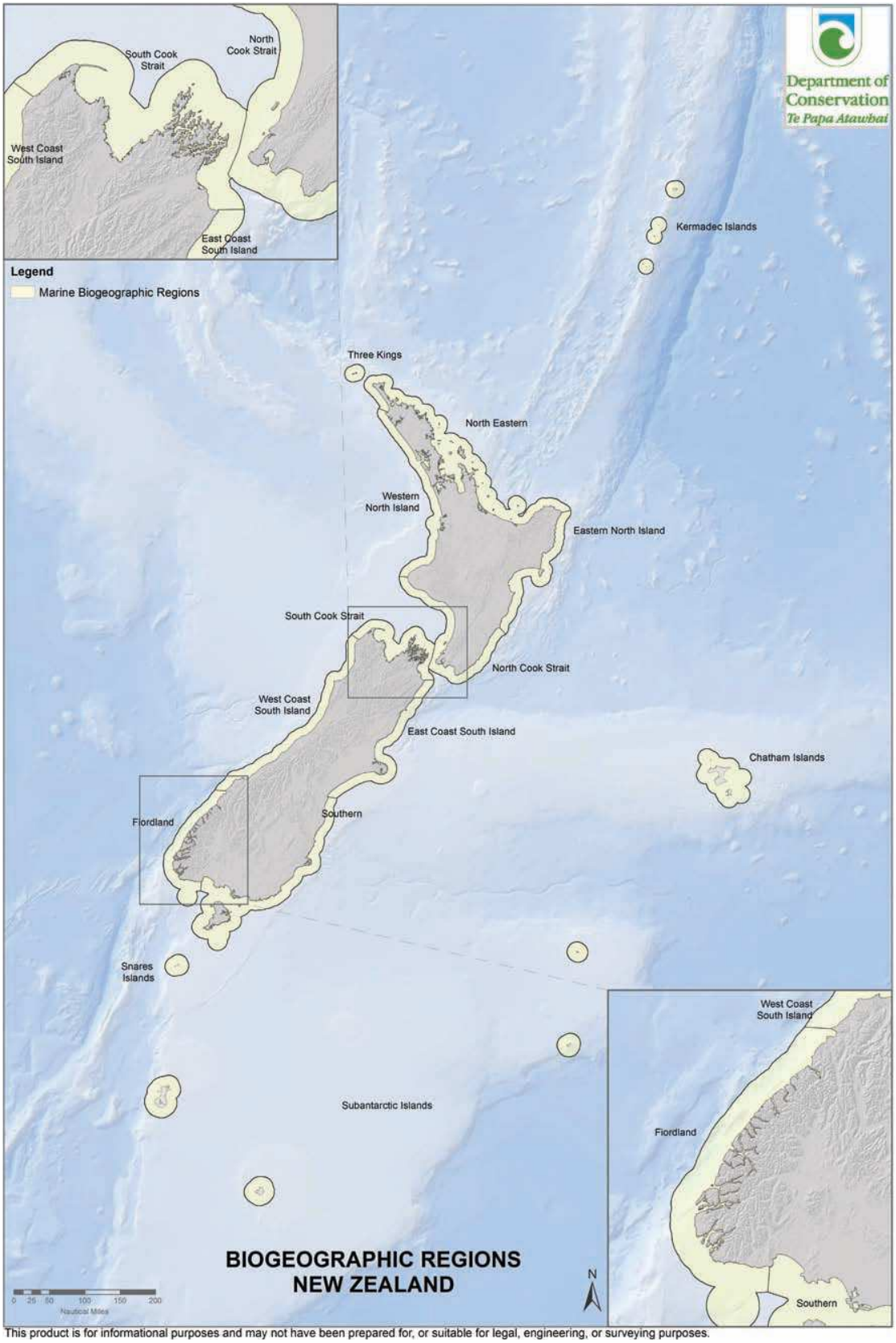


Figure 6.6 New Zealand's coastal biogeographic regions and marine protected areas *(Department of Conservation)*

In 2011, the Department of Conservation undertook a gap analysis of marine protected areas to determine how representative the network was. The report concluded that significant gaps existed. Of the ecosystem types that were represented in the existing network, only a very small proportion of their total area was subject to protection.[24] The report found that 6.9 per cent of all coastal marine bioregions were protected within the coastal marine area, but that the figure was heavily influenced by two large marine reserves (Kermadec Islands and Subantarctic Islands). Aside from those two bioregions, less than one per cent was protected to a Type 1 standard. Approximately 1.14 per cent of the territorial sea was estimated to be protected to a Type 2 standard. Most marine bioregions nationally were poorly represented in marine protection.[25] These areas are shown in Figure 6.7 below.

Biogeographic region	Total area (km²) of marine reserves		Total area (km²) of Type 2 MPAs		Total area (km²)
Chatham Islands					12,318
East Coast South Island	112	1%			11,288
East Coast North Island	29	0.2%			11,637
Fiordland	104	1%	378	3.7%	10,241
Kermadec Islands	7675	100%			7149
North Cook Strait	30	0.2%	241	1.8%	13,671
North Eastern	85	0.2%	898	2.4%	38,073
Snares Islands					2154
South Cook Strait	39	0.3%	139	1.1%	12,241
Southern South Island	11	0.01%	88	0.4%	20,986
Subantarctic Islands	9408	79%			11,936
Three Kings					2226
West Coast South Island	174	1.3%			13,158
West Coast North Island	33	0.2%	329	2.3%	14,589
Total	**17,698**	**10%**	**2,073**	**1.1%**	**181,699**

Figure 6.7 Areas of marine protected areas in coastal marine biogeographic regions *(Department of Conservation)*[26]
Note: Blank indicates no marine protected areas, data rounded to the nearest km²

Implementation

Recent implementation efforts for the policy have been concentrated on the territorial sea. As part of the agreement with the fishing industry to establish the 17 benthic protection areas in the EEZ, the government agreed not implement the marine protected areas policy within the EEZ until 2013. It is anticipated that planning in this area, when it does occur, will be undertaken by an expert offshore panel.

Each of the biogeographic regions is to be the focus of a planning process to be undertaken by community-based marine protection planning fora supported by staff from the Department of Conservation and the Ministry for Primary Industries. The fora will have up to 14 members including representatives from tangata whenua, commercial fishers, recreational users including fishers, charter fishers and divers, conservation groups, tourism, the aquaculture industry, marine science and the minerals industry.

The fora are tasked with identifying potential sites and tools for area-based protection of biodiversity. They are expected to seek consensus on proposed areas and to make recommendations to the Ministers of Conservation and Primary Industries. They are expected to constructively involve and engage stakeholders in each region and are required to seek written submissions on any recommendations being made. It was initially expected that each forum will produce a set of recommendations within 18 months of being appointed. In practice it has taken much longer than this.

The 'Marine Protected Areas: Classification, Protection Standard and Implementation Guidelines', prepared by the former Ministry of Fisheries and the Department of Conservation, provide design guidelines to assist the fora in identifying and selecting potential protected areas. These include guidance on identifying potential protected areas, on selecting candidate areas from among potential sites and for selecting appropriate tools for protecting the areas. Figure 6.8 summarises these details.

Area	Involves
Identifying potential MPAs	• Protect whole habitats and ecosystems • Be of sufficient size to provide for the maintenance of populations. Fewer larger areas are to be preferred than numerous smaller areas • Maximise and enhance linkages among individual and groups of protected areas • Include differences in habitats and ecosystems that cover both latitudinal and longitudinal or cross-shelf ranges (i.e. from the intertidal zone to deep offshore waters) • Consider adjacent uses which may affect the protected areas • Use simple boundaries and minimise boundary to area ratios
Selecting candidate MPAs – Primary considerations	• Protect the full range of marine habitats and ecosystems • Consider information on cultural use and values and Treaty settlement obligations • Consider information on social and economic interests and users • Minimise adverse impacts on existing users and Treaty settlement obligations
Selecting candidate MPAs – Secondary considerations	• Protect multiple habitats within each protected area • Have fewer larger rather than numerous smaller protected areas • Consider activities such coastal structures, dredging or dumping sites which may negatively impact on the site • Align where possible with other protected areas • Provide, where possible, replication of habitats and ecosystems

Figure 6.8 Guidelines for selecting potential protected areas

At the time of writing two fora had concluded for the West Coast South Island and Subantarctic biogeographic regions. A forum for the Otago coastline was announced in March 2014. The Hauraki Gulf Marine Spatial Planning process (called Seachange) is expected to develop recommendations for marine protected areas in the Hauraki Gulf (see Chapter 7: Marine spatial planning). An initiative led by Ngāti Kurī, known as Te Korowai o Te Tai o Marokura or Kaikōura Coastal Marine Guardians, worked in a collaborative manner to develop the Kaikōura Marine Strategy. This is in the process of being implemented through the Kaikōura (Te Tai-o-Marokura) Marine Management Act.

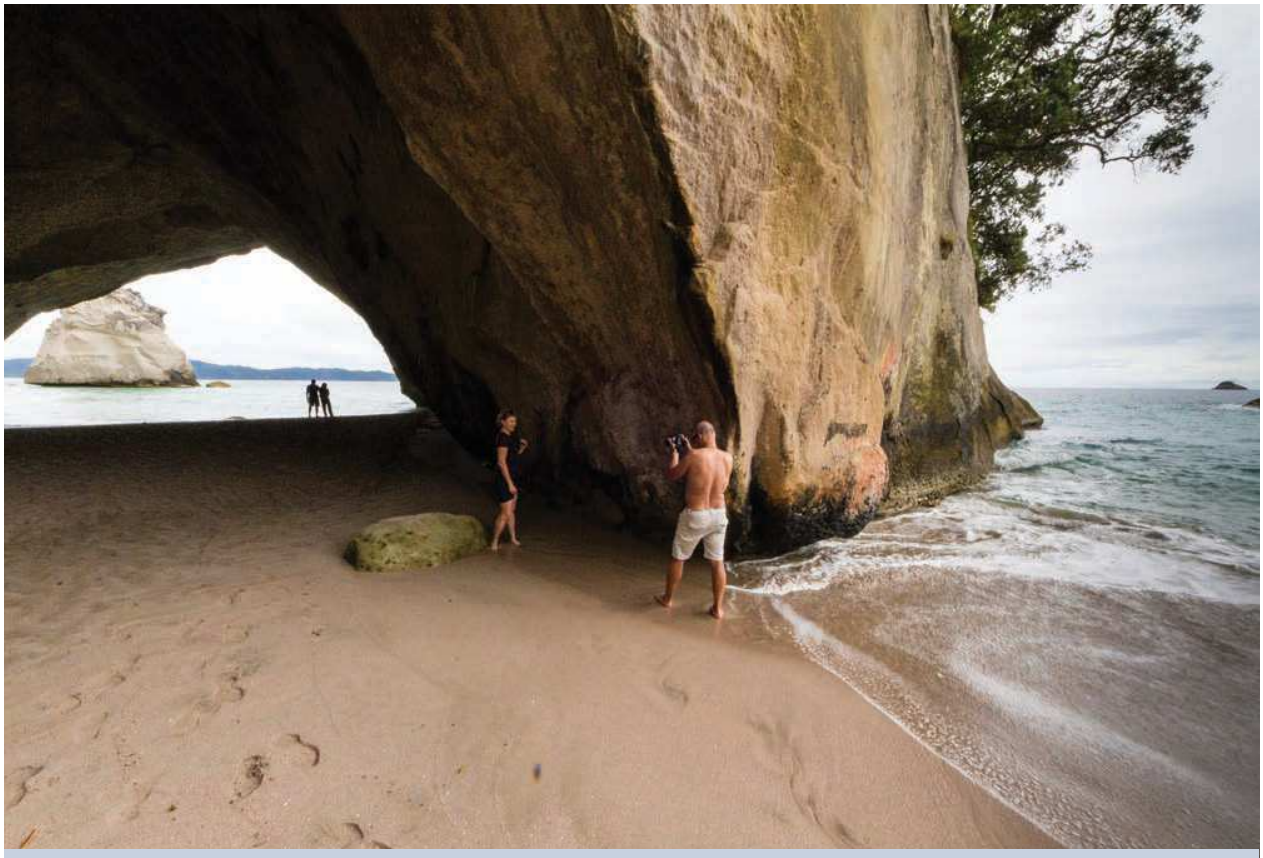
The timetable for progressing the development of marine protection plans in other areas is uncertain. A review of spatial marine protection in New Zealand, the operation of planning fora, and recommendations for reform can be found in the Environmental Defence Society publication *Safeguarding Our Oceans*.[27]

Elements of best practice

The IUCN World Commission on Protected Areas has produced a document that represents a synthesis of the expertise, knowledge and views of world-leading experts in marine protected area network design and implementation. The following elements of best practice have been drawn from this document. To maximise its effectiveness, a network needs to include a group of marine protected areas that are carefully designed to function collectively and synergistically as an ecological network. This includes the following design considerations:[28]

- Does the MPA network protect some of all the habitat types and habitats linked by species life cycle patterns found in a biogeographic region?
- Does the MPA network include both transition zones between biogeographic areas and core zones within each biogeographic region?
- Does the MPA network include representation of ecosystem processes as well as habitat types?

- Does each MPA include a variety of depths and transition zones and areas which cover the life-stage movements of species?
- Are the MPAs large enough to be effective, self-sustaining ecological units? Do they protect and maintain ecological processes such as nutrient flows and food-web interactions? Are they large enough for populations to be self-seeding?
- Does the MPA network include replicates of each representative habitat? It is recommended that at a minimum three replicates of each habitat type should be included.
- Does the MPA network include ecologically significant areas such as rocky reefs, oyster reefs, mussel beds, bryozoan reefs, salt marshes, seagrass beds and mangroves?
- Does the MPA network include unique habitats?
- Does the MPA network protect spawning aggregations of fish, egg sources and nursery areas?
- Does the MPA network protect roosting sites, foraging grounds, socialising areas and migratory routes for marine mammals and seabirds?
- Does the MPA protect source populations including larger, older individuals who have a greater reproductive capacity?
- Are the MPAs spaced so that larvae from as many species as possible can reach other MPAs with appropriate habitat?
- Are the MPAs in the network located so that they are connected by the exchange of eggs, larvae recruits, other propagules, juveniles and adults?
- Are individual MPAs large enough to cover a range of movement patterns of adults, juvenile fish and invertebrates and to include larval dispersal distances?
- Are MPAs located in a wide variety of places in relation to prevailing currents to facilitate larval dispersal?



Te Whanganui-A-Hei (Cathedral Cove) Marine Reserve protects rich and varied habitats associated with rocky reefs and sandy seafloor areas *(Raewyn Peart)*

Cape Rodney-Okakari Point Marine Reserve (Goat Island)

New Zealand's first marine reserve was established near Leigh in May 1977. The impetus behind the creation of a 'protected area in the sea' came from University of Auckland scientists who had established a marine laboratory in the vicinity during 1962. The scientists soon came to realise that, without some form of official protection, scientists would be unable to carry out many useful experiments. This was because their marine 'subjects' were being harvested by fishers.

The marine reserve was first suggested by Professor Val Chapman in 1965, but could only be created after the Marine Reserves Act was passed in 1971. The reserve itself extends 5 kilometres along the coast from Cape Rodney to Okakari Point, and 800 metres out to sea from the high water mark, encompassing Te Hāwere-a-Maki/Goat Island. The reserve has clear, warm water and many rocky reefs.[29]

The reserve has now been in place for 38 years. It has enabled scientists to learn much about the dynamics of rocky reef communities and the impacts of fishing.

The University of Auckland's marine laboratory established near Leigh in 1962 provided the impetus for New Zealand's first marine reserve legislation and the creation of the country's first marine reserve. Scientists based at the laboratory have undertaken extensive research within the reserve which has significantly contributed to our understanding of rocky reef communities *(Raewyn Peart)*

Crayfish were one of the first harvested species to show a rapid recovery within the reserve with numbers increasing five-fold within four years. In addition, red moki soon tripled in number. However, initially there was little change in snapper numbers, although individual fish were larger than in adjacent fished areas.

One important area of research has been on the phenomenon called 'urchin barrens'. These bare-looking areas, where the kelp forest had been lost, were extensive when the reserve was created. By 2006, the area of kelp forest within the reserve had more than doubled when compared to 30 years earlier. In addition, the area of urchin barren had declined from 31 to one per cent.[30]

A wide range of marine species can be viewed underwater at the Cape Rodney-Okakari Point Marine Reserve as shown on this noticeboard *(Raewyn Peart)*

More recent monitoring in 2011 has shown that butterfish, red moki, snapper, John Dory, banded wrasse, blue cod and silver drummer are all present within the reserve in higher numbers than outside it. Snapper abundance was four times greater within the reserve and overall species diversity was higher.[31]

The marine reserve attracts hundreds of thousands of visitors a year. It supports a number of tourism enterprises including the glass-bottom boat *Aquador*, which provides tours within the reserve and Goat Island Dive and Snorkel which provides snorkel and dive equipment, guided snorkelling tours and dive courses. In addition the University of Auckland has recently opened the Goat Island Marine Discovery Centre, next to their marine laboratory, which provides a touch tank, interactive displays and a wealth of information on the marine environment.

The marine reserve attracts hundreds of thousands of visitors a year and supports marine tourism enterprises *(Raewyn Peart)*

The Goat Island Marine Discovery Centre, on the shores of the marine reserve, provides a wealth of information on the marine environment for the public *(Raewyn Peart)*

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Marine spatial planning[1]

Tutukaka, Northland *(Craig Potton)*

Contents

Introduction

For some decades now, marine managers have realised that case-by-case management of activities impacting on the marine area is ineffective in protecting the health of marine ecosystems. This is because the marine environment is much more highly interconnected than land, and impacts in one area can have flow-on effects elsewhere. In addition, marine management is typically split between numerous agencies, which make decisions in isolation of each other, and so fail to adequately address interconnections and resulting cumulative effects.

As the marine area becomes more utilised, conflicts between activities are becoming more acute. This has been increasingly evident in New Zealand, with recent conflicts between marine protection and fisheries interests; between fishing and mining activity; and between aquaculture and landscape protection. Such poorly managed conflicts create cost and uncertainty for all parties and the environment.

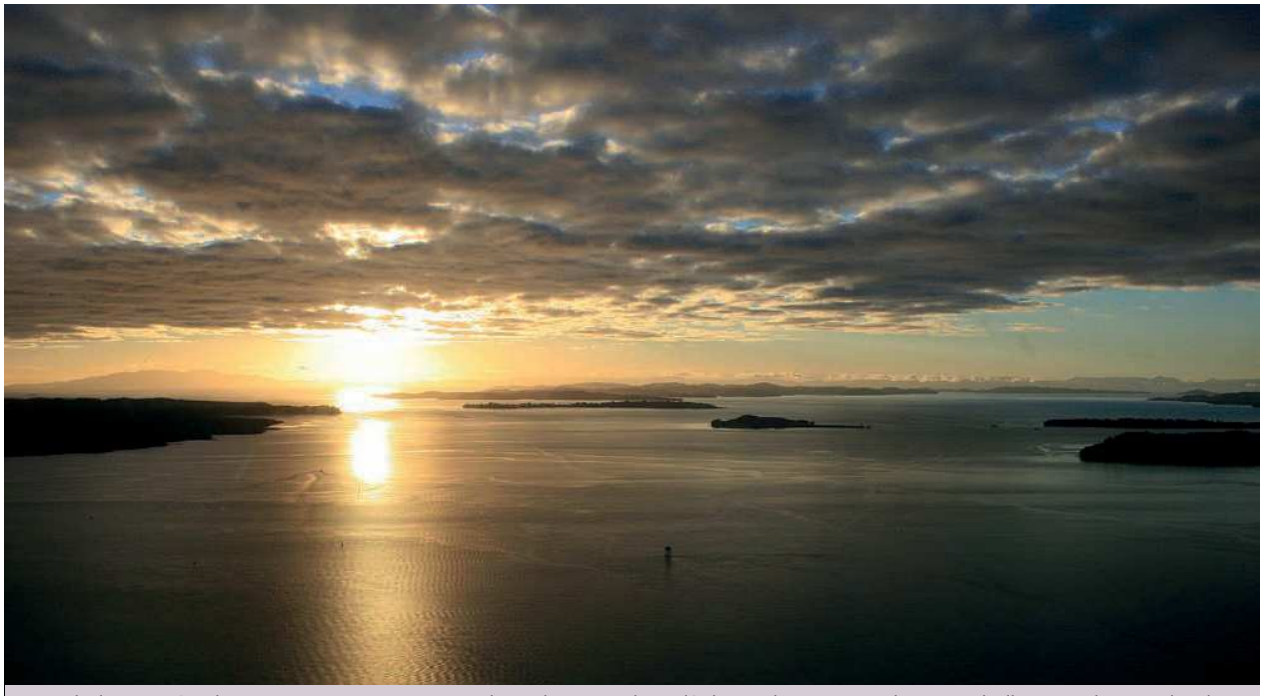
Marine spatial planning is a rational and strategic approach which can be used to proactively plan for the future use of the marine environment. At its heart is a concern to protect the underlying ecological backbone or productivity of the marine area, but it also seeks to reduce conflict and maximise synergies, providing greater certainty on where marine activities can and cannot locate.

Marine spatial planning is now a well-used tool internationally and it is a key element of marine management in the 21st century. The first marine spatial plan in New Zealand is currently being prepared for the Hauraki Gulf.[2]

What is marine spatial planning?

Marine spatial planning seeks to provide greater direction on how defined areas of marine space, including coastal and offshore areas, are to be managed in order to meet desired societal outcomes. Several definitions have been proposed for this approach. In 2010, a group of 21 scientists posited the following definition, which focuses on using marine spatial planning as a tool to implement ecosystems-based management:[3]

> *Ecosystem-based MSP [marine spatial planning] is an integrated planning framework that informs the spatial distribution of activities in and on the ocean in order to support current and future uses of ocean ecosystems and maintain the delivery of valuable ecosystem services for future generations in a way that meets ecological, economic, and social objectives.*



Spatial planning for the marine environment, such as the Hauraki Gulf shown here, is much more challenging than on land *(Raewyn Peart)*

Differences between spatial planning of land and sea

Although the concept of spatial planning has been applied to land (such as in the form of zoning in district plans) as well as to the sea, the approaches taken in these two domains necessarily differ. The marine environment is more fluid and has greater ecological interconnections than land, so what happens in one area has greater impact on other areas. In addition, these interconnections are spatially more extensive. The lifecycles of marine species generally extend over much larger areas than terrestrial species, with larvae travelling long distances in ocean currents, before settling out and developing.

We know much less about the marine environment, with environmental impacts in the sea being less visible than those occurring on land and harder to detect. Marine management is much more reliant on scientific information, rather than visual observation, but this is more expensive to obtain as it often requires the use of research vessels and sophisticated underwater equipment.

Many marine activities are reliant on ecosystem health including commercial fishing, recreational fishing and diving, aquaculture, cultural harvesting, some types of research and ecotourism. At the same time, a much smaller proportion of the sea is fully protected, with around a third of New Zealand's land being in conservation areas, but less than one per cent of the coastal marine area surrounding the mainland being protected by marine reserves.[4]

All these factors make it particularly important that the marine area is managed well, but at the same time create significant challenges in achieving this. Marine spatial planning is an approach which uses the information which is available on the marine environment, and stakeholder values, to guide future decision-making. The resultant plans rarely include detailed zoning like those on land, but usually do identify significant areas which contribute to ecosystem health and need to be protected, and locations for key activities such as aquaculture, renewable energy and petroleum or minerals extraction.

Application of marine spatial planning

One of the earliest applications of marine spatial planning was to assist with the management of marine protected areas. The first spatial plan for Australia's Great Barrier Reef Marine Park was developed in the early 1980s. It identified a number of marine zones where a different range of activities could take place. A similar approach was applied to the Florida Keys National Marine Sanctuary during the 1990s where a comprehensive management plan, including zoning, was developed.

During the early 2000s, Australia and Canada laid the foundations for applying marine spatial planning to large bioregions, which extended out to 200 nautical miles from the shore. While the original intention in both cases was to develop comprehensive zoning plans, this proved difficult in practice, and the main tangible output has been the identification of candidate areas for marine protection.

Marine spatial planning has more recently focused on the management of conflicts between competing marine activities, particularly in the heavily congested marine areas of Europe. Belgium has been progressively implementing a Master Plan for its portion of the North Sea since 2003, the Netherlands developed an overarching spatial planning framework for its North Sea area in 2005 (and revised it in 2009), and in 2008 Germany finalised a spatial plan for its EEZ.

These European planning processes were largely prompted by the need to better manage growing demands from new ocean uses, such as wind energy, oil and gas extraction and aquaculture, as well as the need to implement European Union directives on nature conservation. The European Commission is promoting the adoption of marine spatial planning as 'a stable and transparent way to improve the competitiveness of the EU maritime economy and to deal with complex trans-national issues such as the effects of climate change.' The European Parliament endorsed a Directive on marine spatial planning in April 2014.

There has been a recent high-level initiative in the USA, supported by President Obama, to implement marine spatial planning nationwide. Similar to the approach taken in Australia and Canada, marine spatial planning is to be applied to large marine ecosystems. The spatial plans will identify:

> *Areas most suitable for various types or classes of activities in order to reduce conflicts among uses, reduce environmental impacts, facilitate compatible uses, and preserve critical ecosystem services to meet economic, environmental, security and social objectives.*[5]

The United Kingdom Marine and Coastal Access Act 2009 provides a legal framework for spatial planning in that jurisdiction. This includes the development of a marine policy statement and a series of regional marine plans covering coastal and offshore areas. Most licensing decisions are required to be made in accordance with these documents.

In New Zealand, there is no legislative provision for integrated marine spatial planning. The RMA does provide for partial spatial planning through the preparation of regional coastal plans, but these do not address fishing, marine reserves or marine mammal sanctuaries. Despite this legislative vacuum, New Zealand's first marine spatial planning process has commenced in the Hauraki Gulf. Called 'Sea Change – Tai Timu Tai Pari', the process has adopted a collaborative, stakeholder-led, non-statutory process for the development of the plan, which is expected to emerge later in 2015 (discussed further in a case study below).

Australia's Great Barrier Reef was one of the first areas where spatial planning was applied to the marine area *(Raewyn Peart)*

Potential benefits of marine spatial planning

There are many potential benefits from the adoption of marine spatial planning. They include:[6]

- Application of an ecosystems approach to the management of human activities through safeguarding important marine ecological processes and the overall resilience of the marine system
- Provision of a strategic, integrated and forward-looking framework for all uses of the sea which takes into account environmental as well as cultural, social and economic objectives
- Identification, conservation or restoration of important components of coastal and marine ecosystems
- Allocation of space in a rational manner which minimises conflicts of interest and maximises synergies across sectors
- Management of cumulative impacts over space and time
- Provision of greater certainty for marine users

Marine spatial planning can also help create a better linkage between science and management. The process of mapping physical and ecological information involves the collation and application of existing data to relevant management issues. It also enables information gaps to be identified and future research to be prioritised.

How marine spatial plans are developed

Elements of the plan development process, common to many marine spatial planning initiatives, include:

- Identification of goals, principles and strategies to guide the process
- Collation of spatial information on the marine environment
- Bioregionalisation of the planning region (i.e. spatially delineating the marine area into different categories based on broad habitat type)
- Identification of ecologically important and sensitive areas
- Collation of spatial information on human uses of, and values attached to, the marine environment
- Spatial analysis of compatibilities and conflicts
- Consideration of management approaches and options
- Identification of spatial management areas
- Finalisation of the plan
- Implementation of the plan
- Evaluation and monitoring

What a marine spatial plan might contain

There is a wide variety of material that can be included in marine spatial plans. But as a minimum, such a plan would be expected to include:

- A clear vision, including measurable goals of what the plan seeks to achieve
- Spatial identification of the 'ecological backbone' of the marine area including ecologically important marine areas and connections between them such as areas of high biodiversity, fish nursery areas, shellfish beds, important benthic habitats, important migratory routes for fish and marine mammals, important habitats for seabirds, seamounts, hydrothermal vents, salt marshes, seagrass beds, sponge gardens, horse mussel beds and mangrove forests. It could also include areas providing valuable ecosystem services such as estuaries and coastal wetlands.
- Spatial identification of different uses and values attached to the area including economic, cultural and social. This could include activities such as kaimoana gathering, fishing, shipping, mining, oil and gas, aquaculture and recreational boating.
- Spatial identification of areas of conflict:such as those between catchment activities and ecologically important marine areas, between marine users and those areas, and between different marine users
- Spatial identification of areas of opportunity such as places where activities support each other (e.g. marine conservation and tourism or aquaculture and good catchment management)
- Strategies and tools to address conflicts and maximise opportunities including the spatial identification of marine (and associated catchment) areas to be

Marine spatial planning can identify preferred locations for marine activities such as salmon farming, shown here at Ruakākā Bay, Marlborough *(Raewyn Peart)*

managed for specific ecological purposes, and areas suitable for specific activities such as fishing, mining, oil and gas and aquaculture

- Opportunities for restoration where the marine environment has been degraded in order to restore its productivity, diversity and resilience
- Targets to be achieved, monitoring and review: to make it clear what is expected to be achieved, to keep track of progress, and to review the effectiveness of the plan so it can be refined and improved

Elements of best practice

- Include iwi, user groups and conservationists at the forefront of the process
- Ensure all statutory agencies which will need to implement the plan are fully engaged from its inception
- Be strategic and focus on what is important, taking a long-term perspective. Many problems have taken decades to develop and will take time to resolve.
- Include an historical perspective to address the 'sliding baseline' problem where the extent of degradation is under-estimated due to it spanning more the one human lifetime
- Plan for the future rather than the past and anticipate future pressures and uses
- Focus on identifying opportunities which serve to both protect the environment and support economic, social and cultural well-being
- Use science to inform but not drive the process
- Integrate mātauranga Māori into the understanding of the issues and potential solutions
- Start with an in-depth understanding of the ecological backbone of the marine area, and what areas, habitats and species are important to its ongoing productivity, diversity and health
- Plan for other activities within the framework provided by the ecological backbone
- Be creative and consider a range of tools to achieve desired outcomes, rather than relying solely on current regulatory tools

Marine spatial planning is a well-proven approach to achieving better management of marine space. It has the potential to assist with the effective integrated management of New Zealand's seas, especially in high-value areas that are facing competing uses such as the Hauraki Gulf, the Marlborough Sounds, Tasman and Golden Bays, the Bay of Islands and the Chatham Rise.

Areas facing competing uses, such as the Bay of Islands shown here, could benefit from marine spatial planning *(Raewyn Peart)*

CASE STUDY

Sea Change – Tai Timu Tai Pari: The Hauraki Gulf marine spatial plan

The Hauraki Gulf covers 1.2 million hectares of ocean, stretching from Mangawhai in the north to Waihi on the Coromandel Peninsula and hosting New Zealand's largest city. It is one of this country's most prized marine resources, for many reasons. The Hauraki Gulf generates more than $2.7 billion every year in economic activity and supports the greatest number of recreational fishers and boaties in the country. It has a particularly rich diversity of seabirds, marine mammals, fisheries and marine habitats. In addition, it provides a wide variety of sanctuaries, marine reserves and islands. The Hauraki Gulf was designated a marine park in 2000.[7]

The Sea Change – Tai Timu Tai Pari project had its inception in the 2011 'State of Our Gulf' report[8] released by the Hauraki Gulf Forum. This reported that 'the Gulf is experiencing ongoing environmental degradation, and resources are continuing to be lost or suppressed at environmentally low levels.' In addition, through taking a historical perspective on the changes to the state of the Gulf over time, the report was able to highlight 'the incredible transformation the Gulf has undergone over two human lifespans'. The report made it clear that current management approaches were ineffective in addressing the scale of the challenge and that a step change was required to turn the situation around.

The Forum released an updated report in 2014 that confirmed confirmed that 'pressures on the Gulf remain high and increasing' and that although there had been some environmental improvements, 'many values are continuing to be degraded or suppressed.'[9]

The preparation of a marine spatial plan was seen as a mechanism through which all the significant issues impacting on the Gulf could be considered together as an integrated whole. It also provided the opportunity for manawhenua and stakeholders to be placed at the centre of the process through the adoption of a collaborative process. A collaborative process is a powerful mechanism through which stakeholders gain an understanding of each other's values and perspectives, jointly scrutinise available scientific information, and seek to develop joint solutions.

Port Fitzroy, Great Barrier Island, is part of the area to be covered by the Hauraki Gulf marine spatial plan *(Raewyn Peart)*

A governance entity was established to oversee the project with members consisting of representatives of the statutory bodies involved in managing the Gulf and an equal number of manawhenua representatives, thereby putting in place a co-governance structure.

The plan itself is being developed by a stakeholder working group with representatives from commercial fishing, recreational fishing, farming, aquaculture, infrastructure, community and environmental interests. The group meets monthly and an independent chair was appointed to lead the collaborative process. Six roundtables have been established to focus the plan development work on key elements of the overall picture. The topics for the roundtables are fish stocks, water quality and catchments, aquaculture, biodiversity and biosecurity, accessible Gulf and Gulf infrastructure. These groups include several stakeholder working-group members and others representing a wider range of stakeholder interests.

An extensive public process has been running alongside the stakeholder working group. This has involved public meetings, 25 'listening posts' in communities around the Gulf which totaled more than 250 participants, a web-based use and values survey, a presence at marine-related events, and an active website and email updating programme.

Spatial data sets have been assembled on a web-based tool called SeaSketch for easy accessibility. The software enables users to test and communicate spatially referenced ideas. A technical team consisting of agency staff has also been assembled to support the stakeholder working group and topic roundtables and to access science as requested.

The stakeholder working group first met in late 2013 and is tasked with producing a plan by mid-2015. The plan will then go out for public comment before adoption by the governance group and implementation by the requisite statutory agencies.

> *The Hauraki Gulf Forum's triennial state of the environment reports and recent stock take of economic activity show there are issues and opportunities not being addressed through traditional policy and planning approaches. Inviting the Gulf's communities and users to prepare the plan will help generate new approaches and solutions, in accordance with the Hauraki Gulf Marine Park Act.* (Hauraki Gulf Forum Chair John Tregidga)[10]

The Hauraki Gulf marine spatial plan will consider the harvesting of seafood, such as the gathering of cockles shown here at Kawakawa Bay, Auckland *(Raewyn Peart)*

CASE STUDY

Rhode Island Ocean Special Area Management Plan

This plan, which was completed in 2010, covers a marine area of around 3,800 square kilometres located off the coast of the state of Rhode Island, USA. It includes both state and federally managed marine areas. The area is heavily used for recreational boating, commercial and recreational fishing and shipping. It is located on the convergence of two biogeographic areas and is important for migratory fish, marine mammals, birds and sea turtles.[11]

The key impetus for preparing the plan was the interest in developing offshore wind farms in the area. Spatial planning was seen as a tool which could be used to optimise the locations of these structures.

The plan was prepared by the Rhode Island Coastal Resources Management Council which is the state government's regulatory agency for the coastal area. The University of Rhode Island was closely involved in the plan management team providing several senior advisors and researchers.

A stakeholder group was established for the planning process, and had an independent chair. The group met monthly and initially refined and approved the goals and principles established for the plan. The group then received a comprehensive overview of the ecology and human use of the area. Following on from this, members considered and commented on each draft chapter of the plan which was prepared by agency staff. The group reviewed material as it was produced but was not asked to formally accept or reject it.

A science advisory task force was established to provide expertise and input into the science and research-based elements of the plan. Separate technical advisory committees were established for each chapter of the plan and they focused on improving and refining the content of each chapter.

The spatial elements of the plan, which subsequently emerged, include three broad 'zones' within the overall oceans area. The 'Renewable Energy Zone' is the preferred site for large-scale renewable energy projects in state waters. Where a project wishes to locate outside these areas it must be shown to have no significant adverse impact on natural resources or human uses.

A number of 'Areas of Particular Concern' were identified and mapped. These include:

- Historic shipwrecks, archaeological or historic sites and their buffers
- Offshore dive sites
- Glacial moraines which are important habitat areas for fish (see Figure 7.1)
- Navigation, military and infrastructure areas including designated shipping lanes and anchorages
- Areas of high fishing activity
- Heavily used recreational boating and sailboat racing areas
- Naval fleet submarine transit lanes

Applications for offshore developments are required to avoid Areas of Particular Concern. Where they cannot be avoided, the applicant must minimise to the greatest extent possible any impact and mitigate any significant impact. Applicants are also required to demonstrate why these areas cannot be avoided or why no alternatives are available.

'Areas Designated for Preservation' have also been identified as needing protection for their ecological value. These include sea duck foraging habitat. Large-scale offshore development, mining or other development which is in conflict with the 'intent and purpose' of an Area Designated for Preservation is prohibited.

The plan is to be accompanied by a 'Science Research Agenda' and a 'Progress Assessment and Monitoring Process'. This monitoring system will be designed to 'record decisions, capture lessons learned, note achievements, and document policy and management adaptations. This process will be ongoing, available on the project web sites, and formally reported to the public on a biannual basis'. The oceans plan itself will undergo a major review every five years.

In order to maintain stakeholder engagement with the implementation of the plan, a public forum is to be held every two years. This is intended to highlight projects underway, report on new research findings, review progress towards goals and objectives and recognise contributions to the plan's implementation. The public forum will also address emerging issues and any needed changes to the plan.[12]

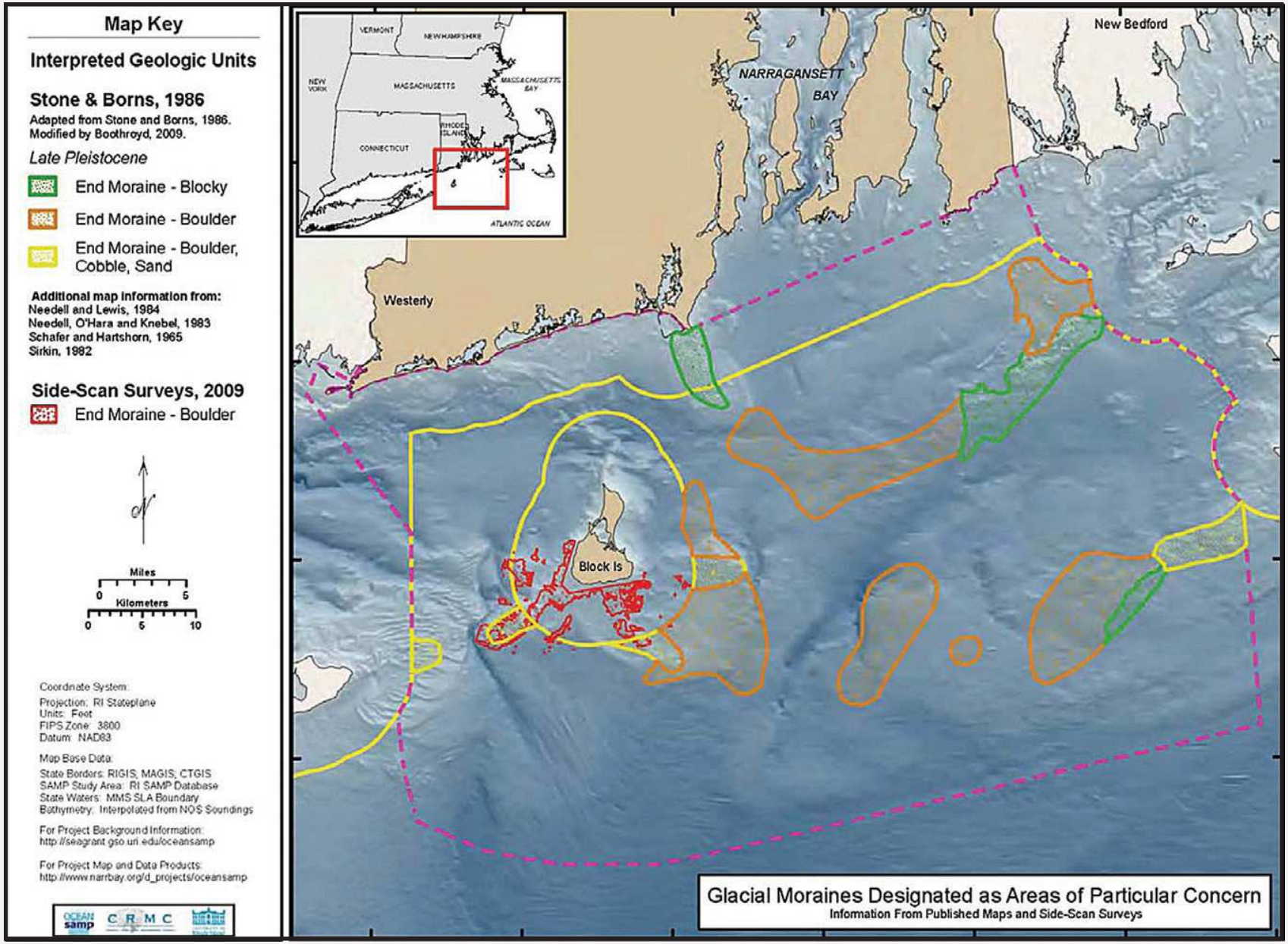


Figure 7.1 Moraines protected as Areas of Particular Concern (*Rhode Island Coastal Resources Management Council, 2010)*

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Endnotes

1 This chapter draws heavily from the Hauraki Gulf Forum report 'Spatial Planning for the Gulf' which includes an international review of marine spatial planning initiatives. We would like to thank the Hauraki Gulf Forum for making the material available for inclusion in this publication.

2 http://www.aucklandcouncil.govt.nz/EN/AboutCouncil/representativesbodies/haurakigulfforum/Documents/Spatialplanforthegulf.pdf

3 Interagency Ocean Policy Task Force, 2009, 1

4 Department of Conservation and Ministry of Fisheries, 2011

5 http://www.noaa.gov/factsheets/new%20version/marine_spatial_planning.pdf

6 UK-MSP Working Group, 2005, *Added value of marine spatial planning*, County Agencies, Interagency MSP Working Group, United Kingdom, cited in Douvere F and C N Ehler, 2009, 78

7 http://www.aucklandcouncil.govt.nz/en/planspoliciesprojects/plansstrategies/seachange/Pages/home.aspx

8 Hauraki Gulf Forum, 2011b

9 Hauraki Gulf Forum, 2014, 11–12

10 http://www.seachange.org.nz/News-Events/Media-release-library/Sea-Change-underway-for-Hauraki-Gulf/

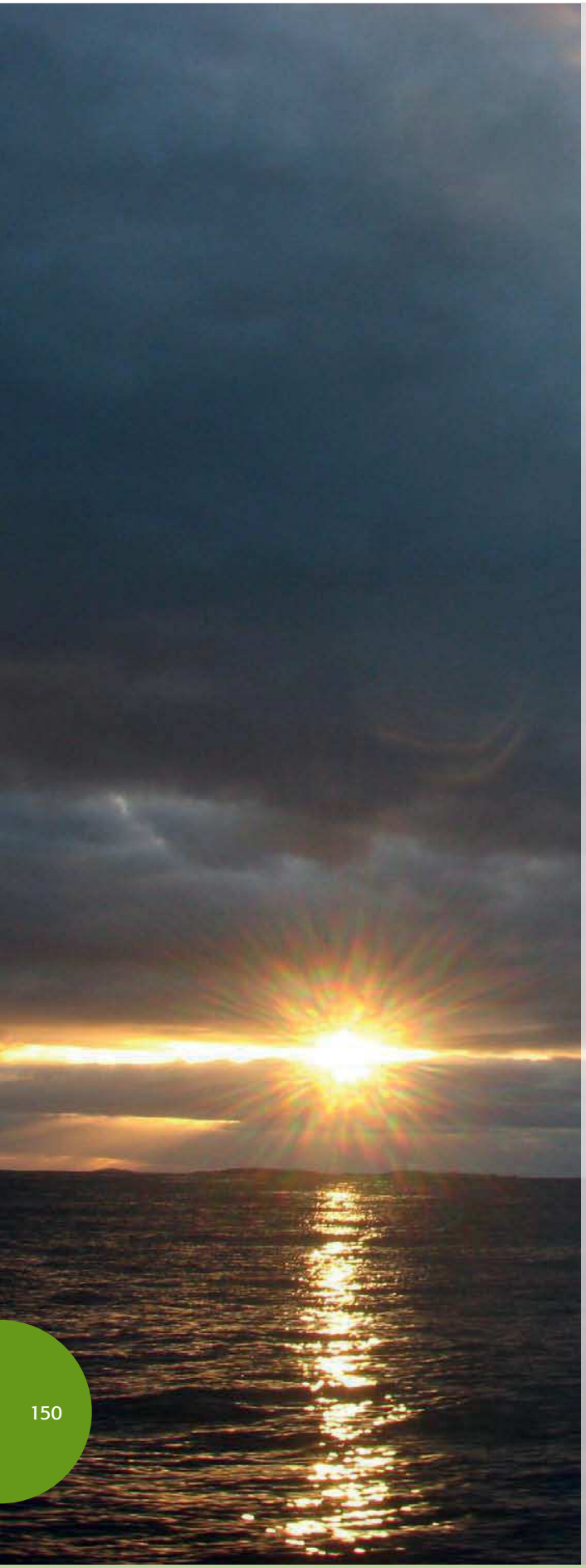
11 Rhode Island Coastal Resources Management Council, 2010, 11–3

12 Rhode Island Coastal Resource Management Council, 2010, 11–6

8

Opportunities for public involvement

Kaiteriteri Lagoon, Tasman Bay *(Raewyn Peart)*



Contents

Introduction

There are many opportunities for members of the public to become involved in statutory processes regarding environmental outcomes for the marine area. Some of these processes involve establishing policies that govern decision-making. Others involve developing rules and regulations that apply to activities in the marine environment. Yet other processes involve considering specific proposals to undertake marine activities. In Section Two, these processes are discussed where they relate to specific activities.

Because there are so many different acts applying to the marine area, which are administered by a range of statutory authorities, there is little consistency in the processes that apply to different management jurisdictions. In some areas, such as under the RMA, there are quite extensive rights of public participation. In other areas, such as under the Fisheries Act, consultation rights are focused on directly affected parties, although the Ministry for Primary Industries will typically provide the opportunity for written public submissions to be made before delivering final advice to the Minister who then makes a decision. Where there are no rights of submission or appeal, a statutory decision may still be able to be challenged by initiating judicial review proceedings in the High Court.

A party landing at Motuihe Wharf to visit and enjoy Motuihe Island, Hauraki Gulf *(Raewyn Peart)*

Preparing policies and plans

Policy/plans	Application	Opportunity for public involvement
Resource Management Act 1991		
New Zealand Coastal Policy Statement Other national policy statements	Activities on land and the territorial sea of the country	• Written submissions on proposed policy statement • Presentation of submissions and evidence to Board of Inquiry (where the Board of Inquiry process is adopted)
Regional policy statements[1]	Activities within catchments and the territorial sea of the region	• In some cases, written feedback on draft policy or plan • Written submissions on proposed policy or plan • Written further submissions by some parties • Presentation of submissions and evidence to council hearing[2] • Appeal to Environment Court – unless nationally significant proposal decided by Board of Inquiry • Presentation of submissions and evidence to Environment Court hearing • Appeal to High Court on points of law
Regional coastal plans	Activities within the territorial sea of the region	
Regional plans	Activities within the catchments of the region	
District plans[3]	Activities within the district	
Fisheries Act 1996		
Fisheries plans	Fisheries or groups of fisheries	• No statutory rights to participate • Minister must consult with persons or organisations representative of those classes of persons having an interest in the stock or effects of fishing on the aquatic environment in the area concerned including Māori, environmental, commercial and recreational interests • In practice, a draft plan is usually circulated for public written submissions
Conservation Act 1987		
General policy	Conservation areas and natural and historic resources applied nationally	• Written submissions on draft policy • Presentation of submissions to the Director-General of Conservation
Conservation management strategies Conservation management plans	Regional conservation areas and natural and historic resources	• Written submissions on draft strategy • Presentation of submissions at a meeting of representatives of the Director-General of Conservation and affected conservation boards
Marine Mammals Protection Act 1978		
Population management plans	Marine mammals	• Written submissions on draft plan • Presentation of submissions to the Director-General of Conservation or his or her representatives
Wildlife Act 1953		
Population management plans	Wildlife including seabirds	• Written submissions on draft plan • Presentation of submissions to the Director-General of Conservation or his or her representatives
Reserves Act 1977		
Reserve management plans	Land-based reserves	• Written submissions where intention to prepare plan is publicly notified • Written submissions on draft plan • Presentation of submissions to reserve administration body or nominee

Policy/plans	Application	Opportunity for public involvement
No legislative basis		
Fisheries standards	All fisheries	• No statutory rights to participate and the standards are non-statutory • In practice, written submissions are sought on draft standards
Recommendations for marine protected areas in biogeographic regions	Marine areas in territorial sea and EEZ	• No statutory rights to participate and the process is non-statutory • In practice, stakeholders will be represented on a marine protection planning forum and written submissions will be sought on the forum's recommendations

Figure 8.1 Summary of opportunities for public participation in the preparation of policies and plans affecting the offshore environment

RMA policies and plans

There is a hierarchy of policies and plans that guides decision-making under the RMA, and members of the public have the opportunity to influence the content of these documents. At the national level is the NZCPS; the National Policy Statement for Freshwater Management which governs freshwater bodies, many of which feed into the marine environment; and the National Policy Statement for Renewable Electricity Generation, which includes provisions on tidal, wave and ocean current resources. There is also the possibility of other national policy statements being prepared which affect the marine environment.

Members of the public must be given the opportunity to make submissions on proposed national policy statements. If a Board of Inquiry process is adopted by the Minister for the Environment (or the Minister of Conservation for a NZCPS), submitters will also have the opportunity to present their case (including submissions and evidence) at a public hearing. The Board of Inquiry then makes recommendations to the relevant Minister, who makes the final decision. There are no appeal rights against the relevant Minister's decision on national policy statements, and the only redress is through judicial review proceedings in the High Court.

At the regional level, regional policy statements, regional coastal plans and regional plans are prepared. At the district level, district plans are prepared. These documents typically contain objectives, policies, rules, methods and anticipated environmental results which guide decision-making on resource consent applications.

There is a very open process for public participation in council policy and plan-making under the RMA (as shown in Figure 8.2). Councils are required to consult with a range of parties prior to proposed plans and policy statements being formally notified, including Ministers of the Crown, local authorities and iwi. Councils also commonly consult with a range of other stakeholders. Increasingly, councils are issuing draft policy statements and plans, and providing members of the public with an opportunity to give feedback prior to formal notification of the documents. This provides an additional opportunity to have input into the preparation of the document outside of the statutory process.

Members of the public have the opportunity to submit on regional coastal plans which help determine where marine activities, such as the moorings, jetties and reclamations shown here in Lyttleton, can be located *(Raewyn Peart)*

Once the proposed policy statement or plan is formally notified, members of the public can make written submissions. The following persons are then able to lodge further submissions in support or opposition to the submissions already lodged:

- Any person representing a relevant aspect of the public interest. This is likely to include public interest environmental groups.
- Any person that has an interest in the proposed policy statement or plan greater than the interest that the general public has. This is likely to include owners of land and users of resources directly affected by plan provisions. It is also likely to include iwi and hapū where their interests are directly affected.
- The local authority itself

All submitters then have the opportunity to present their case before a council-initiated public hearing which is required under the RMA.

When preparing a plan or a plan change, councils must take into account relevant iwi planning documents which have been lodged with them. This provides an opportunity for tangata whenua to have proactive input into planning initiatives.

Once the council has made decisions on submissions, any submitter has the right to appeal the decisions to the Environment Court. The Court will consider the matter afresh at a public hearing.

The process is slightly different for the preparation of the Auckland Unitary Plan in the Auckland region. An Independent Hearing Panel is considering submissions. The Panel must make recommendations to Auckland Council within a defined timeframe. Recommendations accepted by Auckland Council can only be appealed to the High Court on points of law. Where Auckland Council rejects a recommendation of the Hearings Panel and decides on an alternative solution the right to appeal to the Environment Court is available.[4]

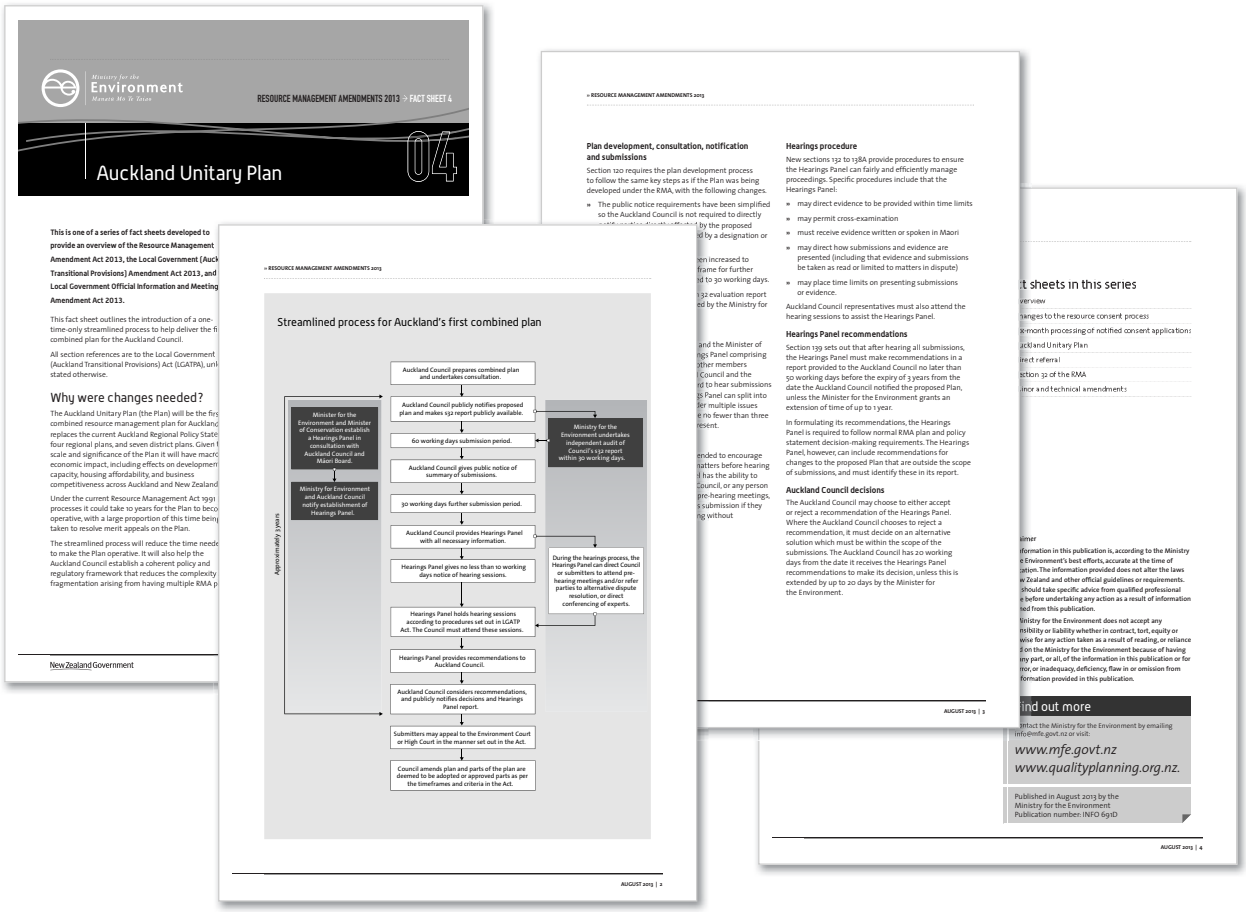


Figure 8.2 Public process applying to the preparation of the Auckland Unitary Plan *(Ministry for the Environment)*[5]

Other parties can become party to any appeal (referred to as section 274 parties) only if they can show that they fall within one of the following categories:

- They have lodged a submission about the subject matter of the proceedings at the local authority stage
- They have an interest in the proceedings greater than the public generally (excluding trade competitors). This will normally include neighbours, downstream resource users and iwi authorities. It is uncertain whether public interest groups will be able to become parties under this category as well.

Decisions of the Environment Court can be appealed to the High Court on questions of law, but not on the merits.

Conservation strategies and plans

Under the Conservation Act, the Minister of Conservation can prepare general policy and conservation management strategies and plans. These guide the Department of Conservation's marine protection as well as other work. The public process for preparing each of these documents is similar. Members of the public must be given the opportunity to make written submissions on draft documents. Submitters must then also be given the opportunity to present their submissions to the Director-General of Conservation in person (for submissions on general policy) or to a meeting consisting of representatives of the Director-General and affected conservation boards (for strategies and plans).

Members of the public have the opportunity to make written submissions on conservation management plans which guide day-to-day management of marine reserves including the Tāwharanui Marine Reserve shown here *(Raewyn Peart)*

Population management plans

Population management plans can be prepared by the Minister of Conservation for marine mammals under the Marine Mammals Protection Act and for other wildlife such as seabirds under the Wildlife Act. Members of the public must be given the opportunity to make written submissions on the draft plan and also to present their submissions in person to the Director-General or his or her representatives. No such plans have yet been completed.

Marine protected areas

The government's 'Marine Protection Areas Policy Statement and Implementation Plan' is a non-statutory document that provides for the establishment of regional marine protection planning forums which prepare recommendations for marine protected areas within biogeographic regions. The forums are made up of local stakeholder representatives. The recommendations of the forums have no legislative basis. There are consequently no statutory rights for the public to participate in forum deliberations. However, in practice, members of the public will be given the opportunity to make written submissions on the proposed recommendations. In addition, the recommendations may be implemented through the processes for marine reserve creation under the Marine Reserves Act described below and these provide the opportunity for public objections. Alternatively they may be implemented more directly by special legislation. This is discussed further in Chapter 6: Marine protected areas.

Making rules and regulations

There are a large number of processes through which rules and regulations are made to manage activities affecting the marine environment.

Rules and regulation	Application	Opportunity for public involvement
Resource Management Act 1991		
National environmental standards	Activities within catchments and the territorial sea	• Must be adequate time and opportunity for public comment • Usually written submissions on the proposed standard will be sought
Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012		
Regulations	Activities within the EEZ and continental shelf	• Must be adequate time and opportunity for public comment • Usually written submissions on the proposed regulations will be sought
Fisheries Act 1996		
Sustainability measures Total allowable catch Total allowable commercial catch	Fish stock Fishing activity within the territorial sea and EEZ	• No statutory rights to participate • Minister must consult with persons or organisations representative of those classes of persons having an interest in the stock or effects of fishing on the aquatic environment in the area concerned including Māori, environmental, commercial and recreational interests • In practice, written submissions are sought on an initial advice paper
Mātaitai reserves	Spatial marine area	• Written submissions from local community and people having a fishing interest in the area on proposed reserve • Local community consultative meeting
Taiāpure	Spatial marine area	• Written submissions on proposed taiāpure • Presentation of submissions to judge of Māori Land Court • Appeal to the High Court on points of law
Maritime Transport Act 1994		
Marine protection rules	Vessels and/or offshore installations	• Written submissions on the proposed rule
Marine Mammals Protection Act 1978		
Marine mammal sanctuaries	Spatial marine area	• Written submissions on sanctuary after it has been notified by the Minister
Marine Reserves Act 1971		
Marine reserves	Spatial marine area	• Written objections to the proposal to establish a marine reserve
Crown Minerals Act 1991		
Minerals programme	Individual minerals	• Written submissions on draft minerals programme
Biosecurity Act 1993		
Import health standards	International vessels	• Consultation with persons who are representative of classes of persons having an interest in the standard • In practice, written submissions are sought from the public on draft standards

Figure 8.3 Summary of opportunities to participate in the development of rules and regulations affecting the marine environment

National environmental standards

National environmental standards are regulations issued under the RMA which prescribe technical standards, methods and other requirements for environmental matters. Regional councils and territorial authorities must enforce these standards (or they can enforce stricter or weaker standards when the standard provides for this). In this way, national environmental standards can be used to ensure that consistent minimum standards are applied to management of the marine environment.

There is no prescribed process for the preparation of national standards other than that the public must be given adequate time and opportunity to comment. Usually written submissions will be sought on a proposed standard before it is adopted, but there will not be a public hearing to consider submissions.

Under the RMA, plans (but not regional policy statements) contain rules as well as objectives and policies, and the opportunity to participate in plan-making processes has been described in the previous section.

Exclusive Economic Zone regulations

There is no prescribed process for the preparation of EEZ regulations other than that the public, iwi authorities, regional councils, and persons whose existing interests are likely to be affected must be notified of the proposed subject matter of the regulations and must be given adequate time and opportunity to comment. Usually written submissions will be sought on regulations before they are adopted, but there will not be a public hearing to consider submissions.

Fisheries sustainability measures

For the setting of sustainability measures under the Fisheries Act there are no statutory rights of public participation. Sustainability measures include setting the total allowable catch, regulatory measures such as restricting fishing methods or locations, and measures to manage the effects of fishing-related mortality on protected species.

The Minister must consult with representatives of groups having an interest in the stock or the effects of fishing on the aquatic environment in the area concerned. This will normally include commercial and recreational fishing interests and environmental organisations. The Minister must also provide for the 'input and participation' of tangata whenua.[6]

There is usually an opportunity for members of the public to make a submission on proposals to change the total allowable commercial catch of fish stocks such as snapper *(Daniel Sharp)*

When setting or varying the total allowable commercial catch, the Minister must consult with representatives of groups having an interest including Māori, environmental, commercial and recreational interests.[7]

In practice, the Ministry for Primary Industries makes available an initial advice paper and will accept written submissions from any party before finalising its advice to the Minister. If you have an interest in particular fisheries sustainability matters, contact staff at the Ministry so they can add you to the relevant circulation lists.

Mātiatai and taiāpure

When mātaitai reserves are proposed, consultation is undertaken with members of the local community and people with a fishing interest in the area. Public participation provisions for taiāpure proposals are broader. Any person can make written submissions on a proposal and present their submissions to a Māori Land Court judge. There are also rights to appeal the decision of the judge to the High Court on points of law. These processes are described in more detail in Chapter 4: Kaitiakitanga.

Marine reserves

When an application is made to establish a marine reserve, the application is publicly notified and any person can make a written objection to the proposal. The objections are lodged with the Director-General of Conservation. The final decision is made by the Minister of Conservation with the concurrence of the Ministers of Transport and Primary Industries. There is no right of appeal although judicial review is an available remedy.

Any person may make a written objection to a proposal for a marine reserve; the opposition shown here is to the proposed marine reserve at Nugget Point, Catlins Coast, Southland *(Raewyn Peart)*

Biosecurity

There are no statutory rights for the public to participate in the preparation of import health standards, although there is an obligation in the Biosecurity Act for the chief technical officer to consult with representatives of persons having an interest in the standard. In practice, written submissions are sought from the public on draft standards before they are finalised.

Other processes

When marine protection rules are developed under the Maritime Transport Act, when minerals programmes are developed under the Crown Minerals Act and when marine mammal sanctuaries are established by the Minister of Conservation, there are statutory provisions requiring members of the public to be given the opportunity to make written submissions, but no requirement for public hearings and no appeal rights.

Members of the public must be given the right to make written submissions on proposals for marine mammal sanctuaries, which may be proposed to protect endangered populations such as the bottlenose dolphins shown here in the Bay of Islands *(Raewyn Peart)*

Deciding individual proposals

Application	Area	Opportunity for public involvement
Resource consent	Activity within the catchment or territorial sea	• Statutory right to participate only where application publicly notified (or where there is limited notification to affected persons) • Written submissions on application • Presentation of submissions and evidence to council hearing (where no direct referral or call-in) • Appeal to Environment Court – unless a nationally significant proposal decided by the Board of Inquiry • Presentation of submissions and evidence to Environment Court hearing (or board of inquiry for some call-ins) • Appeal to High Court on points of law
Marine consent – unless classified as non-notified	Activities within the EEZ and extended continental shelf	• Written submissions on application • Presentation of submissions and evidence to hearing • Appeal to High Court on points of law

Figure 8.4 Summary of opportunities to participate in the determination of individual applications affecting the marine environment

Resource consents

The opportunities to become involved in decisions about individual proposals for activities in the marine area are much more limited than the opportunities provided for in the development of policies and rules.

Under the RMA there are broad rights of participation in resource consents, when they are publicly notified, and these usually include being heard at a council-initiated hearing, appealing the council's decision to the Environment Court and being heard again, and appealing the Environment Court's decision to the High Court on points of law only.

There are no appeal rights against a council's decision not to notify a resource consent and the only redress is through initiating judicial review proceedings in the High Court. In cases where the council decides not to publicly notify the application, it may still be given limited notification. This means that parties who are directly affected by the proposal, and who have not given consent, will have the opportunity to lodge a submission and subsequent appeals. In 2012/13 only around five per cent of resource consent applications were publicly notified, and the small proportion of notified consents has steadily decreased since 2007/08.[8]

Matters can be directly referred to the Environment Court for decision on the request of the applicant. In this case there will be no hearing by the council in the first instance. The decision of the Environment Court can be appealed to the High Court on points of law only.

Matters of national importance can be 'called in' by the Minister for the Environment (or Minister of Conservation for applications within the coastal marine area). In addition, applicants can choose to lodge the application with the EPA. The Minister will then decide if it is nationally significant, and it also can refer it to the Environment Court or Board of Inquiry for decision. In the case of a call in there will also be no council hearing in the first instance, but the matter will be processed by the EPA and determined either by the Environment Court or by a Board of Inquiry appointed by the Minister. Decisions can be appealed to the High Court on points of law only.

Anyone can make a submission and be heard on a notified resource consent application, such as for the canal development shown here at Marsden Cove, Whangarei *(Raewyn Peart)*

Marine consents

The EEZ Act establishes that activities can be classified as permitted, non-notified discretionary, discretionary or prohibited. All marine consent applications for discretionary activities will be publicly notified and any person will have the opportunity to make written submissions and present to a hearing held by a Decision-Making Committee appointed by the EPA. Decisions can be appealed to the High Court on points of law only.

The ways that the public can become involved in a marine consent process, and suggestions for how this might be done, are provided in Figure 8.5.

Stage	Detail
Application lodged	
Assessing a marine consent application	In order to decide whether or not to lodge a submission, you will need to assess a marine consent application to determine the effects of the proposed activity on the environment and any existing interests.
Ensure that you have the full application	Before assessing a marine consent application, ensure that you have access to the full documentation including the marine consent application, the impact assessment, and any supporting technical reports.
Check that effects have been identified and addressed	Check that the effects of concern to you have been adequately identified and assessed. This may include impacts on the benthic environment, marine mammals or fishing interests.
Identify any modifications to mitigate effects	Identify how the application could be modified or measures taken to reduce adverse effects to acceptable levels. Identify other mechanisms for addressing adverse effects, such as environmental offsetting.
Consult with others	Arrange to meet with other interested parties to discuss the application. They may have similar concerns to yours and be able to provide different perspectives on the application. Explore the possibility of lodging a joint submission and pooling resources to obtain professional assistance. If possible, discuss the application with relevant professionals (such as a marine ecologist or oceanographer) who can provide initial guidance on the adequacy of the application and potential impacts of the proposal.
Submission period	
Identify aspects to support or oppose	Before preparing a submission on a marine consent application you will need to assess the application to identify which aspects of the application you wish to support or oppose. Once you have identified issues you would like to raise, you can prepare a written submission and lodge it with the EPA.
Form of submission	The EPA provides a submission form particular to each marine consent application. This will be available on the EPA website when the submission period opens.
Content of submission	• Contact details • Whether you have an existing interest that may be affected by the application • Your position on the proposed application (do you support in full, support in part, are neutral, oppose in part, oppose in full, or have a range of views on the application?) • Your reasons for your position. (When writing your reasons you should consider the Decision-Making Criteria[9] and Information Principles[10] that the Decision-Making Committee will need to take into account. These are discussed in Chapter 3: Economic zone legislation.) • The decision you would like the EPA to make • In what form you would prefer correspondence. (There will be a large amount of correspondence so we recommend you use electronic methods if possible.) • Whether you wish to speak to your submission by presenting at the hearing. You should attend the hearing to present your submissions if possible. • Whether you will be available to participate in meetings or mediation • Whether you will be providing expert witnesses
Lodging of submission	Submissions may be lodged by mail or email. Directions will be set out on the EPA website when the submission period opens. There is no charge for lodging a submission.

Stage	Detail
Hearing	
Hearing procedure	Marine consent hearings are required to avoid unnecessary formality. At the time of writing, only one marine consent application has been heard so a 'normal' hearing procedure cannot yet be identified. The Decision-Making Committee will produce a document setting out Hearing Procedures in advance of the hearing. It is expected that cross-examination of expert witnesses will generally be permitted but only the Committee will ask questions of submitters.
Preparation of submissions to present at the hearing	• Always make your submissions available in written form. You will need to bring sufficient copies for all members of the Decision-Making Committee, the applicant, and the EPA. • It is useful to identify ahead of time who will be on the hearing body, and their backgrounds and likely points of view, so that you can target your submissions accordingly • The purpose of your submissions is to persuade the Decision-Making Committee to agree with your point of view. Avoid being argumentative or badgering. • Avoid personally attacking the applicant, expert witnesses, the Decision-Making Committee or the EPA. This is inappropriate and counterproductive. • Clearly state your concerns and provide information to back up your point of view • Be concise and to the point. Avoid being verbose. Do not get sidetracked with irrelevant matters, allegations or conspiracy theories. • Make sure that all the material presented to support your submission is consistent • Where possible illustrate your points with maps, photographs and illustrations • Always use words that you understand and customarily use so that your presentation flows naturally
Structure of submissions	• Start by introducing yourself and/or your organisation. Provide a brief description of your background, and your organisation's objectives, activities and membership base. • Where you have made efforts to resolve your concerns directly with the applicant, state this, and the reasons why no resolution was achieved (without directly attacking the bona fides of the applicant) • State concisely the issues which are of concern to you. The Decision-Making Committees has powers to limit oral presentations both in terms of content and time. • Where there is more than one person involved in presenting your case, state who will be giving submissions or evidence and on what issues. Each issue of concern should have a separate section in your submission. This should state in more detail the nature of your concern, provide supporting information to support your concern, and clearly state what action you would like the Decision-Making Committee to take in order to address the concern. • Include a brief concluding section which summarises the essence of your concerns and action sought • Thank the Decision-Making Committee for taking the time to hear and consider your submissions
Sources of supporting information	Supporting information for issues of concern can include: • Drawing the Decision-Making Committee's attention to relevant parts of the EEZ Act, EEZ Regulations, and other statutes and instruments relevant to marine management (such as the RMA and NZCPS) • Identifying any relevant research and reports which support your concerns • Describing any local knowledge that you have about the environment and the impacts of the proposed activity on it • Describing practical cases or examples which illustrate your main points • You may wish to use a lawyer to support your case and call expert witnesses relevant to your specific matters of concern (e.g. marine ecologist, noise specialist and/or planner)
Presenting your submissions	• Read from your written submissions but, where appropriate, ad-lib relevant comments • Speak slowly and clearly and try to vary your tone to keep up interest • Where possible illustrate points through reference to photographs, maps, slides and other pictorial material. Make sure that all members of the Decision-Making Committee have copies. It can be useful to take a large map or diagram, which can be placed on a display board, to illustrate points during your presentation. • Try to avoid repeating what others have already said. Even if you have included such material in the written version of the submissions, you can skip over these sections, and politely inform the hearing body that you are leaving out sections to avoid repetition. • There is no charge for presenting oral submissions to a Decision-Making Committee

Stage	Detail
Appeals	
	• The applicant or any submitter on an application for a marine consent may appeal to the High Court against the decision of the EPA on a question of law only[11] • The purpose of an appeal on a question of law is to determine whether the EPA has acted within its powers. The weight given to various relevant considerations is for the EPA to determine and cannot be reconsidered by the High Court. • The decision of the High Court may be appealed to either the Court of Appeal or the Supreme Court • If you are considering an appeal to the High Court you will need to consult with a lawyer

Figure 8.5 Participating in a marine consent process under the EEZ Act

Publicly-initiated processes

In most cases, the initiation of a process to develop new policy or rules, or to amend existing instruments applying to the marine environment, is left to the statutory authority concerned. Members of the public will need to persuade the relevant Minister or agency that a change is needed. There are, however, two statutory processes that can be initiated by any person.

Private plan change

Any person can request a change to a regional or district plan, including a regional coastal plan, and this is called a 'private plan change'. Such a request can only be made, however, when the plan is operative. The council can only reject the request if:

- It is frivolous or vexatious
- The local authority or the Environment Court has considered the substance of the request within the last two years
- The request is not in accordance with sound resource management practice
- The request would make the plan inconsistent with the provisions of the RMA
- The policy statement or plan has been operative for less than two years

If none of these criteria apply the council must process the private plan change, and has the option of adopting the plan change as though it was initiated by the council. This is likely to occur when the council supports the change sought.

Requesting a private plan change can be an expensive exercise as the application will need to include an assessment of environmental effects of the proposal and an assessment of its benefits and costs. Preparing these assessments is likely to require the assistance of environmental professionals. In addition, the council can charge the applicant the full costs of processing the proposed plan change including the costs of the submission process and hearing.

Taiāpure

It is legally possible for any member of the public to propose the establishment of a taiāpure under the Fisheries Act. The application is lodged with the Minister for Primary Industries in the first instance. Support, however, is required from the Minister after consulting with the Minister of Māori Affairs, before the proposal can proceed.

The purpose of a taiāpure is to make 'better provision for the recognition of rangatiratanga and of the right secured in relation to fisheries by Article II of the Treaty of Waitangi'.[12] This means that, in practice, a person would need to be acting on behalf of an iwi or hapū that had an Article II right in order to succeed.

Although anyone can technically apply for a taiāpure, such as the Akaroa Taiāpure shown here, in practice only those acting on behalf of an iwi or hapū exercising Treaty rights are likely to succeed *(Raewyn Peart)*

Reporting offences

Another way in which members of the public can initiate action to improve the health of the marine environment is through reporting issues of concern to the relevant authorities, particularly where there is suspicion of an offence being committed. Before reporting the issue, it is useful to record as much relevant information as possible, including taking photographs or filming a video. Most authorities have hotlines and after hours numbers and these are often prominently displayed on their websites.

- Pollution incidents and suspected illegal structures or unlawful mangrove removal in the marine area should be reported to the regional council
- Suspected illegal fishing or shellfish harvesting outside marine reserves should be reported to the Ministry for Primary Industries
- Suspected illegal fishing or shellfish harvesting inside marine reserves should be reported to the Department of Conservation
- Harm to protected species such as marine mammals and seabirds should be reported to the Department of Conservation
- Suspected new alien marine species should be reported to the Ministry for Primary Industries

Most regional and territorial authorities have a 24 hour pollution hotline, which can be called if pollution of the catchment occurs, and which can be found on council websites. Pollution response teams respond to reports of pollution events, and aim to put an immediate halt to the discharge, ensure that polluted waters are cleaned up and collect evidence of the pollution incident.

Unlawful mangrove removal, such as shown here at Whangamatā, should be reported to the regional council *(Raewyn Peart)*

When an incident occurs, the regional council can send a warning letter setting out how the perpetrator has breached either the rules of a regional plan or the RMA. Then the council can issue an abatement notice requiring the perpetrator to stop the offending activity occurring or take some action to ensure compliance. The council can issue infringement fines of up to $1,000 or prosecute the offender. The maximum penalties for offenders are up to two years in prison or a fine of up to $300,000, with a further $10,000 for every day that the offence continues. The maximum penalty for a commercial organisation is $600,000, with a further $10,000 for every day that the offence continues. The Environment Court can issue an enforcement order requiring the offender to comply with the RMA.[13]

Judicial review

Judicial review involves challenging the exercise of a statutory discretion. The challenge cannot be based on the merits of the decision, but only on the basis that it was unlawful, that it was unreasonable or that the decision-making process did not follow the proper procedure. Judicial review has been used to challenge decisions such as the setting of the Total Allowable Commercial Catch under the Fisheries Act, the decline of a marine reserve application under the Marine Reserves Act, and the failure to notify resource consents under the RMA.

In order to overturn a decision on the basis that it is unlawful, it will normally be necessary to establish one of the following grounds:[14]

- The decision was motivated by an improper purpose, which was not contemplated by the legislation
- The decision-maker took into account irrelevant matters
- The decision-maker failed to take into account relevant matters that were mandatory under the legislation
- The decision was made under an invalid delegation
- The decision-maker made an error of law
- The decision-maker had insufficient information on which to base the decision

It is also possible to challenge a decision on the basis that it was unreasonable. This is a hard test to meet and involves establishing that the decision was 'so unreasonable that no reasonable [decision-maker] could ever come to it'.[15]

Another ground on which a decision may be set aside is on the basis that the procedure which the decision-maker followed did not accord with the principles of natural justice, including acting in good faith and listening fairly to both sides.

CASE STUDY

Akaroa Marine Reserve

In June 2014, on World Oceans Day, the Akaroa Marine Reserve was established. It was a milestone in a process that had taken nearly two decades and which had struggled to secure consensus within the community affected.

The marine reserve's inception was in 1990, when Forest and Bird undertook a series of exploratory surveys in the Akaroa Harbour as part of a baseline study of its biodiversity. Near the Akaroa Heads the area was described as being 'profuse with marine life'. The area was already within a marine mammal sanctuary where set netting was banned for most of the year.[16] Community interest groups, environmentalists and recreational bodies identified that the establishment of some form of marine protection within the harbour was the best course of action.[17] The Akaroa Harbour Marine Conservation Working Group, initiated by the North Canterbury Conservation Board, was formed in 1993. Representatives from local community groups, dive clubs, recreational and commercial fishing interests, the five local rūnanga of the Banks Peninsula area, marine conservationists, aquaculturalists, recreational surface users and commercial tour operators were involved in the Group and began to process the proposal further.[18]

In 1995 the Akaroa Harbour Marine Protection Society was formed to facilitate the proposal for the marine reserve in the Dan Rogers area, a site selected for its important coastal value, including the diverse array of fish species supported, and the opportunity to protect across the land–sea boundary because of existing scenic reserves. The consultation period took 10 months and involved schools, dive clubs, resident groups, adjacent land owners and local iwi, as well as commercial and recreational fishermen.

In 1996 a formal application for a 560 hectare reserve, covering 10 per cent of the Akaroa Harbour, was submitted. The area of the marine reserve applied for was in the south-eastern area of Akaroa Harbour extending around the head of the harbour to Gateway Point. Over 2,300 supporting submissions were received along with more than 700 objections. A second round of consultation held later that year received a further 48 submissions of support along with 25 objections. Primary opposition came from recreational fishers, concerned about the loss of access to fishing, and Ngāi Tahu, who wished to see the area set aside as a taiāpure. A taiāpure was set in place prior to the marine reserve being created.

In 2010 the marine reserve application was declined by the former Minister of Conservation on the basis that the establishment of a reserve would have an adverse effect on the area's recreational use including fishing. The decision was challenged by the Akaroa Harbour Marine Protection Society (supported by the Environmental Defence Society) by way of judicial review and was subsequently reversed by the High Court in the same year. After agreeing to reduce the size of the reserve to 475 hectares, to take into account customary and recreational fishing areas, the Akaroa Marine Reserve was finally approved by the Minister of Conservation in 2013.

An active community group in Akaroa was successful in promoting the establishment of a marine reserve in the harbour
(Raewyn Peart)

Tairua Marina

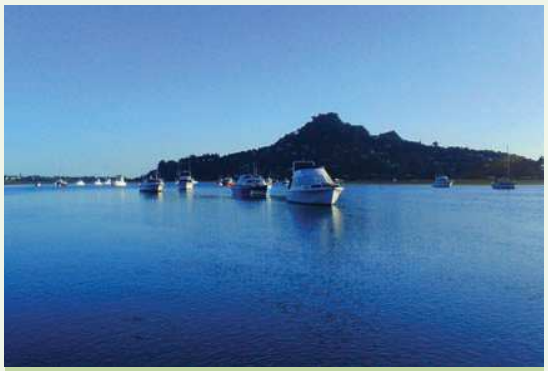
In the small coastal community of Tairua, on the Coromandel's east coast, a 253 berth marina was proposed in the early 2000s. The development required the dredging of Paku Bay to enable sizeable vessels to access the marina, and the disposal of 270,000 cubic metres of sediment into a reclamation of 4.6 hectares of seabed and foreshore. Ongoing dredging was also required to maintain the channels.

Some local residents were concerned about the potential negative impacts of the proposed large-scale marina development on their community and the local marine environment. The Guardians of Paku Bay Association was a community group borne out of a desire to protect these values. The first gathering, after invitation for submissions was announced, attracted just 23 people, 12 of whom formed the committee. Ten weeks later the group had grown to 140, and five years after that it had reached 425.[19] Bi-monthly meetings were held throughout the process to keep the community, including tangata whenua and iwi with whom a good relationship was formed, informed of progress.

In 2004 a redesign of the proposal was presented in a resource consent application. The main differences were:[20]

- The reduced scale of reclamation and increased beach width
- A beach renourishment area along the northern foreshore area
- Change to the northern edge of the inner breakwater
- Realignment and deepening of the Graham's Stream diversion channel
- A proposed bird roost

The Waikato Regional Council and Thames-Coromandel District Council refused the resource consents. In 2005 the applicants appealed these decisions to Environment Court, where the Court supported the councils' decisions to decline the application. This decision was then appealed to the High Court in 2006, where the appeal was dismissed.[21]



A local community group played an important role in reducing the size of the marina proposed for Tairua Habour *(Daniel Sharp)*

Four years later a new application was lodged with the councils. This application included a significantly reduced footprint, which provided 95 berths and 40,000 cubic metres of capital dredging. The application was approved. The Guardians of Paku Bay Association and Tairua Environmental Society appealed this decision. The appeal was heard by the Environment Court in 2010. At the hearing a number of experts presented evidence about the impacts on coastal processes, water quality, marine ecology, avian ecology, landscape/natural character/visual amenity and cultural values. The Environment Court confirmed the councils' decisions to grant consent.[22]

In 2011 the applicant for the marina sought costs against the Guardians of Paku Bay Association through the Environment Court. The Court stated that the hearing was one in a long series of hearings related to the use of the Tairua Harbour, in which parties had relatively entrenched views. The Court concluded that this was a clear case where the public and participatory nature of the RMA was intended to be achieved, and in which costs should not be awarded. Accordingly, costs were to lie where they fell.[23] In 2012 the Guardians of Paku Bay Association appealed the Environment Court decisions to the High Court, where the appeal was dismissed.[24]

The tireless work of some members of the local community ensured that enough funds were raised to supplement the funds received from the Ministry of the Environment's Environmental Legal Assistance Fund in order to cover legal costs. This was done through raffles, garage sales and art auctions. The media was used as a way to communicate to residents and ratepayers about the development proposed. To raise awareness, pamphlets detailing the proposal and issues were dropped to all homes, petitions were started and bumper stickers circulated. Over 200 letters to the local newspaper editor opposing the proposal were published. The group engaged with industry professionals, both individuals as well as recognised bodies, as sources of knowledge and advice.

Whilst not able to prevent the development, the local community's fight against the proposal was instrumental in reducing the footprint of the marina to a quarter of what was originally proposed.[25] The experience they gathered throughout the process has enabled them to form partnerships and provide support to others with similar environmental objectives.

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Endnotes

1 In some areas plans are combined, such as the Proposed Auckland Unitary Plan which includes a regional policy statement, coastal plan, regional plans and district plans
2 For the Proposed Auckland Unitary Plan, a number of changes to standard processes were made by the Local Government (Auckland Transitional Provisions) Act 2010
3 Changes can be made to regional plans, coastal plans and district plans as part of nationally significant proposal decided by the Board of Inquiry, but not to regional policy statements
4 Local Government (Auckland Transitional Provisions) Act 2010, sections 156 and 158
5 https://www.mfe.govt.nz/publications/rma/rma-amendment-act-factsheets-2013/factsheet-4.pdf
6 Fisheries Act 1996, section 12
7 Fisheries Act 1996, section 21(2)
8 http://www.mfe.govt.nz/publications/rma/annual-survey/2012-2013/rma-survey-2012-2013.pdf
9 EEZ Act 2012, section 59
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13 http://www.aucklandcouncil.govt.nz/EN/ENVIRONMENTWASTE/POLLUTION/Pages/reportpollutionhome.aspx
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19 Giberd B, 2011
20 *Tairua Marine Ltd v Waikato Regional Council* (NZEnvC A108/05, 1 July 2005)
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23 *Tairua Marine Ltd v Waikato Regional Council* [2011] NZEnvC 161 and [2011] NZEnvC 218
24 *Guardians of Paku Bay Association Inc v Waikato Regional Council* [2012] 1 NZLR 271
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Section Two

Management of activities

Blue maomao, Poor Knights Islands *(Daniel Sharp)*

Black sea urchins, Great Mercury Islands *(Daniel Sharp)*

9 Management of fisheries

Fishing boat tied up at the Mangonui wharf, Northland *(Raewyn Peart)*

Contents

Introduction

New Zealand's commercial fishing sector has changed significantly over the last 40 years. Up to the 1970s, the domestic industry was almost entirely made up of relatively small inshore vessels, manned by owner-operators under a licence system. The country's offshore waters were being fished by overseas vessels coming from nations such as Japan, Korea, Taiwan and Russia. The declaration of the 200 nautical mile EEZ in 1977, followed by the property-rights-based QMS in 1986, fundamentally changed the sector. The largest-volume fisheries are now offshore and they are dominated by a small number of New Zealand companies.[1] Due to the settlement of fisheries claims under the Treaty of Waitangi Māori have a major stake in New Zealand's commercial fisheries industry (see Chapter 4: Kaitiakitanga).

Overview of fishing industry

- Eight fishing companies provide 80 per cent of production by weight
- There are a large number of equally important medium and smaller fishing operations, with the majority of these being inshore
- Approximately 2,200 individuals and companies own quota in New Zealand fisheries
- The estimated value of the total quota is $3.5 billion
- Over 1,500 commercial fishing vessels are registered in New Zealand[2]

Commercial fishers target well over 100 different wild species, which include finfish, squid, shellfish, lobster, crabs, sharks, sea cucumbers and seaweeds. The most valuable species is rock lobster, with $223 million worth exported in 2012, followed by hoki ($195 million) and squid ($86 million).[3] In terms of tonnage, the highest is hoki with over 130,106 tonnes caught in the 2011–12 year, followed by jack mackerel (40,261 tonnes) and squid (35,207 tonnes).[4]

There are three main types of commercial fisheries within New Zealand's waters:

- Inshore (coastal) fisheries – these are located out to the edge of the continental shelf in relatively shallow waters up to 200 metres deep. They target a wide range of species such as paua, rock lobster, snapper, terakihi, scallops and red cod flatfish
- Deepwater fisheries – these are located within the deeper waters of the EEZ and include many of the commercially important species such as squid, hoki, orange roughy, ling, hake and jack mackerel
- Migratory species fisheries – these are target species that travel into and beyond New Zealand's waters such as tunas and swordfish

Much of the deepwater commercial fishing effort is concentrated off the South Island. In 2010, approximately 60 per cent of the fish harvest came from the Chatham Rise and Subantarctic areas, including the main hake, hoki, ling, silver warehou, squid, orange roughy and oreo fisheries. A further 30 per cent was caught off the country's west coast, mainly when some stocks spawn there in winter and spring, including hake, hoki, ling and silver warehou.[5]

Coastal fishing occurs all around New Zealand, including around the Chatham Islands, with varying importance regionally and with differences in catch and method importance depending on area.

Figure 9.1 shows the general spatial pattern of commercial trawl activity.

Snapper being packed at the Leigh Fisheries factory at Leigh, Auckland
(Raewyn Peart)

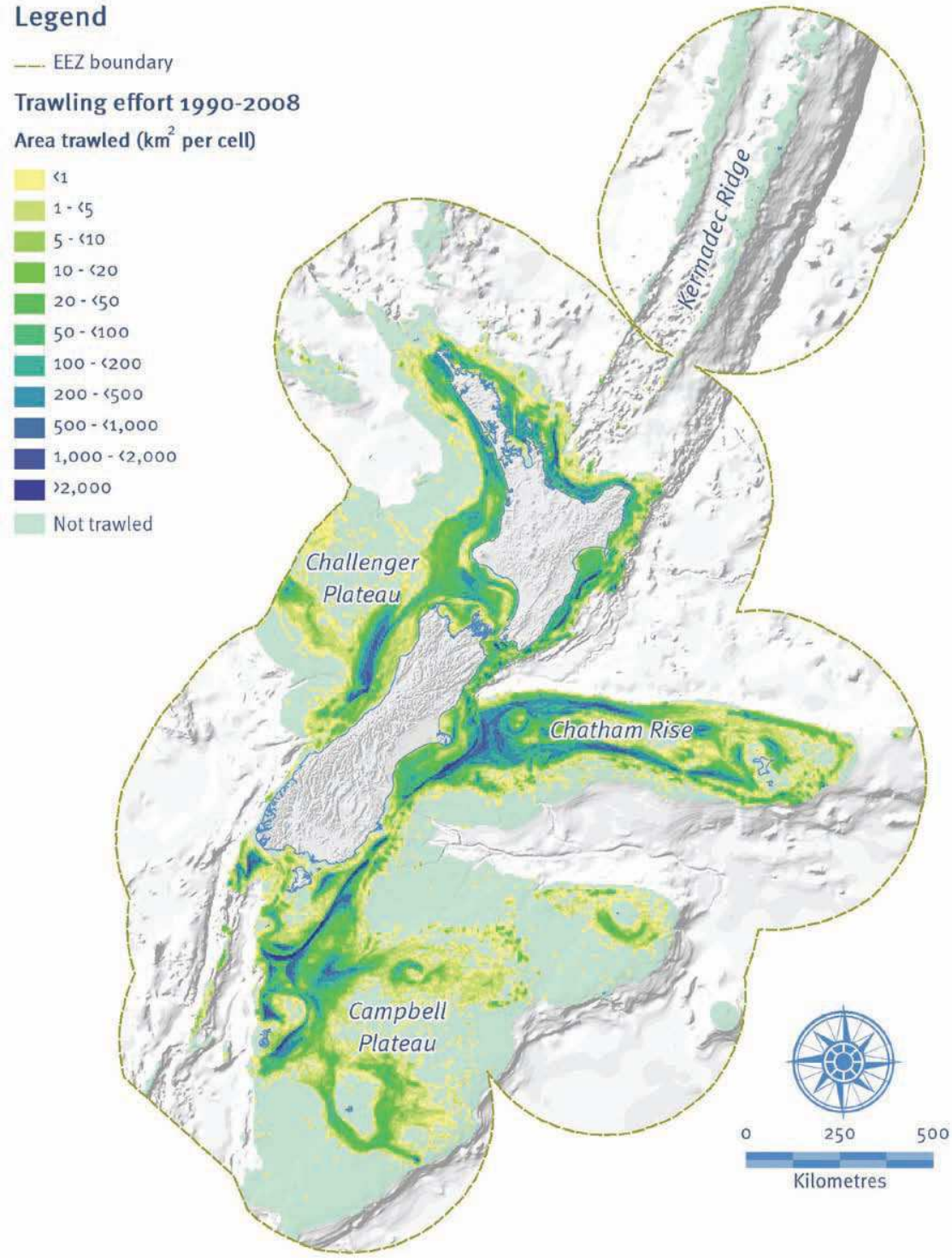


Figure 9.1 The general spatial pattern of commercial inshore trawl fishing activity[6] *(Ministry of Fisheries, NIWA and MfE)*

In terms of industry structure, Seafood New Zealand provides overarching representation of the commercial fishing sector. It provides economic information and advice to the sector, co-ordinates industry resources, and seeks to enhance the industry's profile in the community. Currently, most commercial fisheries in New Zealand are represented under five sector representative entities, which are (in alphabetical order):

- Aquaculture New Zealand
- Deepwater Group Limited
- Fisheries Inshore New Zealand Limited
- Paua Industry Council Limited
- Rock Lobster Industry Council

For information on farmed fish species please see Chapter 10: Aquaculture.

Snapper caught by longline in the Hauraki Gulf, ready for packing and sale *(Raewyn Peart)*

General potentially adverse environmental impacts

Fishing activity can potentially impact on the marine environment in many ways. Some of these effects can be mitigated through careful fisheries management which is discussed further below in the section on elements of best practice.

The potential impacts can be classified into four broad categories as the effects on:

- Target fish populations
- Non-target species
- Seabed habitats
- Marine ecosystems

Impacts on target fish populations

Fishing activity can significantly reduce the population size of a targeted fish species. In fact, fisheries management has long been aimed at achieving such a reduction. This is because it is thought that 'fishing down' a stock will increase its productivity, through removing older, slower-growing individuals and freeing up ecological 'space' for younger faster-growing cohorts. But if fishing levels are not well managed, then sometimes biomass can reduce to a level where the stock has difficulty recovering. This can be a particular problem with long-lived species which reproduce slowly, such as orange roughy and sharks. It can also occur when species are hard to measure and therefore monitor.

In the main, fishing preferentially removes larger and older fish, which might affect the reproductive potential of the stock. This is because larger fish produce more eggs in relation to their body weight than smaller fish. Fishing also changes the size and age structure of exploited populations and potentially reduces their genetic diversity.

Some fish species, such as orange roughy, have a set of biological characteristics which mean that they are only able to sustain very low exploitation rates. In addition, if such stocks do become depleted, recovery takes a long time and may not occur at all. The characteristics include:[7]

- Maturation at relatively old ages
- Slow growth
- Long life expectancies
- Low natural mortality rates
- Spawning that may not occur every year (not all fish may spawn in any one year)

Impacts on non-target species

Most fishing methods result in the catch of species that are not targeted by the fisher (bycatch). Non-targeted fish species that are in the QMS (discussed below) cannot generally be discarded at sea and must be landed. In general, this bycatch is a more serious problem for fishing nets (including gillnets and trawling) than for hook and line methods and fish traps, which are more selective.

Non-targeted species such as the male pigfish shown here off the Alderman Island in the Hauraki Gulf, can be inadvertently caught as bycatch in fishing nets *(Daniel Sharp)*

Of particular environmental concern is the capture of protected species such as marine mammals, seabirds and turtles in fishing gear. Dolphins, fur seals and sea lions can become entrapped in fishing nets, with some being released successfully and others drowning. Seabirds are attracted to baited hooks in longline fisheries and can get hooked or tangled in the line and drown. Others can become entangled in trawling gear, both the net and the cables towing the net. A high proportion of marine mammal and seabird species in New Zealand are vulnerable or endangered. All except black-backed gulls have protected status.

Impacts on seabed habitats

Fishing methods which involve equipment contacting the seabed can impact on benthic habitat and the organisms which live there. Bottom trawling and dredging are the methods which have the most impacts on the seafloor. Dredging is considered more destructive to the seabed in the localised areas where it occurs. Trawling has a higher cumulative impact within New Zealand's marine area, as it is undertaken over much larger areas. During 2008, 85,222 square kilometres of seabed were trawled, which equates to around a third of New Zealand's land area, and two per cent of the country's entire marine environment.[8] Other methods which involve the use of equipment on the seabed include seining, longlining and potting, although the effects are significantly less than those caused by dredging and trawling.

Disruption of marine ecosystems

The reduction of targeted fish populations may have significant ecological flow-on effects. These impacts are not well understood. Large-scale purse seining of inshore species such as kahawai, jack mackerel and trevally may have reduced food for seabirds such as white-fronted terns and Hutton's and fluttering shearwaters which typically feed in association with schooling fish. These larger schooling fish drive the smaller fish to the surface where they can be captured by these seabirds.

Squid is an important part of the diet of many bird species, toothed whales, dolphins, seals and sea lions. Harvesting large quantities of squid may have an impact on these species, but the effects are poorly understood.[9]

Reductions in targeted fish populations can impact on the entire food web. When top predators are removed, their prey species may increase in number, in turn increasing predation further down the food web. This is thought to be the cause of 'kina barrens'.[10]

Seabirds often rely on larger schooling fish to drive smaller fish near to the surface where they are accessible, such as in this 'boil up' in the Hauraki Gulf *(Raewyn Peart)*

Potential effects of specific fishing methods

A wide range of methods are used to harvest seafood, which are described below and shown in Figure 9.2. Each has different impacts on the marine environment, and these are of varying significance depending on the location and intensity of the activity. There are a number of methods which can be used to mitigate many of these impacts which are outlined in the section on elements of best practice.

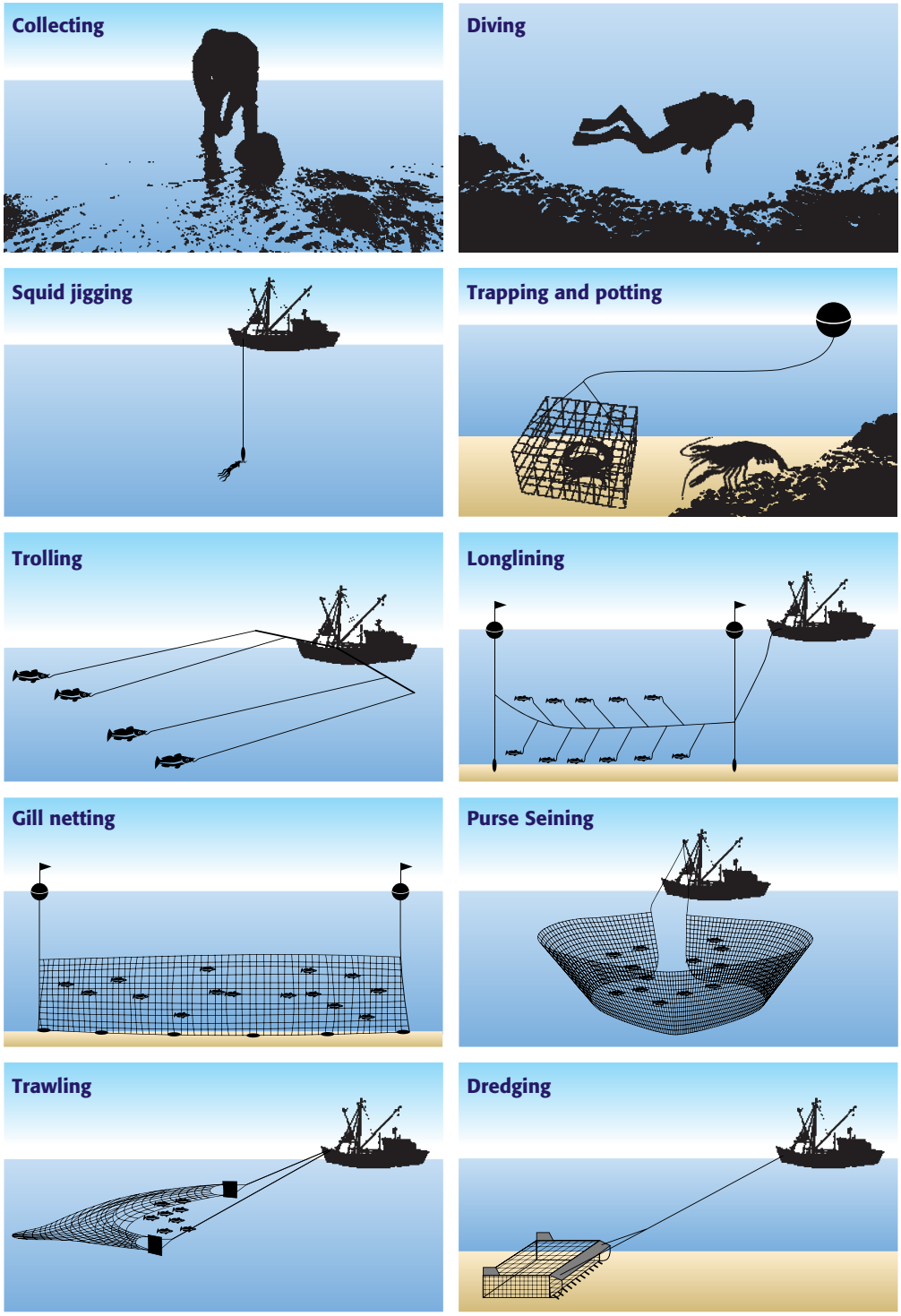


Figure 9.2 Sketches of different fishing methods

Collecting and diving

Divers gather kina and paua by hand for commercial sale. Cockles are harvested by hand using mechanical digging and raking. This has minimal impacts other than on the targeted species. It enables only target species to be harvested and undersized specimens to be left undisturbed. Mechanical methods of collection are more indiscriminate and can impact on habitats and other organisms living on the seafloor.

Squid jigging

Jigging for squid involves using powerful lights, which illuminate seawater at night and attract the prey of and the squid themselves to the area under the boat. Lures are attached at short intervals along lengths of line that are dropped over the side of the fishing boat. The lures are 'jigged' up and down by mechanically-operated pulleys. These entice the squid which are caught on the hooks and hauled onboard. This is a relatively low-impact fishing method that only catches the targeted species. If lines or jigs are lost at sea, they can become a hazard for other marine species, which may become entangled in the fishing equipment.

Trapping and potting

Traps and pots are used to catch rock lobster, blue cod, octopus and crabs. They are usually constructed from steel mesh. A baited pot is lowered to the seafloor and connected by a line and float. The targeted species are attracted to the bait and enter the pot or trap. Once inside they are unable to escape. The pots are lifted by winch back onto the boat and the catch removed. This is also a relatively low-impact fishing method, although fragile species located on the seafloor such as soft corals, sponges and bryozoans can be damaged if heavy pots are dropped on top of them. Undersized and non-target specimens can be returned to the sea relatively unharmed. Some seals and shags can drown as a result of being caught in rock lobster pots. Marine mammals can become entangled in pot lines.

Crayfish are commonly caught by the use of pots *(Daniel Sharp)*

Trolling

Trolling is mainly used to catch species such as tuna and yellowtail kingfish. A boat slowly drags a set of hooked lures through the water. Weights can be attached to the lines so that they sink in order to target fish at lower depths. This is a low-impact and selective method of fishing. Few non-target species are caught and it has no impact on benthic habitats. Occasionally fur seals and seabirds can become hooked on the lures but this is a rare occurrence.

Longlining

Longlining is used to catch a number of species, including:

- High-value inshore species such as snapper and groper
- Deeper-living species such as ling and bluenose
- Migratory species such as yellowfin and southern bluefin tuna

Longlining involves setting a long main line, which has numerous branch lines or snoods connected to it, each containing a baited hook. Longlining can be used to target fish near the surface, in mid-water or on the bottom. Longlines (between 80 to 150 metres deep) are used to target tuna and other large schooling and migratory species. They can be many kilometres long and each line can have thousands of hooks. Surface longlines are held up by a series of floats. The line is gradually let out as the fishing boat slowly moves ahead. The entire process of setting and hauling in a surface longline can take up to 12 hours. Bottom longlines are used to target the likes of ling, snapper, hāpuku, bluenose and school shark. They are shorter than the surface lines and are

attached to the seafloor with an anchor at one end and a weight at the other. The lines are left on the bottom for between six and 12 hours and are then hauled in. The number of hooks may range from 1,000 to 30,000 per day. This method results in little damage to the fish caught, which sometimes can then be sold for higher prices, but can incur higher costs to catch. Longlines generally have little impact on seafloor habitats, although if lines and weights are dragged across the seafloor they can damage sensitive benthic organisms. The size and shape of the hook and type of bait can be tailored to attract specific species, thereby reducing bycatch. Because this method of fishing uses a large amount of bait, it can place pressure on stocks of bait fish if these are not managed sustainably. Longlining can result in the death of seabirds, turtles and marine mammals which drown as a result of becoming caught on the hooks or entangled in the lines.

Tuna fishing vessel berthed in Nelson *(Raewyn Peart)*

Gill netting

Gill nets are used to catch a variety of inshore fish including flounder, rig shark, elephant fish, butterfish and grey mullet. The nets are normally narrow with the bottom weighted down and the top held up with floats. Driftnets are left to drift in water currents and are usually set at or near the water surface. Set nets are anchored to the seafloor and are usually set near the bottom. The net effectively forms a wall in the water which fish swim into and get caught in, often by their gills. Using a net with a large mesh size can help avoid small fish being caught. This has little impact on benthic habitats. However, compared to other methods, there is a higher risk of catching non-target species with gill nets including dolphins, penguins, shags, shearwaters, seals, sharks and fish. Such nets are a particular problem for the endangered Hector's and critically endangered Maui's dolphins which live in the shallow coastal waters where nets are commonly set.

Purse seining

Seining is a method where a net is used to encircle fish and capture them. Purse seining is used to catch fish that feed on the surface such as tuna, trevally, kahawai or mackerel. When a school of fish has been sighted from the main fishing vessel, a small boat is launched which tows one end of the net around the school to encircle the fish. Ropes at the bottom of the net are drawn in (pursed) to completely enclose the fish. The net is then pulled close to the larger boat and the fish are scooped or pumped into the hold. Because purse seining targets schooling fish, it usually results in little bycatch, although dolphins can be caught. It has little impact on benthic habitats as the net does not normally come in contact with the seafloor.

Beach and Danish seining

Other variants of seining are beach seining and Danish seining. Beach seining, also called drag netting, is used to target mullet, flatfish, snapper, trevally and crabs. The beach seining net has long ropes attached to each end. One of the ropes is left on the beach and the net is then extended out into the sea and brought around in a semi-circle until the other rope reaches further down the beach. The net is then hauled in towards the shore. Danish seining is similar, but is undertaken in deep water with the net and ropes slightly weighted and drawn along the seafloor. It is used to target species such as snapper, flat fish, gurnard and John Dory. Beach and Danish seining can be less selective than purse seining, depending on the extent to which schools of fish are targeted. Danish seining can damage sensitive benthic habitats as a result of the weighted net and ropes being dragged across the seafloor.


Danish seine fishing vessel berthed at Whitianga wharf *(Raewyn Peart)*

Trawling

Trawling catches the greatest quantity of fish in New Zealand and the majority of tonnage in deepwater fisheries. It involves one or occasionally two boats towing a net through the sea. Steel cables attach the net to the specially designed trawling vessel. The mouth of the net is spread open by two doors. The fish enter the net through the mouth and are forced down to the smaller cod end. The mesh size helps to avoid catching small fish, although as the net fills with fish the meshes can get blocked by fish already in the net.

Deepwater trawling vessel berthed at Nelson *(Raewyn Peart)*

Trawling can be undertaken in mid-water or along the seafloor. Bottom trawling is used to catch species such as orange roughy, ling, hake, squid and scampi. The net is often protected along the leading edge by rubber rollers. Mid-water trawling is also used to catch a range of species including hoki, jack mackerel and southern blue whiting.

This is a relatively indiscriminate method of fishing and can result in a large amount of bycatch. Fur seals, sea lions, dolphins and seabirds can become caught in the trawling equipment and drown. Fur seals, sea lions and common dolphins often deliberately swim into trawl nets to feed on the fish which have been caught.

Bottom trawling disturbs the seabed, and can damage or destroy the organisms and communities that live there. Heavy chains or rollers dragged along the seafloor crush many benthic organisms including sponges, bryozoans, seaweeds and soft corals. In addition, such equipment can flatten rocky and biogenic outcrops which provide refuge for juvenile species of fish. Trawling can also suspend sediment in the water column which can disrupt filter feeders.

Repeated trawling of an area can reduce its overall diversity and productivity. Recent research comparing trawled and untrawled areas around Separation Point, between Tasman and Golden Bays, identified significant differences. The trawled area showed a reduction in the size, biomass and productivity of marine life in the area, with the original shell-gravel substrate transformed to silt-mud, and larger long-lived species replaced by smaller opportunistic species.[11]

A risk assessment exercise looking at activities within the EEZ and extended continental shelf was completed for the Ministry for the Environment by NIWA in 2012. This identified bottom trawling as creating the third most significant risk to New Zealand's marine environment after ocean acidification and increasing sea temperatures from climate change.[12]

Dredging

Dredging is used to harvest oysters and scallops. It involves dropping a steel dredge to the seafloor and then pulling it along the sea bed. Dredging can also be harmful to benthic habitats. The heavy dredge scrapes the seafloor, crushing benthic organisms and flattening the seabed profile. It also suspends sediment in the water column, which reduces light levels, smothers remaining benthic organisms, and clogs up the apparatus of filter feeders. The dredge can also damage a significant proportion of the target species, such as scallops.


Scallop-dredging vessel, Whitianga *(Raewyn Peart)*

Fishing method	Main features	Potential environmental effects		
		Bycatch	Protected species	Benthic habitats
Collecting and diving	Harvesting by hand or with a mechanical digger or rake	Low	Low	Generally low
Squid jigging	Lighting up the sea to attract squid and jigging hooked lures up and down	Low	Low	Low
Trapping and potting	Baited pots and traps are placed on the seafloor	Low	Low – seals and shags can be drowned and marine mammals can become entangled in pot lines	Low – damage can occur to sensitive species located under pots
Trolling	A set of hooked lures are slowly dragged through the water	Low	Low – occasionally fur seals and seabirds are caught	Low
Longlining	Numerous baited hooks are placed in the sea on small branch lines attached to long main lines	Medium – sharks and billfish can be caught	High – seabirds, marine mammals and turtles can become hooked or entangled; can also impact on benthic species such as corals and sponges	Low – although lines and weights dragged across the seafloor can damage sensitive benthic habitats
Gill netting	Nets are placed in the sea and fish swim into them	High – catches a wide range of species which swim into the net	High – Hector's and Maui's dolphins, seabirds and seals can become entangled	Low
Seining	Nets are used to encircle fish	Purse seining – low as targets fish schools Beach and Danish seining – low to high depending on the extent to which fish schools are targeted	Low	Purse seining – low Beach and Danish seining – low but may impact on sensitive benthic habitats
Trawling	A large net is dragged through the water or along the seabed	Low to high and is species dependent. May be very highly targeted but may catch wide range of non-target species.	High – seals, sea lions and dolphins can be caught	Mid-water trawling – low if net does not touch seabed Bottom trawling – high
Dredging	A steel-framed, toothed structure is dragged along the seafloor	High	Low	High

Figure 9.3 Potential environmental impacts of commercial fishing methods *(Adapted from Forest and Bird, 2012)*

Decision-making framework

Fisheries Act

The Fisheries Act governs fisheries management throughout New Zealand's territorial sea and EEZ. The purpose of the Act is 'to provide for the utilisation of fisheries resources while ensuring sustainability'.[13] There are three main categories of fishing activity which are managed under the legislation: commercial, customary non-commercial (discussed in Chapter 4: Kaitiakitanga) and recreational (discussed in Chapter 16: Marine recreation and tourism).

Fishing activity is treated as commercial if the fish are taken for the purpose of sale.[14] Most commercial fisheries are managed under the QMS which first requires the identification of a fish stock. A fish stock may include a single species such as snapper, or occasionally several species as is the case with the flatfish stock, which includes eight different species. A stock comprises the population of such a species or species group within a defined area called a 'quota management area'. A single species may be managed as a number of stocks. There are generally between one and 10 quota management areas per species.

Quota management areas

The boundaries of these areas differ between species and are designed to facilitate the management of each stock. For example, the quota management area for Flatfish 1 (FLA1) extends over the entire northern half of the North Island, whereas the quota management area for Snapper 1 (SNA1) extends only over the northern east coast (see Figure 9.4).

Once a quota management area is established, it can only be changed with the agreement of the owners of at least 75 per cent of the affected quota, or if the Minister is satisfied that it is necessary to ensure sustainability.

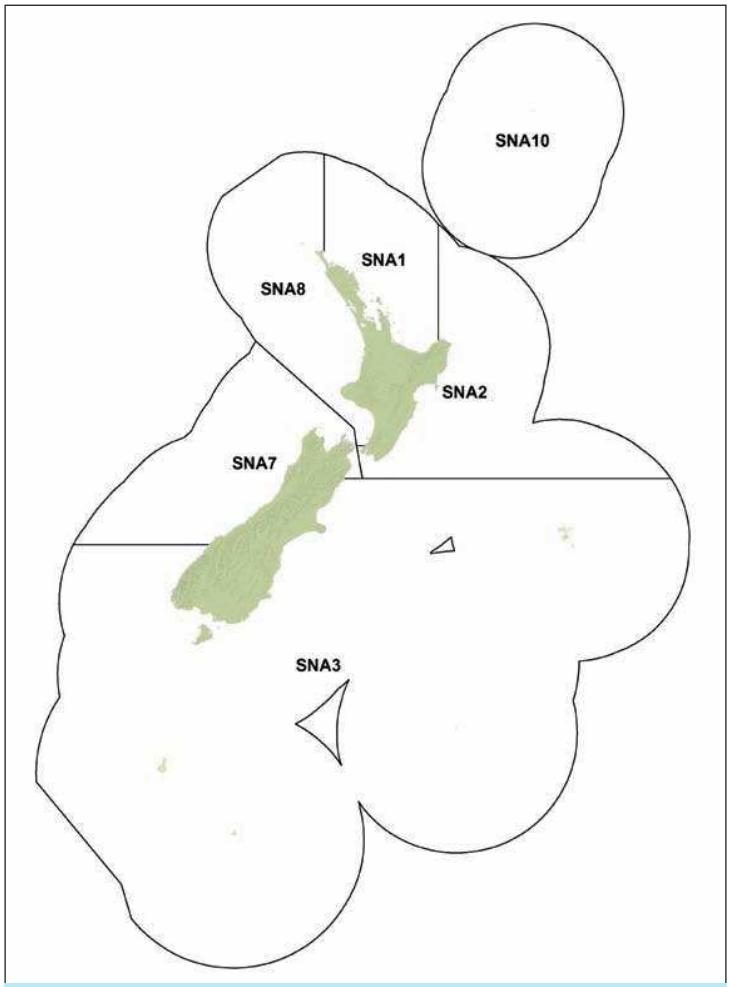


Figure 9.4 Map of quota management areas for snapper
(Ministry for Primary Industries)

Total allowable catch

Under section 13 of the Act, the Minister is required to set a total allowable catch that maintains each fish stock at or above a level that can produce the 'maximum sustainable yield.' Maximum sustainable yield is defined in section 2 of the Fisheries Act as:

> *the greatest yield that can be achieved over time while maintaining the stock's productive capacity, having regard to population dynamics of the stock and any environmental factors that influence the stock.*

The total allowable catch indicates the maximum amount of fish which can be taken by the combined commercial, customary and recreational fishing effort each year from specific stocks, as well as making an allowance for other sources of fishing-related mortality including illegal fishing.

Where a fish stock is below the estimated size required to generate its maximum sustainable yield (called B_{MSY}), the Minister is required to set a total allowable catch which will enable the stock to increase to a level at or above B_{MSY}. The time period within which the stock should be able to rebuild to this level is undefined, but is to be a 'period appropriate to the stock and its biological characteristics' having regard to relevant 'social, cultural and economic factors'.

The Ministry for Primary Industries' 'Harvest Strategy Standard 2008'[15] is a Minister-approved policy statement of best practice for the setting of fishery and stock targets and limits. This serves as a statement of intent as to how stock management will be carried out within the discretion provided by the Act. The standard provides reference points for the size of stock biomass that trigger requirements for management action, such as the development and implementation of a stock rebuilding plan. Operational Guidelines developed by the Ministry in 2011 provide more clarity on how the standard will be applied. These indicate that the fished stock should be around 35 per cent of the unfished stock size for medium productive species such as cod and hake.[16]

Total allowable commercial catch

The Minister is required to set a total allowable commercial catch, which specifies how much of the total allowable catch can be harvested by commercial fishers, and may adjust it from time to time. This must not exceed the total allowable catch and the Minister must 'allow for' Māori customary non-commercial fishing interests and recreational interests before setting or adjusting the total allowable commercial catch. Where fish stocks are shared between commercial, recreational and/or customary fishers, the Act provides no guidance as to what proportion should be allocated to each sector. This is a matter which is left up to the discretion of the Minister for Primary Industries.[17]

Sustainability measures

The total allowable catch is the primary sustainability measure for a stock, but the Minister may also establish other sustainability measures to control the effects of commercial and other fishing on a fish stock or on the marine environment more generally. These measures may include restrictions on fishing methods, the size of fish taken, and where and when fishing may be undertaken.

Where there are fishing conflicts with marine mammals, the Minister may set a limit on fisheries-related mortality for a species. For example, in the squid fishery surrounding the Auckland Islands (SQU6T) the Minister has imposed a fisheries-related mortality level for the New Zealand sea lion for more than 20 years, the most recent number being 68 sea lions during the fishing year. If the limit is exceeded, the fishery is closed for the year.[18]

The Minister sets limits on fisheries-related mortality for sea lions under the sustainability measures of the Fisheries Act *(Raewyn Peart)*

Individual transferable quota

The main means of allocating commercial rights to fishing is through the creation of individual transferable quotas in individual fish stocks. Individual transferable quota are expressed as 'quota shares' and they provide a right in perpetuity to harvest a proportional share of the total allowable commercial catch for a fish stock.

Annual catch entitlement

Each quota share generates an annual catch entitlement which is the right to harvest that share of the total allowable commercial catch during one fishing year. For instance, if a party owns 10 per cent of the quota shares for snapper in the quota management area known as SNA1, the annual catch entitlements generated by such quota share, gives the right to harvest 10 per cent of whatever the total allowable commercial catch for SNA1 is in that year (expressed in kilograms). The total allowable commercial catch may change from year to year, but unless the quota owner buys or sells the shares, it will continue to have rights to 10 per cent of it. Both individual transferable quota and annual catch entitlements are freely traded. The latter are often leased to fishers who do not own quota, to enable them to harvest particular species.

Deemed values

A system of 'deemed values' encourages commercial fishers to ensure that they have sufficient annual catch entitlements to cover the species and amount of fish caught. It also provides an incentive to minimise bycatch of other species for which catch

entitlements are not held. When fishers have insufficient catch entitlements to cover their catch, they are required to pay to the Ministry for Primary Industries the deemed value of the excess fish. The level at which deemed values is set is important. If they are too high, they will encourage fishers to (illegally) discard excess fish. However, if they are too low, they will fail to provide an incentive for fishers to acquire sufficient catch entitlements, or to keep their catch within their allocation, and therefore their combined catch within the total allowable commercial catch.

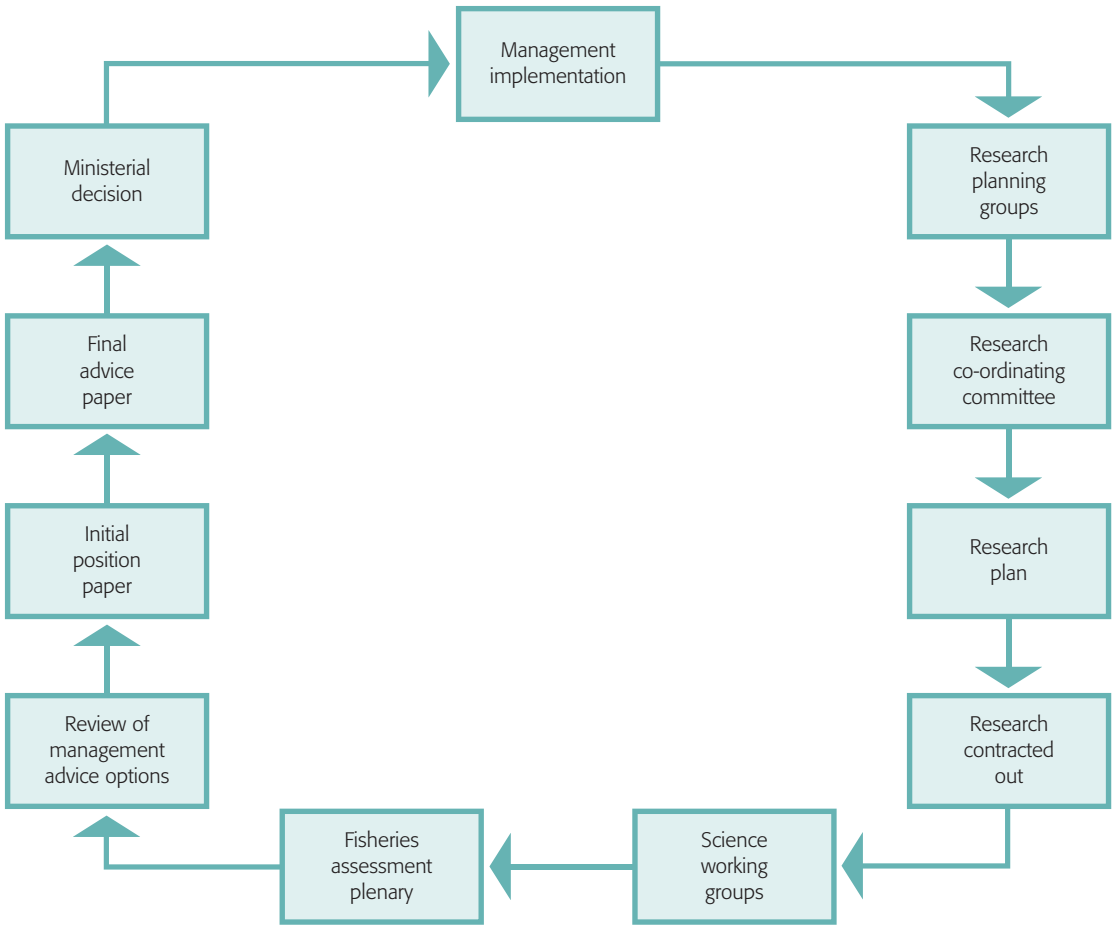


Figure 9.5 Management framework for commercial fishing

Management processes

National Fisheries Plans

The Fisheries Act enables the Minister to approve fisheries plans, which must be taken into account by the Minister when setting sustainability measures. The Act is silent on who may prepare a fisheries plan, but in recent years the Ministry has taken on this function. The plans are not mandatory and may relate to fish stocks, fishing years, or areas.

The Act provides a broad statutory framework for the preparation of fisheries plans:

- Plans may relate to fish stocks, fishing years and/or areas
- Plans may include fisheries management objectives, strategies to achieve the objectives, and/or performance criteria to measure the achievement of the objectives amongst other things
- Plans are prepared within the overriding purpose of the Act which is 'to provide for the utilisation of fisheries resources while ensuring sustainability'[19]

Fisheries decision-making processes for deepwater, highly migratory species, inshore finfish, inshore shellfish and freshwater fisheries are guided by National Fisheries Plans. These plans are designed to build on the Fisheries 2030 Government strategy for the seafood sector which has a long-term goal of 'New Zealanders maximising benefits from the use of fisheries within environmental limits'.[20] They are important, because the Minister for Primary Industries is required to take them into account before setting or varying relevant sustainability measures, or making other decisions under the Fisheries Act.[21] As well as setting out the broader management approach, the plans may contain fishery-specific chapters which provide more detail on the way that individual fisheries are to be managed in accordance with the overall fisheries plan. These chapters also provide operational objectives for managing bycatch species. Figure 9.6 outlines the wider context of the fisheries plans. Information about National Fisheries Plans is available on the Ministry's website.[22]

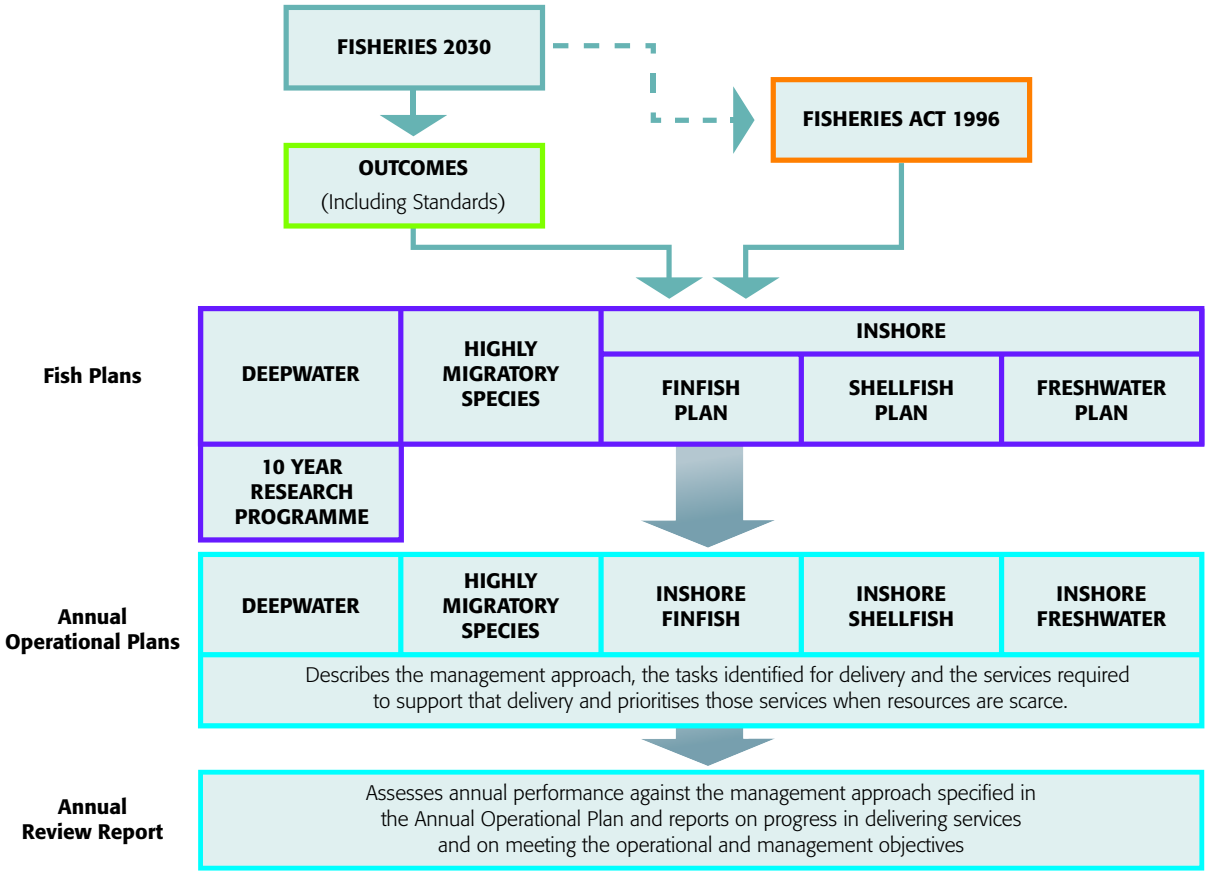


Figure 9.6 Fisheries planning structure *(Ministry for Fisheries, 2010b)*

Research planning and contracting

The Ministry for Primary Industries contracts around $20 million of research each year (as at 2011).[23] Much of this cost is recovered from the fishing industry. Research is determined by fisheries managers, who take advice from science staff, and is carried out by different fisheries. For example, deepwater fisheries have had a 10 year research programme in place for four years. The projects identified in the research plan are contracted out to science providers. The draft results of each research contract are considered by the relevant science working group (see below) before finalisation. Research is important, as it is often the basis on which fisheries management decisions are made.

Stock assessment

Science working groups meet regularly to evaluate research and to contribute to the assessment of fish stocks. The Ministry for Primary Industries Science Working Groups cover a wide range of sector interests including deepwater, shellfish, middle-depth, Antarctic fisheries, Northern and Southern inshore, highly migratory species, rock lobster, eel, stock assessment and fisheries data.

The role of the working groups is advisory only. Membership of the working groups is open to all interested parties and usually includes a range of representatives of fishing interests and environmental groups.

Several working groups focus on the assessment of fish stocks. They each prepare a report, which includes information on fishing interests in the stock, sustainability issues and estimates of stock size. These reports are incorporated into a fisheries assessment plenary report.[24] Two plenary reports are produced each year:[25]

- The May Fisheries Assessment Plenary Report summarises fishery, biological, stock assessment and stock status information for 82 of New Zealand's commercial fish species or species groups in a series of working group or plenary reports. Each species or species group is split into 1–10 stocks for management purposes.
- A mid-year plenary is produced each November for species that operate on different management cycles and includes 18 working group and plenary summaries for highly migratory species, Antarctic toothfish, rock lobster, scallops and dredge oysters

More recently, working groups have focused on protected species and environmental effects and contributing to the Aquatic Environment and Biodiversity Annual Review. This provides a summary of interactions between fishing and the marine environment and other relevant information for fisheries management. The review also assesses the current status against specified targets or limits.[26]

Fisheries management advice

Every year the Minister reviews a small number of fish stocks and makes a decision on whether to change the management measures in place. This can include the amount of fish that can be harvested and any restrictions on bycatch and the manner and locations in which fishing is undertaken. The processes to undertake these reviews are called 'sustainability rounds.'

Currently there are two sustainability rounds a year (called the April or October round), resulting in new management measures being in place by 1 April or 1 October. Of the stocks that are reviewed each year, most are reviewed in the October round, but rock lobster, southern blue whiting and some shellfish species are reviewed in the April round. Ministry officials undertake a priority-setting process that determines which stocks will be included in the sustainability round.

Management decisions which affect fishing activity, such as the set netting shown here at Ōmaha beach, result from the result from the sustainability and/or regulatory rounds undertaken and/or Regulatory Rounds undertaken by the Ministry of Primary Industries *(Raewyn Peart)*

Each round takes five to six months and consists of the following steps:

- An Initial Position Paper is prepared for each stock that is being reviewed. This is normally prepared by the Ministry, but in some cases is prepared by a fisheries management group, for example the National Rock Lobster Management Group. This will set out the issues to be addressed, identify and assess options to address them, and make recommendations as to what management measures should be adopted. The paper will also often include a summary of the relevant science related to the fish stock in question, usually drawing on the information contained in the latest plenary report.
- The Initial Position Paper is publicly released and written submissions called for. Usually six weeks is allowed for submissions, but this time may be extended for more contentious issues. Any person is able to make a written submission.
- Once the submission period has closed, Ministry staff summarise and consider the written submissions. The Ministry then prepares a Final Advice Paper, which is forwarded to the Minister. This provides the information on which the Minister will base his or her decision. This paper will normally have attached to it the Initial Position Paper and a summary of written submissions received.
- A notice is then placed in the *Gazette* to give legal effect to the final decision

There is no legal right to appeal the Minister's decision on its merits. It can only be legally challenged through initiating judicial review proceedings in the High Court.

Regulatory rounds

In addition to the sustainability rounds, the Ministry operates regulatory rounds, which function in a similar manner but apply to changes that require regulations to be adopted by the Governor-General on the recommendation of Cabinet (rather than becoming operative through a notice in the *Gazette* after the decision of the Minister). The regulatory round is more appropriate for decisions that will have longer-term implications.

Addressing environmental impacts

In order to help address the environmental impacts of fishing activity, the former Ministry of Fisheries prepared a report in 2005 titled 'Strategy for Managing the Environmental Effects of Fishing.'[27] The core approach adopted in the Strategy was the development of environmental standards to specify the limits of acceptable effects of fishing on the aquatic environment. Such standards were to have no statutory force, but were to be used as a guide to decision-making under the Fisheries Act. No environmental standards have as yet been finalised, but the following standards have been prepared:[28]

- Harvest Strategy Standard 2008 – discussed further below
- Stakeholder Consultation Process Standard (draft) – outlines how stakeholders will be consulted during decision-making
- QMS Introduction Process Standard (draft) – defines the process for introducing new fisheries into the QMS
- Research and Science Information Standard 2011 – focuses on the delivery of high-quality research and science to inform fisheries management

The Harvest Strategy Standard, finalised in October 2008, provides guidance for the setting of the target sizes for fish stocks. It contains three core elements: a specified target about which a fishery or stock should fluctuate; a soft limit that triggers a requirement for a formal, time-constrained rebuilding plan; and a hard limit below which fisheries should be considered for closure. The Operational Guidelines for New Zealand's Harvest Strategy Standard (Revision 1) was prepared in June 2011 to support the implementation of the Standard.[29] This document includes guidance on calculating biological reference points which assist with setting fishing targets that form the basis for the default limits specified in the Standard.

Much of the work on Standards has now been superseded by National Plans of Action. For example, the National Plan of Action Seabirds 2013 sets out a number of long-term objectives for the next five years with the goal of reducing the seabird interactions with the fishing industry. These are broken down into practical, biological risk and research and development objectives, both on a high-level and five-year basis, and include the following examples:[30]

- 'The level of mortality of New Zealand seabirds in New Zealand commercial fisheries are reduced so that species currently categorised as at very high or high risk from fishing move to a lower category of risk.'

- 'Where existing mitigation measures are impractical or of limited effectiveness in reducing the mortality of New Zealand seabirds, new or improved mitigation measures have been sought and where identified are under development for all priority fisheries or fishing methods…'

The development of this National Plan of Action has been a collaborative effort involving the Ministry for Primary Industries, the Department of Conservation, the fishing industry, tangata whenua and environmental groups. A risk assessment approach is being used to guide management priorities, an online database provides more detail about seabird captures, and an advisory group monitors the implementation of the Plan.

Iwi and recreational fora

In order to develop a closer working relationship with some key groups involved in fisheries management, the Ministry for Primary Industries has facilitated the establishment of a number of iwi and recreational fora. These fora meet regularly (every three months), and provide the opportunity for the participants to provide feedback to Ministry staff, and also for the Ministry to update participants on current and upcoming issues and processes. There is also an annual national meeting of all regional recreational fora.

Observer programme

The Ministry for Primary Industries' observer programme fulfills an important role in fisheries management through the collection of data, assisting with stock assessment, and monitoring of the environmental impacts of fishing. Observers are trained using the NZQA-approved Observer Qualification. Data is captured using electronic laptops or tablets. When observers return from trips, the information can be downloaded and reviewed during debriefing.

The Department of Conservation is a partner in the Ministry's observer programme with fisheries observers acting as the Department's 'eyes and ears at sea'. This work is an important part of the Conservation Services Programme, which is managed by the Department and which aims to ensure that 'commercial fishing is undertaken in a manner that does not compromise the protection and recovery of protected species in New Zealand fisheries waters'.[31] The Programme monitors the impacts of commercial fishing on protected species, researches endangered species populations, and identifies ways to limit bycatch. The commercial fishing industry is legally required to contribute to the costs of research provided by this programme. These levies have helped to fund a number of measures, including the development of potential mitigation devices, provision of advisory officers and the development of bycatch management measures.[32]

The Conservation Services Programme aims to ensure that commercial fishing is undertaken in a manner that does not compromise protected species, such as the common dolphins shown here *(Raewyn Peart)*

Elements of best practice for fisheries

Ecosystem approach

There has been a growing awareness that fishing activity needs to be managed by an approach which considers the ecosystems within which the fisheries are located. An ecosystem-based management approach takes into account the interactions of fishing activity with the marine ecosystem and incorporates such considerations into fisheries management decisions. The aim is to allow the utilisation of fisheries while maintaining the natural structure, balance and functioning of marine ecosystems and important species. It also focuses on protecting habitats of importance to fisheries.

The fisheries management challenge can be conceptualised as consisting of a number of levels, which extend from simpler single species management up to more complex and comprehensive multi-sector approaches, as shown in Figure 9.7.[33]

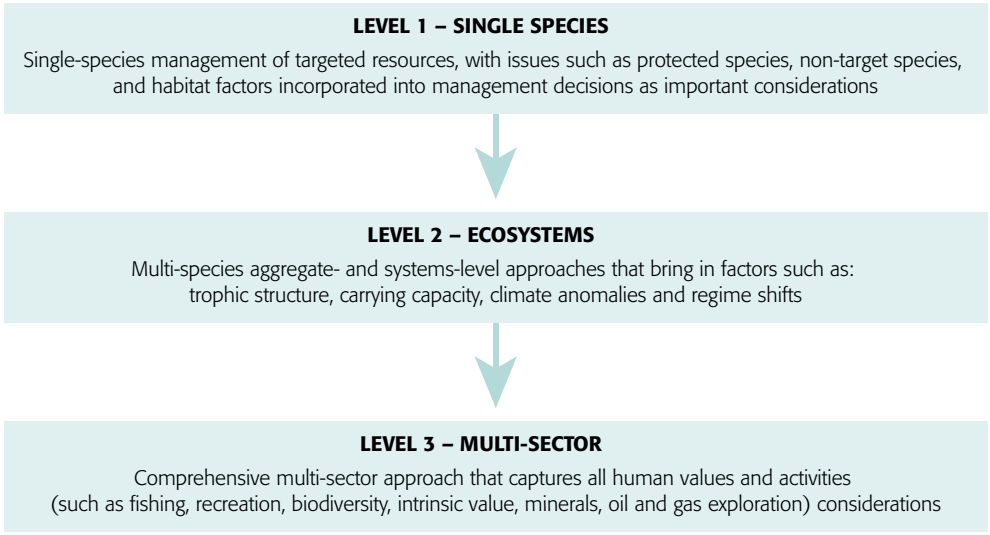


Figure 9.7 Levels of complexity within fisheries management

The fisheries management system currently applied by the Ministry for Primary Industries is based on Level 1, being primarily single-species focused. Applying a more comprehensive ecosystems approach requires an understanding of the ecosystems within which fishing is taking place, and the interactions between fishing and the affected ecosystems – knowledge which is gradually being developed. An ecosystems-based approach to fisheries management could be expected to take into account the issues identified in Figure 9.8.

Current fisheries management is focused on single species, but increasing knowledge about ecosystem interactions should enable a more comprehensive approach to be applied in the future. Fishing boats are shown here moored at the Viaduct Basin, Auckland *(Raewyn Peart)*

Issue	Best practice considerations
Targeted fish stock	• Is the size of the exploited population such that it retains its productivity, provides margins of safety for error and uncertainty, and retains its capacity for yields over the long term? • If the fish stock is depleted, is it able to recover, and if so are management measures in place to enable its recovery within a reasonable time frame? • Is fishing conducted in a manner to ensure that the age or genetic structure, or sex composition, of the stock is not changed to a degree that impairs reproductive capability?
Bycatch species	• Are any threatened or endangered species affected by the fishery such as sea lions, Hector's and Maui's dolphins and seabirds? If so, are effective measures in place to ensure that any negative effects on populations are mitigated? • Are any other protected species affected by the fishery such as seals, dolphins, whales or seabirds? If so, are effective measures in place to ensure that the effects are minimised? • Is there any significant bycatch of untargeted species including juveniles? If so, are effective measures in place to reduce this? • Does management ensure recovery of depleted populations? • Are fisheries impacts on bycatch species reversible over a reasonable time period (20–30 years)?
Associated or dependent species	• Is the fishery depleting food sources important to other species such as seabirds or marine mammals and is this having a detrimental effect on these populations? • Does management ensure recovery of depleted populations? • Are fisheries impacts on associated and dependent species reversible over a reasonable time period (20–30 years)?
Biodiversity	• Is the fishing activity threatening marine biological diversity at the genetic, species or population levels? • Is the fishing activity enabling the natural functional relationships among species to be retained? Is it leading to trophic cascades or ecosystem state changes? • Is the natural structure and function of the marine ecosystem being maintained, including its biodiversity and productivity?
Habitats/ ecosystem approach	• Are habitats of particular significance for fisheries management well-managed or protected, including addressing land-based impacts? • Is fishing activity impacting on habitat important for juvenile fish? • Are changes to the marine habitats caused by fishing activity reversible over a reasonable time period (20–30 years)? • Are sufficient representative and unique benthic habitats protected from trawling and dredging activity, including vulnerable marine ecosystems? • Is fishing activity reducing the resilience of marine ecosystems to climate change-related impacts? If so, are effective measures in place to reduce these impacts?
Information and uncertainty	• Has the decision been based on the best available information and has the adequacy and reliability of the information been assessed? (see Fisheries Act, section 10) • Has a recent assessment of the biological status of the fish stock and impacts of the fishery been conducted? • Is sufficient research being undertaken into the environmental impacts of the fisheries to enable informed management decisions to be made? • Is sufficient research being undertaken to understand the important trophic linkages between the fish stock and other marine species? • Where information is inadequate, has a precautionary approach been adopted? • Has uncertainty in the available information not prevented action being taken when the sustainability of the fisheries resource or the health of the aquatic environment is at risk?

Issue	Best practice considerations
Monitoring and enforcement	• Is adequate monitoring being undertaken? • Is there adequate enforcement of fisheries regulations?
Management	• Have clear management goals been established? • Have management plans been developed to ensure progress towards those goals? • Do these management plans include clear targets and timelines for progress?

Figure 9.8 Best practice considerations for fishing activities (*Sourced and adapted from the Australian Department of the Environment and Water Resources, 2007; Marine Stewardship Council, 2002; and Ward et al., 2002*)

Strengthening links between science and the fishing industry

As an industry science provider Trident Systems are forging important links between science and the fishing industry. Trident is supporting fishing vessel crews with scientific protocol training. This is a partnership programme, with funding from a number of partners and co-funding from Seafood Innovations Limited. Working with a number of science providers, the company's research and development focus covers three key areas:[34]

- Efficient sampling of inshore stocks, especially finfish fisheries
- Realising greater value from fisheries data
- Evaluating management procedures for lower-information stocks

A valuable component of Trident's work is the application of any scientific information gathered directly to processing plants and fishing vessels in order to improve fisheries practices.

Reducing seabird bycatch

Seabird mortalities are one of the major challenges associated with longlining. A number of measures can be implemented to reduce seabird attraction and subsequent entanglements or capture during fishing activity. These include:

- Batching offal – offal is held onboard and periodically discarded when there is less danger from the fishing activity. It can also be minced before it is discarded, making it less attractive to some birds. Offal management in the bottom longline sector is mandatory under fisheries regulations.[35]

Southern Buller's Albatross can become caught on longline hooks *(Tamar Wells Photography)*

- Tori lines – a set of streamers are hung off a line located above the fishing lines or nets. This is designed to scare seabirds away from baited hooks or dangerous cables.
- Blue-dyed bait – research has shown that birds are less interested in blue-dyed bait
- Weighted lines – this helps the bait to sink fast meaning the birds have less time to get tangled up in the hooks or lines
- Night setting – there are usually less feeding birds around at night. However, there are exceptions, such as black petrels feeding on bioluminescent squid during darkness hours.
- Bird baffler – booms are attached to the back of a vessel on either side and swing plastic tubes or cones that are tied onto the booms, essentially scaring the birds away
- Move to another fishing spot – some commercial skippers have found it is best to stop setting lines and to move to another spot, especially if the birds are hungry and/or at-risk species

The development of vessel-specific seabird risk managements plans can help fishers to consider the overall risk to seabirds of the vessel's operation and to identify the most effective ways of mitigating the risks.

There are some mandatory government measures in place requiring the use of certain seabird mitigation technologies. For example, since 2006 regulations have been in force requiring fishing boats over 28 metres in length to carry and deploy a seabird scaring device if using a trawl net, but currently no regulations apply to smaller inshore trawlers.[36]

A unique conservation partnership called Southern Seabird Solutions is an example of some of the collaborative innovative work underway between a wide range of stakeholders to reduce the impact on seabirds from commercial longlining. This example is discussed in the case studies below.

Reducing marine mammals bycatch

The most effective way of reducing bycatch of marine mammals is to avoid using set and trawl nets within their habitats. Set nets are a particular risk to coastal dolphins including Hector's, Maui's and common dolphins. While less of a risk than set nets to some species, trawl nets are a particular risk to Hector's and Maui's dolphins, common dolphins and New Zealand sea lions. Set net prohibitions have been put in place along areas of the coast to protect Hector's and Maui's dolphins.[37] There has also been a recent prohibition on set netting attached to the marine mammal sanctuary located off the Taranaki Bight.[38]

Voluntary marine mammal operational procedures

The Deepwater Group represents the owners of quota for deepwater and middle-depth fish species in New Zealand. The group has developed a set of voluntary operational procedures which relate to marine mammals. These are given to all skippers of vessels involved in the jack mackerel fishery (where there is a particular conflict with common dolphins) and annual briefings are carried out to reinforce the message. The recommended procedures include:[39]

- The officer on watch confirms that the area is visibly clear of dolphins before the net is deployed
- If the vessel turns during trawling, it must haul the doors to the surface so the end of the net is closed before making the turn
- Nets are not to be launched or retrieved between 02.30 and 04.30 hours
- A dolphin dissuasive device (acoustic pinger) is to be deployed on night tows

Experiments with acoustic alarms on nets overseas showed promising results initially, but have not yet proved to be practically applicable. Other measures that can help to reduce, but not eliminate, the risk of marine mammal bycatch include:

- Increasing the depth of the trawl net in the case of conflicts with common dolphins
- Adopting new technologies to enable animals to escape from trawl nets, such as the Sea Lion Exclusion Device (see Figure 9.9)
- Avoiding dumping offal when the net is being shot (launched) or hauled[40]
- Keeping watch for marine mammals, and if any are sighted, not deploying a net and leaving the area
- Hauling the net in as quickly as possible
- Recovering any accidentally lost fishing gear[41]

In response to sea lion bycatch in the squid trawl fishery, the fishing industry has developed a Sea Lion Exclusion Device, and this has been deployed in squid trawl nets over recent years. It consists of a grid that is placed across the net in front of the cod-end where the fish accumulate. The gaps in the grid are large enough for squid and other fish to swim through, but are too small for the larger sea lions. The device is designed so that marine mammals which reach the grid are forced to swim up, forward and out of the exit hole on top of the net. Research work on efficacy suggests that the device can increase the likelihood of survival for sea lions that enter a trawl net. More information can be found in the 'Aquatic Environment and Biodiversity Annual Review 2013'[42] and in the Ministry for Primary Industries 'Fisheries Assessment Plenary May 2014'.[43]

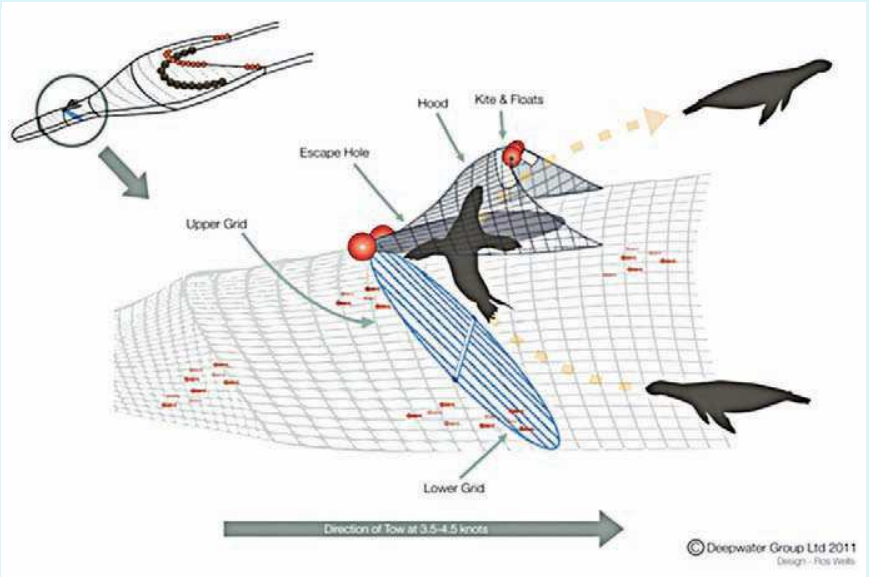


Figure 9.9 Diagram of a Sea Lion Exclusive Device inside a trawl net
(Ministry for Primary Industries, 2013b – image courtesy of the Deepwater Group)

Reducing fish bycatch

Bycatch of other fish can also be a problem for the trawling industry but does tend to be lesser where one species is specifically targeted. Best practice measures to reduce bycatch of juvenile and unwanted fish species include:

- Using longline or purse seine methods to harvest fish rather than trawling
- Using shorter more carefully targeted trawls
- Using larger mesh sizes for nets to enable juveniles to escape
- Not fishing in areas where juveniles predominate the catch

Juvenile snapper, such as the one shown here, can inadvertently become caught in trawl nets *(Daniel Sharp)*

Reducing benthic impacts

One approach to managing fishing impacts on the seabed is through the use of spatial controls. A wide variety of controls apply in New Zealand waters. Some of these were introduced specifically to manage the impacts of fishing on the seabed (see Figure 9.10). Other closures exist for other reasons such as for protecting cables, but have the effect of protecting certain areas of seabed from disturbance. These are discussed further in Chapter 6: Marine protected Areas.

Other approaches to reducing the impacts of trawling on benthic habitats include:

- Ensuring that trawl equipment does not come into contact with the seafloor

- Avoiding trawling in areas which have not already been impacted
- Minimising the size of the trawl footprint
- Increasing the time period between repeated trawling of the same area to enable recovery
- Excluding trawling activity from vulnerable marine ecosystems and areas of ecological benthic importance such as coral and sponge gardens, shellfish beds, seagrass beds, hard and shelly substrates, seamounts and underwater features
- Actively developing new trawl technology which reduces benthic impacts

Within the EEZ, 17 areas around underwater features (including some surrounding seamounts) and 17 Benthic Protection Areas have been closed to trawling to protect benthic habitats. Other forms of fishing are allowed in these areas.

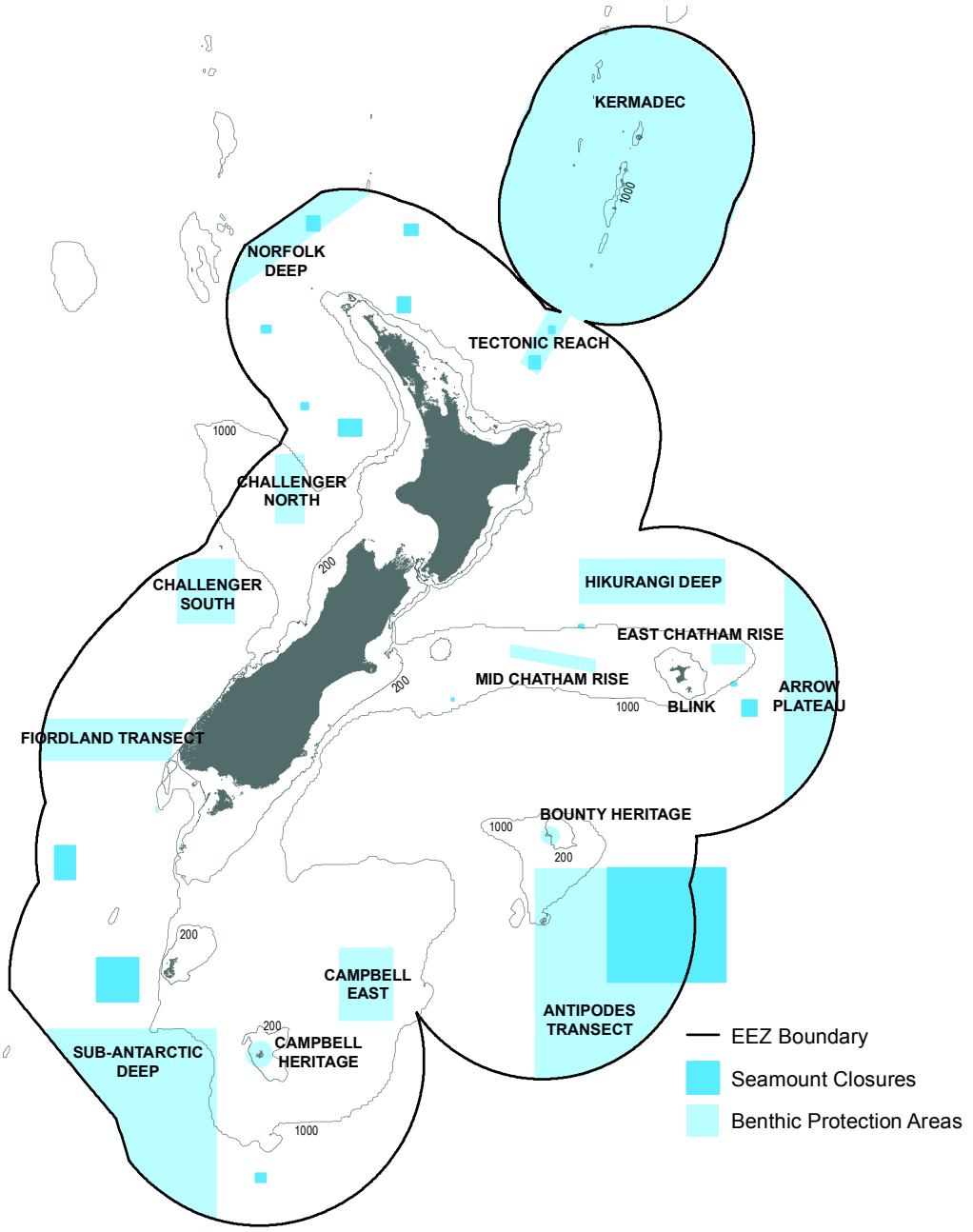


Figure 9.10 Benthic protection areas *(Deepwater Group Ltd, 2014)*

Vulnerable marine ecosystems

The Food and Agriculture Organization's 2009 international guidelines on deep-sea fishing provide criteria to assist with identifying vulnerable marine ecosystems which are recommended to be specifically protected from the impacts of fishing. These guidelines are not binding and are focused on implementing the United Nations General Assembly Resolution on Sustainable Fisheries (UNGA61/105). The criteria provided by the guidelines include:[44]

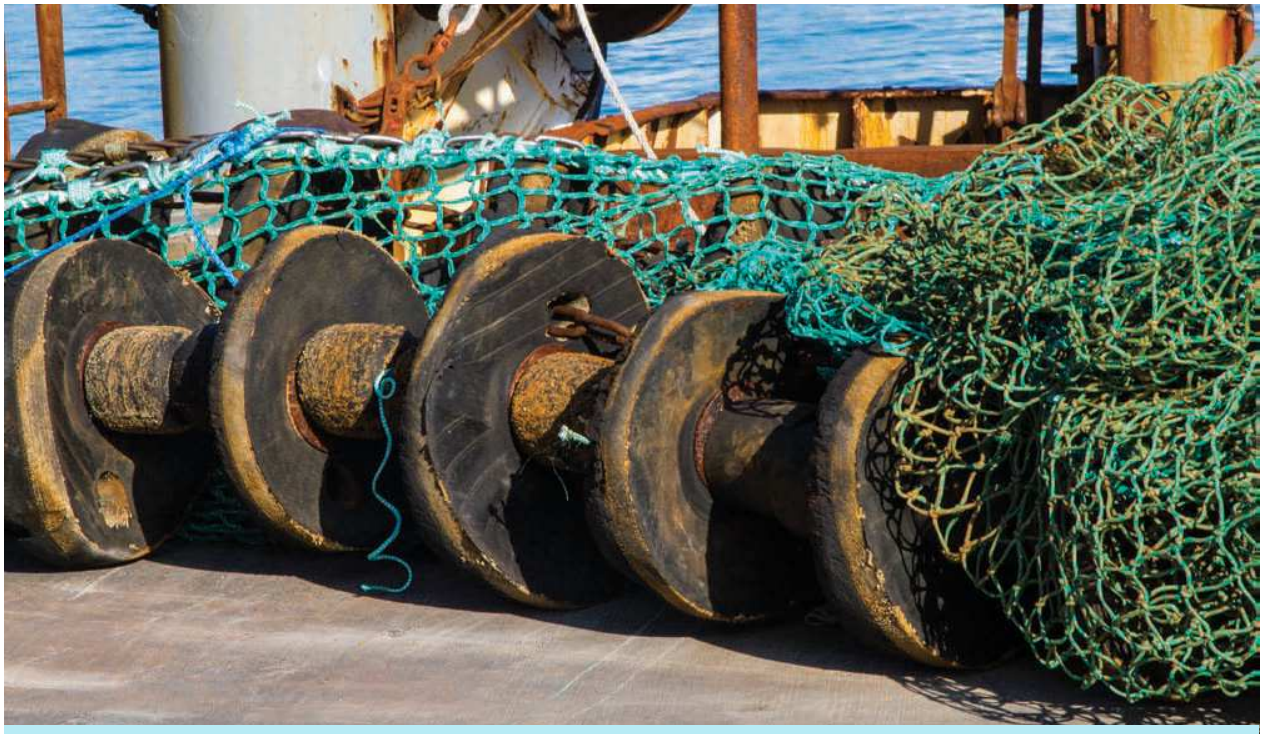
a) Uniqueness or rarity – an area or ecosystem that is unique or that contains rare species whose loss could not be compensated for by similar areas or ecosystems. These include:
   - habitats that contain endemic species;
   - habitats of rare, threatened or endangered species that occur only in discrete areas; or
   - nurseries or discrete feeding, breeding, or spawning areas.

b) Functional significance of the habitat – discrete areas or habitats that are necessary for the survival, function, spawning/reproduction or recovery of fish stocks, particular life history stages (e.g. nursery grounds or rearing areas), or of rare, threatened or endangered marine species.

c) Fragility – an ecosystem that is highly susceptible to degradation by anthropogenic activities.

d) Life-history traits of component species that make recovery difficult – ecosystems that are characterised by populations or assemblages of species with one or more of the following characteristics:
   - slow growth rates;
   - late age of maturity;
   - low or unpredictable recruitment; or
   - long-lived.

e) Structural complexity – an ecosystem that is characterized by complex physical structures created by significant concentrations of biotic and abiotic features. In these ecosystems, ecological processes are usually highly dependent on these structured systems. Further, such ecosystems often have high diversity, which is dependent on the structuring organisms.



Gear dragged along the seafloor, such as the trawl net bobbins shown here on the Viaduct Basin wharf, Auckland, can damage vulnerable marine habitats *(Raewyn Peart)*

Southern Seabird Solutions

In July 2002, Southern Seabird Solutions was formed at a workshop attended by parties with a shared interest in the development and implementation of sustainable and responsible fishing practices, in recognition of the need to improve management of the impact from commercial and recreational fisheries on seabirds.

Flesh-footed shearwaters, shown here near the Mokohinau Islands in the Hauraki Gulf, are susceptible to being caught on longline hooks *(Raewyn Peart)*

The concept was officially launched in November 2003 as a registered charitable trust, in partnership with the seafood industry, Department of Conservation, Ministry for Primary Industries, WWF New Zealand and Te Ohu Kaimoana. Representatives from these groups make up the 15 person board of trustees and management committee. Its aim is to work with commercial fishing fleet crew and skippers, as well as recreational anglers, to minimise the harm caused to seabirds through fishing. The initiative has generated much support from some environmental groups, ecotourism operators, fishing gear retailers and seabird ecologists.

Underpinned by a motto of 'conservation through cooperation', Southern Seabird Solutions empowers and encourages new attitudes and behaviours amongst fishers, and advocates the adoption of practical fishing practices to reduce accidental seabird capture. The group acknowledges that there is no single solution to the problem, and it works collaboratively with partners and supporters to educate and share ideas through workshops and awareness campaigns. Fishing technology designers help to refine solutions based on feedback from industry professionals and those whose hands are literally on deck.

Southern Seabird Solutions offers a range of useful tools and resources to professional skippers and crews including:[45]

- Inshore finfishing and seabird workshops – these are tailored to fit the local fleet and help crew learn about seabird lifecycles and best practice measures. In 2012 there were over 160 skippers and crew involved in these workshops.
- Commercial fishing and seabirds mitigation DVDs (including: *Sharing Worlds* – seabirds and fishing Otago/Southland; *Sharing the Hauraki Gulf* – fishers and black petrel; and *Seabird Smart Fishing* – deepwater trawl and longline)
- Seabird safe release (from hook events) poster and guidelines
- International mitigation mentor programme – including 'cross pollination' of ideas with South America and South Africa and some skipper swaps with South American crews
- 'New Zealand Seabirds Long Haul Experts' booklet – providing a range of facts about different seabirds found in New Zealand[46]
- Seabird Smart Awards – recognising people from the industry who demonstrate passion and commitment for a seabird smart fishing culture

Southern Seabird Solutions is keen to see New Zealand fishers become world leaders in the development and use of mitigation measures to avoid seabird mortality from fishing. It also hopes to be able to transfer technology and knowledge between countries, and to be part of a movement that engages fishers, governments, agencies and individuals worldwide.

CASE STUDY

Precision seafood harvesting

Innovative research is underway to identify new technologies that can reduce the environmental impacts of fishing. Precision seafood harvesting, also known as modular harvesting, is the latest advancement in trawling and is a significant step change in harvesting technology.

New technology for reducing the environmental impacts of fishing being trialled
(Precision Seafood Harvesting)

This replacement system for the old trawl technology, which has been in use for over a century, has resulted from 10 years of development effort as part of a joint-funded research programme between the Government, Sanford Limited, Sealord Limited and Aotearoa Fisheries Limited. The new technology has been based on understanding fish physiology and behaviour. This has enabled the development of a trawling system that is intended to reduce the number of non-target species taken, better target selected species, and land them in an improved condition. This could potentially provide multiple benefits including obtaining a higher price for the fish caught, reducing the numbers of juvenile fish killed and increasing the probability of bycatch species being released alive.[47]

The new system means that traditional trawling nets are replaced with a flexible PVC landing liner which is dotted with escape portals. During a trawl, undersized and non-target species are more likely to be able to escape the net through the portals. This means that they can freely return to the sea without being boarded on a vessel, and this greatly reduces any physiological stress. Targeted fish continue to swim at a natural pace within the liner, until such time as they are landed. This method is far gentler than traditional methods, where fish are forced down to the cod-end of the net and hauled along at speed, and fish remain alive until they are landed. The target fish are often very close to the bottom and the new equipment will contact the seabed, but the performance of the new technology is significantly improved in other areas.

Trials using the new method have shown that if juvenile snapper are able to swim out of the net before it is hauled aboard, they have a 90 per cent survival rate in the first 24 hours post-harvest.[48] For targeted species, the much greater probability of being alive when the net is hauled improves catch quality and may result in more opportunities to export to live fish markets. In addition, the technological development means that any bycatch, which can include species too large to escape through the escape portals such as shark or rays, can be rereleased with a good chance of survival.[49] If the technology meets the shorter-term expectations for performance, it will allow smaller fishing vessels to significantly improve the quality and value of their catch. In the longer term it is expected there will be vessel design changes to optimise the handling systems for the new system and changes to fishery laws that will bring improved management of the fishery, including bycatch and wastage of juvenile fish.

The participating fishing companies have been trialing the new technology on board their fishing vessels. Vessel crews were initially skeptical about the new technology, but are beginning to see its value in the long run:[50]

- *'Replacing the old trawl technology is really important for the industry. We're going to see better stock recruitment and better stock in the water'* – Nathan Reid, Vessel Manager for Aotearoa Fisheries Limited
- *'When we talk to them (the crews) now, when we see their reactions to the fish coming up, we know we're on to something. I know we're doing something unique and great when I look at the crews'* – Bill Healey, Vessel Manager for Sealord Limited

While the test results to date have been very encouraging, the validation of these results as a data set will take some time. This validation step is a necessary process that will help promote the successful deployment across a wider range of commercial fishing vessels at later stages of the programme.

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