

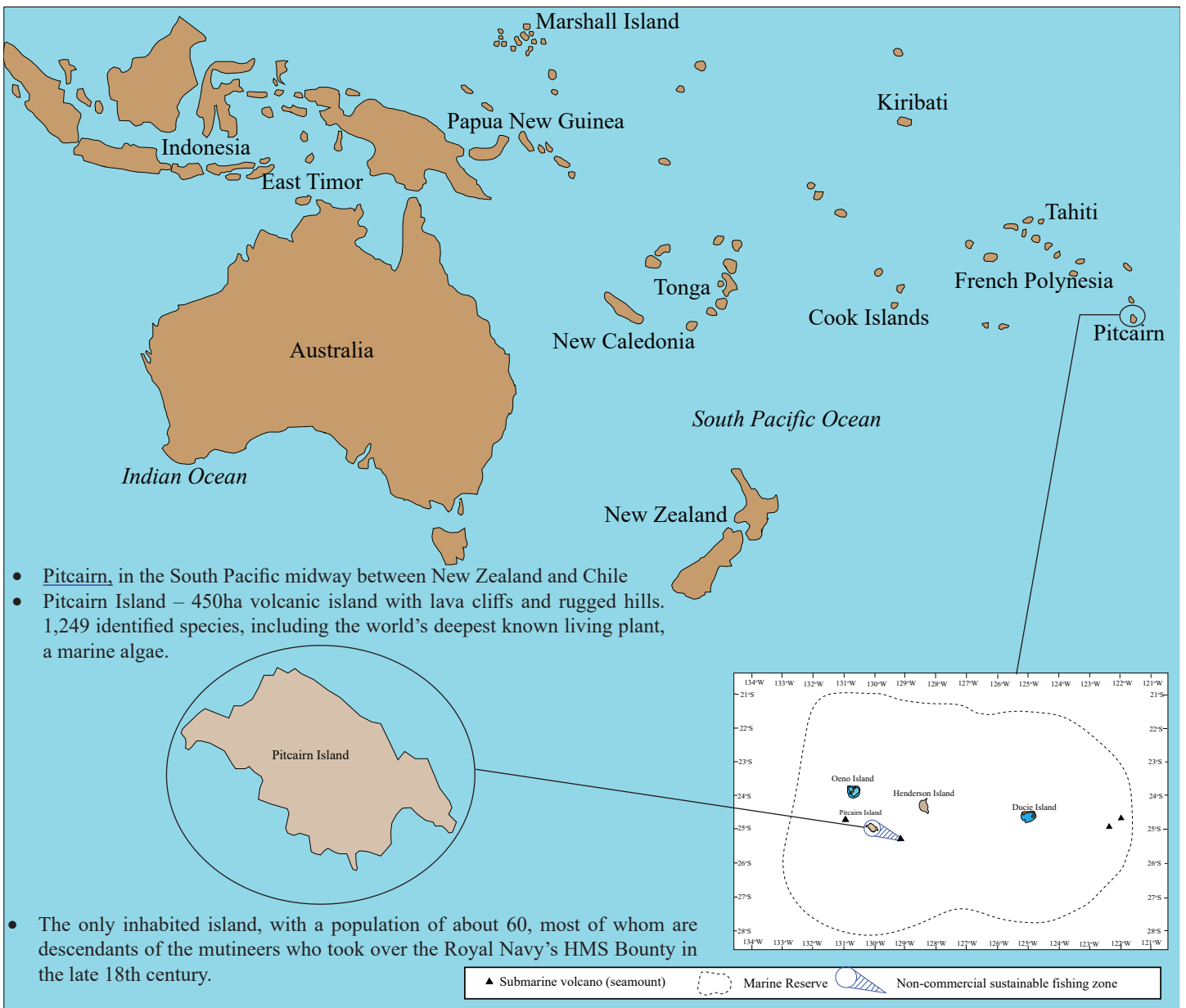


Pitcairns Marine Nature Reserve

In March 2015, the UK declared the world's largest fully protected marine reserve in the extremely remote waters surrounding the Pitcairn Islands in the South Pacific Ocean (Fig. 1). This is the first time a government has created a fully protected marine area with detailed plans for surveillance and enforcement so that it is protected.

Together, the four islands and their surrounding waters out to the 200 nautical mile limit – the Exclusive Economic Zone (EEZ) – covers a vast area of ocean of about 836,000 km², more than three times the size of the UK!

Fig. 1 Pitcairns Marine Nature Reserve



Henderson (200 km ENE of Pitcairn), covering 4,310ha is the largest island in the group. A raised fossilised coral atoll designated a UNESCO World Heritage Site because of its unique natural history and ecological intactness. It is home to extremely good populations of petrels (16,000 breeding pairs = >95% of the world's population) and healthy populations of sharks and top predators.

Ducie (472 km E of Pitcairn), the most southerly coral atoll in the world, consists of a central lagoon surrounded by four islets. It has extremely healthy populations of sharks and top predators.

Oeno (120 km NW of Pitcairn) is a low coral atoll of 65 ha comprising a central low-lying island surrounded by a shallow lagoon and a fringing reef).

The waters around Pitcairn are exceptionally clear because they are pollution-free with low levels of suspended organic matter in the water column as well as the fact that the waters are almost totally pollution-free.

Within the reserve, which starts 12 nautical miles from Pitcairn Island and extends out 200-nautical-miles, all forms of commercial extractive activity e.g. fishing and oil, gas, and mineral mining are banned. Traditional sustenance fishing by Pitcairn islanders is allowed.

Question

Why is it considered essential that the Pitcairn islanders are to be actively involved in creating the conservation action plan for the Reserve?

Answer

- To ensure that the Reserve continues to supply sufficient food for the islanders
- To ensure that they feel that they are in control of this new development
- To ensure that their detailed knowledge of the ecology of the surrounding ocean is incorporated in the plan

The Reserve contains:

more than 1,200 marine species including several that are globally threatened, e.g. the critically endangered hawksbill turtle and the humpback whales that travels to Pitcairn every summer to calve.



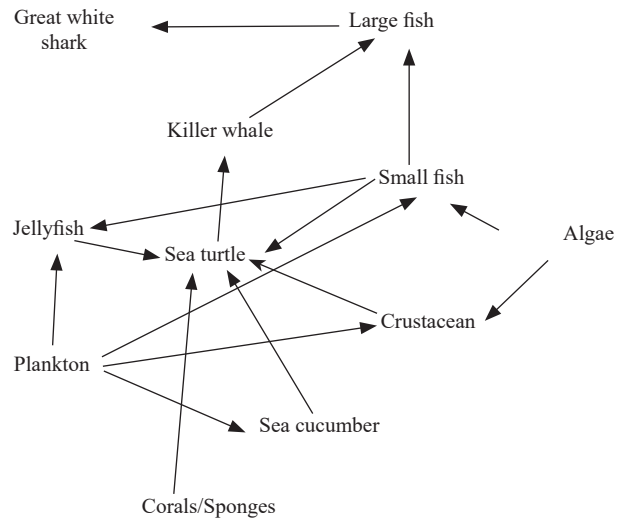
https://commons.wikimedia.org/wiki/File:3959_aquaimages.jpg Liftam

It contains:

- a complex community of hard and soft corals that provide habitat to hundreds of species of fish, including two found nowhere else on Earth: the squirrelfish and the many-spined butterfly fish.
- 69 seamounts and 327 knolls that are important breeding and feeding habitats for many aquatic predators, fish, and invertebrates.
- several marine species found only in the Pitcairn Islands (**endemic species**) such as the iconic Henderson petrel and the elusive Pitcairn angelfish. This is a result of the islands' isolation.

Question

The diagram shows part of a food web.



Describe the possible ecological effects of allowing the population of sea turtles to be eliminated by over catch. (4)

Answer
 Less food for killer whales and sharks whose populations may decrease;
 Less predation of jellyfish/corals/sponges/sea cucumbers/crustaceans whose populations may increase;
 If jellyfish population increases that of small fish may decrease;
 So less food for large fish whose population may fall;
 Possible causing fall in population of sharks;
 Credit any other sensible connection;
 Ref to possible effects at all trophic levels;

Protecting the Reserve

- Modern satellite monitoring will replace expensive and inefficient boat patrols to stop overfishing and will enable authorities in relevant ports to prevent landing of illegal catches.
- The offshore water provide important migration routes for several species of tuna and whales, which were previously hunted by Japanese, Taiwanese and Korean vessels.
- To protect breeding seabirds, the Pacific rat *Rattus exulans*, a major predator on petrel chicks, has been cleared from both Ducie and Oeno Islands but efforts to eradicate the rat from Henderson by the RSPB has so far been unsuccessful.

Endangered species within the Pitcairns

Species	Status
Humpback whale	EN
Sei whale	EN
Blue whale	EN
Hawksbill turtle	CR
Green turtle	EN
Phoenix petrel	EN
Henderson petrel	EN
Polynesian storm petrel	EN
Black-browed albatross	EN
Great hammerhead shark	EN
Humphead wrasse	EN

Key: EN: endangered CR: critically endangered

Group	No. of species recorded	No. of endemic species
Cetaceans	22	0
Breeding marine birds	13	1
Non-breeding marine birds	20+	0
Turtles	2	0
Pelagic fish	13	0
Reef fish	352	5
Echinoderms	>64	3
Molluscs	>502	5+
Crustacea	>42	7
Ostracods	47	7
Hard corals	87	1
Hydroids	8	0
Sponges	12	0
Forams	32	7
Algae	29	0
Blue - green algae	4	0

References

Irving R Dawson T (2012) Marine Environment of the Pitcairn Islands