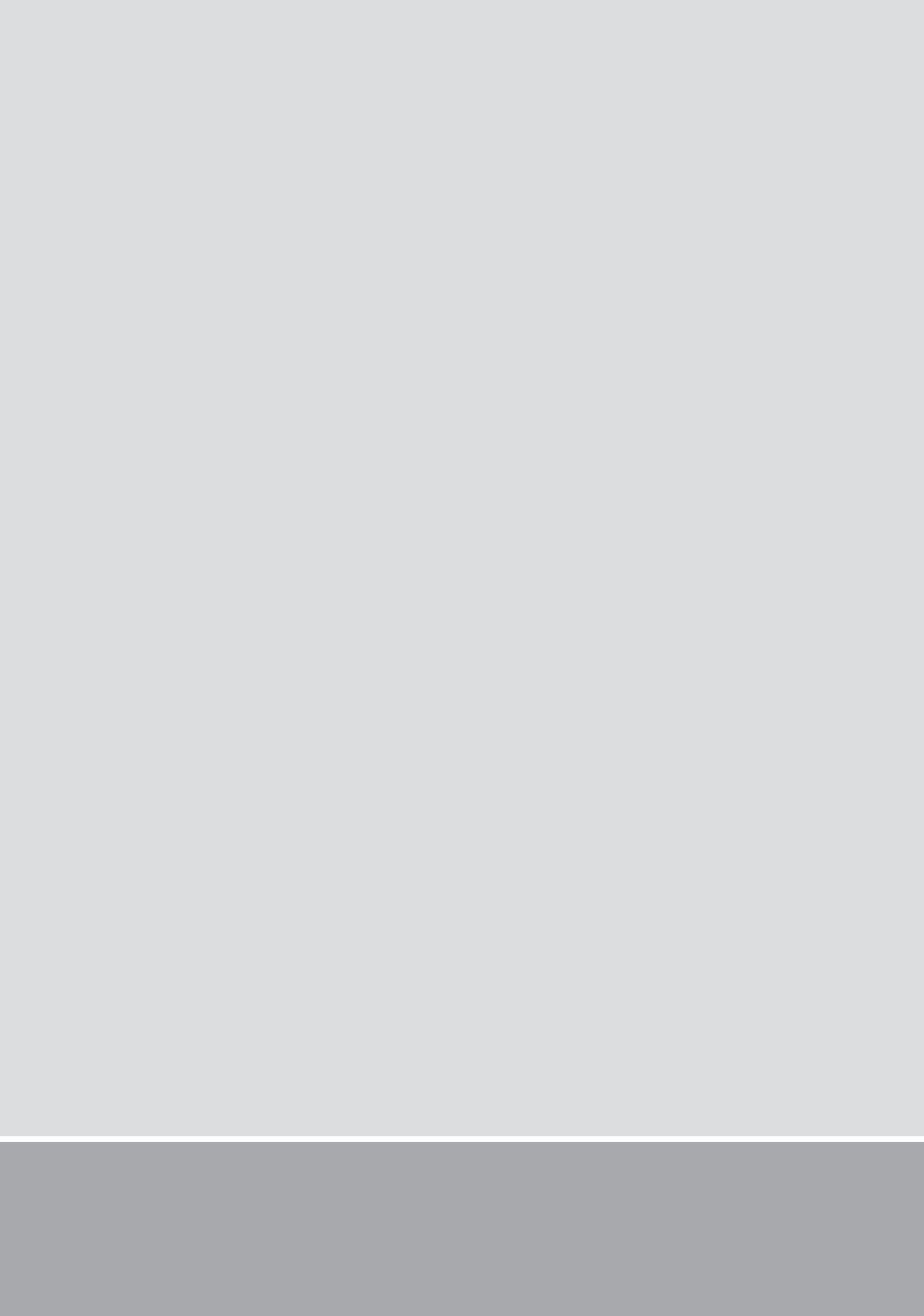


PART TWO

NEW ZEALAND'S PERFORMANCE





Why New Zealand needs
marine protection

New Zealand's management challenge is significantly larger than that of many coastal nations, as it is responsible for one of the largest marine jurisdictions in the world. This expansive area is a rich resource for the country, and is extremely important in both economic and cultural terms. As a result, the pressures on the environment are significant and good management is extremely important.

Large and biodiverse marine area

At more than 4.2 million square kilometres, the territorial sea and exclusive economic zone are over fourteen times the size of New Zealand's land area, thanks to the large number of offshore islands and islets that are included in the country's territory.¹ The extended continental shelf adds a further 1.7 million square kilometres, although New Zealand's right to manage this area is much more limited.^{2,3}

New Zealand's marine environment is host to a highly unusual array of unique and diverse ecosystems. This is partly due to its latitudinal spread. The area spans a latitude of 40 degrees, from subtropical Raoul Island (29°15'S), to Sub-Antarctic Campbell Island (52°30'S). This results in a wide range of oceanographic conditions, ranging from the tropical waters to the north, to the Sub-Antarctic waters of the south. It also has a unique and tumultuous geological history, in which it developed in isolation from other land masses for many millennia.

The islands of New Zealand are the visible surface of a large submerged continent, known as *Zealandia*. Zealandia began to split away from Australia and Antarctica 83 million to 100 million years ago, in the late Cretaceous period. Large fluctuations in sea level over the following millennia meant that Zealandia became mostly submerged, and it was only relatively recent volcanic activity and tectonic movement which brought about New Zealand's land mass as we know it today. This volcanic history has contributed to the undulating nature of the coastline with its many inlets, harbours, spits, fiords, sounds and estuaries. The complex topography creates a wide variety of coastal marine habitats and also makes it very difficult to measure the length of the coastline accurately – estimates have ranged between 15,000 and 19,000 kilometres.⁴

Offshore tectonic and volcanic activity has created a wide variety of seabed habitats, including seamounts, hydrothermal vents, mud plains and deep canyons. For example, the meeting point of the Pacific and Australian crustal plates is associated with the 10,047 metre deep Kermadec Trench, the volcanic Kermadec Ridge (which is part of the Pacific Ring of Fire) and the Puysegur Trench south-west of New Zealand

(which is up to 6,200 metres deep). South-east of New Zealand the Kaikoura Canyon, created by the movement of the tectonic plates towards each other, is an area of deep water (plunging down to 1,000 metres) unusually close to the coastline.

New Zealand's offshore waters are very deep. The limited availability of nutrients means that in a global context, offshore fishing grounds are relatively unproductive, accounting for less than one per cent of the global catch.⁵ However, the biodiversity of the region is unusually high. The Census of Marine Life's 2010 report on marine biodiversity in New Zealand, which studied marine species found within the 200 nautical mile boundary of New Zealand's exclusive economic zone, identified 17,135 living species, including 4,135 which were held in collections but remained undescribed.⁶

The list includes 148 species of cartilaginous fish, three species of pinnipeds and 43 species of cetaceans (comprising nearly half of the world's cetacean species). Of these cetaceans, nine are baleen whales, 17 are members of the dolphin family, and 12 are species of beaked whale about which little is known. Of New Zealand's 286 bird species, 122 are marine species, or spend some part of their lives in the maritime area. More sea birds breed in New Zealand than anywhere else in the world.

Figure 6.1: New Zealand's marine jurisdiction

Source: Ministry for the Environment



Many marine species yet to be discovered

The large size, geological variety and relative remoteness of New Zealand's marine jurisdiction mean that much of it remains unexplored, especially the 50 per cent of the exclusive economic zone that is deeper than 2,000 metres. It is thus estimated that there are around 17,000 undiscovered marine species in New Zealand's waters.⁷ This would put the country's total biodiversity at equal to, or in excess of, the region covered by the European Register of Marine Species, which is around 5.5 times larger and includes multiple state jurisdictions.⁸

Significant discoveries of previously unknown species are not uncommon in New Zealand. For example, in 2012 seven examples of a 'supergiant' shrimp or amphipod, were discovered deep in the Kermadec Trench. These were around 30 centimetres in length, three times larger than any previously known amphipod.⁹ 'Bioblitzs', where scientists and members of the public work together to undertake a biological survey of an area over a short period of time, can also yield new species. For example, a Bioblitz undertaken in the vicinity of the Wellington Taputeranga Marine Reserve in 2007, resulted in the discovery of new tube anemone, nudibranch and bryozoan species, amongst others.¹⁰

High social and cultural values

The oceans are of particular cultural importance to Māori. The marine area provides kaimoana (seafood) for sustenance, for ceremonial occasions and for trade. For example, tāngata whenu often refer to the Hauraki Gulf as 'pataka kai' or food-basket being "*a place where spiritual and physical sustenance is gained*".¹¹ Many cultural practices are associated with the exercise of kaitiakitanga over the marine area. New opportunities are being provided through the creation of taiāpure and mātaitai which enable traditional fisheries to be managed by tāngata whenua. For example, at the Maketu taiāpure in the Bay of Plenty, kaitiaki have undertaken stock assessment surveys, funded the removal of an invasive starfish species and initiated a breeding and planting programme to restore whitebait.¹²

New Zealanders are more generally ocean-loving people, and many cultural and recreational activities are based around the water. It is estimated that 19.5 per cent of the New Zealand population participates in recreational fishing,¹³ taking an estimated annual catch of 25,000 tonnes.¹⁴ Sport New Zealand's most recent 'Active New Zealand' national monitoring survey indicates that New Zealanders

participate in a range of ocean based sports – including swimming (34.4 per cent), canoeing and kayaking (6.4 per cent), surfing (4.4 per cent), diving (3.7 per cent) and sailing (2.4 per cent).¹⁵ Coastal marine areas, in particular, are popular for their intrinsic natural values and New Zealand is world-renowned for its beautiful coastlines.

High commercial values

Three of the four largest export earners in New Zealand are reliant, at least in part, on marine resources.

Tourism

In the year ending March 2011, tourism was New Zealand's second largest export earner. International tourist expenditure accounted for \$9.7 billion or 16.8 per cent of New Zealand's total export earnings. Total tourism expenditure (including both domestic and international tourism) was \$23 billion dollars, or 8.6 per cent of New Zealand's gross domestic product.¹⁶

Tourism New Zealand's marketing strategy is heavily reliant on the country's clean environment and international perceptions of New Zealand as an Eden-like escape.¹⁷ Coastal and marine activities form a key part of many tourist experiences.¹⁸ In 2007, 111,420 international tourists went dolphin watching and 98,110 went whale watching. Other popular activities include boating (698,380), kayaking (153,166), fishing (120,483) and swimming (104,592).¹⁹

Oil and gas extraction

New Zealand's third largest export earner is oil and gas extraction, which has been undertaken in New Zealand waters since the late 1950s. Activity has been focused off the coast of Taranaki.²⁰ In 2009, nearly 20 million barrels of oil and over 140 billion cubic feet of gas were generated in New Zealand, of which most came from offshore areas. It is believed that the continent of Zealandia is likely to have potential for many more hydrocarbon resources. The National Institute for Water and Atmospheric Research (NIWA) estimates that New Zealand's recoverable petroleum reserves could be around 10 to 20 billion barrels.²¹ The country's oil and gas reserves are highly significant, both in terms of potential export revenues,

and medium term energy security. In recent years, the government has prioritised the growth of the oil and gas sector,²² and this has stimulated exploration activity.

Seafood industry

The seafood industry, including aquaculture, is worth around \$4 billion to the New Zealand economy each year (2009 figures),²³ and is New Zealand's fourth largest export earner. At present, some 600,000 tonnes of seafood is harvested from New Zealand waters each year, and one hundred and thirty of the species found in New Zealand waters are fished commercially. Around 63 per cent of this harvest is comprised of mid and deep water fish, 12 per cent is pelagic fish (that inhabit the water column), 10 per cent is inshore species and 15 per cent is from aquaculture. Aquaculture is currently worth \$320 million per year, and is likely to expand significantly in the future.²⁴

Seabed mining

Seabed mining is a key potential growth area. Activity is currently limited to the extraction of sand from coastal marine areas for use in building construction and beach nourishment projects. However, in recent times there has been growing interest in the possibility of extracting other materials from the seabed. It is estimated that once extracted, they could be worth billions of dollars.

Ironsand found off the west coast of the North Island is one such resource. It is used for steel manufacture domestically and is also exported as a raw material. Ironsand has been mined onshore from the Taranaki coastline for many years, but increasing global prices, make mining it offshore a more economically viable prospect.

Deep water phosphorite nodules may be a valuable source of phosphates, used in fertiliser. They are found at depths of around 400 metres, in sandy silt located within the top 70 centimetres of the seabed. It is estimated that there are around 100 million tonnes of phosphates in the Chatham Rise area, located south-east of New Zealand. There are indications that commercial extraction is realistic and could commence in the next few years.

Gas hydrates, described by NIWA as “*an ice like form of water, with methane gas molecules caught in the ice crystal*”²⁵ are found east of the North Island at the Hikurangi Margin. They could become a significant source of energy in the future, but until recently, it was thought that they would be too difficult to extract.

Seabed massive sulphide deposits typically contain copper, lead, zinc and some silver and gold. They are formed on seamounts, where superheated fluids spurt through thermal chimneys. When the fluid hits the water, it hardens into such deposits. They were first discovered on the Kermadec Arc by NIWA and GNS Science researchers in the 1990s. Since then, several companies have investigated their extraction, and there is the potential for commercial exploitation in the future.²⁶

Significant pressures

The government estimates that about 30 per cent of New Zealand's marine environment is 'experiencing some degree of disturbance from human activities'. The largest impact is thought to be from commercial fishing and trawling.²⁷

Furthermore, land-based activities in catchments discharging into the coastal marine environment are also a key concern.²⁸ Sedimentation caused by changes in land use, sewage discharge, increased nitrogen and phosphorus loading, and heavy metal pollution are believed to be key causes of the degradation of New Zealand's inshore marine environment. All these impacts take place in a context where climate change has the potential to significantly alter New Zealand's marine environment, for example, through species shifting their range and ocean acidification.²⁹

Current management has resulted in some successes but there is evidence that the overall health of New Zealand's marine environments may be in decline. The Royal Society of New Zealand has noted (in respect of New Zealand's biodiversity generally) that "*the past fifty years have seen a substantial and largely irreversible loss of biodiversity. New Zealand's unique endemic biodiversity has similarly seen serious decline – an unknown but large loss of common wealth and natural heritage.*"³⁰ The Ministry for the Environment reported in 2007 that "*of the almost 16,000 known marine species in New Zealand, 444 are listed as threatened*".³¹

Trends in the abundance of keystone marine species reflect the likely overall decline. Keystone species are those which have a disproportionately large effect on their environment relative to their abundance, such as marine mammals, seabirds and sharks.³² Of New Zealand's three endemic marine mammal species and subspecies, the New Zealand sea lion and Maui's dolphin are classified as 'nationally critical' and the Hector's dolphin as 'nationally endangered' by the Department of Conservation.³³ Sixty-two per cent of New Zealand's ocean-going

seabirds are listed as threatened.³⁴ Although two species have shown some signs of recovery in recent times, another seven species have become increasingly threatened.³⁵ Many species of sharks, skates and dogfish are at risk, with the great white shark and basking shark being identified as chronically threatened.³⁶

Declining marine health has been documented on a regional scale: for example, the Hauraki Gulf State of the Environment Report 2011 notes that indicators of rare and threatened fish species, fish diversity, fish size and productivity ‘displayed negative trends’ in the Firth of Thames and most central Gulf areas.³⁷

New Zealand’s fisheries are carefully managed under the quota management system, and thus it is sometimes argued that this means that New Zealand has no need for marine protected areas. However, the system is principally addressed at the management of target stocks rather than the protection of the marine environment as a whole. Furthermore, management of all existing activities in the marine area is hampered by an absence of complete data about the marine environment and the impact that human activity has on it. For example, in 2010, the Ministry for the Environment noted that there was sufficient information to assess fish stocks for 119 of the 633 stocks in the quota management system.³⁸ The long term impacts of activities such as sea-bed trawling, are not well understood.³⁹

The development of new activities such as minerals mining in areas of the marine space which are unique, fragile and little explored, brings with it increased risks that human activity will have unintended consequences. As a result, more than ever, an improved framework for marine protection is required.

Figure 6.2: Summary of reasons why New Zealand needs marine protection

- New Zealand has one of the largest marine jurisdictions in the world
- New Zealand’s marine area has an unusually high biodiversity, and it is believed that a large proportion of the resident marine life is yet to be discovered
- New Zealand’s marine area is very important to New Zealanders, providing for a range of economic, cultural and recreational activities
- The marine environment is experiencing significant pressure from human activity. Key activities include fishing, shipping, aquaculture, oil and gas extraction, sand mining and tourism
- There is growing interest in new extractive activities including ironsand mining off the west coast of the North Island, rock phosphate mining on the Chatham Rise, gas hydrate extraction and seabed massive sulphide mining on seamounts in the Kermadec Arc
- The impacts of anthropogenic pressures on the marine environment are poorly understood, whilst marine biodiversity is declining

Endnotes

- 1 Ministry for the Environment, 2007
- 2 Under article 77 of the United Nations Convention on the Law of the Sea, states can exercise rights over the continental shelf “*for the purpose of exploring it and exploiting its natural resources.*” In comparison, rights over the exclusive economic zone are much broader: article 56 of the Convention provides that states have “*sovereign rights for the purpose of exploring and exploiting, conserving and managing the natural resources, whether living or non living, of the waters superjacent to the seabed and of the seabed and its subsoil, and with regard to other activities for the economic exploitation and exploration of the zone, such as the production of energy from the water, currents and winds.*”
- 3 New Zealand also claims sovereignty over the Ross Sea in Antarctica, as part of the Ross Dependency. However, the terms of the Antarctic Treaty mean that this claim is effectively suspended, and management decisions in relation to the Ross Sea are undertaken by all treaty signatories together. The Convention for the Conservation of Antarctic Marine Living Resources, part of the Antarctic treaty system, governs decision making about environmental protection and resource use.
- 4 Gordon D *et al*, 2010
- 5 Food and Agriculture Organisation of the United Nations, 2004-2012
- 6 Gordon D *et al*, 2010
- 7 Gordon D *et al*, 2010
- 8 Gordon D *et al*, 2010
- 9 Mosher D, 2012
- 10 For example see <http://www.marinebioblitz.wellington.net.nz/node/16> (accessed 11 July 2012)
- 11 Hauraki Gulf Forum, 2004, 13
- 12 Stephenson J *et al*, 2012
- 13 Ministry for the Environment, 2007
- 14 Ministry for Primary Industries, ‘New Zealand fisheries at a glance’, <http://www.fish.govt.nz/en-nz/Publications/Annual+Reports/Annual+Report+2008/New+Zealand+Fisheries+at+a+Glance.htm> (accessed 31 July 2012)
- 15 Sport New Zealand, 2008
- 16 Ministry of Economic Development, 2012
- 17 Ministry for the Environment, 2001
- 18 For example see <http://www.newzealand.com/int/#/water-activities/> (accessed 11 July 2012)
- 19 Ministry of Economic Development, *New Zealand International Visitor Survey 2007*, <http://www.med.govt.nz/sectors-industries/tourism/tourism-research-data/international-visitor-survey> (accessed 31 July 2012)
- 20 National Institute for Water and Atmospheric Research, 2011
- 21 National Institute for Water and Atmospheric Research, 2011
- 22 For example see New Zealand Energy Strategy 2011, <http://static2.stuff.co.nz/files/Govtenergyplan.pdf> (accessed 31 July 2012)
- 23 New Zealand Seafood Industry Council, *Information*, <http://www.seafoodindustry.co.nz/factfile> (accessed 31 July 2012)
- 24 New Zealand Seafood Industry Council, *Information*, <http://wwwseafoodindustry.co.nz/factfile> (accessed 31 July 2012)
- 25 National Institute for Water and Atmospheric Research, 2011
- 26 National Institute for Water and Atmospheric Research, 2011
- 27 New Zealand Government, 2010, 9
- 28 McGinnis M, 2012
- 29 For example see Hall *et al*, 2009
- 30 Royal Society of New Zealand, 2011
- 31 Ministry for the Environment, 2007, 313
- 32 McGinnis M, 2012
- 33 Baker C *et al*, 2009
- 34 Ministry for the Environment, 2007, 313

- 35 New Zealand Government, 2010, 9
- 36 Ministry for the Environment, 2007, 332
- 37 Hauraki Gulf Forum, 2011
- 38 Ministry for the Environment, 2010
- 39 Ministry for the Environment, 2007