

# How healthy is the marine reserve?



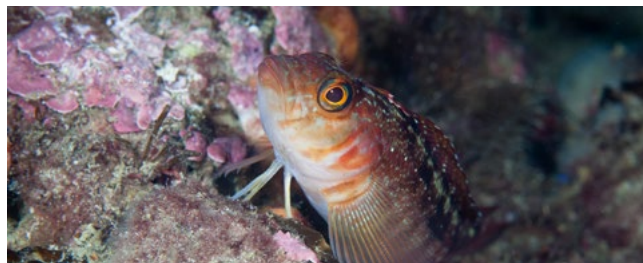
Ulva Island – Te Wharawhara Marine Reserve

Marine reserve report card



## Marine reserve health

A marine reserve is an area of sea and shore protected from fishing, shellfish gathering, mining and other kinds of disturbance. Once a marine reserve is created, the ecosystems within it may change and become closer to how they were before human influences. Marine reserves may become important nursery grounds for fished species and are valuable as places where scientists can study the environment in a more natural state.



Variable triplefin and coralline algae. Photo: Vincent Zintzen

A range of measures is used to decide how healthy a New Zealand marine reserve is. These measures have been carefully chosen so that together they provide an indication of the health of any marine reserve. The status and trend (in the previous 5 years) is reported for each measure.

Measure	Status	Trend
Habitat	Good ○○●○	Undetermined*
Seafood species	Undetermined* ○○○○	Undetermined*
Marine pests	Fair ○●○○	Declining ↘
Water quality	Superior ○○○●	Stable →
Surrounding land	Superior ○○○●	Stable →

## Monitoring the marine reserve

There is no regular monitoring of the marine reserve, but researchers at the University of Otago and DOC carry out a range of research projects in the marine reserve and surrounding area.

\* Natural levels of seafood species (including blue cod) in the marine reserve are uncertain, so a status and trend for this measure cannot currently be assessed. A trend for the habitat measure cannot be made until another survey has been carried out.

## Seafood species

Paterson Inlet has been a popular and highly valued fishery. Ulva Island – Te Wharawhara Marine Reserve is an important nursery area for many fish species: DOC's 2014 survey found 56 different species including blue cod, southern pig fish, gurnard, blue moki, skate, carpet shark and tarakihi.

## Blue cod

In the 1990s there was no significant difference in the number of blue cod longer than 33 cm (the legal size for recreational fishing) at sites that would eventually be inside or outside the marine reserve. Once the marine reserve was established, diver surveys found more large blue cod inside the marine reserve than outside. A 2014 study (using baited underwater video) found more blue cod of all sizes inside the marine reserve.

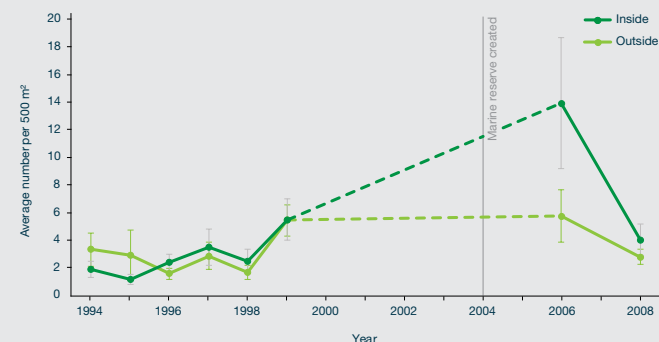
### Number of blue cod longer than 33cm inside and outside the marine reserve



## Blue moki

Counts of blue moki (of all sizes) at sites that would eventually be inside or outside the marine reserve showed no significant differences from 1994 to 1999. A large increase in the number of blue moki at marine reserve sites was reported in 2006, but in 2008 returned to the level recorded in previous years.

### Number of blue moki inside and outside the marine reserve



## Habitat

The marine reserve protects three separate areas in Paterson Inlet/Whaka a Te Wera, the largest inlet in southern New Zealand outside Fiordland. The inlet is a shallow flooded river system, 45 m at its deepest point.

The habitat map below was created from a 2014 survey of the marine reserve. Habitats include rocky reef, sand, soft mud, beds of shellfish, sponges, kelp forests and meadows of small red seaweeds.

2014



## Key

Macrocystis	Sponges and sessile invertebrates
Urchin barrens	Mobile invertebrates
Urchin barrens and macroalgae	Brachiopods and sessile invertebrates
Mixed algae	Infaunal community
Red turfing algae	Brachiopods
Red algae and queen scallops	Soft sediment
Red/brown turfing algae	Marine reserve boundary
Burrowing holothurians	

## Marine pests

Marine pests are unwanted species that have been introduced to New Zealand. The Asian kelp *Undaria pinnatifida* has become established in the marine reserve in the last 5 years.

## Disease outbreaks

A microscopic parasite, *Bonamia ostreae*, was found in farmed oysters in Big Glory Bay in May 2017. In late 1989 an algal bloom (*Heterosigma akashiwo*) decimated salmon farms in the same area. This was the first record of the alga in New Zealand.

## How we made the habitat map

A team of DOC scientists surveyed the marine reserve using video techniques. Underwater cameras (towed behind a boat or attached to a pole) recorded about 20 hours of footage to document the habitats on the sea floor. GPS, depth and scale data were recorded with each video, which was also viewed in real time on board.

The video and other data was analysed (in 1,108 data points) based on the species found in 5 x 5 m squares. The habitats were grouped into 14 living and 7 non-living types. Living habitats included shellfish, sponges and seaweeds, while non-living habitats included rocky reefs and sandy sediments. These maps will be updated after future surveys.



A map showing the placement of each tow, with the marine reserve areas highlighted.

## Threatened species

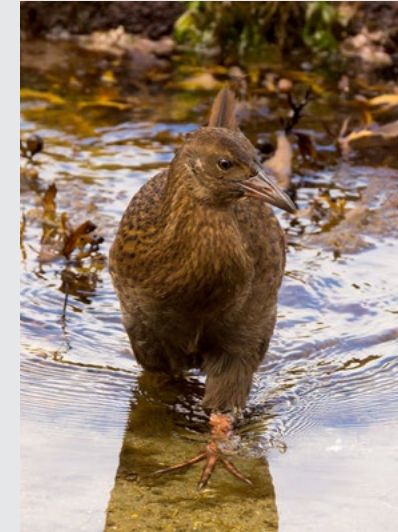
The protected land and sea around Ulva Island supports New Zealand sea lions, yellow-eyed and little penguins as well as the Nationally Critical southern New Zealand dotterel. Fascinating black corals and great white sharks are found under the waves.



tags to track great white sharks around Stewart Island/Rakiura. "While I had some records of white sharks from Paterson Inlet before the start of the research" Clinton says, "we had no knowledge of how often they occurred there. We found that the sharks spend most of their time at the Titi/Muttonbird Islands but from time to time make short excursions (sometimes several at once) into the mouth of the inlet, with a few moving further into it."

## Surrounding land

The land around Paterson Inlet is almost completely undeveloped - most is conservation land or part of Rakiura National Park. The marine reserve is isolated and a significant distance from any urban area or port.



Weka, Ulva Island. Photo: David Cook

Ulva Island itself is now largely uninhabited and has been a pest-free open sanctuary since 1997. Together, the island and the marine reserve are a rare example of an intact ecosystem from forest heights to sea floor. They provide a vital refuge for a wide range of species, habitats and communities that have disappeared or been modified in many other places.

## Water quality

The native forest encircling Paterson Inlet keeps the water quality close to that of prehuman times. Water from the Pacific Ocean also moves in and out of the inlet, driven by wind and tides. Freshwater River, which enters on the western side, is in pristine condition.

Marine farms (mussels and salmon) operate in Big Glory Bay, a southern arm of Paterson Inlet, about 3.5km from the marine reserve.



Boulder Beach, Ulva Island. Photo: Kristina DC Hoepfner



## Seaweed explorer

Mrs Eileen Willa was a Stewart Islander who played an important part in cataloguing the seaweeds surrounding the island. Beginning in the 1940s, she collected and pressed hundreds of specimens, many of which had never been named. These were sent to botanists in New Zealand (mainly Victor Lindauer, Bay of Islands school teacher and son of artist Gottfried) and around the world. She also made the specimens into little cards that were sold at the local museum to raise funds.



*Durvillaea willana* at Ringaringa Beach, Stewart Island, where Mrs Willa lived. Photo: Sarah Wilcox

to honour her contribution to research, including a species of bull kelp *Durvillaea willana*, and the beautiful red alga *Ptilonia willana* – named for her by Lindauer.



Eileen Willa (left) passing the role of Rakiura Museum curator to Nancy Schofield, 1985. Photo: Rakiura Museum, Stewart Island

Seaweed scientist Professor Wendy Nelson remembers Mrs Willa fondly. “She was such a remarkable woman – an amateur botanist with a wonderful eye who loved seaweed and could recognise their smallest differences. Mrs Willa was very knowledgeable and generous. The studies based on her specimens greatly enhanced our knowledge of the New Zealand flora.”

Several seaweed species are named

Year established: 2004

Coastal biogeographic region: Southern

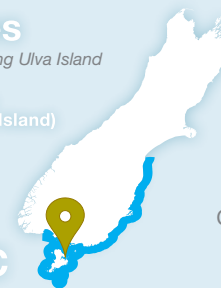
Area: 1,075 hectares

(approx. 11 km<sup>2</sup>), in three parts adjoining Ulva Island

Visitors: 20,000 per year (to Ulva Island)

Nearest town: Oban

Mean sea-surface temperature: 11.4 °C



Location: Stewart Island/Rakiura

Climate: Cool in winter, temperate in summer

## More information is online

If you'd like to know more about the health of this marine reserve and how we created this report card, please go to [www.doc.govt.nz/report-card](http://www.doc.govt.nz/report-card).

You will find:

- report card rationale
- published research from this marine reserve
- information about other seafood species
- list of threatened species found in the marine reserve
- a map of land use in the catchment area
- more details about disease outbreaks.

## Protected area

The marine reserve lies between Ulva Island and Stewart Island to the south and Ulva Island and Native Island to the north, as shown in the map below.

You may not take any fish or shellfish or disturb the marine life in this area.

Find out more about what you can and can't do in a marine reserve on our website: [www.doc.govt.nz](http://www.doc.govt.nz).



Published by:  
Department of Conservation  
Whare Kaupapa Atawhai/  
Conservation House  
PO Box 10420  
Wellington 6143  
New Zealand

October 2017

Editing and design:  
Creative Services,  
DOC National Office

This publication is produced using paper sourced from well-managed, renewable and legally logged forests.

Cover image: Carpet shark in kelp forest.  
Photo: Vincent Zintzen

This project is part of the National Marine Reserves Monitoring and Reporting programme, funded by DOC's partnership with Air New Zealand.