Photo: Malcolm Francis, 2004

Photo: Malcolm Francis, 2004

Protecting our seas

Tiakina a Tangaroa

An overview of New Zealand's marine biodiversity conservation and the role of Marine Protected Areas

Photo: Kim Westerskov

Biodiversity
OUR LIVING TREASURE
HE KURA TAIAO

Hon. Chris Carter,
Minister of Conservation

Hon. David Benson-Pope,
Minister of Fisheries

We have become increasingly aware of the exciting diversity of the life in our seas and of the need for its protection.

Photo: Malcolm Francis, 2004

Foreword

New Zealand has an important role to play in the preservation of global biodiversity.

The processes that have shaped our land and surrounding oceans over the aeons have left us in charge of an amazing diversity of life and ecosystems. Much of the focus of nature conservation in New Zealand for the last century has been on the land, where sizeable national parks and reserves have been established. With the advent of scuba diving and the efforts of underwater naturalists such as Wade Doak and Roger Grace, we have become increasingly aware of the exciting diversity of the life in our seas and of the need for its protection.

The Government, as a signatory to the United Nations Convention on Biological Diversity, is committed to maintaining and preserving the natural heritage of our lands and waters.

Towards this, a strategy has been developed for maintaining New Zealand's biodiversity, with a vision to the year 2020.

Marine habitats and ecosystems will be maintained in a healthy, functioning state, and degraded areas allowed to recover. A full range of New Zealand's marine habitats and ecosystems will be protected.

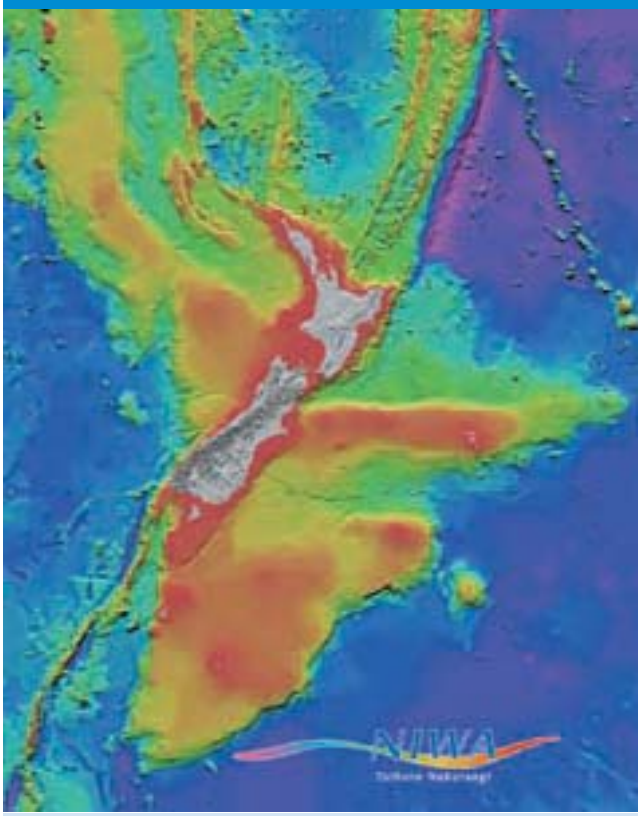
A network of marine reserves and other Marine Protected Areas will be established to protect special and unique sites and also representative areas. The target is to protect 10% of New Zealand's marine environment in this way by 2010. These protected areas will provide an invaluable store of genetic diversity that will contribute to maintaining the health of the wider marine ecosystem. They will also provide unique opportunities for recreation, marine tourism, scientific research and education.

In the 90% of the sea that will lie outside the protected areas, sustainable fisheries management will be the key means of maintaining productive and healthy marine ecosystems. But human activities on land can adversely affect the sea through pollution and increased sedimentation from run off. Dealing with these problems requires concerted action from local councils, farmers, foresters, property developers, road makers, and you and I being careful about what we tip down the drains in our backyard. The sea and land are connected.

New Zealand is one of the most maritime countries on earth. The relationship we have with the sea is an important part of defining who we are as a people. Whether our connection with the sea is from gathering kai moana for a hangi, catching a snapper, obtaining a living from fishing, shipping or marine tourism, or from simply enjoying a beach picnic or a snorkel along a rocky reef, Kiwis share a common love and respect for the oceans that surround us.

Hon. Chris Carter, Minister of Conservation
Hon. David Benson-Pope, Minister of Fisheries

New Zealand's marine environment covers some **410 million hectares of ocean** and our Exclusive Economic Zone is the fourth largest in the world.



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New Zealand's incredible marine biodiversity

Biological diversity or "Biodiversity" for short describes the variety of all biological life – plants, animals, fungi, and microorganisms – the genes they contain and the ecosystems on land or in water where they live. It is a term that encompasses the diversity of life on earth.

New Zealand has a particularly rich and complex seascape; a consequence of its extension over 30° of latitude, its position on an active plate boundary with all the consequent folding, faulting and volcanism, and its positioning in relation to major subtropical and subantarctic water masses and surface and deep water current systems.

New Zealand's marine environment covers some 410 million hectares of ocean and our Exclusive Economic Zone is the fourth largest in the world.

More than 15,000 marine species have been found in the sea, based on current knowledge, we predict that New Zealand could have up to 10% of the global marine biodiversity represented within the waters under its jurisdiction.

Our isolation in the south-west Pacific means that in some marine groups there is a particularly high proportion of species only found in New Zealand. This is particularly high amongst:

Triplefins (small reef fish)	100%
Sponges	90%
Molluscs (shellfish)	86%
Bryozoans (lace corals)	60%
Seaweeds	40%

And amongst our mammals, the New Zealand sea lion and Maui's and Hector's dolphin are found nowhere else in the world.

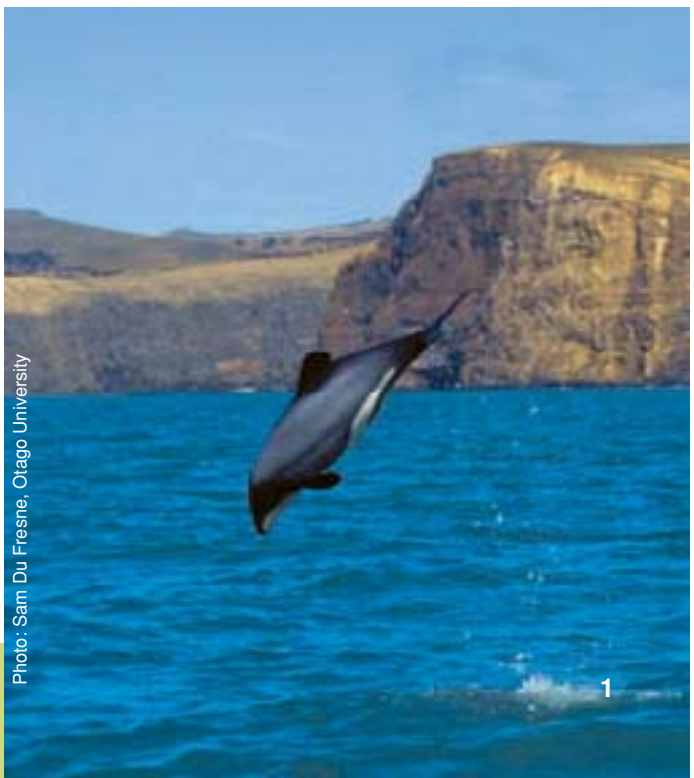


Photo: Sam Du Fresne, Otago University

New Zealand is also visited by a number of migratory species, and provides habitat that is critical to the long-term viability of some of these; including some of our whales, and sea birds like albatrosses and petrels.

This wide variety in marine seascapes and diversity of habitats means that New Zealand has a great richness of unique species.

The second deepest part of the Earth's ocean is found in the Kermadec Trench, north-east of mainland New Zealand; as yet its fauna is almost completely unknown. The shallow, warm sub-tropical waters around the Kermadec Islands themselves support large colonies of plate and soft corals and populations of the rare spotted black groper as well as a species of giant sex-changing limpet which grows as big as your hand.

Extending north-east and south-west of the Kermadecs are many steep-sided undersea volcanoes or 'seamounts' that never made it above the sea surface. Some slopes comprise recently extruded material with little marine life, while others have developed unique faunas different from adjacent seamounts. Seamounts are also found around much of New Zealand, though not all have been formed by volcanic action. Around the active hydrothermal vents of some seamounts, highly specialised marine life can be found.

The north-eastern coastline of North Island has many harbours, estuaries, and sandy bays interspersed with rocky headlands and offshore islands. Along the muddy margins of the harbours and estuaries are forests of mangrove. In the shallow harbour flats are meadows of sea-grasses, and banks of filter feeding cockles and pipi. These are important nursery grounds for juvenile fish and provide rich feeding grounds for coastal fishes and sea birds.

New Zealand is also visited by a number of migratory species, and provides habitat that is critical to the long-term viability of some of these; including some of our whales, and seabirds like albatrosses and petrels.

Photo: Kim Westerskov

Photo: NIWA 2004

Photo: NIWA 2004

Undersea volcanoes or 'seamounts' have developed unique faunas

Photo: T. and J. Enderby

In the shallow harbour flats are meadows of sea-grasses, and banks of filter feeding cockles and pipi. These are important nursery grounds for juvenile fish and provide rich feeding grounds for coastal fishes and sea birds.

Of all the offshore islands, none are as remarkable as the steep-sided Poor Knights Islands, lying 25 kilometres off the east coast of Northland and in the path of the warm East Auckland Current. The islands support a unique mix of sub-tropical and temperate species, in a spectacular seascape of caves, archways, cliff faces and pinnacles bathed in clear water. Densely packed schools of plankton-eating fishes crowd the archways, and mosaics of algae and invertebrates encrust the cliff faces.

The margin of New Zealand's continental shelf is indented by over a hundred canyons. Some of these steep-sided features are only a few kilometres long, while others like the Cook Strait and Kaikoura Canyons are major features of the seascape and bring deep water close to the New Zealand mainland. Vertical mixing of the water column and associated increased productivity often occurs in and around canyons, helping to sustain a more varied and abundant mid-water and bottom dwelling fauna than the surrounding continental shelf. This in turn attracts large predators like giant squid and sperm whales.

Fiordland is a place of seascapes unequalled in Australasia. Sheer rock walls, carved by glaciers, plunge up to 450 metres below the surface. A yellow tinted surface freshwater layer, a consequence of the high rainfall percolating through decaying leaf litter, greatly reduces the underwater light. So species like black coral, red coral and glass sponges, that are usually only found in deep water, can be found close to the surface. Nowhere else in the world are black corals found in such abundance, or so close to the surface.

Thus we have a wide variety of marine habitats inhabited by an estimated 65,000 species, many of which are unique to New Zealand, making it a hotspot for marine biodiversity worldwide.

Photo: Malcolm Francis, 2004

Photo: Malcolm Francis, 2004

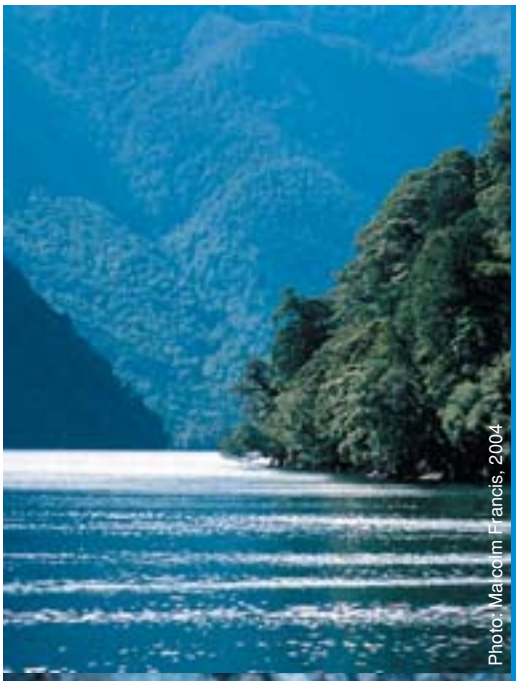


Photo: Malcolm Francis, 2004

Photo: Ken Grange, NIWA 2004

Sheer rock walls, carved by glaciers, plunge up to 450 metres below the surface. A yellow tinted surface freshwater layer, greatly reduces the underwater light. **Nowhere else in the world are black corals found in such abundance, or so close to the surface.**

Fiordland is a place of seascapes unequalled in Australasia.

A coordinated approach

Many different groups have a stake in New Zealand's coastal and marine environment, and responsibilities for its management are shared between a range of central and local government agencies. Some significant agencies and their responsibilities include:

Department of Conservation

Responsible for managing protected areas and species, under the Marine Reserves, Wildlife, Conservation, and Marine Mammal Protection Acts. Together with regional councils, DoC also has a role in the management of the coastal marine area (excluding fishing and many significant fishing impacts) under the Resource Management Act.

Ministry of Fisheries

Responsible for managing fishing, its effects, and fisheries resources under the Fisheries Act, whose jurisdiction extends out to 200 nautical miles – the edge of our Exclusive Economic Zone (EEZ).

Regional Councils

Responsible for managing some land use activities and water quality, and together with DoC also manage the coastal marine area, including aquaculture. All these responsibilities fall under the Resource Management Act, which covers our territorial sea area extending out to 12 nautical miles.

Ministry of Agriculture and Forestry

Responsible for minimising the risks posed by vessels accidentally transporting exotic marine life into or around New Zealand waters. This is done under the Biosecurity Act.

Ministry of Foreign Affairs and Trade

Responsible for international agreements to maintain biodiversity in 'high seas' areas, outside of nations' EEZs.

Ministry for the Environment

Responsible for developing an Oceans Policy for New Zealand, to ensure integrated and consistent management of the oceans within New Zealand's jurisdiction. This is a cross-government exercise, covering all aspects of oceans management, out to the edge of the Exclusive Economic Zone and the Continental Shelf beyond.

Human impacts on marine biodiversity

Aside from global climate change, human activities alter the biodiversity of our surrounding oceans in three key ways: through harvesting seafoods, land-based sources of sedimentation and pollution, and through the introduction of marine pests.

Although our coastal waters and habitats are generally in good condition by international standards, they are under stress in some areas – particularly estuaries near towns and cities, and inshore areas near the mouths of large rivers.

Some 390 million tonnes of sediment are washed from the mainland into the sea each year. While sedimentation is part of the earth's natural cycles, poor land-use management practices can have potentially dramatic impacts on the productivity and biodiversity of estuarine and inshore habitats, as demonstrated by the impacts of Cyclone Bola in the East Cape area in the late 1980's.

Point source discharges and contaminated runoff also have impacts. Many estuarine ecosystems have been lost or damaged through land reclamation, encroachment from land development, and other human activities.

Shellfish and some other marine invertebrates remain vulnerable to poaching and localised overharvest, and to habitat degradation caused by sediment from rivers, by pollution, by changes in sea temperatures and by potentially destructive fishing practices like bottom trawling and dredging.

Estuarine and other coastal ecosystems are also threatened by the invasion of exotic species like the Asian date mussel and Undaria seaweed. Such species are spread by hull encrustations on vessels, the transportation of ballast water by vessels and marine farming equipment being transferred from one marine area to another.

Many coastal fish stocks were heavily reduced by overfishing in the 1970s. The fisheries Quota Management System was introduced in 1986 to address this by controlling the commercial catch for all the main fish stocks in NZs fisheries waters. It was introduced to prevent overfishing and improve the economic efficiency of the fishing industry.

Human activities alter the biodiversity of our surrounding oceans in three key ways: through harvesting seafoods, land-based sources of sedimentation and pollution, and through the introduction of marine pests.

Hunting of marine mammals was banned in New Zealand waters in the latter half of the 20th century. Since then, most whale and dolphin species are recovering or at least holding their own. Fur seal numbers appear to be rebuilding in some places, although their populations are a fraction of their original size. Fisheries by-kill (capture of non-target species) remains a problem for some species, such as Hector's dolphin, New Zealand sea lion, and a number of seabirds, although programmes are underway to reduce kills of these species.

Many of our marine species spend part of their lives in international waters, particularly in the southern ocean, so the state of these areas is important to New Zealand's marine biodiversity. New Zealand also has interests in maintaining biodiversity in international waters, for example in the marine area around New Zealand's Antarctic territory – the Ross Dependency.

Photo: NIWA, 2004

Whaingaroa Harbour estuary area. Fenceline shows the impact of stock (left) and no stock impact (right)

Photo: Karen Baird, Department of Conservation *Te Papa Atawhai* 2004

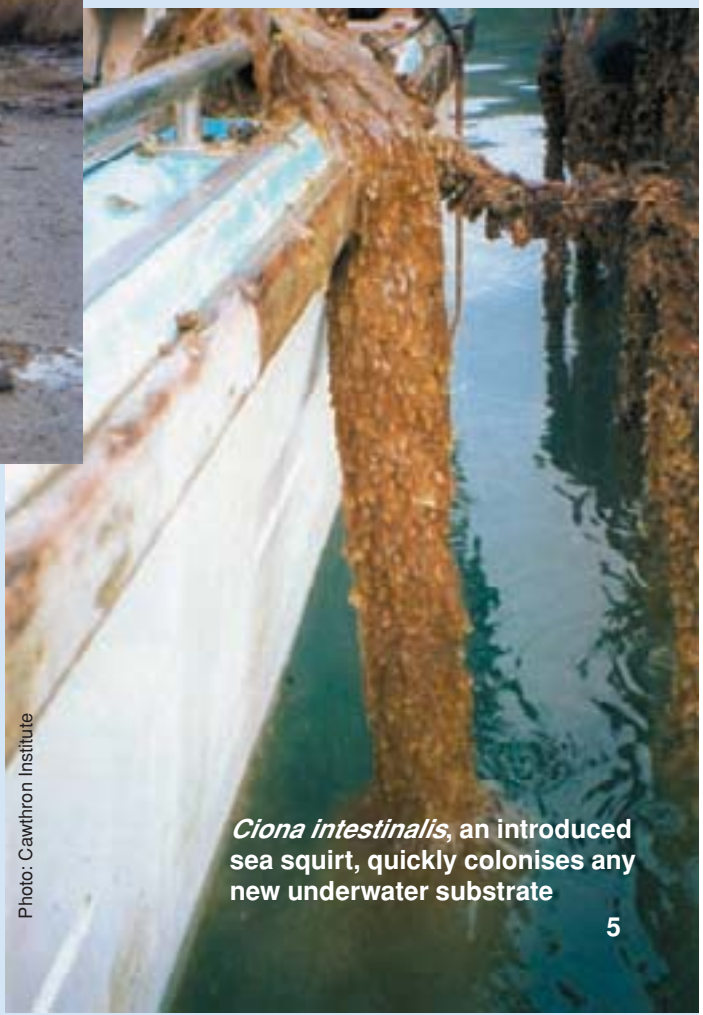


Photo: Cawthron Institute

***Ciona intestinalis*, an introduced sea squirt, quickly colonises any new underwater substrate**

Protecting biodiversity

Our growing understanding of ecosystem issues confirms that an integrated approach to fisheries and environmental management is needed to conserve marine biodiversity.

Fisheries management

In the 1970s, open access to fishery resources and emphasis on increasing commercial harvest began to impact on fish stocks and returns to fishers.

The Quota Management System was introduced in 1986, to improve New Zealand's management of fisheries resources. Key to this is the system's requirement that fish stocks are maintained at a level that produces a maximum sustainable harvest.

Through the Fisheries Act, there are a range of tools to conserve marine areas and marine life, including seasonal area closures (e.g. over spawning grounds), restrictions on certain fishing techniques, partial closures to commercial fishing, as well as taiapure and mataitai (which allow for customary harvest).

Marine Reserves

Marine reserves protect an area in as natural a state as possible, and are administered under the Marine Reserves Act. Marine reserves provide the most comprehensive and long-term means of legal protection afforded to marine areas in New Zealand. Activities permitted in marine reserves can be highly regulated and typically exclude any means of harvest, disturbance, structures, and discharge. Marine reserves provide excellent opportunities for recreation and marine education, and play a key role in research of marine organisms in relatively undisturbed natural habitats.

They can be seen as similar to a marine version of a National Park, in the way they protect unique, distinctive, and representative examples of marine habitats and their dependant organisms.

The Department of Conservation manages marine reserves and is responsible for marking boundaries, law enforcement, issuing scientific permits and monitoring environmental changes.

Marine Mammal Sanctuaries

Marine Mammal Sanctuaries established under the Marine Mammal Protection Act are managed by DoC. Particular restrictions can be placed on activities in sanctuaries in order to protect dolphins, whales, sea lions and seals.

Other Protected Areas

Marine Parks (created under their own Acts of Parliament), and submarine Cable Protection Zones may be able to protect areas of coastal habitat and marine ecosystems.

In addition, the Resource Management Act enables Regional Councils to identify and protect areas of significant conservation value in the marine environment primarily through the practice of zoning and the provision of rules to control the effects of activities.

Cathedral Cove Marine Reserve

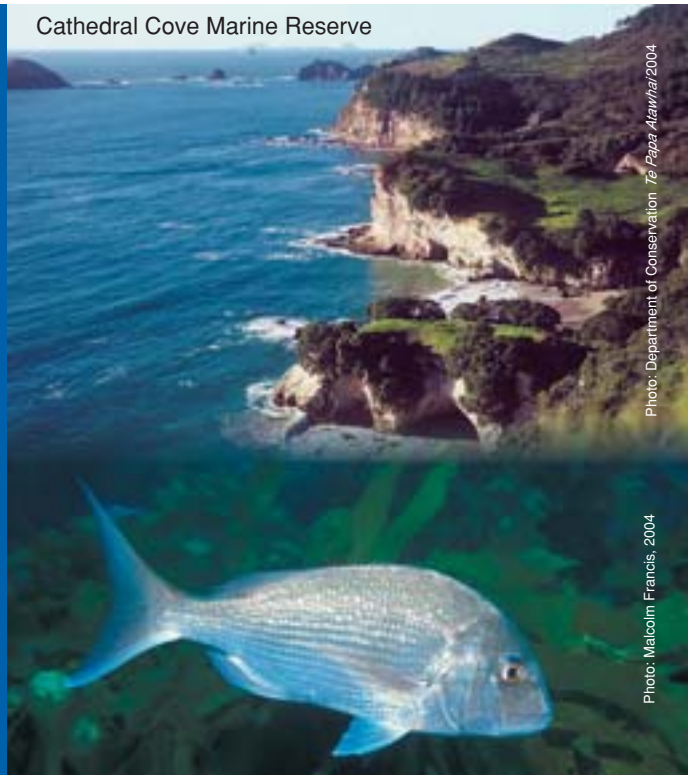


Photo: Department of Conservation *Te Papa Atawhai* 2004

Photo: Malcolm Francis, 2004

Marine reserves and other areas of marine protection
as at May 2005

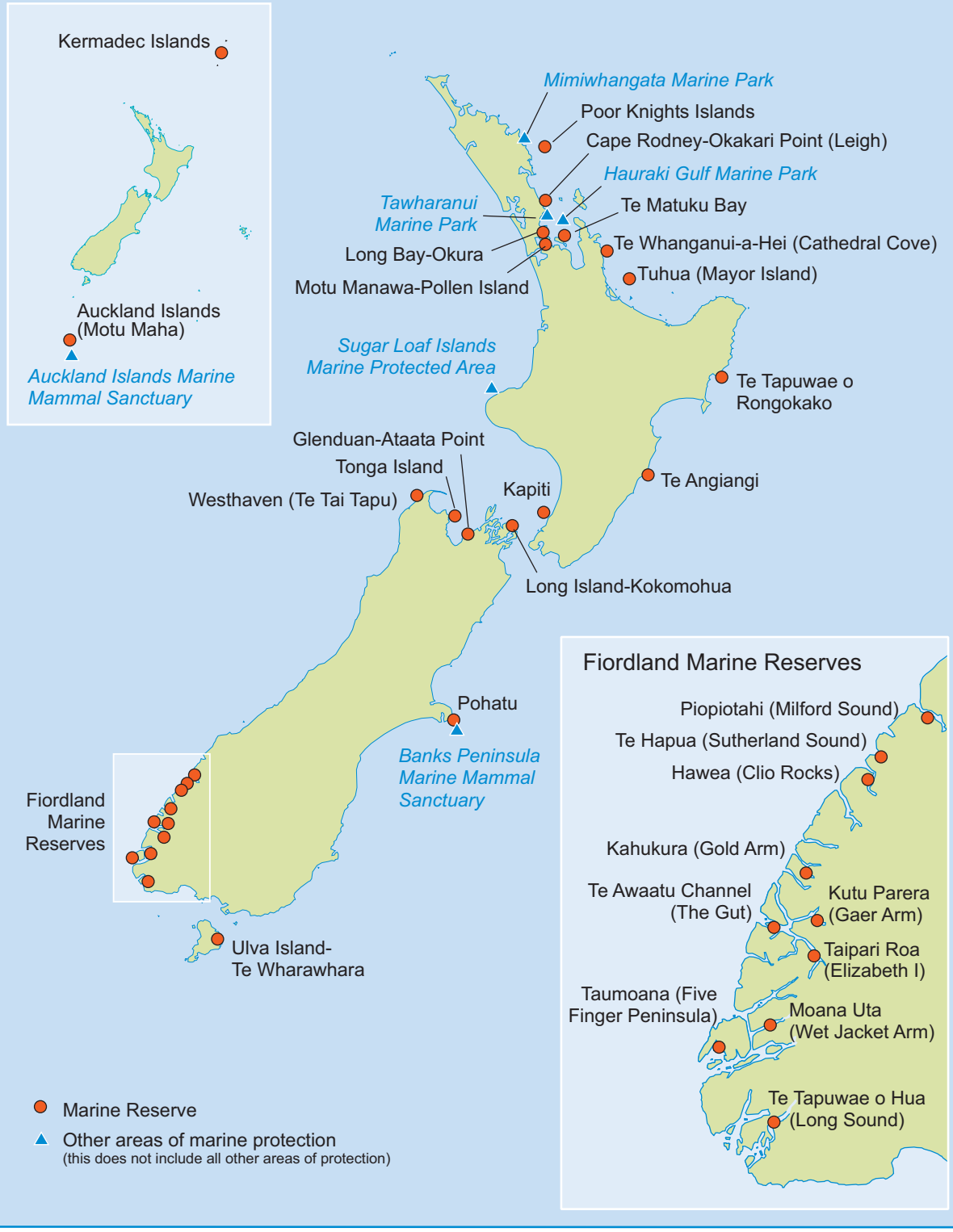



Photo: NIWA 2004


Photo: Oli Floerl, NIWA 2004


Photo: NIWA 2004

International agreements

In response to increasing global pressure on marine resources, international management regimes are being developed. The United Nations Convention on the Law of the Sea (UNCLOS) was signed in 1982 and provides a standard international regime for ocean spaces including the territorial sea, the EEZ (which had previously been a global resource), and the continental shelf. UNCLOS provides for a sustained yield fisheries regime, as well as the protection of the marine environment.

Further agreements have added to New Zealand's marine responsibilities: through our signing of the United Nations Fish Stocks Agreement (providing a framework for managing fish stocks that are migratory or extend beyond nations' EEZs); through regional fisheries agreements; and through conservation agreements like the Convention for the Conservation of Antarctic Marine Living Resources, which covers the Southern Ocean, and through the Convention on Biological Diversity.

Only a limited number of marine species are specifically protected under law – marine mammals, most seabirds, spotted black groper, marine reptiles, black and red corals.

Protected species

Only a limited number of marine species are specifically protected under law: marine mammals, most seabirds, and a number of other species (including spotted black groper, marine reptiles, black and red corals).


Photo: Malcolm Francis, 2004

Maintaining water quality

The relationship between land use and the sea can be direct and obvious, as with the impact of land clearance on increased rates of sedimentation in estuaries and sheltered waters. The effects of land use on coastal marine ecosystems can also be subtle, as is usually the case with the impact of pollution, pesticides and fertilisers.

Regional Councils address these threats through their Regional Plans, which control the effects of land use practices.

Many councils have begun work with their stakeholders to improve water quality by encouraging good land use practices, like planting buffer zones alongside waterways to reduce sediment and nutrient runoff.

For example, in the Whaingaroa (Raglan) Harbour, community groups and Environment Waikato have worked together to help farmers plant and fence harbour and stream margins, which has dramatically improved harbour health and biodiversity.

Maintaining biosecurity

New Zealand has unique marine plants and animals, and a special advantage because we have fewer introduced organisms than many other countries.

We face a constant danger that exotic species could slip into New Zealand waters via fouling on vessel hulls or through the discharge of ballast water (carried in the base of ships for stability).

Already, scientists have listed 148 marine organisms that have been introduced accidentally – 70 per cent of which probably arrived as fouling. Despite the use of anti-fouling paint, unwanted organisms continue to hitch a ride on ships' hulls.

The Ministry of Agriculture and Forestry works with stakeholders to minimise the risks posed by fouled hulls, through a combination of regulatory and voluntary measures, and public education.

Better Understanding

Both the Department of Conservation and the Ministry of Fisheries are involved in research to improve understanding of New Zealand's marine biodiversity and how it can be protected.

This includes: classifying and characterising marine habitats, developing an ecosystem-scale understanding of fisheries management, investigating nearshore functional ecology and terrestrial effects like sedimentation and pollution, and protected species management.

Protecting special or representative marine habitats will 'bank' some of our biological wealth as an investment for future generations.

Marine Protected Areas

As part of the NZ Biodiversity Strategy, the government is committed to protecting rare and significant habitats, ecosystems, and species, as well as a range of areas representative of the more common coastal, offshore and deep water habitats and their communities.

To this end, government has developed a Marine Protected Areas policy, designed to drive the creation of a network of Marine Protected Areas (MPAs) across our EEZ.

This network can be seen as somewhat similar to to our land-based Protected Natural Areas network.

Protecting special or representative marine habitats will 'bank' some of our biological wealth as an investment for future generations.

Government policy defines a MPA as "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 or ecosystem level in a healthy functioning state".

Some sites selected as part of a MPA network will already be in a near-pristine state; others may have been impacted by a range of human activities, and need some recovery.

Photo: Malcolm Francis, 2004

Photo: Malcolm Francis, 2004

Closing areas to potentially destructive fishing practices like bottom trawling or dredging can protect sea-floor habitats and the creatures that live there.

Photo: NIWA 2004

Marine reserves, can protect significant or representative areas, restore habitats and rebuild food chains broken by the removal of highly sought-after species.

Biodiversity benefits of MPAs

Closing areas to potentially destructive fishing practices like bottom trawling or dredging can protect sea-floor habitats and the creatures that live there. Such closures made under the Fisheries Acts already protect certain seamount communities, and some coastal bryozoan beds.

Complete fishing closure, such as with marine reserves, can protect significant or representative areas, restore habitats and rebuild food chains broken by the removal of highly sought-after species.

A MPA can also address the effects of fishing on the abundance of non-target (by-kill) species, as is the case with marine mammal sanctuaries.

Marine environments are highly interconnected and currents will carry larvae and eggs produced in a MPA out into adjacent waters and across many (sometimes hundreds of) kilometres of ocean.

Research shows that within marine reserves, some heavily-fished species like snapper, rock lobster and blue cod grow larger and become more abundant. Because larger fish produce far more eggs than an equivalent weight of smaller fish, MPAs may be a useful management tool where egg production is constraining population growth of a species.

One role that these larger fish play lies in preserving genetic diversity. Over generations, fishing pressure can sometimes end up selecting for fish that grow slower and mature smaller: fish that grow quickly and mature at a larger size are removed more frequently before they breed, while fish that mature smaller end up dominating the gene pool. The fact that MPAs can harbour larger fish that contribute their genes to the wider gene pool may help offset this effect. Fisheries restrictions, like maximum size limits, can also help achieve this.

Photo: Malcolm Francis, 2004

Example: Restoring a food chain

The Cape Rodney – Okakari Point (Leigh) Marine Reserve is the oldest in New Zealand, and has been the site of several long-term studies that document gradual but pronounced habitat regeneration.

In 1978, the Leigh Marine Reserve was classified into various habitat types. One habitat – which comprised 30% of the rocky reef at that time – was termed the 'urchin barrens'. Here, heavy grazing by sea urchins had removed virtually all seaweed. Large seaweeds like kelp were absent, and the small encrusting algae known as pink paint algae dominated the seabed. Experimental sea urchin removals showed that urchins were indeed responsible for keeping the habitat in this state.

Before the reserve was established, local fishing pressure on species like snapper and rock lobster that eat sea urchins had allowed urchins to increase to unusually high densities. With the reserve established, the numbers of these predators increased, thereby slowly reducing urchin densities. Consequently, kelp started to re-establish in the reserve.

Subsequent habitat mapping spanning 20 years of protection has shown the 'urchin barrens' have disappeared (see figure below). Seaweed communities and their associated fauna regenerated, and reef habitats became quite different in the reserve compared to non-reserve sites where urchin-grazed areas persisted. Primary productivity of kelp within the marine reserve is now estimated to be as much as 58% greater than in areas outside.

As the abundance of the dominant urchin predators has remained high at reserve sites compared to non-reserve sites, the macroalgal forests and other indirect benthic effects are likely to persist in the Leigh Marine Reserve.

While these changes have been observed at Leigh, one cannot assume this extent of change will occur everywhere a Marine Reserve is created – as many habitats chosen for the MPA network will be in places that have been less affected by fishing.

Photo: Malcolm Francis, 2004

Photo: Steve Mercer, NIWA 2004

Turfing algae habitat increased

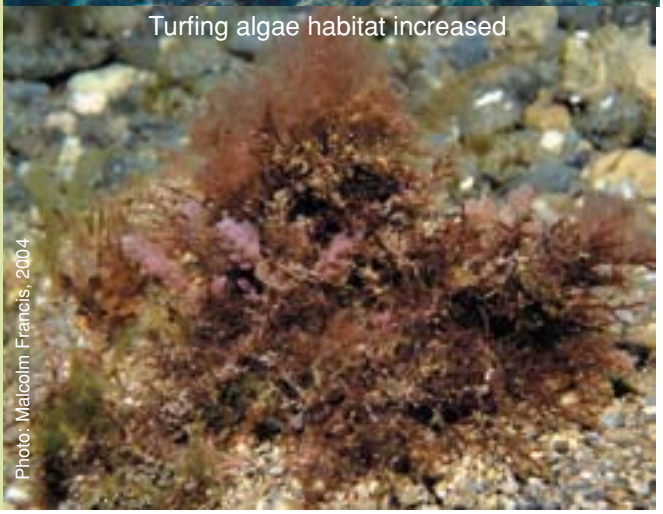
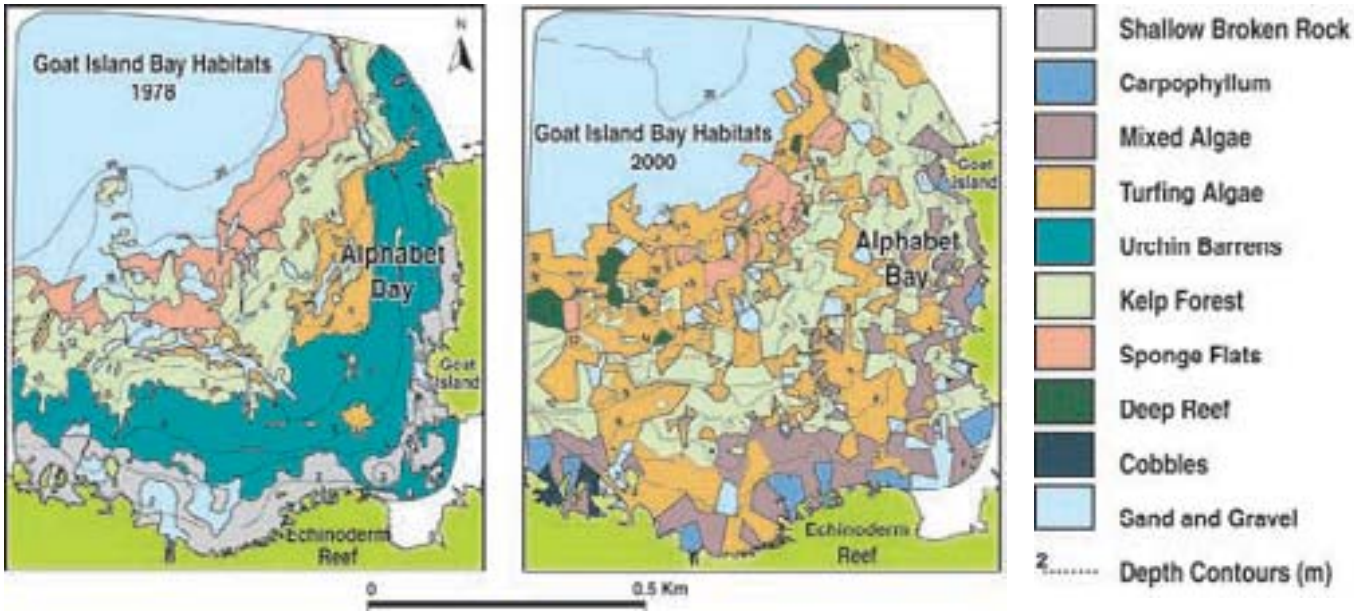


Photo: Malcolm Francis, 2004



Map: Darren Parsons, 2004

Photo: Sean Handley, NIWA 2004

Example: Increase in size and egg production

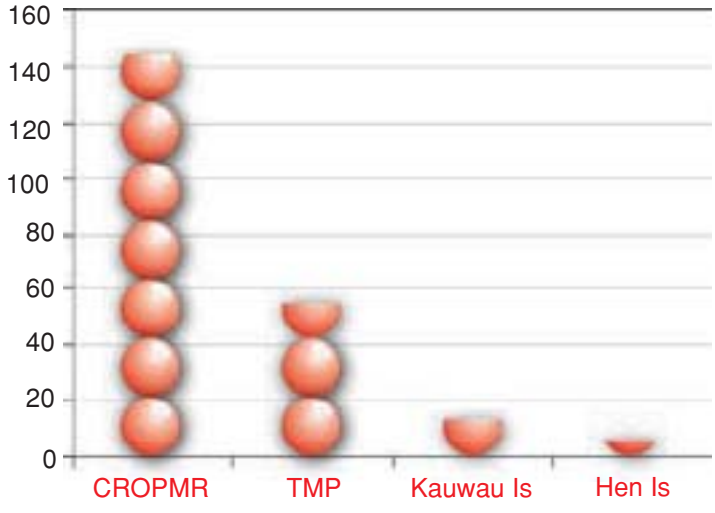
Studies of rock lobsters, or crayfish, illustrate the potential contribution that protected populations can make to the regional production of eggs and larvae of otherwise exploited species.

A comparison was made between protected lobster populations within Cape Rodney – Okakari Point (Leigh) Marine Reserve and Tawharanui Marine Park (which is also a 'no-take' area) and two populations heavily exploited by commercial and recreational fishers at Kawau and Hen Islands. Divers counted and estimated the size of every lobster within a total area of one hectare of suitable rocky reef at each location.

They found that more large legal-sized females lived within the two protected areas, while the two fished areas had significantly fewer large females.

A direct consequence of there being more and larger female lobsters within the protected populations is that their total estimated egg production per hectare of reef (see bottom chart) was on average 10 (range 4 – 24) times higher than the fished populations. Another way of looking at this is that the egg production of lobsters within the 5 km long Leigh Marine Reserve is estimated as similar to the egg production along 76 km of heavily fished rocky coastline. Similar results have been found in other New Zealand reserves. Fishing restrictions that protect larger individuals of a target species may also be useful for maintaining a viable spawning stock as long as fishing mortality enables sufficient individuals to survive to this size.

Rock lobster egg production (millions) per hectare of reef in two MPA's and two fished areas in north-eastern New Zealand



CROPMR = Cape Rodney to Okakari Point Marine Reserve
TMP = Tawharanui Marine Park

Graph: NIWA, 2005

Example: Increase in population density

A number of studies documenting population density inside and outside of 'no-take' marine reserves have been carried out. The majority of these studies indicate that marine reserves increase the abundance of species previously targeted by fishers.

A two-year study of snapper density in three northern protected areas clearly demonstrates population density increase. Snapper is heavily exploited by both commercial and recreational fishers. The three MPAs which had been established for varying lengths of time were sampled by baited underwater video (BUV). Estimates of relative abundance, size, biomass, and egg production were obtained inside and outside of the three MPAs during spring and autumn each year. Egg production was estimated from existing data relating number of eggs produced to size of female fish.

This study demonstrated that relative total abundance, biomass and estimated egg production were all greater within reserves than in adjacent fished areas. Legal sized fish were also estimated to be more abundant in areas afforded protection than in fished areas, and estimated egg production was greater.

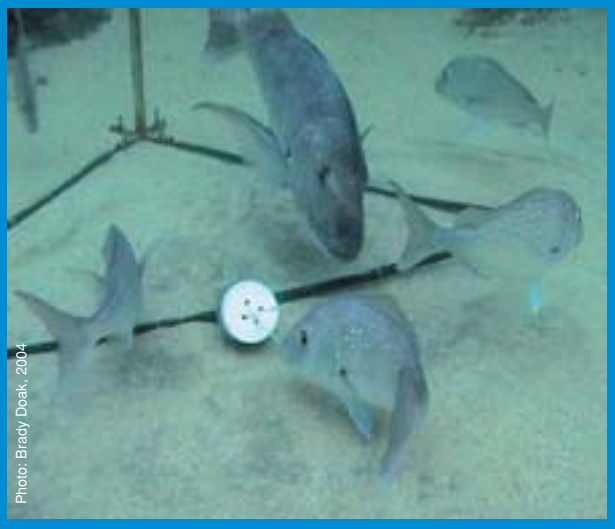
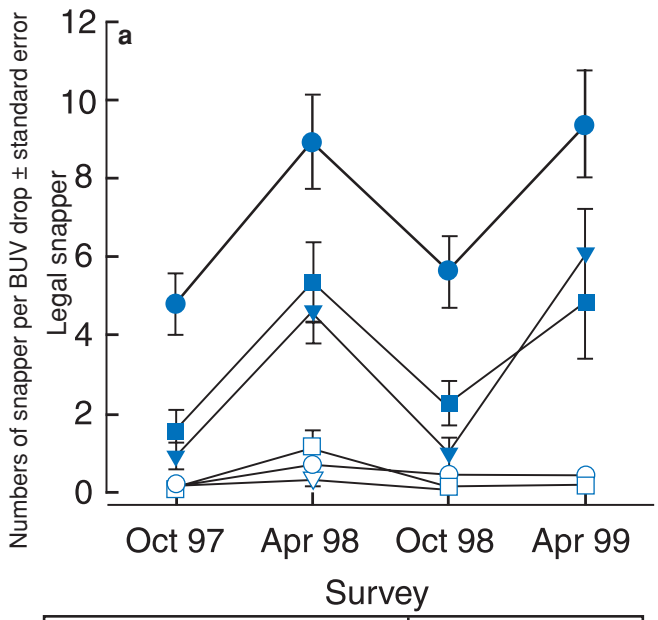


Photo: Brady Doak, 2004

Snapper attracted to the baited video camera

Estimates of relative abundance of snapper at protected and fished sites in NE New Zealand



Mean reserve (filled symbols) and non-reserve (open symbols) snapper *Pagrus auratus* numerical relative density at Leigh, Hahei and Tawharanui from November 1997 to April 1999.

(a) Fish > minimum legal size (LEGsna)

Leigh
Hahei
Tawharanui

Graph: T.J. Willis, R.B. Millar & R.C. Babcock. 2003. Protection of exploited fish in temperate regions: high density and biomass of snapper *Pagrus auratus* (Sparidae) in northern New Zealand marine reserves. Journal of Applied Ecology 40: 214-227, Blackwell Publishing.

Designing a MPA network

The first stage in designing an EEZ–wide network of MPAs lies in describing and classifying the different ecosystems and habitats.

Following this, areas can be identified that are rare, have special significance, or are representative of more common habitats.

Something that must be taken into account is that many marine species have complex life cycles, with a larval phase that is carried by ocean currents, and juvenile and adult phases that may be free-swimming, bottom-dwelling or directly attached to the sea bed.

Also, species differ in the degree to which they stay in an area over time, for example paua live their lives within a small area; kahawai do not.

So the larger the MPA the greater the range of species that will be protected. However, the choice will have to be made about what size MPA is practical in a given situation.

Photo: NIWA, 2004

Areas can be identified that are rare, have special significance, or are representative of more common habitats.

Photo: NIWA, 2004

Photo: NIWA, 2004

Community Involvement

The government encourages community participation in all aspects of marine protection.

Visit the Department of Conservation website **www.doc.govt.nz** to keep up with the Marine Protected Areas policy and for other information about marine protection.

Visit the Biodiversity website **www.biodiversity.govt.nz** to read the government's approach to maintaining and recovering our marine biodiversity.

Visit the Ministry of Fisheries website **www.fish.govt.nz** to keep up with fisheries management and marine protection.

Visit the Ministry for the Environment website **www.mfe.govt.nz** for information on local authority initiatives in water quality and land use practices, and for information on the development of a New Zealand Oceans Policy.

Visit the Ministry for Agriculture and Forestry website **www.maf.govt.nz** for information on marine biosecurity.

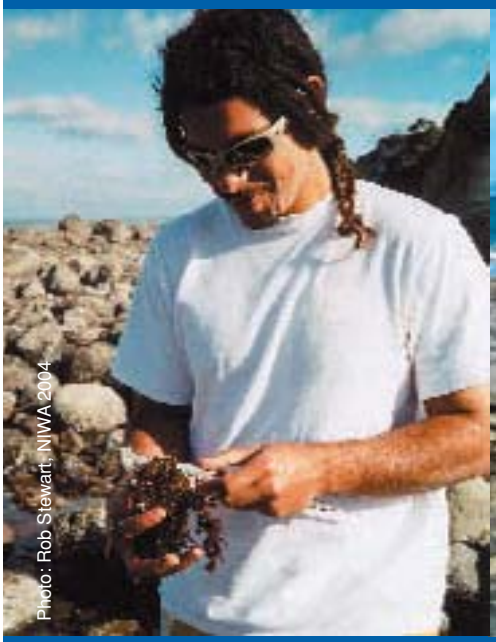


Photo: Rob Stewart, NIWA 2004

Photo: Annie Wheeler, Department of Conservation *Te Papa Atawhai* 2004

Photo: P. Thompson

Department of Conservation
Te Papa Atawhai

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