



THE KERMADECS

“An Oasis in Our Ocean”



THE KERMADECS
**YOUR OCEAN
SANCTUARY**



Forest & Bird
GIVING NATURE A VOICE

THE KERMADECS



● (One of) the last pristine sites left in the ocean ●

National Geographic & Census of Marine Life

Your Ocean Sanctuary: Remote and Remarkable

New Zealand has the chance to demonstrate its leadership in marine protection by creating a large scale marine reserve, a Kermadec Ocean Sanctuary, to fully protect the extent of the Kermadec marine environment. The sanctuary will surround the remote sub-tropical Kermadec Islands and extend to the boundaries of our Exclusive Economic Zone (EEZ) out to 200 nautical miles.

A Kermadec Ocean Sanctuary will be one of the world's largest no-take marine reserves and offer complete protection for its remarkable geology, biology and serve as a resource for further scientific discovery.

The Kermadec region is remarkable and one of the most complex deep-sea marine habitats on Earth. It is the only part of New Zealand where tropical, sub-tropical and temperate species of birds, whales, dolphins, turtles, fishes, corals and other marine invertebrates live together. The region is an important foraging ground and migratory pathway through the Pacific for a wide range of species. The deep water environments of the region are host to some very specialised animals, some unique to the region.

The Kermadec Arc is the longest underwater volcanic arc on the planet. This geologically active region with its submarine volcanoes and active hydrothermal vents also includes the Kermadec Trench, one of the deepest submarine trenches on the planet.

New Zealand's 4.1 million square kilometre EEZ is almost 15.4 times larger than New Zealand's land mass. We have the fourth largest EEZ in the world. Currently less than one per cent of this area is in full protection. There is a globally recognised need to safeguard large unspoiled marine sites. The only areas of full protection for New Zealand's marine environment are within our territorial seas, or 12 nautical mile limit. Creating a 620,000 square kilometre Kermadec Ocean Sanctuary to the boundaries of our EEZ will expand New Zealand's full marine protection to 15 per cent and will be a strong statement to the world of New Zealand's commitment to the marine environment.

The Kermadec Islands were once a stepping stone for early Polynesian voyagers on their long migrations to and from Aotearoa. The islands have been inhabited intermittently by European settlers, WWII coast-watchers and scientific explorers. A meteorological station was established there in 1937 and the Department of Conservation has managed the islands since 1987.

The Kermadec region is in a near pristine state, protected up to now by its isolation. But it needs protection from the growing pressures of increased human impacts on the environment, to ensure we retain its value for the future. This is a significant place for our connection to the Pacific, our people and the animals and plants that live in and traverse these waters above and below.

● I woke up to a 360 degree view with no land in sight. No land and 10 kilometres to the bottom of the ocean. I felt small. Sharks and stingrays circling around us! Looking down into this deep ocean and seeing all this life, I had never had that sense of an untouched place before. I felt like the first person there, fresh, clean, as opposed to everywhere else! A no-man's land. ●

Felix Bornholdt – student voyager, Young Blake Expedition to the Kermadecs.

ACTIVE & ALIVE

Black smokers in the Kermadecs are as active and impressive as anywhere on the planet

Malcolm Clark – marine ecologist, NIWA Taihoro Nukurangi



When scientists first saw the fuzzy photos from video in 1998, it was like seeing moon landing images. These are special communities of animals that are in a pristine state. If you don't go you don't learn, and every time we go and everywhere we look we find something new. It is the most exciting area to investigate the deep sea in New Zealand, period!

Ashley Rowden – marine benthic ecologist, NIWA Taihoro Nukurangi

The Kermadec region is geologically highly active and has one of the most complex areas of seafloor in the world. Here the tectonic plate boundary where the Pacific plate dives under the Australian plate gives rise to the actively volcanic Kermadec Ridge and Arc, a 1200-kilometre portion of the longest submarine arc of volcanoes in the world, stretching from the Bay of Plenty to Tonga. About two-thirds of the volcanoes along the Kermadec Arc have hydrothermally active areas.

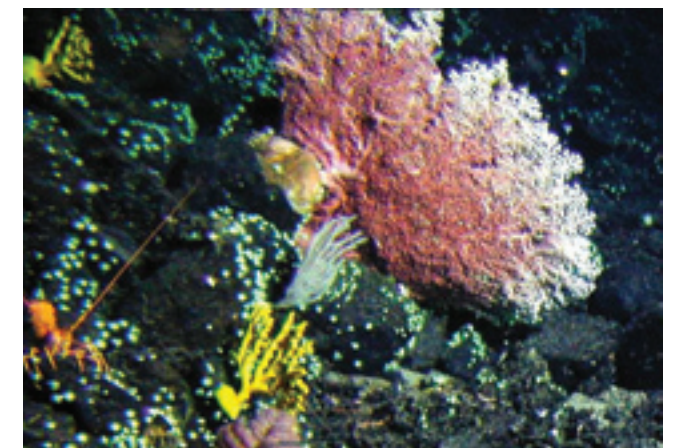
The volatile hydrothermal vents produce extreme conditions that appear inhospitable to living creatures. Surprisingly, a community of life has been discovered, flourishing in darkness under immense pressure at temperatures of up to 370°C in waters with high levels of toxic compounds. Microbes that derive energy from the vents' chemical compounds (chemo-synthesis) provide energy to a thriving range of organisms. New populations of chemo-synthetic-dependent organisms are still being discovered, uniquely adapted to depth, geochemistry and the flow of fluids from these hydrothermal vents. These deep-sea vent ecosystems were only discovered in the Kermadec region in 1998.

The highly productive and abundant vent animals support a "halo" of fauna, including deep sea corals, such as stony-corals, black corals and gorgonian corals. Many of these species are fragile and grow very slowly. Differences between the types of animals present at different vent sites may well reflect the chemical composition of the differing volcanic sites.

The sulphur-rich magmatic and hydrothermal fluids flowing from hydrothermal vents precipitate sulphur and metals and can form features like "black smoker" chimneys. Where mineralisation is extensive Seafloor Massive Sulphide deposits (SMS) can form with concentrations of minerals, including iron, copper, lead, zinc, gold and silver.

Extractable resources at vents are fossil in nature and non-renewable. While mineral deposits can form quickly at vents, commercial ore deposits accumulate over millennia. The prospect of deep-sea mining for SMS is still in its infancy but current methodologies used

for experimental mining of massive sulphide deposits would damage the benthic (seafloor) communities and could harm the ecosystems that depend on them. Mining could indirectly impact marine mammals and affect a range of marine reptiles, fish, birds and invertebrates. The functional impact from mining on the benthic ecosystems could be widespread.

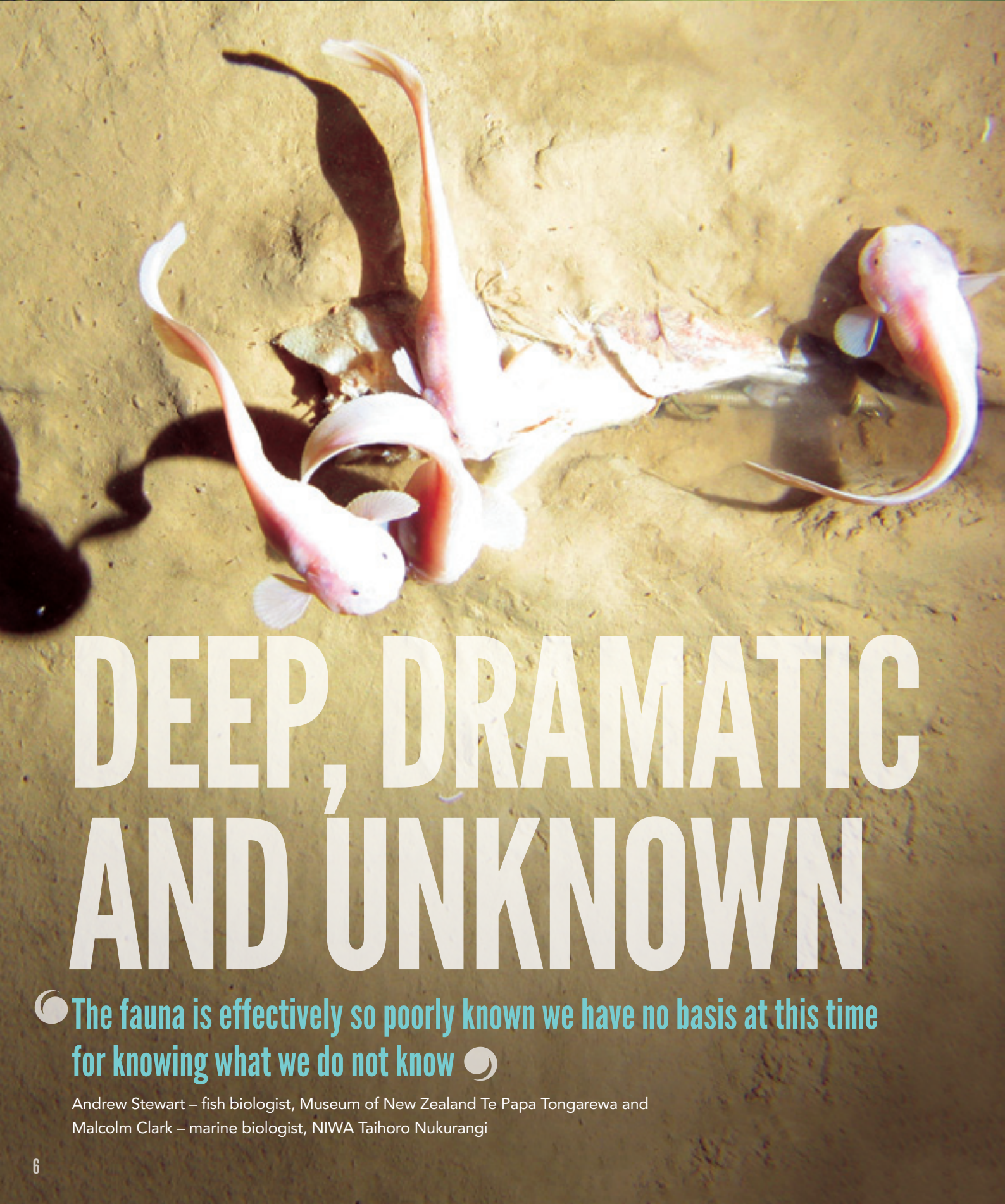


Vulnerable, big, bushy coral trees hundreds of years old, a lifelong refuge for brittle-stars and shelter for other animals, the marine equivalent of a giant kauri tree.

Di Tracey – marine benthic biologist, NIWA Taihoro Nukurangi

Mining and the Kermadecs

The Kermadec region is in a near pristine state and should be protected from the inevitable growing pressures of mining interests. The Government has temporarily closed off a large part of the Kermadec region to mining-licence applications, and no new permits will be granted or extended until July 2015.



DEEP, DRAMATIC AND UNKNOWN

● The fauna is effectively so poorly known we have no basis at this time for knowing what we do not know ●

Andrew Stewart – fish biologist, Museum of New Zealand Te Papa Tongarewa and
Malcolm Clark – marine biologist, NIWA Taihoro Nukurangi

● When the deep sea baited trap came back on board the boat there were snail fish in it, the first specimens collected in over 50 years and ... then there was something else – super-giant amphipods! For such a large and conspicuous animal to go unnoticed for so long is just testament to how little we know about life in New Zealand’s most deep and unique habitat. Here is a single and very large pristine environment and we are only beginning to put names to the animals that live there Amazing to have the chance to see a whole system intact! ●

Ashley Rowden – marine benthic ecologist, NIWA Taihoro Nukurangi

The seabed in the Kermadec region is deep, almost all of it is over 1000 metres and a third of it over 5000 metres deep. It includes the Kermadec Trench, one of the deepest submarine trenches on the planet and the deepest part of our Exclusive Economic Zone (EEZ). At over 10,000 metres deep you could stack over thirty Sky Towers in the trench and they would still not break the surface.

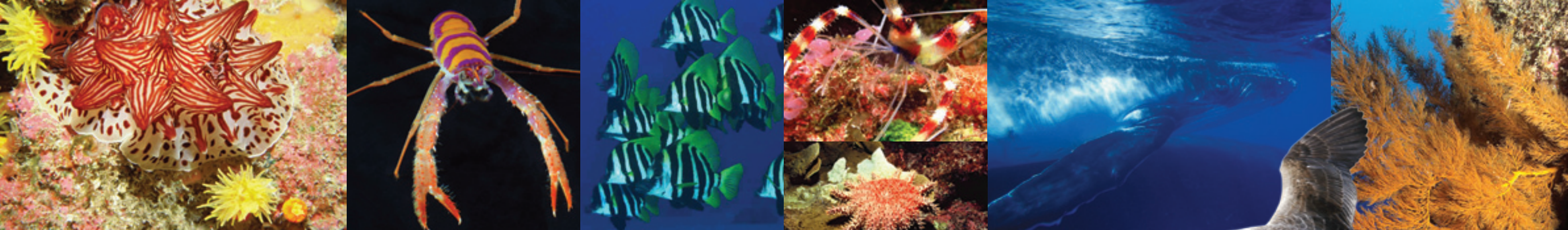
The deep sea is the largest ecosystem on Earth and one of the least studied. Technological developments threaten to open up these remarkable places to the potential for exploitation. These once safe environments face changes that are large and accelerating, giving us an increasing need to provide legislation that successfully manages the conservation of the deep-sea ecosystem.

The active Kermadec ridge system and the more ancient Colville ridge, 100 kilometres to the west are separated by the Havre Trough, created by millions of years of rifting. The Havre Trough is a large area mostly over 3000 metres deep with a complex seafloor providing a multitude of deep-sea habitats.

The deepest part of the region lies to the east of the Kermadec Ridge, diving down through unexplored marine canyons at abyssal depths (4000-6000m down) and onward into the hadal zone (depths beyond 6000m) and the deepest reaches of the Kermadec Trench itself beyond 10,000 metres. Even with recent scientific exploration these zones remain one of the least understood habitats on the planet. The Kermadec region is the only place in New Zealand waters where scientists can investigate from the shallows to the deepest parts of the ocean.

Quiet waters do not run deep! It is now known that fingers of current, which are part of the great ocean circulation system originating in the Southern Ocean, flow through the Kermadec Trench down to at least 6000 metres. These currents affect this trench environment and expose even these great depths to the shifts of climate change. Turbidity currents, sediment laden flows set off by earthquakes, storms and volcanic eruptions all add to the dynamism of this area. These flows of mud, sand and rocks take carbon to the deep ocean and are now thought to play a significant role in nutrient cycling in the deep ocean. How this affects the seafloor animal communities still remains a mystery.

The abyssal and hadal regions are even more poorly known than the ridge and seamount habitats of the Kermadec region. Recent collaborative expeditions to explore the deepest parts of the Kermadec Trench have revealed that they host active and diverse biological communities that are intrinsically linked to shallower ecosystems. With each scientific trip new species or species not known to exist in New Zealand waters are discovered, like the “supergiant” amphipod, a sandhopper-like crustacean 10 times larger than most other amphipods, other deep-sea crustaceans, molluscs and odd fish. The fishes from these depths are dominated by snailfish, abyssal rat tails, eel pouts, and cusk eels, but below 6000 metres the only fish we find are snailfish. The snailfish in the Kermadec Trench is a distinct species and occur nowhere else. Found at depths down to nearly 8000 metres these fish are the deepest fish observed alive in the Southern Hemisphere.



LIFE FROM TOP TO BOTTOM



The Kermadec region is the only place within New Zealand's waters where we can explore from the shallows to the deepest parts of the ocean. Everywhere along this scale there is life. What we know primarily comes from exploration in the shallows around the islands and surveys around the active Kermadec volcanic arc. Despite new explorations into the trenches, when it comes to the deep we are still just scratching the surface.

Seabirds:

With the elimination of pests from the islands the Kermadec region forms a seabird refuge of major international importance. Fourteen species and an estimated six million birds breed on the islands each year. A further 28 species use the region during their migrations. Tropical species such as tropic birds and noddies and more temperate species such as petrels and albatrosses intermingle in the subtropical Kermadec waters. The world's populations of the endemic Kermadec storm petrel and Kermadec little shearwater breed there. These birds forage throughout the region and some form multi-species flocks feeding on prey driven to the surface by tunas. The rare Tasman boobies chase and catch flying fish in flight!

Turtles:

Leatherback, green and hawksbill turtles have been observed in the waters of the Kermadecs region, and loggerhead and olive ridley turtles are also likely to spend parts of their lives there. Leatherbacks are found in the open ocean, and the smaller green and hawksbill turtles are known to feed around the islands. All turtle species are listed as threatened or endangered.



Whales and dolphins:

Since the days of sailboat whaling the Kermadec region has been recognised as an important place for whales. Sperm whales and almost certainly a number of beaked whales and smaller deep diving species take advantage of prey species around the seamounts and canyons of the region. Migrating large baleen whales pass through the region, most notably humpback whales with their calves on their southward migration. Bottlenose dolphins are frequently seen around the islands. Stranding records from the north of the North Island of New Zealand, Tonga and New Caledonia suggest that as many as 35 species of whales and dolphins may be found in the region.

Coastal and pelagic fishes:

A unique combination of temperate, subtropical and tropical fish species are known from the Kermadec region. A total of 175 species of coastal fishes have been recorded to date from the Kermadecs, including species only found there. The submarine features serve as pathways in the ocean for many migrating species of sharks, tunas and billfish. The clear surface waters abound with predatory species such as kingfish and Galapagos sharks. The world's largest populations of black spotted grouper live around the islands. Our knowledge of fishes in the region is still very incomplete, but includes endemic species such as Kermadec rig and carpet (swell) shark. Sharks and even deep water bottom dwellers are likely to move beyond the reaches of the existing reserve areas.

Corals and bryozoans:

The region is home to many deep-water corals, such as the large bubblegum coral. Like a kauri tree in the forest, it offers homes for many other smaller animals including brittlestars. Bamboo coral and black coral are also found in the region. New Zealand's only populations of zooxanthellate hard corals (containing symbiotic algae) are also found here. Unlike in the tropics these corals do not form classic reefs because of the cooler waters. Soft corals are an important feature of the shallow waters of the region, adding colour and structure to the underwater environment.

Many tiny colonial animals called bryozoans, which build stony skeletons similar to corals are in the region. Two hundred and fifty six species have already been recorded, many are only found in the vicinity of the Kermadecs. Recent collections of these animals await description and will certainly include species new to science.

Chemosynthetic communities:

Water coming out of the hydrothermal vents varies in temperature, depending on water depth and other factors, but can reach temperatures of 350 degrees Celsius at some sites along the Kermadec volcanic arc. Chemosynthetic bacteria transform the dissolved sulphides from this superheated water into organic matter. Many animals, like stalked barnacles and giant mussels have evolved a symbiotic relationship with these bacteria in their gut to process the sulphide rich waters to produce the nutrients that allow them to flourish. Other chemosynthetic organisms make microbial mats that provide food for grazing animals like vent crabs and other small crustaceans. At the top of this food web are predators and scavengers that come in from surrounding areas including sea stars and shrimps. The species groupings that occur at the different vent sites reflect in part a difference in the chemistry and temperature of the fluids of those sites.

Deep-sea animals:

With increasing depth pressure increases, this forces changes in not only the types of animals found there but the animals themselves. We still know little about these animals and the deep-sea environment of the Kermadec region. The cosmopolitan rattail, first recorded in 1870 was not recorded again until 2013. Fish are abundant in the surface waters but decrease in diversity and number with depth. Beyond the limits of sharks and rays, the fish fauna changes to creatures such as rattails and cusk eels. Beyond 6000 metres and down to nearly 8000 metres only snailfish are found, constrained in a depth range because of pressure in the trench. Amphipods, marine sand-hoppers seem less affected by pressure and some live over a range of 7000 metres, exponentially increasing in numbers with depth. These ocean floor scavengers, living even at the bottom of the trench, gorge themselves on particles of organic matter and dead creatures that rain down from shallower depths.



UNTOUCHED, UNSPOILED AND UNKNOWN

People are amazed at the friendliness of the species encounters. It is so different to snorkel with wildlife that has not been disturbed by man. It is the whole idea of what the oceans could be like if we weren't ripping the guts out of them. It is like Goat Island on steroids!

Rodney Russ – eco-tourism operator, Heritage Expeditions

I dived and saw plenty of spotted black grouper and Galapagos sharks. This is what sets the Kermadecs apart, having these top predators in large numbers. I've dived in many places around the Pacific and it is the exception to find coastal areas where top predator numbers are still intact. In many places they are completely gone. I liken it to an African savannah: imagine not seeing any lions and the consequence would be that the herbivores would increase to such numbers that they would defoliate the place, upsetting the entire ecosystem. Sadly that is what we accept as normal around mainland New Zealand, where the underwater seascape has seen dramatic changes due to the small number of top predators. Meanwhile, at the Kermadec Islands we actually get to see a fully functioning ecosystem with the top predators in place – it is a marvel worth protecting.

Tom Trnski – fish biologist – head of natural sciences, Auckland War Memorial Museum Tamaki Paenga Hira

The Kermadec region is the only place in New Zealand's Exclusive Economic Zone (EEZ) where tropical, sub-tropical and temperate marine plants and animals are found living together. This is not seen in any other part of New Zealand's EEZ. The waters and seafloor of the Kermadec region are largely undisturbed by fishing, mining and pollution, providing a baseline to understand these ecosystems and to observe the effects of global phenomena like climate change and associated ocean acidification.

The region's numerous seamounts are homes for animals and are stepping stones for tropical and sub-tropical animals. Many marine animals, such as corals and sponges, spend their entire life permanently attached to rocks, and depend on ocean currents to bring their food to them. Seamounts, rising from the seafloor, often have strong currents that run over them, providing the animals living along their flanks with a constant supply of planktonic food, that in turn support other communities of organisms. Ocean currents also carry larvae from geographically distant areas, which settle and grow on the seamounts.

The sub-tropical environment of the Kermadecs gives rise to some unexpected sights. Given the cooler waters, the hard corals found in the region do not form large reefs like they do in the tropics. Colourful soft corals make up part of the shallow water animal groups, which also include a variety of starfish, crustaceans, bryozoans and other invertebrates, and fish that are not normally found together. The clear waters allow for seaweeds to flourish in deeper waters than previously considered possible.

The marine ecosystem is continuous yet the existing marine reserve is discontinuous, covering only the 12 nautical miles around the exposed Kermadec Islands. Fish like sharks and other highly mobile marine species such as birds, marine mammals, and turtles move between islands, and roam broadly through the region or are focussed over unprotected seamounts, which makes them vulnerable to fishing and other human-induced impacts.

Fishes in the Kermadec region are in a relatively pristine state, especially within the existing marine reserve. The abundance of top predators such as the Galapagos shark, kingfish and spotted black grouper are testament to the health of this ecosystem. Increasing scientific interest in the last couple of years has enabled scientists to expand the list of species known from the region. At least 175 species of coastal fish are known from the region including many endemic species. Some species present at the Kermadecs are likely to have arrived through episodic events, perhaps associated with Pacific storms, and have subsequently become established there.

Seabirds are conspicuous above the water and dominate the fauna on the islands. Despite the destruction wrought by introduced predators, seabird populations are recovering and are likely to exceed six million breeding seabirds. The 14 species breeding there including three that are endemic to the Kermadec Islands – the white-naped petrel, Kermadec storm petrel and Kermadec little shearwater. The world's largest population of black-winged petrels – 2.5 million pairs – breeds on Macauley Island along with a globally important population of the regional endemic Tasman booby. The eradication of predators from the islands has set the stage for a resurgence of seabird populations, and all depend on a healthy functioning marine ecosystem for their survival. Many species forage throughout the entire region, with some species forming important associations with migrating tuna that drive their shared prey to the surface.

The trench and seamounts of the arc systems are attractive habitats for deep diving species such as sperm whales. Some large oceanic dolphin species probably live in the area, at least for parts of their lives. Other deep divers like beaked whales are almost certainly present, though they have not been observed there. Some dolphin species, like bottlenose dolphins, may even live around specific islands or seamounts.



HAVEN FOR OCEAN WANDERERS

● The ocean realm is a massive area, yet in the lives of these animals they know and find these places ●

Rochelle Constantine – marine mammal scientist, University of Auckland Te Whāre Wananga o Tamaki Makaurau



● We had made an assumption about the presence of turtles around the Kermadecs, the destination for the planned release of stranded turtles found on the shore near Auckland. We steamed for two and a half days to Raoul Island, a wild mountainous looking place cloaked in vegetation. We scouted around for a spot to drop the turtles off, and just as we said “this looks good” a turtle popped up right next to the boat! ●

Dan Godoy – marine biologist and turtle specialist, Massey University Te Kunenga Ki Pūrehuroa

Open ocean wanderers, migratory species like whales, tunas, sharks, bill fish, turtles and numerous seabirds have been shown to use the Kermadec Ridge and other submarine features as important pathways as they pass through the Kermadec region. These species cover massive distances and encounter many hazards across their ranges. Protecting even a part of a migratory species’ range, especially critical habitat areas important for foraging or breeding can reduce overall threats to populations.

Tagging programmes for swordfish and sharks (particularly mako sharks but also, great white and blue sharks) have shown an affinity for the Kermadec Ridge. Blue sharks form a large part of the by-catch in tuna long-lining.

Whales like blue, fin and sei whales have been shown to use the Kermadec arc as a feature of importance in their annual voyages between their summer feeding areas around Antarctica and their wintering grounds. Recent regular observations of large numbers of Humpback whales with their calves show their strong affinity for the area on their southward migrations. Other species such as the two species of minke whales almost certainly use this region. The area south east of the Kermadec Islands was once the centre for the southern right whale hunt in the South Pacific; although almost wiped out by this activity, a few sightings have been made of this species in recent times from the islands.

This is a globally significant area for migrating seabirds. Apart from the 14 seabird species that breed on the islands of the Kermadecs a further 28 species forage extensively in the region during migration.

Five of the world’s seven turtle species range across the Pacific region and three of these — the green, hawksbill and leatherback have been recorded within the Kermadec Islands region. At 30 degrees south the Kermadec Islands marine environment is likely to be providing an important foraging habitat for these threatened species. Incidental capture of turtles in commercial fisheries activities has been identified as one of the primary causes of turtle deaths at sea. Unfortunately not all by-catch outside EEZ boundaries is reported. For these threatened species a

no-take reserve would offer some protection over at least a part of their range.

Fishing in the region is minimal and the fishing industry has already recognised the unique qualities of the region, working with Government to protect the whole region from bottom trawl-fishing by designating it a Benthic Protected Area (BPA).

Open ocean species range widely and it is recognised that marine reserves need to be large enough to encompass an adequate portion of their home ranges. A Kermadec Ocean Sanctuary would be a step in the right direction in the protection of these species.



● On my first trip to the Kermadecs our approach to the islands in calm conditions was punctuated by wheeling flocks of wedge-tailed shearwaters and sooty terns feeding en masse over schools of tuna active at the surface. Close to Macauley Island, at dusk, the sheer numbers of birds was overwhelming. Hundreds of thousands of black-winged petrels were milling over the islands darkening silhouette – like midges against the fading light. However the next day, we arrived at Raoul Island where the contrast could not be more dramatic. Three thousand hectares of prime South Pacific seabird real estate almost totally devoid of birds – the effect of introduced rats, cats, goats, dogs, pigs and people! On my second visit, six years after all the predators and pests had been eradicated the daytime calling heralded the triumphant return of the black-winged petrels. Tides turn. Witnessing the beginnings of such change is something to treasure, especially in a world where so much is stacked against nature. ●

Chris Gaskin – Ornithologist

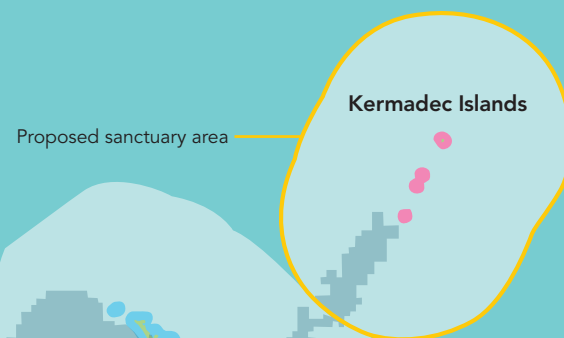
LIFE IN THE BALANCE





Currently 12.4% of New Zealand's marine environment has been allocated for mining or oil and gas permits. Most of New Zealand's marine environment is available for fishing and less than 1% is fully protected.... we need to see some balance. Add your voice to see meaningful balance on a large scale.

What can you do?

Register your support now for a Kermadec Ocean Sanctuary. And spread the word ...

www.forestandbird.org.nz/kermadec-ocean-sanctuary-signup 



-  NZ EEZ – 4,128,331km²
-
-  NZ Territorial Sea –181,207km² (4.4% of EEZ)
-
-  Marine Reserves > 100km² –Total 16,810km² (0.4% EEZ)
-
-  Mineral and Oil & Gas Permits, and new block offer as of 2014 624,116km² (12.4% of EEZ)



DETACHABLE
POSTCARDS 

Remarkable features of the Kermadec Region:

- Intact ecosystems.
- Geologically active area: 30 plus submarine volcanoes. Striking volcanic submarine landforms and hydrothermal vents.
- Deepest region of New Zealand's marine environment at over 10,000m.
- The most significant hydrothermal vent activity in New Zealand.
- The most significant hydrothermal vent animal communities in New Zealand.
- Important breeding and feeding grounds for a variety of sea birds, whales and dolphins, turtles, an extraordinary variety of fish, and invertebrates like starfish, corals, bryozoans, crustaceans and molluscs.
- The only place in New Zealand where tropical, sub-tropical and temperate plants and animals can be found together.
- A migratory corridor between the tropics and the temperate seas around mainland New Zealand for many species e.g. migratory birds, sharks, tunas and whales.

Key facts:

- At 620,000 square kilometres, a Kermadec Ocean Sanctuary will be the second largest no-take marine reserve on the planet.
- A sanctuary will increase no-take protection in the marine environment of the New Zealand EEZ from less than 1 per cent to 15 per cent.
- Currently full marine (replaces no-take) protection only exists out to 12 nautical miles around the Kermadec Islands and does not provide connectivity of protection for open ocean species or include the deepest regions of the Kermadecs.
- The region is designated as a Benthic Protected Area but this only protects it from bottom trawling and offers no protection from long-line fishing, shark fishing or mining.
- Fishing within the Kermadec region represents a negligible amount of New Zealand's overall annual catch.
- Large parts of the Kermadec region are closed to mining until July 2015.

Currently 12.4 per cent of New Zealand's marine environment has been allocated for mining or oil and gas permits. Most of New Zealand's marine environment is available for fishing and less than one per cent is fully protected. We need to see some balance...meaningful balance on a large scale.



**The Kermadec Initiative is a partnership of
The Pew Charitable Trusts, WWF NZ and Forest & Bird.**

Forest & Bird is New Zealand's leading independent conservation organisation,
with 70,000 members and supporters. We are a charity and we are active
nationally and in branches around New Zealand.

For more information: www.thekermadecs.org a.vanhelden@forestandbird.org.nz