



The Pitcairn Islands Marine Protected Area Management Plan 2021 to 2026

October 2021



Mark Tomlinson

FOREWORD

“The Pitcairn Islands Marine Protected Area is a unique area of scientific interest and a globally important area of marine biodiversity. A key objective in the battle to protect our natural environment is to protect and restore 30% of marine biodiversity globally. This can only be achieved through the creation of highly protected MPAs, as with the Pitcairn Islands. This Plan will provide an important tool for the Government of Pitcairn Islands in the stewardship required in protecting such an important area of rich marine biodiversity. I would like to extend my thanks to the MMO, Cefas and the Government of Pitcairn Islands in drawing up this Management Plan.”

Laura Clarke OBE, Governor of the Pitcairn Islands

“Pitcairn Island is perhaps best known as the home of the descendants of the HMAV Bounty mutineers. The sea still holds an important cultural value to our local community.

The pristine nature of most marine ecosystems of the Pitcairn Islands means that the MPA has a unique global value that is irreplaceable. Henderson Island, World Heritage Site is one of the world’s best remaining examples of an elevated coral atoll. More than 1,250 marine species have been recorded from the waters of the Pitcairn Islands, the extreme clarity of the water surrounding the four islands means that coral can grow at depths greater than expected for most Pacific reefs.

Pitcairn Islanders are proud custodians of our MPA”

Mayor Charlene Warren

“The Blue Belt Programme continues to be an extremely important piece of work for the Pitcairn Islands. This year we’re excited to put in place our new MPA Management Plan, which will bring clear guidance on how to manage and effectively protect our valuable marine environment.”

Michele Christian - Division Manager, Government of Pitcairn Islands

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LIST OF ACRONYMS

| | |
|--------|---|
| AIS | Automatic Identification System |
| BRUV | Baited Remote Underwater Video |
| CBD | Convention on Biological Diversity |
| Cefas | Centre for Environment, Fisheries and Aquaculture Science |
| CITES | Convention on International Trade in Endangered Species of Wild Fauna and Flora |
| CSSF | Conflict, Stability and Security Fund |
| Defra | Department for Environment, Food and Rural Affairs |
| ECNRD | Environmental, Conservation and Natural Resources Division |
| EEZ | Exclusive Economic Zone |
| EU | European Union |
| FCDO | Foreign, Commonwealth and Development Office |
| HMAV | His Majesty's Armed Vessel |
| IATTC | Inter-American Tropical Tuna Commission |
| INNS | Invasive non-native species |
| IUCN | International Union for Conservation of Nature |
| IUU | Illegal, unreported and unregulated |
| MCA | Maritime and Coastguard Agency |
| MEA | Multilateral environmental agreements |
| MMO | Marine Management Organisation |
| MPA | Marine Protected Area |
| RFMO | Regional Fisheries Management Organisation |
| SAR | Synthetic Aperture Radar |
| SDG | Sustainable Development Goal |
| SPC | The Pacific Community |
| SPREP | Secretariat of the Pacific Regional Environment Programme |
| SPRFMO | South Pacific Regional Fisheries Management Organisation |
| VMS | Vessel Monitoring System |
| WCPFC | Western and Central Pacific Fisheries Commission |

INTRODUCTION

The Pitcairn Islands, a UK Overseas Territory, are a group of four small islands covering a total land area of 49 square kilometres. The Pitcairn Islands Marine Protected Area (MPA), encompassing the entire Exclusive Economic Zone (EEZ)¹ and the territorial seas² of Pitcairn, Henderson, Ducie and Oeno Islands (841,910 square kilometres³) was designated by the Government of Pitcairn Islands in September 2016.⁴ A total of 99.5% of the MPA (832,738 square kilometres) comprises a no-

take zone (defined as strictly no extraction activities allowed). The remaining part of the MPA consists of the territorial seas around Pitcairn, Henderson, Ducie and Oeno Islands, an area within two nautical miles of 40 Mile Reef (also known as Adams Seamount) and a transit zone between Pitcairn Island and 40 Mile Reef / Adams Seamount, where activities, including fishing, are permitted if managed sustainably. These areas are known as Coastal Conservation Areas (See Figure 1).

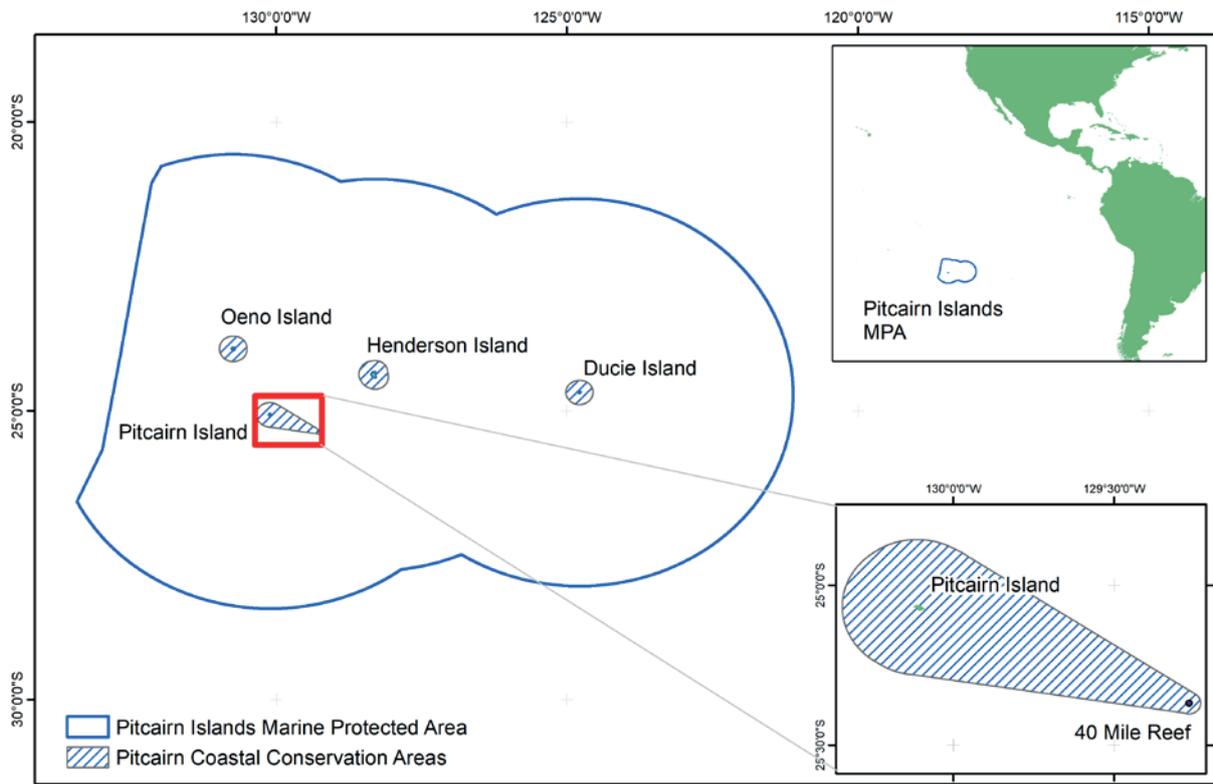


Figure 1: The Pitcairn Islands Marine Protected Area

This MPA Management Plan has been developed by the Government of Pitcairn Islands with assistance from the UK Blue Belt Programme.⁵

Consultations with the Government of Pitcairn Islands and the local community were held during August 2018 to identify the key values of the MPA, the potential threats, issues and constraints; and to obtain views to help formulate a vision and determine the priority management actions. This has helped to inform development of the Management Plan.

This Management Plan describes a comprehensive management regime to achieve the vision and long-term goals of the MPA and to address priority management needs over the next five years. The vision and goals of the plan provide the longer-term direction for management of the Pitcairn Islands MPA. The objectives and indicators reflect an outcome-based 'best practice' approach from which the effectiveness⁶ of management can be assessed. For the purposes of developing management priorities, threats to the MPA are confined to current pressures and pressures likely to occur during the lifetime of the Management Plan and considered to be manageable within the MPA context and the limited resources available in the Pitcairn Islands.

1 As defined in the 'Proclamation Establishing an Exclusive Economic Zone' (Proclamation No 1 of 1977)

2 The territorial sea means: (a) any part of the sea within 12 nautical miles from the nearest point of the low-water line along the coast of Pitcairn and Henderson Islands; and (b) any part of the sea within 12 nautical miles from the nearest point of the seaward low-water line of the reef around Ducie and Oeno Islands, together with the lagoons of those islands.

3 The extent of the Pitcairn Islands was recently updated by JNCC to inform the K4 indicator in the UK government's 25 Year Environment Plan. See Wright & Woods (2021) for details of the methods used

4 The Pitcairn Islands MPA was designated through the 'Pitcairn Islands Marine Protected Area Ordinance 2016' which came into force on 15 September 2016

5 The Blue Belt Programme assists delivery of the UK Government's manifesto commitment to provide long term protection of over four million square kilometres of marine environment across the UK Overseas Territories. The programme is being delivered in partnership between the Centre for Environment, Fisheries and Aquaculture Science (Cefas) and the Marine Management Organisation (MMO), working closely with the UK Overseas Territories on behalf of the Foreign, Commonwealth and Development Office (FCDO) and the Department for Environment, Food and Rural Affairs (Defra).

6 Effectiveness is defined as the extent to which management is protecting the values and achieving the goals and objectives of the MPA



PART 1: THE PITCAIRN ISLANDS MARINE PROTECTED AREA

1.1 SETTING

The Pitcairn Islands are one of the world's most remote group of islands, situated between the latitudes 23° and 26° south and longitudes 124° and 131° west, in the central South Pacific, about 2,200 km south-east of Tahiti and 2,100 km west of Easter Island [1]. The group comprises:

- Pitcairn Island, a volcanic island with an approximate land area of 4.5 square kilometres. It has a rocky coastline with steep, high, lava cliffs and rugged hills rising to a peak at 347 m. The landscape is dominated by coconut palm trees, Norfolk pine trees, banana and breadfruit trees, and a wide variety of other trees. It is the only inhabited island within the group with a population of 42 people (as of December 2020), all living in the only settlement, Adamstown.
- Henderson Island, the largest island in the group with an area of 43 square kilometres, is situated 193 km north-east of Pitcairn Island. It is a raised fossilised coral

atoll, which rises to an elevation of 33 m. There is a reef platform 20 - 90 m wide on the north, north-west and north-east sides of the island, protecting the principal beaches [2]. It was designated as a World Heritage Site in 1988, on account of its exceptional natural beauty and important and significant natural habitats containing endemic plants, invertebrates and birds.

- Ducie Island, the most southerly coral atoll in the world, is situated about 470 km east of Pitcairn Island. It consists of a central lagoon surrounded by four islets. It is the smallest of the Pitcairn Islands with a land area of 0.74 square kilometres.
- Oeno Island is situated about 143 km to the north-west of Pitcairn Island. It is a low coral atoll, comprising a central low-lying island surrounded by a shallow lagoon of approximately 4 km in diameter and a fringing reef [1, 3].

1.2 OCEANOGRAPHY AND CLIMATE

The Pitcairn Islands are located at the south-eastern extremity of the Indo-West Pacific biogeographic province. Prevailing winds and currents are predominantly from the east. The islands lie south of the Tropic of Capricorn and have relatively cool waters and climate [1]. Due to the distances between the islands and their different altitudes, there is some variation in the climate, with Pitcairn Island receiving 50% more rainfall than Henderson Island [4]. This additional rainfall, particularly when concentrated into heavy rainfall events, has led to a higher erosion rate and surface run-off seen at Pitcairn Island. This contributes to higher levels of nutrients in the waters surrounding the

island than is seen in the generally nutrient-poor waters within the rest of the MPA [5].

The Pitcairn Islands MPA is in an area of relatively slow surface currents, being positioned towards the centre of the South Pacific Gyre⁷ [6]. Two major currents feed into the Pitcairn Islands MPA, namely the Pacific Equatorial Undercurrent and the Humboldt Current. The annual mean sea surface temperatures range from 22.5°C (Aug/Sept) to 26.3°C (Feb/Mar) [7]. All the islands have regular semi-diurnal⁸ tides, with a (measured) spring tidal range of 1.5 m at Henderson Island [2] and 0.4 m at Ducie Island [8].

1.3 GEOLOGY

The four islands which make up the Pitcairn Islands vary in both make-up and age. Pitcairn Island is the youngest of the four islands, at 0.8 million years old, and is formed of overlying lava flows creating the single shield volcano seen today. It belongs to an ancient formation which includes the Gambier Islands and the Duke of Gloucester Islands in the Tuamotu Archipelago [9, 10]. This volcanic chain appears to originate from hot-spot volcanism on the Fallon Plate.

Ducie, Henderson and Oeno Islands are all part of a much older chain of islands and seamounts (8 million years (Myr), 13 Myr and 16 Myr old respectively). This volcanic chain is possibly an extension of the Hao-Marutea hotspot trace. Today, the three islands are coral atolls made up of limestone and live coral. Henderson Island, unlike Ducie and Oeno Islands, is a raised coral atoll projecting 30 m above sea-level [11].

As a result of the high level of volcanic activity in the region, there are over 90 seamounts within the MPA. The Bounty and Adams Seamounts, which lie to the east of Pitcairn, reach within 450 and 55 m of the sea surface, respectively and remain volcanically active.



7 The South Pacific Gyre is a large system of rotating ocean currents. Ocean currents in the South Pacific Ocean circulate in an anti-clockwise direction.

8 Two high and two low tides of approximately equal size every day

1.4 BATHYMETRY

The seafloor within the Pitcairn Islands MPA is dominated by the two island/seamount chains (described in Section 1.3 above). These island chains run across the centre of the MPA in a west-north-west to east-south-east direction (Figure 2). Either side of these island chains, the depth increases rapidly down to relatively flat areas to the north and south with a maximum depth of approximately 5,000 m [12].

The bathymetry of all four of the islands is dominated by their seamount structures with small shallow platforms surrounding the islands. Around Pitcairn Island, the seabed shelves gradually from 10 to 30 m forming a platform around the island approximately 300 to 500 m offshore (Figure 3). The seabed then falls away steeply to depths of over 4,000

m. Henderson Island has reef platforms adjacent to its North and East Beaches and to North-West Beach (Figure 5). These platforms extend horizontally between 20 to 40 m at North-West Beach and 40 to 90 m at North and East Beach [2]. Oeno Island consists of a low-lying island surrounded by a shallow lagoon of around 3 m deep surrounded by a fringing reef [13] (Figure 7). Outside of the reef, the seabed deepens gradually to a depth of 40 m where it increases rapidly to depths of over 4,000 m. Ducie Island comprises one main island and three islets which encircle a central shallow lagoon. A well-developed reef encircles the whole of the atoll, with an extensive fore-reef projecting around the southern half. The fore-reef gradually slopes from the shore to 25-30 m, after which it drops away steeply [1] (Figure 8).

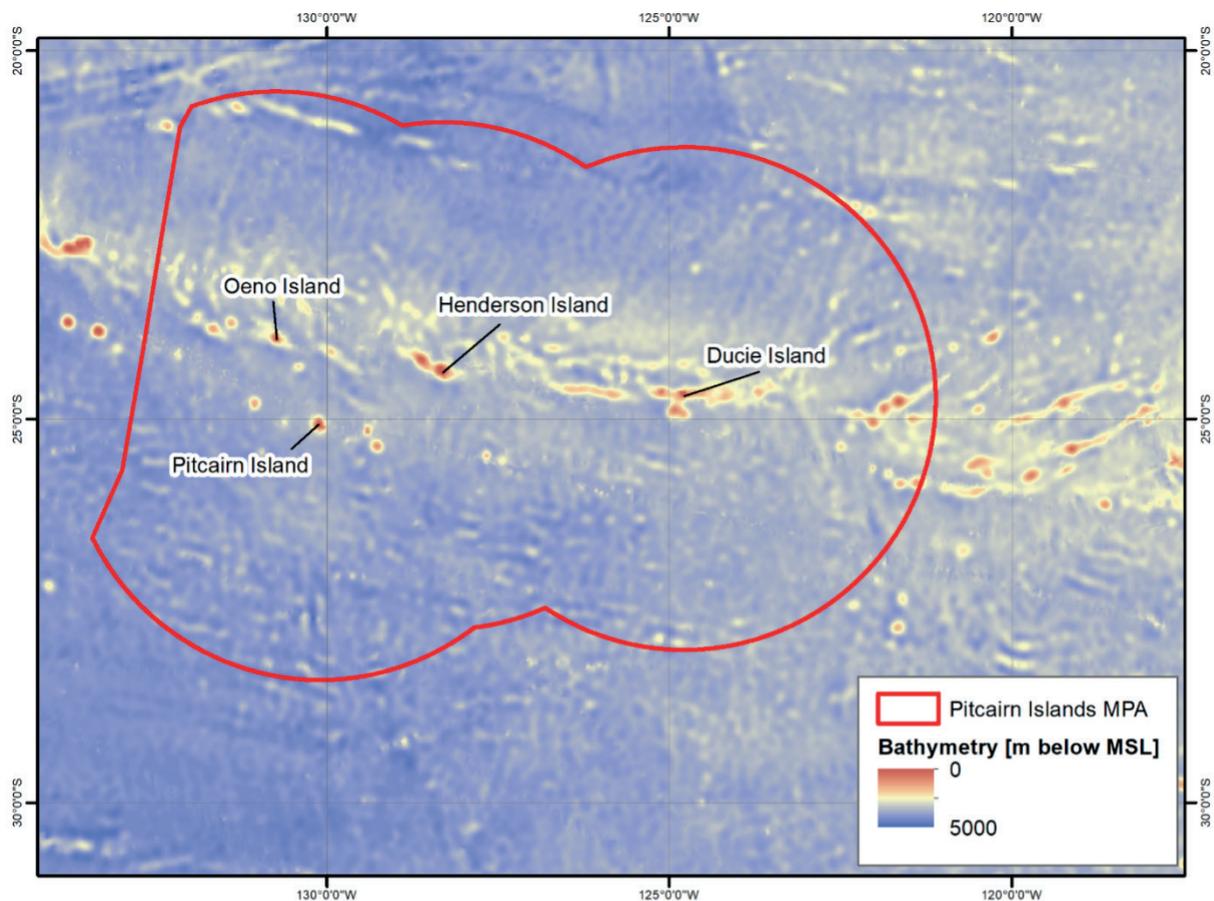


Figure 2: Bathymetry across the Pitcairn Islands MPA (GEBCO, 2014)

1.5 HABITATS AND SPECIES

1.5.1 Nearshore Waters

Pitcairn Island

Much of the near-shore seabed around Pitcairn Island comprises sand-scoured, low-lying rock outcrops surrounded by sand patches [13]. There is abundant seaweed growth. Extensive carpets of mostly brown macroalgae⁹, as well as calcareous green macroalgae and red coralline algae, cover bedrock outcrops in depths between 14 and 22 m [1, 5]. Cover of live coral varies from 5% to 80%, depending on the depth and location around the island [13]; a survey in 2012 assessed mean coral cover to be up to 11% [5]. Coral cover seems most prolific in the 12 to 22 m range; however, one of the most extensive areas of live coral growth is present off Adamstown at a depth of 18 to 30 m, covering an area of about 2 square kilometres [1, 13]. A total of 31 coral species have been recorded from Pitcairn Island and the coral community is comprised mainly of cauliflower, lobe and fire corals [5].¹⁰

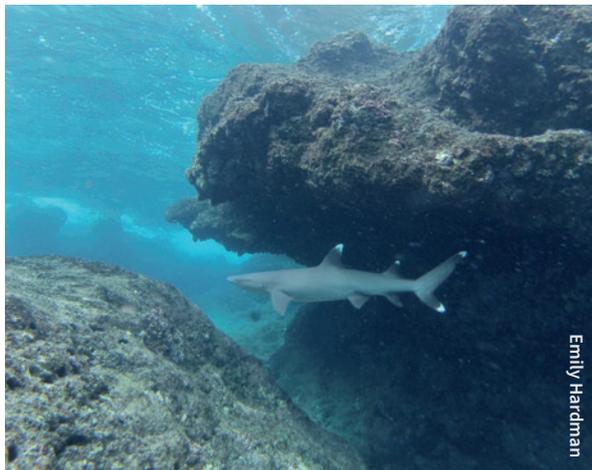
Seabed imagery data collected in 2020 was used, together with satellite data, to map the different habitat types around the island to a depth of around 20 m [14]. From the imagery data, five different habitats were identified:

- high relief rock with occasional stony corals and hydrocorals (fire corals)
- rock with high densities of stony corals and hydrocorals (fire corals)
- low and medium relief rock dominated by macroalgae
- sand and low relief rock with patches of macroalgae
- clean wave swept sand

The distribution of these habitats around Pitcairn Island is displayed in Figure 4. Areas of higher coral density are found to the south-east of the island attached to areas of exposed rock. The corals in this area consist of both hard corals and fire corals. To the south and west, the areas are dominated by dense macroalgal beds attached to low lying rock. To the north west, sandier habitats with patches of low density macroalgae attached to occasional patches of low-lying rock were predicted.

A total of 294 species of reef fishes have been recorded from Pitcairn Island [15] with the fish community dominated by herbivores such as wrasse, surgeonfish, damselfish and drummer (nanwe) [13, 16]. The most common fish species observed at diving depths of about 10 to 20 m are the sunset wrasse (whistling daughter), coris, whitebar surgeonfish, canary demoiselle, Pacific gregory and the drummer (nanwe) [1, 13]. Baited Remote Underwater Video (BRUV) surveys around the coast at depths of 10 to 40 m found that fish communities were dominated by the drummer (nanwe) and crosshatch triggerfish (pick-pick) [16]. The sharks most commonly seen are the grey reef shark and the whitetip reef shark [17].

Reef-associated invertebrates which have been recorded from Pitcairn Island include 27 species of echinoderms, 90 types of mollusc, and 79 species of crustacean [15]. There are very few sessile,¹¹ filter-feeding organisms present (such as sponges, tube worms, bivalve molluscs, sea squirts etc.), which is probably a reflection of the poor nutrient levels in the water column and low levels of plankton upon which these organisms feed [13].



9 Seaweed

10 A glossary of scientific terms (species names) is provided at the end of this document

11 Animals or plants that are permanently attached to one place and cannot move around

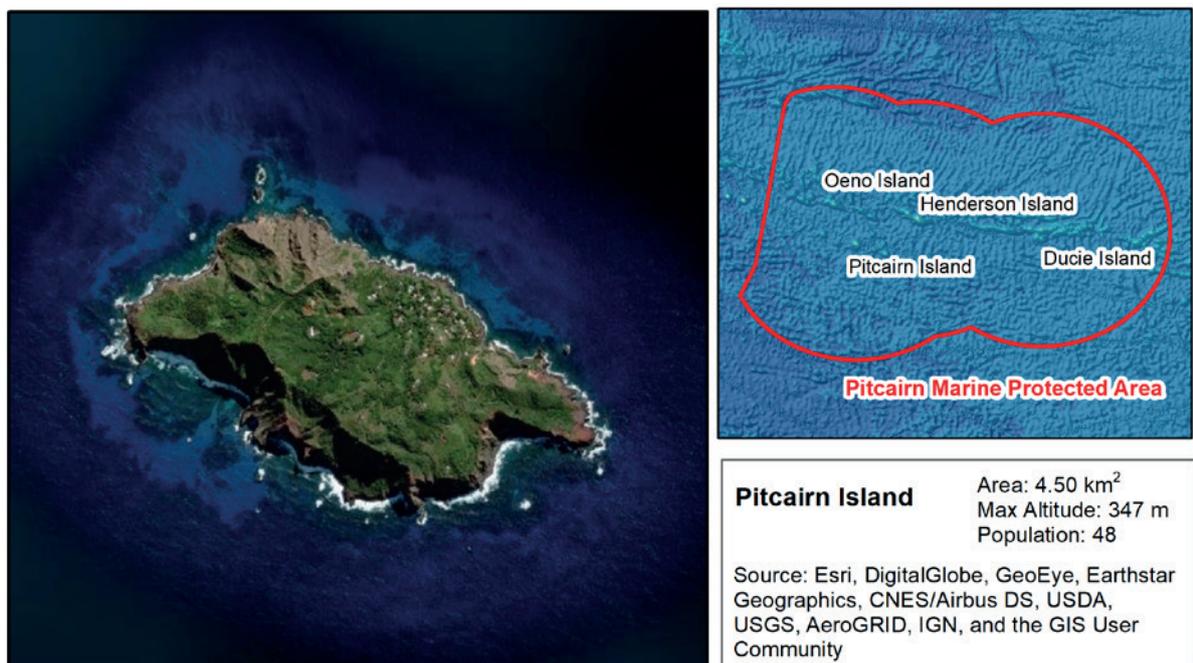


Figure 3: Satellite image of Pitcairn Island and the surrounding shallow waters

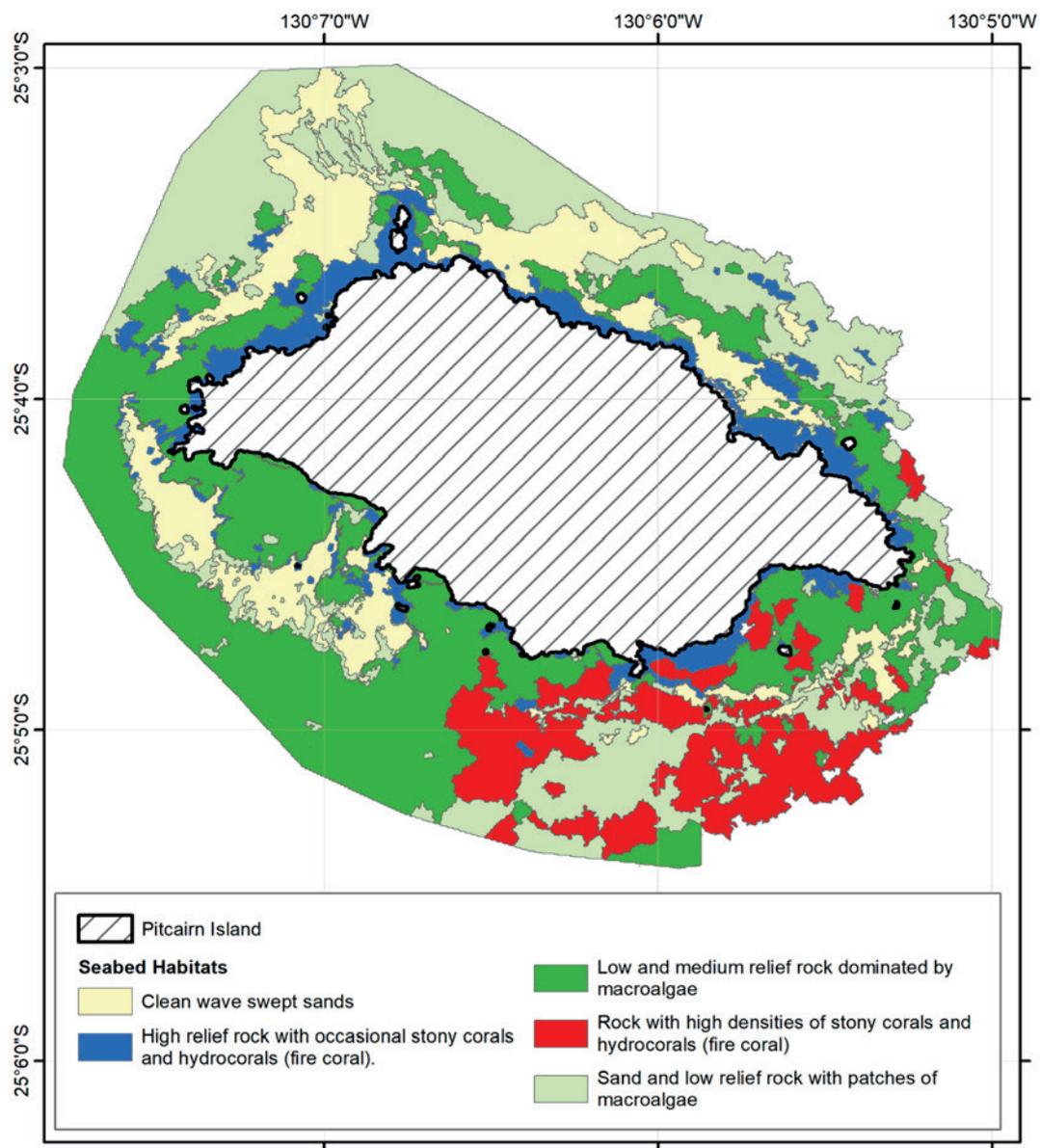


Figure 4. Pitcairn Island near shore habitats. Limits of the map indicate the limits of the earth observation data at roughly 18 m deep.

Henderson Island

Henderson Island was designated as a UNESCO World Heritage site in 1988. The site covers 42.7 square kilometres,

and at the time was cited as one of the best examples of an elevated coral atoll ecosystem in the world [18].

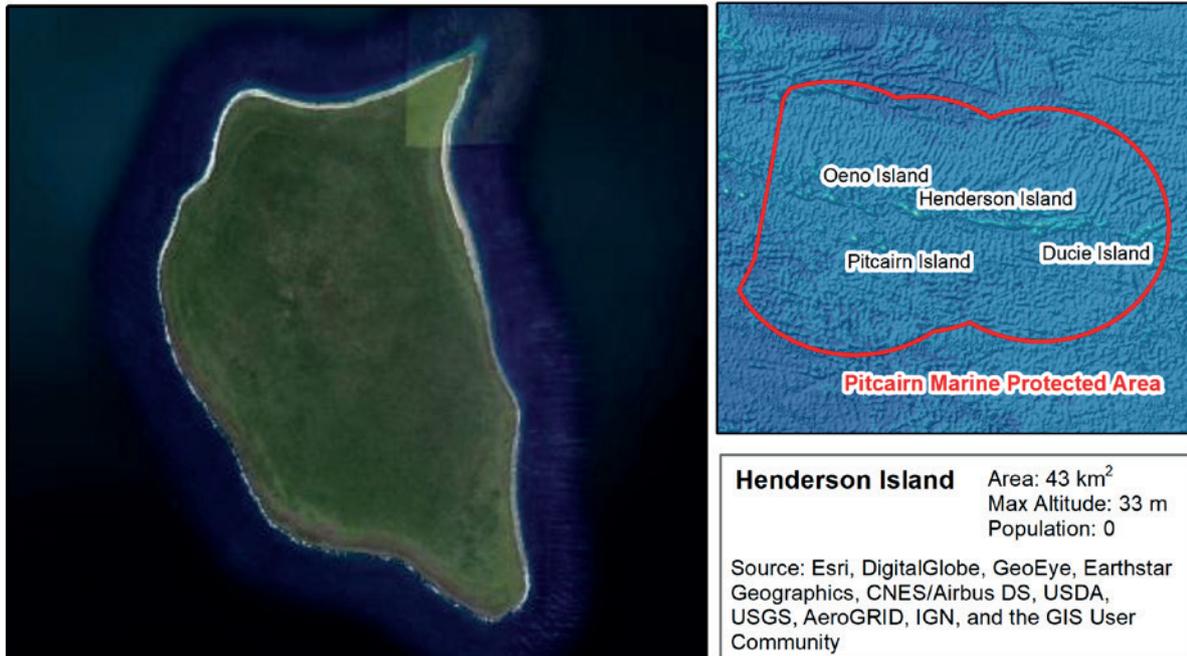


Figure 5: Satellite Image of Henderson Island, a UNESCO World Heritage site

The reef platform around Henderson Island extends around almost two thirds of the island's 26.4 km perimeter beginning at North-West Beach and extending clockwise around the island to just north of the South East Point [2]. The seaward sides of the reef platform have been undercut in many areas forming caves and channels which are colonised by several species of fish (such as squirrelfish and blackspot sweeper) and mobile invertebrates (including spiny lobster).

The fore-reef around much of Henderson Island is poor in terms of coral cover and diversity, with the richest area being off the northern end of East Beach. Live coral cover was found to be between 10% and 30%, being dominated by cauliflower corals [2, 5]. To date, a total of 76 coral species have been identified around Henderson Island [15].

Occasional patch reefs or 'bommies' are found around the northern half of the island, at a depth of between 20 and 35 m. These large and impressive structures are usually made up of a single coral species, often lobe coral [2].

Areas of high coral density can be found off East Beach on the seaward side of the fore-reef stretching up to the north-eastern point of the island. Corals are only occasionally found in the shallow areas off the north and west of the island. Deep water video data has identified large areas of corals on the island slopes ranging from 30 m to 80 m deep off the north coast (Figure 6). The rest of the habitats around the north of Henderson Island are made up of coral skeleton and rubble mixed in with sand.





Figure 6. Habitat map of the nearshore areas to the north of Henderson Island.

A total of 208 species of reef fish have been identified through diver transects around the island [15]. The most common fish species are types of wrasses, surgeonfish and blennies [5]. Out of the four islands within the MPA, Henderson Island was found to have the most balanced fish population with

relatively equal numbers of plankton-eating fish, herbivores, predators and top predators [5]. The long-spined sea urchin appears the most numerous sea-urchin on the fore-reef, often present in large aggregations in areas of coral rubble [5].





Oeno Island

Oeno Island consists of a central low-lying island surrounded by a fringing reef which forms a shallow lagoon. Around 20% of the lagoon is reef platform and 20% of the reef is patch reefs [2]. Large numbers of giant clam can be found embedded within the sides of the patch reefs. A total of 62 coral species have been recorded at Oeno Island [5]. The

patch reefs are predominantly made up of encrusting corals and finger coral [1]. The fringing reef coral community is dominated by fire coral, cauliflower coral, and lobate coral [5]. To date, 214 fish species have been recorded from Oeno Island [15].



Figure 7: Satellite image of Oeno Island and the shallow lagoon within the fringing reef

Ducie Island

Ducie Island is the most southerly atoll in the world and is also the most easterly island on the Pacific Plate. The atoll consists of a main island and three islets which surround a small lagoon. The lagoon is open to the ocean through a channel in the south-west of the atoll.

The reef slope around the atoll was found to have very high coverage of live corals with much of the areas dominated by encrusting pore coral [2, 5, 19]. Given that Ducie Island is located on the easternmost limit of coral distribution in the Pacific, its high cover of live coral has been described as exceptional [5].

Within the lagoon, only a small number of live corals exist with many dead coral heads covering the lagoon floor. There are relatively few fish species within the lagoon when compared to the fore-reef surrounding the island. During a survey in 1975, only 47 species were recorded in the lagoon; a total of 173 fish species have now been recorded from Ducie Island [8, 15].

The fish community at Ducie Island is dominated by top predators, such as grey reef sharks, whitetip reef sharks and black trevally (ulwa) [19]; groupers and snappers are also common [5].



Figure 8: Satellite image of Ducie Island and the shallow lagoon between the islands

1.5.2 Offshore waters

The northern extremities of the MPA overlap with migration routes for stocks of three tuna species: skipjack tuna, yellowfin tuna (yellowtail) and bigeye tuna [1]. Western and Central Pacific Fisheries Commission (WCPFC) assessments in 2019 showed that the migratory stocks of these species were not overfished.¹² Inter-American Tropical Tuna Commission (IATTC) assessments in 2018 however indicated that although there was no concern over the status of the skipjack tuna stock, fishing mortality rates for yellowfin and

bigeye tuna were above maximum sustainable yield, and therefore indicate that overfishing was occurring.¹³

Migration routes for several species of whale and other cetaceans, as well as for green turtles, pass through the MPA. Several oceanic shark species have also been recorded, such as the oceanic whitetip shark [1].

¹² <https://www.wcpfc.int/current-stock-status-and-advice>

¹³ https://www.iattc.org/PDFFiles/StockAssessmentReports/_English/No-20-2019_Status%20of%20the%20tuna%20and%20billfish%20stocks%20in%202018.pdf

1.6 KEY VALUES

Remote and pristine environment

The nearly pristine and unique nature of most marine ecosystems of the Pitcairn Islands, means that the MPA has a unique global value that is irreplaceable. Results of surveys in 2012, indicate that the Pitcairn Islands contain healthy coral reef communities: Ducie Island in particular, was dominated by top predators and had exceptionally high coral cover (56 %) [5]. The current low level of human activities and its geographical position as the southernmost atoll in the world, suggests that these coral reefs have the potential to be more resilient to climate change. The extreme water clarity surrounding the Pitcairn Islands (measured up to 75 m at Henderson Island [1] and Ducie [5]) allows for coral growth at depths greater than expected for most Pacific reefs. Almost 100% live coral cover has been reported on an offshore structure known as “The Bear” down to 44.5 m depth [20]; 40 Mile Reef / Adams Seamount has one of the deepest well-developed coral reefs reported worldwide [19], and encrusting coralline algae has been observed at depths of 312 m at Ducie Island and potentially down to 382 m at Henderson Island [5]. Henderson Island is one of the world’s best remaining examples of an elevated coral atoll ecosystem and was designated as a World Heritage Site in 1988, on account of its exceptional natural beauty and important and significant natural habitats. Oeno, Henderson and Ducie Islands and two sites on Pitcairn Island (Brown’s Water and Pitcairn Island’s coastal waters) have also been proposed as Ramsar wetland sites of international importance.

In April 2019, the Pitcairn Islands were named an International Dark Sky Sanctuary by the International Dark-Sky Association. The sanctuary, named Mata ki te Rangi (“Eyes to the Skies”), is currently one of only ten on Earth. Such areas have an exceptional or distinguished quality of stary nights and a nocturnal environment that is protected for its scientific, natural, or educational value, its cultural heritage and / or public enjoyment.



Endemic marine species

There are five species of bony fishes which are currently believed to be endemic to the Pitcairn Islands. These are the Pitcairn sandlance, the many-spined butterflyfish (both only found at Pitcairn Island), the Henderson triplefin and the squirrelfish (both found only at Henderson). There is also an undescribed species of combtooth blenny [20], found both at Pitcairn and Henderson Islands [1].

14 IUCN Red List categories as of February 2020

15 To qualify for Alliance for Zero Extinction status, a site must be the last known location of a critically endangered or endangered species, according to the IUCN Red List threat categories

Endangered marine species

To date, more than 1,250 marine species (including seabirds) have been recorded from the waters of the Pitcairn Islands. These include three species of whales listed as endangered on the IUCN Red List¹⁴ (humpback, blue and sei whale), hawksbill and green turtles (critically endangered and endangered, respectively), three species of endangered seabirds (Henderson petrel, Phoenix petrel and Polynesian storm petrel), one critically endangered fish (great hammerhead shark) and one endangered fish (humphead wrasse) [1].

The nearshore waters surrounding both Pitcairn and Henderson Islands have now been shown to be an important mating and calving ground for humpback whales [21]. The regular migration of humpback whales to the Pitcairn Islands was first noted anecdotally in the early 1990s and since then, small numbers have become regular visitors each austral winter (May to October). Humpback whales have been sighted in all areas around Pitcairn Island, in both deep, offshore and shallow, inshore waters [22] as well as around Henderson Island [21]. These findings suggest a recent geographical shift in the easterly extent of the range of humpbacks in the South Pacific Ocean. Whilst populations of humpback whales in the rest of the world have recovered well from the days of whaling, the Oceania sub-population, has not recovered so swiftly and was listed as endangered on the IUCN Red List [23].

Green turtles nest on Henderson Island’s East Beach, with the main nesting season being between January and March. Observations in 1991–1992 suggested about ten females may be using the island [24]; there have been more recent sightings of two separate diggings on North Beach in July 2011 [1]. Henderson Island is also home to large colonies of breeding seabirds and is the only known breeding site in the world for the endangered Henderson petrel, with over 16,000 pairs being resident (>95% of the world population) [1]. All four islands were designated as Important Bird Areas in 2010, with Henderson Island also being designated an Endemic Bird Area and an Alliance for Zero Extinction site.¹⁵

Culture and History

Pitcairn Island is perhaps best known as the home of the descendants of His Majesty’s Armed Vessel (HMAV) Bounty mutineers and their Polynesian companions who arrived in 1790. The mutineers ran the Bounty ashore and set her on fire so that no clue to their whereabouts would remain visible from the sea. Her remains were discovered in 1957 in shallow water off the shores of Bounty Bay. Although only ballast blocks now remain, this area of sea holds an important cultural value to the local community.



1.7 HISTORY OF THE PITCAIRN ISLANDS

The first known settlers to the Pitcairn Islands were Polynesians and it is believed that Pitcairn and Henderson Islands were first colonised in about AD 900 and that the occupation of both islands lasted until about 1450 [1]. The majority of Pitcairn Islanders today are descended from the nine mutineers of HMAV Bounty who, led by Fletcher Christian, landed on Pitcairn Island in 1790 with six Polynesian men, twelve Polynesian women and an infant girl.

Pitcairn officially became a British colony authorised by the British Settlements Act of 1887 (although the islanders usually date their recognition as a British territory to a

constitution devised with the help of a visiting Royal Navy officer of HMS Fly in 1838). In 1902, Oeno, Henderson and Ducie were annexed by Great Britain and were included in the territory in 1938 [25]. The Pitcairn Islands now fall under the jurisdiction of the British High Commissioner to New Zealand, based in Auckland [26]. The population of the Pitcairn Islands grew to a peak of 233 in 1937; it has declined slowly since this date remaining at around 50 for the past few decades due to emigration, mainly to New Zealand. In 2020, there was a total of 42 permanent residents.

1.8 HUMAN USES

Inshore fishing

Fishing within the Pitcairn Islands EEZ was stopped with the designation of the MPA. The Pitcairn Islands MPA Ordinance does however permit fishing by the lawful residents of the Pitcairn Islands within the Coastal Conservation Areas which extend to the limits of the territorial waters around each island (12 nm) and to 2 nm around 40 Mile Reef (Adam's Seamount) and the transit zone between Pitcairn Island and 40 Mile Reef, as long as it is conducted in accordance with the Fisheries Management Plan. Pitcairn Island has accommodated an historic subsistence fishery for the past two centuries [16] with most island households eating fish. Most of the fishing occurs using handlines from the rocky shores around the island. Some of the households also own their own small fishing boats, typically fitted with outboard engines, which are used to target both nearshore reef / rock species as well as for trolling for pelagic species, such as tuna and wahoo (kuta).

Although rarely eaten by the island residents, due to the majority being Seventh Day Adventists, lobsters are caught in order to sell to tourists and occasionally cruise ships. The lobster fishery is highly variable in both effort and in the number of specimens caught, with some pots being left overnight yielding none or a single specimen. Tuna and wahoo (kuta) are also occasionally sold to visiting cruise ships [27].

Reconstructed catches for Pitcairn Island totalled about 418 tonnes for the period 1950 to 2014 [28]. Subsistence catches fell throughout this period due to the declining population, with average catch declining from 12 to approximately four tonnes per year by 2014; artisanal catches increased from an estimated catch of 0.6 tonnes per year in 2000 to 2003 to one tonne per year between 2004 and 2014. During a 12-month fisheries survey conducted by the Environmental, Conservation & Natural Resources Division of the Government of Pitcairn Islands, fishers were encouraged to record their catches and submit their records to the Fisheries Officer. Of the 12 regular fishers on the island, six participated in the survey. During the 12 months from September 2014 to August 2015, 1,190 individual fish were caught ranging across 30 different species by the six fishers [17]. Of these fish, the drummer (nanwe) was the most frequently caught, with blacktip grouper (red snapper), being the second and yellowfin tuna (yellowtail), being the third most caught fish by individuals. Although the fishing pressure exerted by the local population is small-scale, evidence from these surveys suggested that a few species were potentially at risk of being over-harvested, in particular lobsters (spiny lobster and slipper lobster), sharks and groupers (especially blacktip grouper (red snapper) and yellow-edged lyretail (fafaia)).



Cruise ships and visiting yachts

Around ten to 16 cruise ships visit the Pitcairn Islands per year. The Islands are mainly classified by cruise ship operators as a “cruise-by” destination with only a small percentage of passengers landing on Pitcairn Island; some of the expedition cruises land passengers on Henderson, Ducie or Oeno Islands if the weather conditions permit. Ships anchor offshore from Pitcairn Island in the deeper water off Bounty Bay and the local community go out to the ship to sell handicrafts, curios and other souvenirs. When the water is calm enough, the smaller cruise ships arrange for passengers to be ferried ashore using local longboats. Only four to six ships allow passengers to disembark [27] and between 389 and 913 passengers per year disembarked between 2013 and 2016 (average 670 passengers per year) [29]. Some cruise ship operators purchase fresh seafood (fish and live spiny lobster), although demand is declining due to higher food safety standards and seafood only being purchased from certified suppliers. In 2011, approximately 50 kg each of yellowfin tuna (yellowtail), wahoo (kuta) and reef fish (mainly coral trout, grouper and parrotfish) and about 400 kg of lobsters in total were purchased by cruise ship operators [1]; records for 2016 showed that 90 kg of lobsters were sold, whilst no sales were reported in 2015 [17].

There are around 25 yachts a year calling at Pitcairn Island, staying on average for one to two nights with four to six passengers [27]. Anchoring a vessel is permitted in any place within the MPA unless directed not to by the Government of Pitcairn Islands. In addition to Bounty Bay, there are three other potential anchorages around Pitcairn Island at Tedside, Ginger Valley and Down Rope (Figure 9). The Mayor (who is also the Pitcairn Island Harbourmaster) ensures that all vessels are guided to the best anchorage on the day of arrival.

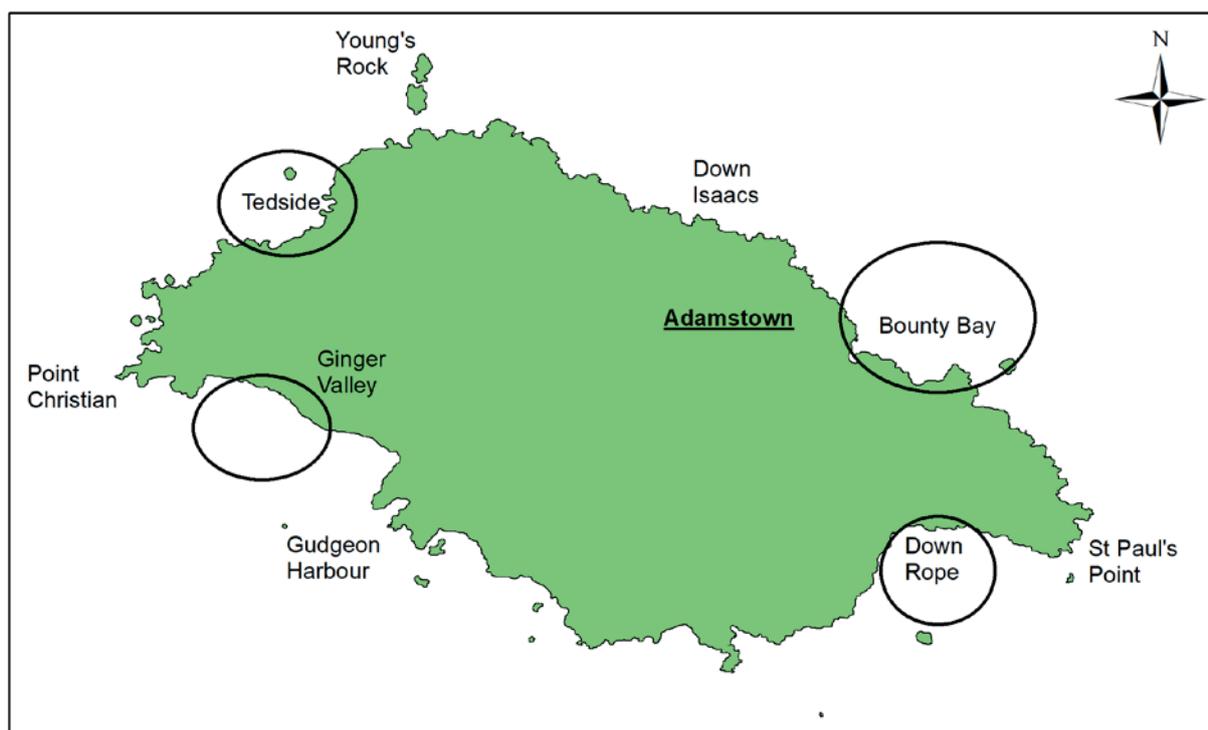


Figure 9: Map of Pitcairn Island showing the anchorage points (circled in black) (from Pitcairn Islands Tourism)

Shipping

The Pitcairn Islands are not on a main shipping route, however Automatic Identification System (AIS) monitoring showed a stable, annual, presence of cargo ships within the MPA with cargo ships frequently observed transiting every month [30]. A low and stable presence of hazardous cargo¹⁶ vessels occurred during the period reviewed. During 2015 to 2017, between 284 and 305 non-fishing vessels were observed annually within the Pitcairn Islands MPA and a surrounding 100 nautical mile buffer zone, of which an average of 29 per year were carrying hazardous cargo (Table 1).

Table 1: Total unique vessel AIS IDs per category within the Pitcairn islands MPA and surrounding buffer zone between 2015 and 2017 [30]

| Category | 2015 | 2016 | 2017 | Total |
|-----------------|------------|------------|------------|------------|
| Cargo | 198 | 201 | 198 | 484 |
| Hazardous cargo | 29 | 28 | 30 | 82 |
| Passenger | 2 | 0 | 1 | 3 |
| Pleasure | 32 | 27 | 38 | 96 |
| Unknown | 26 | 28 | 38 | 86 |
| Total | 287 | 284 | 305 | 751 |

Marine recreation

Marine recreation is currently very limited in the Pitcairn Islands. Members of the local community swim within Bounty Bay and some also go kayaking around the island. In recent years, there has been the development of boat-based whale watching tours to see humpback whales during their migration from May to October. To date, only two boat operators have taken tourists out to view the whales; however, there is growing interest from others. A code of conduct for whale watching has been developed¹⁷ and training provided to interested boat operators to help minimise disturbance to the whales. The remote location and lack of infrastructure (in particular access to recompression facilities) severely limits the development of a dive industry in the Pitcairn Islands. On some of the smaller cruise ships some tourists will however occasionally snorkel or dive, mainly around the wreck of the SS Cornwallis off the island's north-east coast.

The COVID-19 pandemic resulted in closure of the border in March 2020, resulting in a complete cessation of tourists. Prior to the pandemic, the Government of Pitcairn Islands was seeking to achieve a greater level of income from tourism to increase Gross Domestic Product, offset budgetary aid, and provide a better standard of living for the community. The new shipping service which started in 2019 is able to provide more regular voyages between Mangareva and Pitcairn Island and it is hoped that this will increase the number of tourists in the future. Small group 'Explorers Voyages' visiting all four islands are also offered by Pitcairn Islands Tourism on the MV Silver Supporter. The Pitcairn Islands MPA and the humpback whales are promoted on the Pitcairn Islands Tourism website.

16 Hazardous cargo is defined as merchant vessels (of any size) carrying dangerous goods and that must comply with the relevant provisions of the International Maritime Dangerous Goods (IMDG) Code.

17 https://www.visitpitcairn.pn/resources/downloads/Whale_Booklet_FINAL_2019.pdf and https://www.visitpitcairn.pn/resources/downloads/Whale_Leaflet_FINAL_2019.pdf

1.9 THREATS

IUU fishing from foreign fishing boats

Comprehensive satellite surveillance has been undertaken since January 2016 to better understand the threat of illegal, unreported and unregulated (IUU) fishing. The Blue Belt Programme has developed a compliance risk profile which is regularly updated based on new intelligence. This work suggests that compliance with the Pitcairn Islands Marine Protected Area Ordinance 2016 is good and to date, little evidence of IUU fishing has been found. Longliners targeting tropical tuna species comprise the only known IUU fishing threat to the Territory; other fishing methods such as purse seine do not appear to be a threat to the Pitcairn Islands.

The main tuna fisheries in the vicinity of the Pitcairn Islands are to the north (from 0° to 16°S) and immediately to the south of the EEZ where primary productivity is higher (Figure 10). Fishing primarily targets albacore tuna and, to a lesser extent, bigeye and yellowfin tuna. Boats potentially crossing into the EEZ at the northern perimeter is the highest risk of IUU fishing. Fishing activity to the north of the EEZ moves from being very close to the boundary to over 100 nm away periodically over a period of weeks / months.

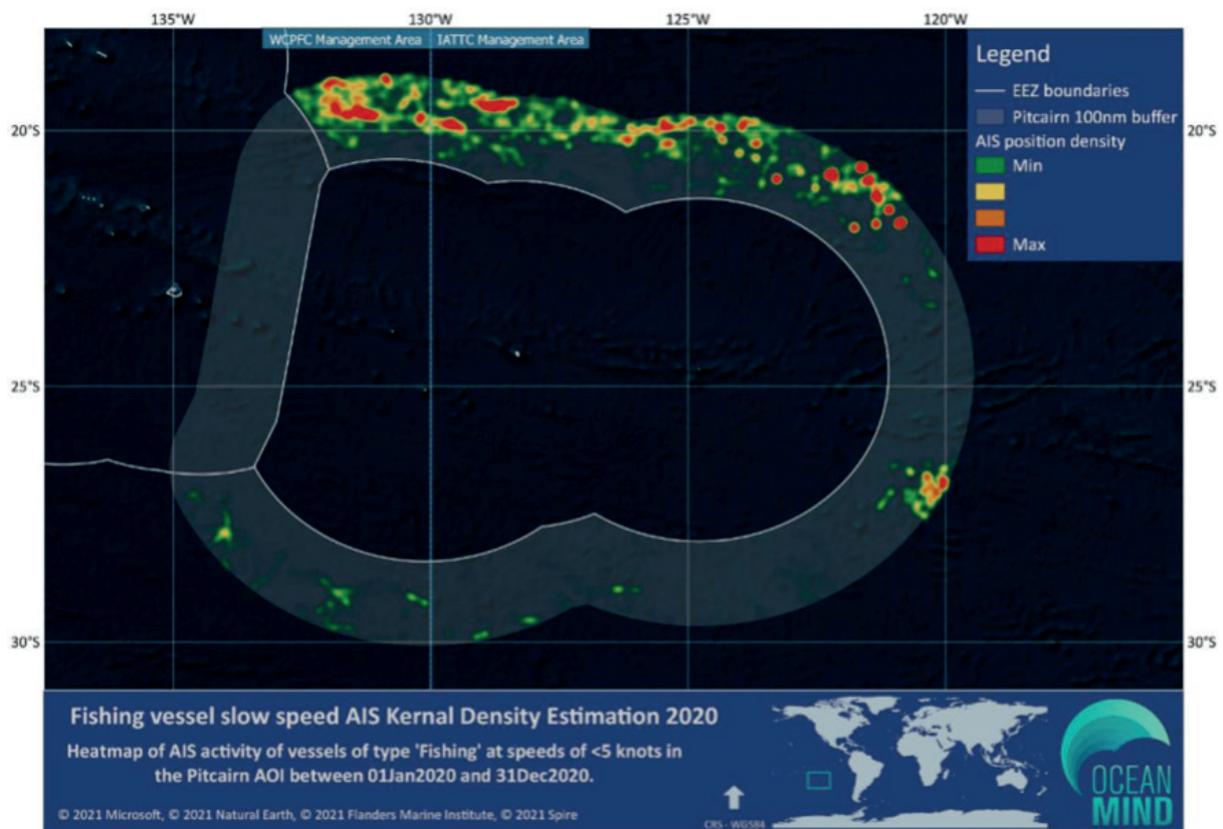


Figure 10: Heatmap of fishing vessel activity around the Pitcairn Islands MPA between 1st January and 31st December 2020 (from OceanMind, 2021)

Tuna abundance in the area appears to vary according to a 3 to 4 year cycle with anecdotal evidence that this is associated with a southerly shift in fishing effort and an increase in the IUU fishing risk at the northern EEZ perimeter. Climate change predictions suggest that tuna stocks may increase within the waters of the Pitcairn Islands due to climate-driven shifts in their distributions [31], potentially increasing the risk of IUU fishing in the future.

Pollution including oil spills and marine plastics

Pollution in the form of chemical or solid waste is a significant threat to marine life in all the world's oceans including within the Pitcairn Islands MPA. The interactions between marine species and the different pollutants are very complex and many of the long-term impacts are still not completely understood.

The two main threats are oil spills and, more recently, the accumulation of plastics in the marine environment. Both forms of pollution can have a massive impact on the health of a marine ecosystem in both the short and long term.

Although oil spills are relatively rare, their impact can be devastating. Large oil spills occurring from damage to an oil tanker can release millions of litres of oil into the environment in a very short period of time, causing damage to sensitive habitats through smothering and acute chemical poisoning [32, 33]. Even at low levels the impact of oil pollution can still be significant. The relative isolation of the Pitcairn Islands makes it less susceptible to the chronic long-term input of oil from bunkering and bilge oil activities. The low level of traffic through the region also makes the likelihood of a significant accident (involving a tanker or cargo vessel) occurring very small [30].

Plastics are currently at the centre of international conservation efforts on pollution. Recently the Pitcairn Islands have been at the centre of attention after the publication of data demonstrating that the levels of plastic accumulation on Henderson Island are some of the highest on the planet [34]. Due to the location of the Pitcairn Islands lying within the vortex of the South Pacific Gyre, floating objects such as



plastics and discarded fishing gear (including Fish Aggregating Devices from outside of the MPA) entering the southern Pacific will likely remain within the region for a long time. These objects eventually pass through the Pitcairn Islands MPA; many of the floating objects accumulate on Henderson Island's East and North Beaches due to the lack of a surface-breaking coral reef, and to a lesser extent on Acadia Beach on Ducie Island. The direct impact of plastics on the marine environment and its inhabitants includes entanglement, ingestion of plastics and the subsequent absorption of toxic chemicals which are often present on the surface of plastics [6].

Anchor damage

There are currently no permanent moorings within the Pitcairn Islands MPA and visiting vessels anchor in 'safe spots' from the prevailing weather conditions as directed by the Harbourmaster (Mayor). The impact these vessels may be having on the seafloor habitats around the Pitcairn Islands is currently not well understood. Physical disturbance through the incorrect placement of anchors is a major threat to immobile species, in particular slow-growing ones such as corals. Anchoring activities can break, fragment or overturn coral colonies which can lead to considerable losses of not only the species directly impacted, but also the animal communities living within that habitat [35]. Impacts and loss of three-dimensional habitats, reduce the areas which are used for grazing, refuges and breeding by fish. The slow-growing nature of coral reefs means that structural damage can impact the reef for decades. As well as the anchor itself, chains and warps associated with the anchor can also cause considerable damage as the vessel swings with the changing tides and winds. These chains sweep the seabed as the vessel rotates on its anchor and can disturb significant areas of seabed [36].

Erosion and run-off from land

Goat grazing and trampling and incorrect excavation of roads, combined with recent changes to weather patterns bringing above-average rainfall, has led to erosion on some exposed ridges and slopes, [29]. A major rainfall event in February 2012 resulted in 600 mm of rain falling over two days, which caused several landslides across the island and resulted in high sedimentation loads entering the near-shore marine environment [13]. The lack of large-scale agriculture on Pitcairn Island means that there is minimal run-off of fertilisers or pesticides.

The potential impacts of sedimentation have been well documented in coral reef ecosystems. High levels of sediment in the water column reduces the quality and/or quantity of light available. This can affect coral nutrition, growth, reproduction and depth distribution and excess sedimentation can inhibit the coral's feeding efficiency and may also interfere with the settlement and growth of new coral larvae [37]. In rocky shore environments, impacts include smothering by sediment, scour/abrasion by moving sediments and changes in the physical characteristic of the seabed; this can result in changes in species composition and distribution, reductions in settlement and growth of larvae, mortality of species and reduced species diversity [38]. The strong wave action around the island is however likely to quickly disperse any suspended sediment in the water column [13], minimising impacts.

A number of initiatives have been undertaken on Pitcairn Island in recent years to reduce impacts from erosion and restore damaged terrestrial habitats. As part of the INTEGRE (Initiative des Territoires pour la Gestion Régionale de l'Environnement) project funded by the European Union, a wild goat eradication campaign commenced in 2014, followed by a plan to manage the remaining domestic goats. The project also supported the restoration of eroded hillsides by setting up a nursery to facilitate the replanting of the slopes, laying erosion-control mats and re-planting and laying culverts to collect water flowing down the slopes and reduce erosion during heavy rain [29]. As a result, run-off from land has decreased in recent years. Additional actions to address this threat are therefore not included in this Management Plan.

Invasive non-native species

Invasive non-native (alien) species are species whose introduction and/or spread outside their natural past or present distribution threatens biological diversity. Invasive non-native species (INNS) are considered to be the greatest threat to biodiversity in marine, freshwater and terrestrial ecosystems after climate change [39]. The environmental impacts of INNS include the displacement of indigenous species which results in the loss of both species and genetic biodiversity, destruction of habitat and the introduction of disease. Marine INNS are of particular concern as once they are established, it is extremely difficult and expensive to monitor, manage and eradicate them from marine systems. A review undertaken as part of the Blue Belt Programme [40], noted the presence of the invasive crown-of-thorns starfish, which although native to the Indo-Pacific Region has only recently been found in the waters around the Pitcairn Islands.

Climate change

Climate change is one of the biggest threats the environment faces during the next century. Pressures such as increases in air and sea surface temperatures, increased ocean acidity and sea level rise are all likely to negatively impact the marine environment within the Pitcairn Islands MPA.

Sea level rise is likely to have a significant impact on the Pitcairn Islands, particularly on the low-lying islands of Oeno and Ducie. These islands have a maximum elevation of just 3 to 4 m. Nesting turtles at East Beach on Henderson Island and nesting bird populations on the three uninhabited islands will be threatened during over-washing events and the lagoons, which provide safe nursery grounds for juvenile fish and other species, would be exposed to increased wave action. Sea level rise across the Pacific region has been recorded as being around 6 cm since 1960. By 2100, sea levels around the Pitcairn Islands could have risen by up to 140 cm according to some recent models [31] endangering many of the low-lying areas.

The impact of increases in sea surface temperature on coral reefs has been well documented in other regions [e.g. 41, 42]. Coral bleaching events which cause the widespread devastation of reefs and losses in biodiversity have been associated with increases in temperature of just 1° to 2°C. At a regional scale, the average sea surface temperature in the Pacific increased by 0.31°C between 1950 and 2009 [43] and is expected to have increased by 1.2°C to 2.7°C by 2100 [31]. Sea temperature records from monitoring sites in the Pitcairn Islands show three relative heatwaves, with peaks in 1995,

2006 and 2017, mainly around Oeno, Pitcairn and Henderson Islands, but less noticeable at Ducie, although there is no evidence of coral bleaching having occurred [44]. By 2099, the Pitcairn Islands' average sea surface temperature is expected to warm by 2–2.5°C, with half of shallow-water corals likely to be exposed to bleaching by 2050 [43]. As the Pitcairn Islands are located within the vortex of the South Pacific Gyre, it is however predicted that this region will show less dramatic increases in sea surface temperature than most other regions around the world [5]. The deeper reefs may also be sheltered from future climate change. However, these corals may be more sensitive if stress occurs, and their isolation may challenge their recovery [44].

Many different ocean animals rely on the creation of hard shells and skeletons of calcium carbonate to protect themselves from predation and to form the structures which help them to survive. In acidic conditions calcium carbonate will dissolve. As the concentration of carbon dioxide in the atmosphere increases, through the burning of fossil fuels, some of this is absorbed and dissolved into the ocean forming carbonic acid. This creates a more acidic ocean making it harder for animals such as corals, snails and tiny plankton to form shells and skeletons. This disrupts their growth and can ultimately cause the death of the animal. The Pacific Ocean has a lower value of pH¹⁸ and has seen a faster rate of decline in sea surface pH than other major open oceans. By the end of the century the waters around Pitcairn are projected to decrease by between 0.08 and 0.27 pH units [45] making it harder for calcifying animals to produce robust shells and skeletons.

1.10 GOVERNANCE STRUCTURE



Regional

The Council of Regional Organisations in the Pacific brings together several regional inter-governmental agencies, of which the most relevant in this context are the Pacific Community (SPC) and the Secretariat of the Pacific Regional Environment Programme (SPREP).

The SPC is the principal scientific and technical organisation supporting development in the Pacific region. It is an international organisation established by treaty (the Canberra Agreement) in 1947 and is owned and governed by its 26 members including all 22 Pacific Island countries and territories; the Pitcairn Islands are a member of the SPC. The SPC's main focus is on major cross-cutting issues, such as climate change, disaster risk management, food security and human rights.

SPREP is the region's key inter-governmental organisation for environment and sustainable development. The purposes of SPREP are to promote cooperation in the South Pacific Region and to provide assistance in order to protect and improve the environment and to ensure sustainable development for present and future generations. SPREP also provides regional leadership and technical guidance and serves as a conduit for member states in implementing several global multilateral environmental agreements (MEAs) and regional environmental frameworks. The UK became a member of SPREP on 17th December 2012, but has not ratified the Convention for the Protection of the Natural Resources and Environment of the South Pacific Region (1986) (the Noumea Convention) or the Convention to Ban the Importation into Forum Island Countries of Hazardous and Radioactive Wastes and to Control the Transboundary Movement of Hazardous wastes within the South Pacific Region (2001) (also known also as Waigaini Convention).

Regional Fisheries Management Organisations (RFMOs) are established under the United Nations Convention on the Law of the Sea and the UN Fish Stocks Agreement and have responsibility for managing highly migratory and straddling high seas fish stocks. Two RFMOs managing tuna species (highly migratory remits) are relevant to the Pitcairn Islands:

- Inter-American Tropical Tuna Commission (IATTC)
- Western and Central Pacific Fisheries Commission (WCPFC)

IATTC is of most relevance by virtue of its Convention applying across the entire Pitcairn Islands' EEZ. The Convention area of WCPFC applies in the eastern extremity only; the two Convention areas do overlap (Figure 11).

¹⁸ pH is the measure of acidity/alkalinity with low numbers (1.0) being highly acidic and high numbers (14.0) being highly alkaline.

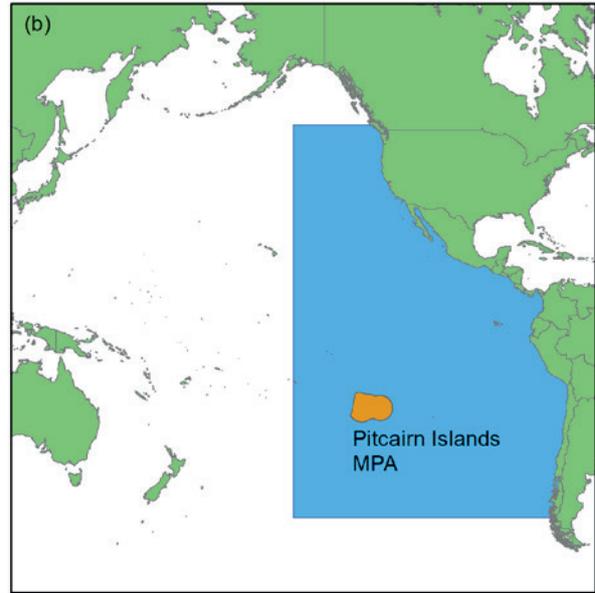
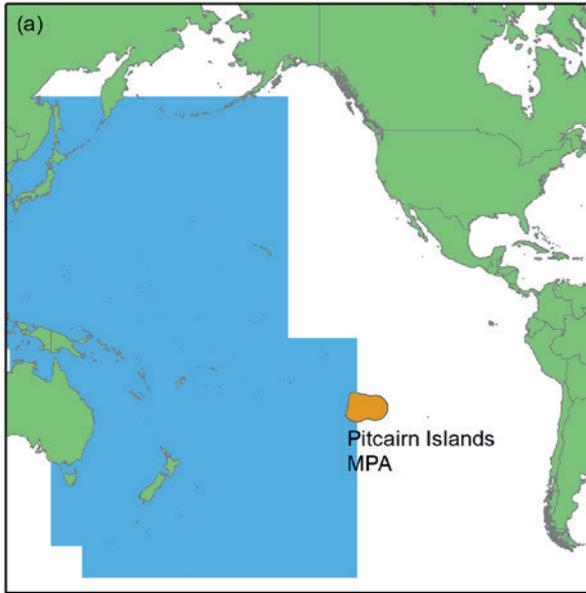


Figure 11: The Convention areas of (a) the Western and Central Pacific Fisheries Commission (WCPFC) and (b) the Inter-America Tropical Tuna Commission (IATTC)

The obligations and requirements of tuna RFMOs apply within coastal State waters and therefore may have implications relating to recreational fisheries for tuna for the Pitcairn Islands. The tuna RFMOs have procedures for ‘listing’ vessels presumed to have engaged in IUU fishing activity. Implications of a vessel being IUU listed include removal from the flag State authorised lists, prohibition of port entry and other ancillary activities. The IUU listing process represents one enforcement response option for the Pitcairn Islands, should it require action against an IUU fishing vessel, and negates the cost, legal and logistical challenges of a prosecution within the Pitcairn Islands court system.

The Pitcairn Islands’ membership of IATTC and WCPFC was previously through the UK’s membership of the European Union (EU). As the UK has now withdrawn from the EU, this arrangement has ceased. UK membership of the tuna RFMOs will be driven by need and subject to a phased prioritisation.

The South Pacific Regional Fisheries Management Organisation (SPRFMO) manages non-migratory species. It has regional application to the Pitcairn Islands; however, its requirements and obligations do not apply within coastal State waters. SPRFMO is of limited relevance to the Pitcairn Islands, as there is very low fishing activity in the vicinity of the Pitcairn Islands EEZ. If fishing effort was to increase in the future, then this might impact upon the conservation objectives of the MPA.

National

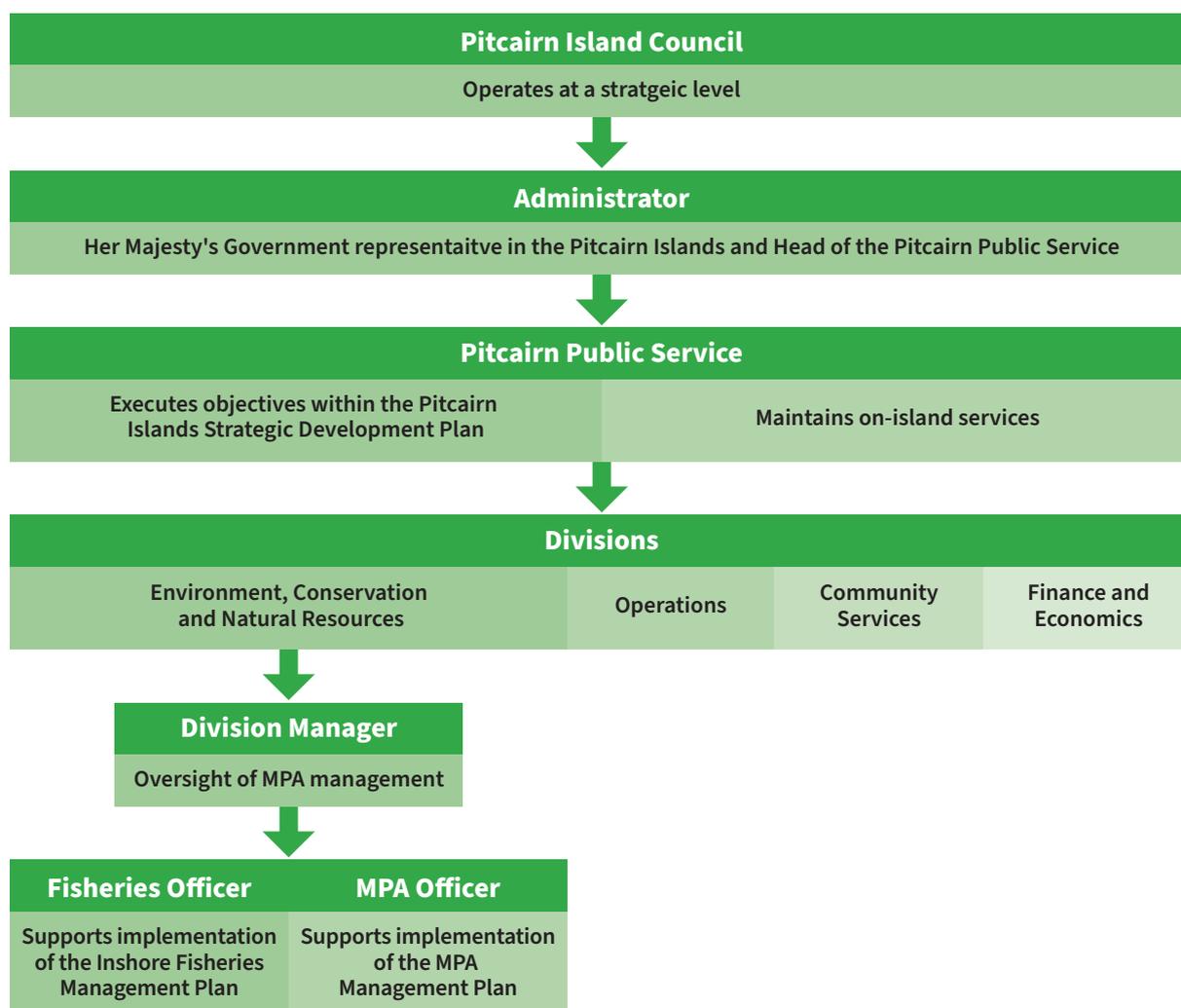
The Pitcairn Islands are a UK Overseas Territory and the governance and institutional structure is set out in the Pitcairn Constitution Order 2010. The governance structure is broadly defined as follows:

- (i) Governor of Pitcairn (British High Commissioner to New Zealand), appointed by Her Majesty by Commission, who may make laws for the peace, order and good government of the Pitcairn Islands (after consulting the Island Council);
- (ii) An Administrator, the Governor’s Representative who normally resides on the Island for 12 months and is the head of the Pitcairn Public Service;

- (iii) The Island Council, an elected body consisting of the Mayor, Deputy Mayor and five Councillors; the Governor, Deputy Governor and Administrator are non-voting *ex officio* members of the Council;
- (iv) On-island operations are supervised by four Divisional Managers (Community Development; Environmental, Conservation & Natural Resources; Finance & Economics and Operations) who report to the Island Council; and
- (v) The Pitcairn Island Office, based in Auckland, which provides administrative and financial support.

MPA management falls under the remit of the Environmental, Conservation & Natural Resources Division (ECNRD). This Division exercises general oversight of the preservation and conservation of the natural environment including biosecurity, quarantine, natural resource management (land, water, fisheries, etc.), management of the plant nursery, promotion of local agricultural production and export, eco-trail maintenance, land court and surveyors, environmental supervision of the outer islands and liaison with international environmental organisations. Enforcement sanction decisions under the Compliance & Enforcement Strategy are the responsibility of the Attorney General’s office and New Zealand Police.





1.11 LEGISLATIVE FRAMEWORK

Pitcairn law comprises ordinances made by the Governor; United Kingdom legislation and Orders in Council which have been extended to the Pitcairn Islands; and the common law of England so far as local circumstances and the limits of local jurisdiction allow.

International obligations

The UK Overseas Territory of the Pitcairn Islands and their marine waters are included within the UK's ratification of a number of MEAs as shown in Table 2.

Table 2: Relevant MEAs ratified by the UK on behalf of the Pitcairn Islands

| Convention | Status |
|--|--|
| The International Convention for the Regulation of Whaling | Ratified by the UK 10/11/48 |
| Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention) | Ratified by the UK 17/11/1975 |
| United Nations Convention on the Law of the Sea | Ratified by the UK 25/07/1997 |
| Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention) | Ratified by the UK 05/01/1976 |
| Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) | Ratified by the UK 31/10/1976 |
| Convention Concerning the Protection of the World Cultural and Natural Heritage | Ratified by the UK 29/05/1984 |
| Convention on the Conservation of Migratory Species of Wild Animals | Ratified by the UK 01/10/1985 A Memorandum of Understanding for the Conservation of Cetaceans and their Habitats in the Pacific Islands Region was signed by the Governor of the Pitcairn Islands on 29/07/2009 |

The Convention on Biological Diversity (CBD) has been ratified by the UK but has not yet been extended to the Pitcairn Islands. Effective management of the Pitcairn Islands MPA will however help the UK Government to meet its commitments under a number of CBD Aichi Targets as well as the United Nations Sustainable Development Goals. In particular, designation of the MPA has contributed significantly towards the UK meeting Aichi Target 11 and SDG 14.5 which both aimed to protect 10% of coastal and marine areas by 2020. Effective management of the MPA will contribute towards achieving the post-2020 global biodiversity framework which includes a target to ensure that at least 30% of land and seas globally are conserved through effective, equitably managed, ecologically representative and well-connected systems of protected areas. It will also contribute towards the Global Ocean Alliance's aim to protect at least 30% of the global ocean by 2030.

Ratification of a number of International Maritime Organization (IMO) Conventions has been extended to the Pitcairn Islands including the International Convention relating to Intervention on the High Seas in cases of Oil Pollution Casualties 1969, the Convention on the International Regulations for Preventing Collisions at Sea 1972 and the Convention on Limitation of Liability for Maritime Claims 1976. The Merchant Shipping (Oil Pollution) (Pitcairn) Order 1997 extends sections 152 to 170 and 172 to 181 of, and Schedule 5 to, the Merchant Shipping Act 1995 to the Pitcairn Islands. It implements the International Convention on Civil Liability for Oil Pollution Damage 1992 and the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage 1992. These, respectively, require oil tankers to hold

insurance against the cost of clean-up, impose strict liability, up to a specified financial limit, if a maritime casualty occurs and enable access to an international fund if costs cannot be recovered from the ship owner or insurer.

National legislation

The Pitcairn Constitution Order 2010 includes protection of the environment, stating that everyone has the right to an environment that is generally not harmful to his or her health or well-being and to have the environment protected, for the benefit of present and future generations.

The Pitcairn Islands Marine Protected Area Ordinance 2016 officially established the MPA in September 2016. It defines the boundary of the MPA, establishes the Coastal Conservation Areas, sets out the prohibited and regulated activities within the MPA, the relevant offences and penalties and enforcement. The Ordinance prohibits the following activities within the MPA:

- fishing – this does not apply to fishing by residents of Pitcairn providing it is conducted while in transit to or from other islands in or outside the MPA for consumption during that trip, is by an attended line and is conducted in accordance with any Marine Conservation Regulations and Fisheries Management Plan
- any mining activities
- the disturbance or removal of non-living material from the seabed
- the dumping of waste
- the causing of vibrations that may have an adverse effect on marine life



The Marine Conservation Regulations prohibit specified activities within the MPA and provide a framework for granting permits for regulated activities to manage activities within the Coastal Conservation Areas. The Marine Conservation Regulations allow:

- residents of Pitcairn to fish in the territorial seas around Pitcairn Island if they hold a fishing permit
- residents of Pitcairn to fish in the territorial seas around Henderson, Oeno and Ducie Islands without a permit, provided that fishing is for consumption during the period of stay on the relevant island, is by an attended line and is conducted in accordance with the Fisheries Management Plan
- non-residents of Pitcairn to fish if they hold a fishing permit, provided that the fishing is for consumption by the person while on Pitcairn Island and they are accompanied by a lawful Pitcairn resident
- anchoring within the MPA unless directed otherwise

The Marine Conservation Regulations prohibit:

- commercial diving within the MPA without a permit
- discharge of a polluting substance from a vessel in any Coastal Conservation Area
- killing, taking, hunting capturing or harassing any protected migratory species listed in Annex I and II of the Convention on Conservation of Migratory Species or any other wild seabird, including its eggs, without written authority of the Marine Environment Committee

The Marine Conservation Regulations also have provisions for the establishment of a Marine Environment Committee which would be responsible for general oversight of human activities in the Coastal Conservation Areas through a permitting scheme (for example, limiting the number of dive permits issued, setting permit fees and suspending or revoking permits).

Other local legislation which offers protection to habitats and species includes:

- The Endangered Species Protection Ordinance 2004 provides for the protection of endangered, endemic and indigenous species of animals and plants and regulates the trade in endangered species. Under this Ordinance, it is an offence to export or import any protected goods (i.e. any specimen of a species that is included in Appendix I, II or III of CITES¹⁹) without a licence. Marine species included in Appendix I (international trade prohibited except in exceptional circumstances) include species of whales and turtles; marine species listed in Appendix II (trade must be controlled) include oceanic whitetip sharks, hammerhead sharks, humphead wrasse and coral species. The Ordinance also enables the Governor to prohibit the import, export or use of any article or substance which may endanger the welfare of continued existence of any plant or animal endemic or indigenous to the Pitcairn Islands and to prohibit the taking, damaging or killing of any specific plant or animal.
- The Prevention of Collisions at Sea Ordinance 2001 extends the provisions of the International Regulations for Preventing Collisions at Sea (1972) to the Pitcairn Islands. The Ordinance requires all vessels to use all available means appropriate to the prevailing circumstances and conditions to determine if risk of collision exists and to take positive action to avoid collision in ample time and with due regard to the observance of good seamanship.



¹⁹ <https://www.cites.org/eng/app/appendices.php>



Robert Irving

International policy

25 Year Environment Plan

The UK Government's 25 Year Environment Plan highlights the UK's ambition to champion and support conservation and biodiversity in Overseas Territories' waters and notes an intention to work domestically and internationally to deliver the UK's commitments under UN SDG 14. It includes a commitment to continue implementation of the Blue Belt programme, including assisting with efficient monitoring and enforcement of large scale MPAs. Two indicators are of direct relevance to this MPA Management Plan: 'Status of endemic and globally threatened species in the UK Overseas Territories' (K3) and 'Extent and condition of terrestrial and marine protected areas in the UK Overseas Territories' (K4).

The UK Overseas Territories Biodiversity Strategy

The UK Overseas Territories Biodiversity Strategy sets out the UK Government strategy to enable the UK and Overseas Territory Governments to meet their international obligations for the conservation and sustainable use of biodiversity in the Overseas Territories. One of the five strategic priorities is to develop ecosystem-based initiatives for the conservation and sustainable use of the marine environment.

National policy

The Pitcairn Islands Strategic Development Plan 2014-2018 (currently being revised) recognises environmental management as one of the four key goals and notes that protecting the environment for future generations is becoming increasingly important. Key objectives include: (i) developing fisheries for local demand (creating a sustainable fisheries management plan); (ii) improving environmental management; (iii) protecting the island's biodiversity; and (iv) climate change.

The Fisheries Management Plan for the Pitcairn Islands Coastal Conservation Areas [16] prohibits:

- netting
- spearfishing for the capture of lobsters
- removal of any V-notched or mutilated lobster
- removal of undersized and berried lobsters
- removal of undersized and juvenile fin fish species
- capture of any shark species using a set shark line
- fishing for any marine aquarium fish, except with the written authorization of the ECNRD

The Government of Pitcairn Islands' 'Guide for visiting vessels' notes that the waters of the Pitcairn islands have been declared an MPA and that all visiting vessels are therefore prohibited from conducting any fishing activities within the Pitcairn Islands EEZ. The policy also requests all visiting vessels that detect unusual activity to report it the ECNRD Manager. The policy notes that all visitors to the outer islands must remove all rubbish including food waste and wrapping from the islands, must not disturb, damage, destroy or remove any flora or fauna, must not introduce any flora or fauna and that after departure, no evidence of the visit must remain. Regarding Henderson Island, the policy states that landing is to be on the North Beach only and that East Beach and North-West Beaches are off-limits to visitors.



PART 2: MARINE PROTECTED AREA MANAGEMENT

2.1 MPA MANAGEMENT PLAN PRINCIPLES

The MPA management will be guided by the following management principles:

- **Evidence-based:** We will make all management decisions based on the best available information, and where possible will aim to address knowledge gaps through research and monitoring. Where, evidence is lacking but there are reasonable grounds for concern that an activity could harm the environment, we will apply the precautionary principle. This gives us the option to restrict activities until the ecological impacts are properly understood.

We will monitor the outcomes of our management actions through the use of indicators and will apply an adaptive management approach. This will allow for changes to be detected and fed-back into the management decision-making process to ensure that our goals and objectives are being achieved.
- **Equitable:** The MPA will generate a flow of benefits but there may also be costs. We will ensure that the MPA will not disproportionately impact certain groups and that any benefits from the MPA are distributed equitably amongst the whole community.
- **Collaborative:** The effectiveness of MPA management depends on the willingness of the local community to comply with the regulations. We will ensure that the local community can actively participate in MPA management to help secure the sustainable future of their marine resources. We will ensure that any decisions we make regarding the management of the MPA will be made in a transparent way, so that they are accessible to the local community.

2.2 VISION

The pristine environment and thriving marine life of the Pitcairn Islands are protected providing benefits to present and future generations

2.3 GOALS

The goals of the Pitcairn Islands MPA as defined in the Pitcairn Islands Marine Protected Area Ordinance (2016) are:

1. Conservation and protection of the marine environment for present and future generations
2. Maintenance of biodiversity
3. Minimisation of human impact
4. Maintenance of the Pitcairn Islands Marine Protected Area as a global reference site against which other marine areas can be benchmarked
5. Preservation of customary fishing practices of Pitcairn residents



2.4 MANAGEMENT STRATEGIES AND ACTIONS

The vision and goals will be achieved through the following management strategies and actions. The management actions will be implemented by the Government of Pitcairn Islands with assistance from external programmes

and organisations including the Blue Belt Programme, international research institutions, non-governmental organisations and others, where appropriate.

Management Strategy 1: The appropriate legal, financial and human resource frameworks are in place and fit for purpose to ensure effective management of the MPA

Objective 1.1: The appropriate legal and policy frameworks are in place to deliver effective management

The Pitcairn Islands Marine Protected Area Ordinance 2016 officially established the MPA. This Ordinance together with the Marine Conservation Regulations set out the prohibited and regulated activities within the MPA. A Fisheries Management Plan for the Pitcairn Islands Coastal Conservation Areas has been produced with funding from the UK Government's Darwin Initiative [17, 46]. We will now develop specific policies to manage other human activities within the MPA to reduce threats such as invasive non-native species and marine pollution.

Objective 1.2: Appropriate long-term financial resources have been secured to deliver effective management

The Government of Pitcairn Islands has been dependent on budgetary aid from the UK Government since 2005. Assistance for MPA management is also provided by the UK Government through the Blue Belt Programme. Short-term funding for conservation work comes from external sources

such as the European Union (e.g. the voluntary scheme for Biodiversity and Ecosystem Services in Territories of European overseas (BEST) and European Development Fund), non-governmental organisations (e.g. Pew Charitable Trusts, RSPB) or academic institutions (e.g. through Darwin Plus grants). The UK's withdrawal from the European Union in January 2020 resulted in a loss of access to future European funding. We therefore need to investigate other funding options to provide long-term support to enable us to effectively implement the MPA Management Plan. We will work with partners to investigate other options such as the Pacific Development and Conservation Trust, international funding organisations, charitable trusts and foundations or the establishment of a campaign to solicit donations (e.g. a "Friends of the Pitcairn Islands MPA" programme) amongst others. We will also consider other sustainable financing options such as charging visiting cruise ships a fee to enter the MPA (regardless of whether passengers disembark or not) and increasing the landing fee.



Objective 1.3: Appropriate human resources have been secured to deliver effective management

The tiny Pitcairn Islands population, with a current workforce of about 30, means that people must hold multiple jobs. The ECNRD currently has five staff all of whom work on a part-time basis. This lack of human resources is a major constraint and additional human resources on-island are required to ensure implementation of the MPA Management Plan. Effective MPA management will however also require the support of external organisations and the development of regional and international collaborations to increase capacity. It is important to enhance communication and cooperation with organisations both within the South Pacific region and internationally, and to promote relationships with other MPA managers. For example, we will investigate strengthening links with the Office of the Pacific Oceanscape Commissioner, implementing an Ocean Arc²⁰ with French Polynesia as they develop their large scale MPA, and whether the Pitcairn Islands MPA could join the Big Ocean network²¹ amongst others.

Objective 1.4: The local community understands and actively participates in MPA management

The effectiveness of MPA management will depend on the willingness of the local community to comply with the new Regulations. We will therefore ensure that the community is adequately consulted and supportive of any restrictions put in place. We will also aim to further enhance effective MPA management through training to enable community members to actively participate in management actions for example, through long-term monitoring of the key habitats and species. This will enhance local understanding and promote stewardship of the marine resources.

| Management Strategy 1: The appropriate legal, financial and human resource frameworks are in place and fit for purpose to ensure effective management of the MPA | | |
|--|---|---|
| Objectives | Action | Indicators of success |
| 1.1 The appropriate legal and policy frameworks are in place to deliver effective management | 1.1.1 Develop required policies for effective management of the MPA and review these policies on a three-yearly basis (e.g. marine biosecurity protocol, marine pollution contingency plan) | <ul style="list-style-type: none"> • Implementation of the management plan and associated work-plan • Existence and adequacy of enabling legislation |
| | 1.1.2 Develop annual operational plans to effectively implement the MPA Management Plan actions | |
| | 1.1.3 Undertake regular reviews of the MPA Management Plan (every 5 years) to ensure that objectives are being met | |
| 1.2 Appropriate long-term financial resources have been secured to deliver effective management | 1.2.1 Develop a 3-year budget for MPA management with annual budget reporting | <ul style="list-style-type: none"> • Existence of an MPA management budget |
| | 1.2.2 Investigate sustainable financing options to support MPA management actions in the long-term | |
| 1.3 Appropriate human resources have been secured to deliver effective management | 1.3.1 Continue to employ an MPA Officer to ensure implementation of the MPA Management Plan | <ul style="list-style-type: none"> • Availability and allocation of MPA administrative resources • Involvement in regional/international projects that will actively improve MPA management |
| | 1.3.2 Undertake a regular staff training needs assessment and facilitate training as required | |
| | 1.3.3 Enhance communication and cooperation with organisations within the South Pacific region and internationally and promote relationships with other MPA managers | |
| 1.4 The local community understands and actively participates in MPA management | 1.4.1 Ensure that the local community is regularly updated and consulted on any MPA management actions | <ul style="list-style-type: none"> • Local understanding of and support for MPA rules and regulations • Level of community participation and satisfaction in management processes |
| | 1.4.2 Support opportunities for the local community to receive training and participate in management actions, particularly long-term monitoring | |

20 As part of the Pacific Oceanscape, the Pacific Ocean Arc component aims to foster development of terrestrial and marine protected areas, based on the natural archipelagic nature of some Pacific Island Countries and Territories (PICTs), including consideration of territorial domains associated with Exclusive Economic Zones (EEZs), and opportunities for protected areas beyond these EEZs, in the surrounding high seas. For many such archipelagos, the implementation of Ocean Arcs will necessitate a trans-boundary approach and associated collaboration between PICTs. See: <https://www.forumsec.org/wp-content/uploads/2018/03/Framework-for-a-Pacific-Oceanscape-2010.pdf>

21 <https://bigoceanmanagers.org/>

2

Management Strategy 2: Human activities within the MPA are effectively managed to minimise threats to key species and habitats as far as is reasonably practical

Human activities within the MPA include fishing by the local community within the Coastal Conservation Areas, shipping and tourism (visiting yachts and cruise ships as well as marine recreation activities). Key threats to the habitats and species as a result of these human activities within the MPA are described in Section 1.9 above. Several specific actions are required in order to minimise these threats, protect the unique marine habitats and species and promote sustainable use of natural resources within the MPA.

Objective 2.1: IUU fishing within the MPA is minimised

The Pitcairn Islands MPA is extremely remote and represents significant challenges to the development of an effective Compliance and Enforcement strategy. Effective understanding of the spatial and temporal IUU fishing threats, how they are detected in a cost efficient and targeted way and mechanisms to sanction and deter IUU fishing are all aspects of a Compliance and Enforcement strategy.

An initial assessment of the levels of IUU fishing based on previous surveillance funded by the Pew Charitable Trusts and open source information considered the level of IUU fishing to be low. Vessels that pose an IUU fishing threat to the Pitcairn Islands MPA have been profiled and knowledge gaps and weaknesses in counter measures have been identified and are being addressed by a cyclical learning process.

Surveillance conducted over the Pitcairn EEZ has consisted of the following:

- Synthetic Aperture Radar (SAR) to detect “dark” vessels, provided by the Pew Charitable Trusts
- AIS-based surveillance using UK based systems since 2018

The latter is now on-going and forms part of a risk-based surveillance system introduced by the Blue Belt Programme; commercial SAR surveillance is available and tasked on a risk basis should it be needed. Between January and March 2021, 63 AIS checks were made, showing 100% compliance with the Pitcairn Islands Marine Protected Area Ordinance. Two high risk detections were picked up inside the MPA using SAR, but further investigation suggested that these were most likely caused by weather conditions at the time.

There is currently no capacity or resources for the enforcement of the MPA on Pitcairn Island, beyond the local fisheries regulations. Therefore, surveillance must be remote and subsequent investigation of IUU fishing will require liaison with relevant flag States and RFMOs. A Compliance and Enforcement Strategy has been developed for the Pitcairn Islands, which will ensure that the Government of Pitcairn Islands achieves full compliance with relevant legislation within the Pitcairn Islands EEZ. This Strategy covers surveillance and intelligence management, capacity building through the training of staff in the Pitcairn Islands, international enforcement liaison and assistance with international obligations (for example RFMOs), which will be delivered through the Blue Belt Surveillance and Intelligence Hub. The Blue Belt Programme has established a dialogue with key flag States and has successfully requested Vessel Monitoring System (VMS) for incidents in the Pitcairn Islands EEZ. When a confirmed non-compliance event occurs, it will result in a proportionate sanction or outcome being applied.

Objective 2.2: Impacts to coral reef habitats from anchor damage are reduced

The Marine Conservation Regulations allow anchoring within the Pitcairn Islands MPA unless directed otherwise. Currently vessels visiting Pitcairn Island anchor in ‘safe spots’ from the prevailing weather conditions as directed by the Harbourmaster (Mayor). The impact visiting vessels may be having on the marine environment around the Pitcairn Islands, in particular on the seafloor habitats within the MPA, has not been studied or quantified and there is concern that local coral reefs may be being damaged by the anchors and chains. The Blue Belt Programme has undertaken a bathymetric assessment and seabed habitat mapping of the inshore (<20 m deep) regions around Pitcairn Island. This will enable the identification of potential exclusion zones where anchoring could be prohibited to protect vulnerable seafloor habitats. In the future, seabed habitat mapping around Henderson, Oeno and Ducie Islands will enable the passes in the coral reefs to be accurately mapped to avoid damage from visiting vessels.





Objective 2.3: Fishing by the local communities within the Coastal Conservation Areas is sustainable

The local fishery is very small-scale with just 12 regular fishers. The Fisheries Management Plan for the Pitcairn Islands Coastal Conservation Areas establishes a set of guidelines, practices and regulations to ensure that the fisheries of the coastal and inshore areas are biologically sustainable and provide long-term benefits for the local community. These practices and regulations are now in place and compliance is good (for example shark fishing has stopped). In order to assess the current status of the fishery and determine the effectiveness of the Fisheries Management Plan, long-term monitoring of fishing effort and catch is required. Monitoring was implemented under a previous Darwin Initiative-funded project,²² however this has not been formally continued. We will work with the Blue Belt Programme and the local fisher community to investigate the most appropriate means to undertake long-term monitoring and will establish a long-term monitoring programme for the fishery.

In order to support effective implementation of the Fisheries Management Plan some additional research is required around the reproductive cycle of key fisheries species such as blacktip grouper (red snapper), yellow-edged lyretail (fafaia) and drummer (nanwe). Current knowledge of reproductive timing in key fisheries species around the Pitcairn Islands is extremely limited. Although there is some information about spawning periods of fish species in French Polynesia, the reproductive timing strategies of marine fish is very variable and is determined by temperature and photoperiod. There is therefore a need to improve understanding of the reproductive cycles so that management strategies can be designed to protect spawning populations. We will also undertake long-term monitoring of the lobster and shark populations in order to determine the effectiveness of the current restrictions within the Fisheries Management Plan.

Objective 2.4: Risks from marine pollution incidents are minimised

The UK Maritime & Coastguard Agency (MCA) is implementing a project funded through the Conflict, Stability and Security Fund (CSSF) to address pollution control and response in the UK Overseas Territories. The aim is to

establish practical solutions to ensure that scarce resources are used in the most effective way and that policies and procedures are appropriate to local situations. This will be achieved by reviewing existing arrangements, developing effective response capabilities and improving capacity for responding to pollution from maritime incidents. The Blue Belt Programme has been working with the MCA to undertake initial reviews of capability. The review for the Pitcairn Islands identified that there is currently nothing in place in for maritime pollution prevention, preparedness and response. As the Pitcairn Islands do not have a vessel that would be capable of dealing with a maritime pollution incident in offshore waters, the current priority is for us to strengthen links with French Polynesia for support in the event of this happening.

Objective 2.5: Awareness of the issue of marine litter both within the local community, amongst visitors and internationally is improved

Elimination of marine litter on Henderson Island is virtually impossible in the context of the Pitcairn Islands MPA Management Plan because the plastic waste comes from other countries around the Pacific Ocean rim as well as international fisheries. Until substantial efforts are made at a global scale to significantly reduce the sources of plastic waste, similar amounts are expected to continue accumulating indefinitely on the beaches on Henderson Island. The Pew Charitable Trusts in collaboration with the Blue Belt Programme undertook a plastic research, clean-up and awareness-raising project on Henderson Island in June 2019. The results of this project will be used to highlight how the behaviour of land-based communities and fishers around the Pacific Ocean are contributing to the degradation and pollution of one of the most isolated areas of ocean. This will help to call international attention to marine debris problems and to identify approaches for reducing foreign debris sources. Education to inform future generations about the impacts of debris is also important. Although local litter is not currently an issue on Pitcairn Island itself, we will continue to carry out education and awareness-raising activities with the school and local community as well as visitors to the island to ensure that this does not become a problem in the future, particularly with increasing numbers of visitors to the island.

²² Developing a sustainable marine and fisheries management plan for the Pitcairn islands <https://www.darwininitiative.org.uk/project/DAR20006/>

Objective 2.6: Understanding and awareness of marine invasive species is improved

There is currently very limited knowledge about the presence of marine INNS in the Pitcairn Islands. The ENCRD has a biosecurity officer and a quarantine officer, however their focus is more on terrestrial INNS, particularly the eradication of invasive plant species and the prevention of pests arriving via ships. A project funded through the CSSF and led by the GB Non-Native Species Secretariat²³ aimed to develop comprehensive biosecurity for the Overseas Territories by providing them with access to UK Government expertise on risk analysis, pathway management, pest identification,

contingency planning, rapid response capability and species management. As part of this project, a horizon scanning exercise highlighted priority marine INNS risks for the Pitcairn Islands as being (i) the Mediterranean mussel, (ii) the black-striped mussel and (iii) the Asian green mussel. The most likely pathway for introduction of all three species is via hull fouling. The Asian green mussel may also be introduced through ballast water and natural spread. In addition, a Marine Biosecurity Toolkit has been developed to provide practical guidance to the UK Overseas Territories to address the issue of marine INNS.²⁴ We will use this to increase our understanding of the level of risk posed by marine INNS.

| Management Strategy 2: Human activities within the MPA are effectively managed to minimise threats to key species and habitats as far as is reasonably practical | | |
|---|--|---|
| Objectives | Action | Indicators of success |
| 2.1 IUU fishing within the MPA is minimised | 2.1.1 Implement the Compliance and Enforcement strategy | <ul style="list-style-type: none"> • Existence and adoption of a clearly defined Compliance and Enforcement strategy • Number of intel reports submitted • Hours of surveillance conducted |
| 2.2 Impacts to coral reef habitats from anchor damage are reduced | 2.2.1 Identify vulnerable habitats around Pitcairn, Henderson, Oeno and Ducie Islands through bathymetric and habitat mapping | <ul style="list-style-type: none"> • Area of seabed under no or reduced human impact • Condition of coral reef habitats |
| | 2.2.2 Minimise impacts to these vulnerable benthic habitats (e.g. through establishing no anchoring areas and / or permanent moorings) | |
| 2.3 Fishing by the local communities within the Coastal Conservation Areas is sustainable | 2.3.1 Implement the Inshore Fisheries Management Plan | <ul style="list-style-type: none"> • Type, level and return on fishing effort • Target species abundance, distribution and size structure • Keystone species abundance and distribution |
| | 2.3.2 Re-establish the fisheries monitoring programme to determine fishing effort and catches over time | |
| | 2.3.3 Undertake training and awareness-raising activities with fishers to encourage catch reporting | |
| | 2.3.4 Undertake monitoring of lobster and shark populations | |
| | 2.3.5 Undertake a study to determine the reproductive cycle of key fisheries species (e.g. nanwe, whitefish etc.) to determine spawning periods | |
| 2.4 Risks from marine pollution incidents are minimised | 2.4.1 Strengthen links with French Polynesia for support with pollution response in offshore waters | <ul style="list-style-type: none"> • Agreement with French Polynesia on pollution response |
| 2.5 Awareness of the issue of marine litter both within the local community, amongst visitors and internationally is improved | 2.5.1 Continue working with partners to remove marine litter from Henderson Island and raise awareness of the issue of marine litter at an international level | <ul style="list-style-type: none"> • Level of understanding of human impacts on marine resources |
| | 2.5.2 Undertake education and awareness-raising activities with the school, community and visitors including beach clean-ups | |
| 2.6 Understanding and awareness of marine invasive species is improved | 2.6.1 Facilitate training for ENCRD staff in identification of marine INNS | <ul style="list-style-type: none"> • Number of marine INNS detected • Level of understanding of human impacts on marine resources |
| | 2.6.2 Use the Marine Biosecurity Toolkit to increase understanding of the level of risk posed by marine INNS | |
| | 2.6.3 Develop guidance for visiting vessels to prevent the introduction of marine invasive species | |

²³ GB Non-Native Species Secretariat. <http://www.nonnativespecies.org/home/index.cfm>

²⁴ <http://www.nonnativespecies.org/index.cfm?pageid=656>

3

Management Strategy 3: Understanding of the marine environment around the Pitcairn Islands is enhanced through a research and monitoring programme

Due to their remote location, we know relatively little about the marine environment of the Pitcairn Islands. Since the 1970s, there have been several individual visits and four major expeditions to the four Pitcairn Islands [1], however the majority of these have concentrated on specific groups of marine fauna, collected specimens on an ad hoc basis and produced only lists of species and subjective estimates of abundance; very few detailed scientific assessments have been undertaken. As a result, there are several key gaps in the current evidence base. In order to protect the unique and pristine marine habitats of the Pitcairn Islands and their associated biodiversity, it is essential that MPA management is underpinned by robust scientific evidence.

Objective 3.1: A comprehensive research programme has been established to address key evidence gaps

The University of St Andrew's / Marine Alliance for Science and Technology for Scotland (MASTS) has a Memorandum of Understanding (MOU) with the Government of Pitcairn Islands. One of the principal activities of this MOU is to develop a research station on Pitcairn Island, which it is hoped will encourage more scientific expeditions to the Pitcairn Islands. With an increase in scientists visiting the islands however, it is important to undertake a gap analysis and determine the priority areas for research to ensure that future projects contribute to the management objectives set out in this management plan and directly inform effective management of the MPA. We will also establish a research permitting system to ensure that the results of all scientific surveys are adequately reported to the Government of Pitcairn Islands and that all data can be used to inform decision-making around effective MPA management. Data management strategies and infrastructure have been put in place by the Blue Belt Programme to ensure the safe long-term storage of the Pitcairn Islands' data.

Objective 3.2: Understanding of the impacts of climate change on the Pitcairn Islands is improved

Sea surface temperature in the Pacific Ocean is expected to continue to rise, however we do not know what impact this will have on key habitats and species within the MPA. The coral reefs around the Pitcairn Islands may be less likely to be exposed to increased sea surface temperatures due to their southerly location. However, should temperatures increase, corals in the Pitcairn Islands may be more sensitive as they have not been exposed to them in the past and recovery may be more difficult due to the isolation of the Pitcairn Islands and a low supply of new coral larvae to support recolonisation [44]. Ocean acidification, where increased levels of CO₂ in the atmosphere are absorbed and dissolve in the ocean and form carbonic acid changes the chemistry of the ocean. This is likely to have an impact on the growth and survival of calcifying organisms, such as corals within the Pitcairn Islands by the end of the century. Where the oceans become too acidic, which is predicted for the Southern Pacific, animals might not be able to form the shells and hard, protective outer body coverings they need to grow and

survive. Also, under current climate change scenarios, the Pitcairn Island MPA is likely to see significant sea-level rise. Ducie and Oeno are both very low lying and will become more susceptible to storms and over-washing, disturbing the important bird colonies that these islands support. We will work with partners to undertake a detailed reef resilience or vulnerability assessment of the coral reefs around the Pitcairn Islands to investigate the extent to which they are resilient to climate change to inform future management measures.

Objective 3.3: A long-term monitoring programme for key habitats and species has been established around all four islands

There is currently minimal monitoring of the marine habitats and species around the Pitcairn Islands. As part of the coral reef monitoring network 'Polynesia Mana', the Centre de Recherches Insulaires et Observatoire de l'Environnement (CRIOBE) has undertaken monitoring surveys at one site on Pitcairn Island in 2009, 2012, 2014, 2016 and 2018;²⁵ surveys include manta tows,²⁶ photo-quadrats and standard fish belt transects as well as water temperature and wave height. In order to identify change over time and understand natural variability between habitats and geographical locations, we will extend the monitoring programme to include other sites around the island. The Blue Belt Programme has developed the Pitcairn Islands Monitoring and Research Plan which provides guidance on establishing long-term monitoring programmes for biological and physical criteria (habitats, species and environmental and oceanographic conditions) including how to collect, analyse and interpret the data taking the constraints described above into account. Due to safety considerations preventing the use of SCUBA diving, we will focus on the use of drop-down video transects to survey the habitats around Pitcairn Island and snorkelling and BRUVs to survey the fish populations.



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²⁵ <http://observatoire.criobe.pf/wiki/tiki-index.php?page=Pitcairn+%28GB%29>

²⁶ Manta tow surveys involve towing a snorkel diver at a constant speed behind a boat. The diver holds on to a manta board attached to the boat by a length of rope and makes a visual assessment of the seabed

It is important to not just concentrate effort around Pitcairn Island; regular monitoring of the marine habitats around Henderson, Oeno and Ducie Islands is however extremely difficult due to their remote location and the expense associated with visiting them, making conventional scientific monitoring programmes very difficult. Visiting vessels provide an opportunity for developing citizen-science programmes which can support the collection of long-term datasets and we will work with partners to consider how this valuable information can be collected. In addition to formal monitoring, the Pitcairn Islands Monitoring and Research Plan provides advice on establishing a community-led rapid monitoring programme, based on the very successful ‘Eye on the Reef’²⁷ programme on the Great Barrier Reef. We will use this to ask visitors to report and photograph any unusual events (e.g. litter, habitat damage or an animal in distress) as well as reporting any key species (e.g. turtle, shark, lobster

or commercially-important fish). We will also encourage the local community and visitors to upload photographs of whales to Happywhale,²⁸ a citizen science platform which uses citizen science to help scientists to track individual whales throughout our world’s oceans.

Objective 3.4: The results of research and monitoring programmes are communicated at a local, regional and international scale

It is important to ensure that the results of any scientific studies or long-term monitoring programmes are shared with regional initiatives such as Pacific Coral Reef Monitoring Network and the South Pacific Whale Research Consortium. We will also make sure that survey results are effectively communicated to the local community and Island Council through the development of communication materials, presentations by visiting scientists and policy briefs.

| Management Strategy 3: Understanding of the marine environment around the Pitcairn Islands is enhanced through a comprehensive research and monitoring programme | | |
|---|---|--|
| Objectives | Action | Indicators of success |
| 3.1 A comprehensive research programme has been established to address key evidence gaps | 3.1.1 Establish a small research station on Pitcairn Island | <ul style="list-style-type: none"> • Existence and application of scientific research and inputs • Level of understanding of the marine environment around the Pitcairn Islands |
| | 3.1.2 Undertake a gap analysis and determine priority areas for research within the MPA. Communicate high priority ecological research projects to appropriate international research organisations | |
| | 3.1.3 Develop a research permitting system which details reporting requirements for researchers in the MPA and gives the Government of Pitcairn Islands ownership of data | |
| | 3.1.4 Implement the data management strategy for the safe storage and cataloguing of ecological data | |
| 3.2 Understanding of the impacts of climate change on the Pitcairn Islands is improved | 3.2.1 Undertake a detailed reef resilience or vulnerability assessment of the coral reefs to determine the extent to which they are vulnerable or resilient to climate change | <ul style="list-style-type: none"> • Level of understanding of the impacts of climate change around the Pitcairn Islands |
| | 3.2.2 Undertake research to better understand the wider impacts of climate change | |
| 3.3 A long-term monitoring programme for key habitats and species has been established around all four islands | 3.3.1 Establish a long-term monitoring programme to monitor important habitats and species around all four islands | <ul style="list-style-type: none"> • Existence and application of long-term monitoring programme for key species and habitats • Extent and condition of important marine habitats • Distribution and abundance of focal species |
| | 3.3.2 Improve links with expedition cruise ships that visit the outer islands – establish an ‘Eyes on the Reef’-type programme | |
| 3.4 The results of research and monitoring programmes are communicated at a local, regional and international scale | 3.4.1 Ensure results are shared with regional monitoring and research initiatives | <ul style="list-style-type: none"> • Data inputted to regional monitoring initiatives • Level of awareness of the marine environment amongst the local community |
| | 3.4.2 Ensure that results of scientific research and monitoring are effectively communicated to the local community and Island Council through the development of communication materials and policy briefs | |

27 A community-based reef monitoring and assessment programme on the Great Barrier Reef that enables anyone who visits (day trippers, tourists, fishers, marine tourism staff etc.) to report observations of protected wildlife species, pests such as crown-of-thorns starfish, marine pollution and coral bleaching, or coral spawning: <https://www.gbrmpa.gov.au/our-work/eye-on-the-reef>

28 <https://happywhale.com/home>

4

Management Strategy 4: The local community is obtaining economic benefit from the MPA and these benefits are distributed equitably

In addition to conserving marine resources, MPAs also have the potential to provide socio-economic benefits to local communities. Well-planned tourism within an MPA can provide economic and political incentives for conservation and effective management and may bring additional benefits to local communities [47]. It is however important to ensure that any benefits are distributed equitably amongst the local community. Local community support for the MPA is key to ensuring successful outcomes and members of the community who feel that they are not benefiting from the MPA may lose interest and no longer comply with associated regulations [48].

A report assessing the likely economic impacts of creating a marine reserve in the Pitcairn Islands [49] suggested that creating the world's largest marine reserve (at the time) would give Pitcairn a unique selling point which could result in an increase in tourism activity, involving more visits by cruise ships, and increased specialist visiting for diving, citizen science, and other nature-based tourism activity. To date this has not occurred, and marine tourism is still very limited. Opportunities to develop dive tourism are severely constrained by significant health and safety risks in such a remote location without recompression facilities and it is therefore important to investigate the development of other marine eco-tourism activities.

Objective 4.1: New marine eco-tourism activities have been developed and promoted within the MPA

A few operators currently provide boat-based tours to watch the humpback whales during May to November. A code of conduct has been developed with assistance from the Blue Belt Programme which has been published on the Pitcairn Islands Tourism website²⁹ and provided in hard copy to the Government of Pitcairn Islands (leaflets aimed at tourists and brochures aimed at the operators). Training has been provided through the Blue Belt Programme to the operators and wider community by regional experts to enable implementation of the code of conduct. The feasibility of vessel-based whale watching is however affected by issues such as access, size of boats, prevailing sea conditions, safety and uncertainty as to whale distribution and abundance. The training therefore focused on delivering a flexible interpretive guiding programme which suits both land-based and vessel-based whale watching. We will continue to promote whale watching activities to visitors at a regional and international scale and will monitor effectiveness of the whale watching code of conduct. We will also investigate the development of other marine eco-tourism activities to ensure that economic benefits are equitably distributed throughout the community.

Management Strategy 4: The local community is obtaining economic benefit from the MPA and these benefits are distributed equitably

| Objectives | Action | Indicators of success |
|---|--|--|
| 4.1 New marine eco-tourism activities have been developed and promoted within the MPA | 4.1.1 Promote and monitor implementation of the whale watching code of conduct | <ul style="list-style-type: none"> • Compliance with whale watching code of conduct • Level of awareness of marine ecotourism activities • Level of participation in marine ecotourism activities • Level of visitor satisfaction • Number of people gaining income from marine eco-tourism |
| | 4.1.2 Investigate the development of other marine eco-tourism activities to ensure that economic benefits are equitably distributed throughout the community | |
| | 4.1.3 Improve marketing of whale watching and other marine ecotourism activities at a regional and international scale | |
| | 4.1.4 Implement a socio-economic monitoring programme to assess community benefits | |
| | 4.1.5 Assess visitor satisfaction through surveys with outgoing visitors to ensure activities provided are high quality and meeting expectations | |

29 http://www.visitpitcairn.pn/marine_reserve/whales/index.html

5

Management Strategy 5: Understanding and appreciation of the MPA by the local community, visitors and the wider international community is enhanced

A greater knowledge of environmental issues amongst the community can create more positive attitudes towards the MPA, helping to develop a sense of stewardship and strengthening compliance with MPA regulations which will subsequently lead to better protection of the MPA's habitats and species.

Objectives 5.1 to 5.3: Understanding of the MPA is improved at a regional and international scale; amongst the local community and visitors to the Pitcairn Islands

Education and interpretation activities will focus on raising awareness of the pristine and unique nature of the marine ecosystems and appropriate behaviours in the MPA amongst the local community as well as at a regional and

international scale. We will regularly promote information about the MPA management strategies through newsletters, news articles, films and social media as appropriate. We will also seek opportunities to provide information to visitors prior to their arrival (for example information made available to passengers of the MV Silver Supporter and cruise ships) as well as through interpretive materials that can be exhibited when tourists arrive. Although awareness of the MPA is high amongst the local community, we will continue working with the local primary school and the Sea Scouts to sustain the children's understanding and appreciation for the marine environment and MPA. It is hoped that the children will pass on this increased knowledge to their parents and other family members.

Management Strategy 5: Understanding and appreciation of the MPA by the local community, visitors and the wider international community is enhanced

| Objectives | Action | Indicators of success |
|---|---|--|
| 5.1 Understanding of the MPA is improved at a regional and international scale | 5.1.1 Promote the Pitcairn Islands MPA through international media including social media | <ul style="list-style-type: none"> Level of understanding of the MPA values at a regional and international scale |
| 5.2 Understanding of the MPA is improved amongst the local community | 5.2.1 Work with the local primary school and Sea Scouts to develop educational activities and materials to improve local children's understanding and appreciation for the marine environment and MPA | <ul style="list-style-type: none"> Level of understanding of the MPA values amongst the local community |
| | 5.2.2 Develop awareness-raising activities for the local community about the benefits of the MPA | |
| 5.3 Understanding of the MPA is improved amongst visitors to the Pitcairn Islands | 5.3.1 Develop awareness-raising materials for visitors (e.g. interpretation boards at important visitor locations, marine species identification guide) | <ul style="list-style-type: none"> Level of understanding of the MPA values amongst visitors |

6

Management Strategy 6: Understanding and appreciation of the Henderson Island World Heritage Site is enhanced

The Henderson Island World Heritage Site Management Plan 2004–2009 [24] has not been revised since first being published in 2004. In order to address outstanding priority management actions, these are included within this Management Plan. The 2017 Conservation Outlook for Henderson Island was ‘Significant Concern’ and the current state and trend of values were ‘High Concern’ and ‘Deteriorating’, respectively [50].³⁰ The outlook notes that: “the key threat to the World Heritage values of Henderson Island continues to be rat predation and competition and its effects on avifauna, invertebrates, and the wider ecological processes of the island”.

Objective 6.1: Awareness of the World Heritage Site and its important habitats and species is improved amongst visitors

Henderson Island is situated 193 km north-east of Pitcairn Island. This distance makes effective management of visitors to the World Heritage Site difficult. The Henderson Island World Heritage Site Management Plan 2004–2009 includes a code of conduct for visitors to Henderson Island (in Annex VII). The Government of Pitcairn Islands ‘Guide for Visiting Vessels’ also states that landing is to be on North Beach only; East Beach and North-West Beach are off limits to visitors. This is difficult to enforce, and it has been noted that there are often footprints in the sand, even on East Beach. In order to encourage visitors to remain on North Beach, we will establish an eco-trail within the woodland at the back of North Beach. The eco-trail will be located and constructed in such a way to minimise any impacts to the environment following scientific advice. This will provide visitors with information about the important habitats and species they are seeing and will remind them of responsible behaviour as outlined in the code of conduct. The trail will also reduce the likelihood of visitors venturing into areas that are prohibited, protecting sensitive species such as breeding birds.

Objective 6.2: Monitoring programmes to determine status of key species have been established

There is currently no monitoring of the breeding seabird populations on Henderson Island nor of the green turtles which nest on East Beach. Conducting regular monitoring

will enable us to determine the current status of populations, understand the range of natural variability between years and help to identify change over time. This will allow the effectiveness of management strategies to be assessed and to identify when management actions need modifying; it will also enhance understanding of large-scale phenomena such as climate change. The most appropriate methods for monitoring these species will be discussed and agreed with partners such as the RSPB.

Objective 6.3: Non-native invasive rodent eradication and island restoration project supported by the Pitcairn Island community and progressed to a stage of operation for Henderson and Pitcairn Island

The 2017 Conservation Outlook also recommends that Henderson Island would benefit from additional efforts to eradicate rats [50]. In addition to protecting 5 single island endemic land birds across the two Islands (Pitcairn reed warbler, Henderson reed warbler, Henderson rail, Henderson fruit-dove and the Henderson lorikeet) and endemic nesting seabirds (Henderson petrel), the eradication of rats has also been shown to have wider benefit to the marine environment. Recent research indicates that rat eradication can enhance coral reef productivity and functioning with beneficial impacts on macro-algae, filter-feeding sponges, turf algae, and fish on adjacent coral reefs [51]. A rodent eradication programme was attempted in 2011 by the Royal Society for the Protection of Birds (RSPB) and the Government of Pitcairn Islands, however surveys in 2015 indicated that the density of Pacific rats was very similar to the estimate prior to the eradication attempt [52]. This was thought to be as a result of a failure to eradicate (rather than due to re-introduction), probably due to a small number of rats either not encountering bait pellets or potentially showing a preference for natural food over the bait pellets [53]. Several successful rodent eradication programmes have since been undertaken in French Polynesia and lessons learnt from this experience could be applied and also help to inform any future rat eradication efforts in the Pitcairn Islands.



30 <https://www.worldheritageoutlook.iucn.org/explore-sites/wdpaid/12896>

Management Strategy 6: Understanding and appreciation of the Henderson Island World Heritage Site is enhanced

| Objectives | Action | Indicators of success |
|---|---|--|
| 6.1 Awareness of the World Heritage Site and its important habitats and species is improved amongst visitors | 6.1.1 Establish an eco-trail for visitors to the island | <ul style="list-style-type: none"> • Level of understanding of the World Heritage Site values amongst visitors |
| 6.2 Monitoring programmes to determine status of key species have been established | 6.2.1 Undertake monitoring of the nesting green turtle population to determine nesting season and numbers of nesting turtles | <ul style="list-style-type: none"> • Existence and application of long-term monitoring programme for key species • Abundance, distribution and breeding success of green turtle and seabirds |
| | 6.2.2 Establish a seabird monitoring programme | |
| 6.3 Non-native invasive rodent eradication and island restoration project supported by the Pitcairn Island community and progressed to a stage of operation for Henderson and Pitcairn Island | 6.3.1 Form a partnership with the RSPB and carry out a full consultation on-island once travel restrictions permit | <ul style="list-style-type: none"> • Full support given by Island Council to progress to operational stage • Project operational plan in place |
| | 6.3.2 Work in partnership with the RSPB to investigate and gather required evidence to support a successful restoration attempt | |
| | 6.3.3 Work in partnership to plan operational stage for rat eradication | |

2.5 REVIEW AND ASSESSMENT OF MANAGEMENT EFFECTIVENESS

One of the largest challenges in MPA management is knowing whether the management actions are being effective over time [54]. Evaluation is therefore needed to determine if management actions are achieving the desired outcomes, addressing priority management needs, and meeting the objectives of the MPA.

Annual reviews conducted by staff within the ECNRD will determine whether activities have occurred as planned. This will enable identification of issues affecting implementation and resource allocation and will inform preparation of the annual operational plan for the subsequent year.

As part of an adaptive management approach to ensure that MPA management is effective, the Management Plan will undergo a comprehensive review and evaluation every five years to be completed in collaboration with the Blue Belt Programme and other key partners who have a good knowledge of the marine environment. The evaluation will assess the extent to which management actions have achieved the MPA objectives over the five-year period. The evaluation will review management actions completed, revise strategies

and activities accordingly and, as appropriate, add new strategies and activities based on priority management needs. The output of this activity will be a revised MPA Management Plan for the next five years of operations.



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GLOSSARY OF SCIENTIFIC TERMS (SPECIES NAMES)

The scientific names of all marine species referred to in the MPA Management Plan are listed in the table below:

| Common name | Scientific name | Pitcairn name |
|-------------------------------|---|------------------------|
| Macro-algae (seaweed): | | |
| Brown macro-algae | <i>Sargassum sp., Lobophora variegata</i> | |
| Calcareous green algae | <i>Halimeda minima</i> | |
| Red coralline algae | <i>Lithophyllum kotschyannum</i> | |
| Corals: | | |
| Cauliflower corals | <i>Pocillopora verrucosa, Pocillopora eydouxii</i> | |
| Encrusting pore coral | <i>Montipora aequituberculata</i> | |
| Finger coral | <i>Acropora humilis</i> | |
| Fire coral | <i>Millepora plathyphylla</i> | |
| Lobe coral | <i>Porites lobata</i> | |
| Invertebrates: | | |
| Asian green mussel | <i>Perna viridis</i> | |
| Black-striped mussel | <i>Mytilopsis sallei</i> | |
| Crown-of-thorns starfish | <i>Acanthaster planci</i> | |
| Giant clam | <i>Tridacna maxima</i> | |
| Long-spined sea urchin | <i>Diadema savignyi</i> | |
| Mediterranean mussel | <i>Mytilus galloprovincialis</i> | |
| Mountain river prawn | <i>Macrobrachium latimanus</i> | |
| Slipper lobster | <i>Scyllarides haanii</i> | |
| Spiny lobster | <i>Panulirus pascuensis, Panulirus penicillatus</i> | |
| Fish: | | |
| Bigeye tuna | <i>Thunnus obesus</i> | Big-eye |
| Black trevally | <i>Caranx lugubris</i> | Ulwa |
| Blackspot sweeper | <i>Pempheris oualensis</i> | |
| Blacktip grouper | <i>Epinephelus fasciatus</i> | Red snapper |
| Canary demoiselle | <i>Chrysiptera galba</i> | |
| Combtooth blenny | <i>Alticus sp.</i> | |
| Coris | <i>Coris aygula, Coris roseoviridis</i> | Miti, Elwyn's Trousers |
| Crosshatch triggerfish | <i>Xanthichthys mento</i> | Pick-pick |
| Drummer | <i>Kyphosus pacificus</i> | Nanwe |
| Great hammerhead shark | <i>Sphyrna mokarran</i> | |
| Grey reef shark | <i>Carcharhinus amblyrhynchos</i> | |
| Henderson triplefin | <i>Enneapterygius ornatus</i> | |
| Humphead wrasse | <i>Cheilinus undulatus</i> | |
| Many-spined butterflyfish | <i>Hemitaurichthys multispinosus</i> | |
| Oceanic whitetip shark | <i>Carcharhinus longimanus</i> | |
| Pacific gregory | <i>Stegastes fasciolatus</i> | |
| Pitcairn sandlance | <i>Ammodytoides leptus</i> | |

| Common name | Scientific name | Pitcairn name |
|-------------------------|--------------------------------|--------------------|
| Fish: | | |
| Skipjack tuna | <i>Katsuwonus pelamis</i> | Boneta |
| Squirrelfish | <i>Sargocentron megalops</i> | |
| Sunset wrasse | <i>Thalassoma lutescens</i> | Whistling daughter |
| Wahoo | <i>Acanthocybium solandri</i> | Kuta |
| Whitebar surgeonfish | <i>Acanthurus leucopareus</i> | |
| Whitetip reef shark | <i>Triaenodon obesus</i> | |
| Yellow-edged lyretail | <i>Variola louti</i> | Fafaia |
| Yellowfin tuna | <i>Thunnus albacares</i> | Yellowtail |
| Marine mammals: | | |
| Blue whale | <i>Balaenoptera masculus</i> | |
| Humpback whale | <i>Megaptera novaeangliae</i> | |
| Right whale | <i>Eubalaena glacialis</i> | |
| Sei whale | <i>Balaenoptera borealis</i> | |
| Marine turtles: | | |
| Green turtle | <i>Chelonia mydas</i> | |
| Hawksbill turtle | <i>Eretmochelys imbricata</i> | |
| Leatherback turtle | <i>Dermochelys coriacea</i> | |
| Loggerhead turtle | <i>Caretta caretta</i> | |
| Olive ridley turtle | <i>Lepidochalys olivacea</i> | |
| Seabirds: | | |
| Bermuda petrel | <i>Pterodroma cahow</i> | |
| Brown noddy | <i>Anous stolidus pileatus</i> | |
| Dark-rumped petrel | <i>Pterodroma phaeopygia</i> | |
| Henderson petrel | <i>Pterodroma atrata</i> | |
| Phoenix petrel | <i>Pterodroma alba</i> | |
| Polynesian storm petrel | <i>Nesofregetta fuliginosa</i> | |
| Short-tailed albatross | <i>Diomedea albatrus</i> | |