Pitcairn Island Desktop study on invasive alien species -PROTEGE Programme

Biodiversity Data Management

Shyama Pagad
9-1-2022

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Introduction

PROTEGE ("Pacific Territories Regional Project for Sustainable Ecosystem Management" or "Programme Régional Océanien des Territoires pour la Gestion Durable des Ecosystème" or "Protect" in French) is an initiative designed to promote sustainable and climate-change-resilient economic development in the European Pacific overseas countries and territories (OCT) by emphasizing biodiversity and renewable resources. PROTEGE is a regional cooperation project that supports the public policies of the four Pacific OCTs, New Caledonia, French Polynesia, Wallis & Futuna, and Pitcairn Islands.

The project covers four themes:

Component 1: Agriculture and Forestry,
Component 2: Coastal Fisheries & Aquaculture,
Component 3: Water, and
Component 4: Invasive Species

The objectives of Component 4 Invasive species, as stated by the project are the following

- Invasive species are managed to enhance the protection, resilience and restoration of ecosystem services and terrestrial biodiversity.
- Biosecurity is enhanced through the development of strategies and action plans to better prevent the introduction of invasive species
- Mechanisms to monitor and manage certain exotic invasive animal and plant species are implemented to protect biodiversity and ecosystem services.
- Cooperation between the OCTs and between the OCTs and the ACP countries is strengthened and made sustainable through operational, coordination and support mechanisms

This project is focused on presenting known and available baseline data on alien and invasive species and key biodiversity of Pitcairn which will inform stakeholders during the development of the Territorial Invasive Species Strategy and Action Plan (TISSAP).

The project is to deliver the following list of activities.

- An annotated inventory of invasive alien species by island, invasiveness and habitat including risk assessment ranking.
- An annotated inventory of key endemic and threatened species at island and site level.
- An annotated inventory of designated natural areas and ecosystems with notes on threat/pressures on these areas.
- An annotated inventory of at-risk invasive species in neighboring countries with pathways of introduction and dispersal.

- An annotated inventory of all invasive species prevention, management/control related projects undertaken on Pitcairn and on-going initiatives.
- A concise synthesis discussion document covering the key areas described.

An annotated inventory of invasive alien species by island, invasiveness and habitat including risk assessment ranking

Definitions

An **Alien species** is described as "*a species, subspecies or lower taxon, introduced outside its natural past or present distribution*"

An **Invasive Alien Species** is described as "*an alien species which becomes established in natural or semi-natural ecosystems or habitat, is an agent of change, and threatens native biological diversity*".

CBD, Glossary of terms <https://www.cbd.int/invasive/terms.shtml>

The focus on this report is on alien and invasive alien species that have impacts on native biodiversity and natural areas.

A baseline compilation of alien and invasive alien species that occur in the Pitcairn Island group was developed by the IUCN SSC Invasive Species Specialist Group within the Global Register of Introduced and Invasive Species GRIIS (see http.griis.org) and published through the Global Biodiversity Information Facility GBIF (see https://www.gbif.org/dataset/e91a6451-c247-4bf6-a6de-d53ce0b30852)

This dataset was updated with new data and information and source information was also recorded. Additionally, the occurrence and impacts of alien and invasive alien species was recorded at individual island and site level. A consolidated Excel file has been attached including **worksheets Pitcairn Island group 2017 list, the updated 2022 list, threatened species dataset, and the risk assessment master**. See details in the text below

The key data components of this baseline list include

- The scientific name of the species as reported
- The 'accepted name' of the species in case of synonyms being used
- The taxonomic status including rank
- The higher taxonomy of the species including kingdom, phylum, order, class, species.
- The environment or system in which the species occurs (Terrestrial, Freshwater, Brackish, Marine, Host including combinations)
- Vernacular and common names of the taxa
- *Weed Risk assessment details including a link to the assessment form, the area or region for which the risk assessment was conducted, the score, and the recommendation of action because of the score.
- The provenance of the species (Alien, Native|Alien or Cryptogenic|Uncertain)
- The occurrence of the species (Present or Uncertain)
- If the species is known to be invasive (display impacts) in the Pitcairn Island group (IsInvasive)
- **Abundance of the species
- **Date of Introduction
- **Introduction type

- **Pathway class and subclass
- Impact mechanism and impact type
- Source information (reference)
- Year data recorded

*Please follow this link for more details on Weed Risk assessments information on the development of weed risk assessments including any additional information < http://www.botany.hawaii.edu/faculty/daehler/wra/summary.htm>

A weed risk assessment master sheet downloaded from the Hawaii Risk assessment resource has been include in **Worksheet Risk assessment Master.** This dataset provides a list of plant species for which risk assessments have been completed with all information on scores and links to the assessment document.

**The data and information for these data components is not available easily, Some data is being sought which will be provided in the data sheet as and when available.

Summary of Pitcairn Island group national checklist

- Number of alien and invasive alien species recorded for the Pitcairn Island group

151 individual known alien and invasive alien taxa have been recorded for the Pitcairn Island group; five of which belong to Kingdom Animalia and 149 to Kingdom Plantae.

- Number of alien and invasive alien species recorded on Pitcairn Island

146 of the 149 alien and invasive alien taxa have been recorded on Pitcairn Island, the only inhabited island of the Pitcairn group

- Number of alien and invasive species recorded on Henderson Island

14 of the 149 taxa are listed to be present on Henderson Island

- Number of alien and invasive alien species recorded on Oeno and Dulcie Islands.

No known alien or invasive alien plants are known to be present on Ducie, whereas five alien taxa have been listed for Oeno

- Number of species known to have impacts on native biodiversity of natural systems

Of the 149 alien taxa recorded in the Pitcairn Island group, 76 taxa are known to display invasive impacts on Pitcairn.

- Primary impact types

The primary impacts type of alien and invasive plants includes competition and habitat degradation and or modification thus causing loss of habitat for native species plants and declines in population. Predation of juvenile birds and eggs of native bird species by introduced mammals including rats and cats is a severe and on-going impact. Rats are also known seed predators.

- How many of the taxa on the Pitcairn Island group list are known to pose a high risk, have a reject score, pose a low risk and need to be evaluated status?

45 of the 97 listed alien and invasive alien species for which Risk assessments have been undertaken and are available, are known to be high risk species; 11 taxa need to be 'evaluated'; 10 taxa have scored a 'reject' status; 22 taxa are known to pose a low risk, with one taxon listed as Data deficient.

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An annotated inventory of key endemic and threatened species at island and site level

The IUCN Red List of Threatened Species, (hereafter referred to as the Red List) is the world's premier comprehensive information source on the conservation status of animals, plants, and fungi. It provides information about range, population size, habitat, and ecology, use and/or trade, threats, and conservation actions that will help inform necessary conservation decisions.

The conservation status of the species is mainly categorized into the following

Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT), Least Concern (LC), Data Deficient (DD), Extinct (EX) and Extinct in the Wild (EW)

The first three categories – Critically Endangered, Endangered and Vulnerable are classification indicating that the species is 'threatened'.

This section provides a detailed account of the Red List assessed species that occur in the Pitcairn Island group.

A complete list of assessed species for the Pitcairn Island group was downloaded from the Red List. There are 709 species listed for this group of four islands. The list of species underwent a species matching process on the GBIF species matching tool, so the higher taxonomy of the species could be recorded (**See worksheet Pitcairn IUCN Red List**).

The list includes 45 Plant species and 664 animals.

Plantae

Of the 45 plant species ten species are classified as Threatened (See Table 1 for occurrence in the Pitcairn Island Group and Table 2 for Endemic status). 33 species are listed as of 'Least Concern' and one each *Abutilon pitcairnense* listed as 'Extinct in the Wild (EW) and, *Zingiber zerumbet* as Data Deficient (DD).

Two plant species *Meryta brachypoda* and *Coprosma benefica* are listed as Critically Endangered (CR); two species *Glochidion comitum* and *Santalum insulare* are listed as Endangered (EN). Six species are listed as Vulnerable (VU) and they include *Nesoluma st.-johnianum*, *Myrsine hosakae*, *Glochidion pitcairnense*, *Homalium taypau*, *Hernandia stokesii* and *Bidens hendersonensis*.

The Critically Endangered (CR) *Meryta brachypoda* occurs in the Pitcairn Island group and Tubuai Islands of French Polynesia There is no information on threats to this terrestrial plant (Florence 1998).

The Endangered (EN) *Coprosma benefica* or Red Berry is endemic to the Pitcairn Island group. "Only 10 individuals of flowering size were seen in 1997, and these are mostly well scattered in the eastern half of the island. Evidence of natural regeneration is limited to a single sapling" (IUCN Red List). There is no information on threats to this terrestrial plant (Waldren and Kingston, Coprosma rapensis var. benefica. The IUCN Red List of Threatened Species 1998: e.T38851A10153343. 1998).

The Endangered *Glochidion comitum* widespread in Pitcairn Island, is listed as a newly described endemic. Exploited for timber, its habitat is under threat from the spread of alien and invasive plants (Waldren and Kingston, Glochidion comitum. The IUCN Red List of Threatened Species 1998: e.T34478A9864653. 1998).

The Endangered (EN) Polynesian sandalwood*, Santalum insulare* is endemic to eastern Polynesia (Cook Islands, Pitcairn Island group and French Polynesia), where it occurs as distinct varieties. *Santalum insulare* var. *hendersonense is found only on Henderson Island* (Butaud 2020)*. No specific threats have been described for S. insulare var hendersonense.*

Elsewhere in its range threats include exploitation and over harvesting, browsing and trampling by alien mammals such as cattle and goats; predation of seeds by rats; decline in avian seed dispersers due to predation by rats. Threats as in the Red List The remaining subpopulations are sorely depleted today because of commercial and traditional harvesting of sandalwood, which has led to over-harvesting. Degradation and loss of habitat due to land use change, spread of alien and invasive plant species.

The Vulnerable (VU) *Nesoluma st.-johnianum* is endemic to Henderson Island and no known threats have been recorded. Populations are known to be fragmented (S. Waldren, Nesoluma st.-johnianum. The IUCN Red List of Threatened Species 1998: e.T32343A9699708 1998).

The Vulnerable (VU) *Myrsine hosakae* is endemic to Henderson Island, populations are severely fragmented with declining numbers of mature individuals. The tree is dioecious and predation of unripe fruit by doves could be a cause for declining populations (S. Waldren, Myrsine hosakae. The IUCN Red List of Threatened Species 1998: e.T32344A9699769. 1998).

The Vulnerable (VU) *Glochidion pitcairnense* is known only from Henderson and Pitcairn Island. Populations are fragmented with declines in numbers of individuals. The spread of invasive Rose apple, *Syzygium jambos* is cited as a threat to this species (S. K. Waldren 1998).

The Vulnerable (VU) Taypau, *Homalium taypau* native to Pitcairn Island, is restricted to the hillsides and valleys. Exploited for timber in the past, current threats are loss of habitat due to alien and invasive plant spread (World Conservation Monitoring Centre 1998).

The Vulnerable (VU) *Hernandia stokesii* is native to French Polynesia (Tubuai Is.) and Pitcairn. On Pitcairn it occurs only on Henderson Island. It has been speculated that the decline in populations could be due to the extinction on the island of the Polynesian pigeon, which was the disperser of seeds (S. Waldren, Hernandia stokesii. The IUCN Red List of Threatened Species 1998: e.T34275A9855530 1998).

The Vulnerable (VU) *Bidens hendersonensis* is found on Henderson and Oeno Islands. The var. *hendersonensis* occurs on Henderson Island (previously considered as two endemic varieties (var. *hendersonensis* and var. *subspathulata*). A separate variety, var. *oenoensis*, now considered extinct, was found only on Oeno Island (Rivers 2021).

Yellow Fatu, Abutilon *pitcairnense* listed as Extinct in the Wild (EW), is endemic to the island of Pitcairn and only survives in conservation collections (Bárrios 2018).

Table 1: Threatened Plantae occurrence on Pitcairn Island Group

Scientific name / Common name	Occurs in	IUCN Red List classification
Meryta brachypoda	Pitcairn Island group	Critically Endangered
Coprosma benefica / Red Berry	Pitcairn Island group	Critically Endangered
Glochidion comitum	Pitcairn Island	Endangered
Santalum insulare	Pitcairn Island group	Endangered
Santalum insulare var. *hendersonense*	Henderson Island	Endangered
Nesoluma st.-johnianum	Henderson Island	Vulnerable
Myrsine hosakae	Henderson Island	Vulnerable
Glochidion pitcairnense	Henderson Island, Pitcairn Island	Vulnerable
Homalium taypau / Taypau	Pitcairn Island	Vulnerable
Hernandia stokesii	Henderson Island	Vulnerable
Bidens hendersonensis var. *hendersonensis*	Henderson Island	Vulnerable
Bidens hendersonensis var. *oenoensis*	Oeno Island	Extinct
Abutilon pitcairnense	Pitcairn Island	Extinct in the Wild

Table 2: Threatened Plantae - Endemic to the Pitcairn Island Group

Scientific name / Common name	Endemic to	IUCN Red List classification
Coprosma benefica / Red Berry	Pitcairn Island Group	Endangered
Glochidion comitum	Pitcairn Island	Endangered
Santalum insulare	Pitcairn Island Group	Endangered
Nesoluma st.-johnianum	Henderson Island	Vulnerable
Myrsine hosakae	Henderson Island	Vulnerable
Abutilon pitcairnense	Pitcairn Island	Extinct in the Wild

Animalia

664 animal taxa that occur on the Pitcairn Island group have been conservation assessed.

Of the 664 Animal taxa, 465 species belong to the class Actinopterygii (Ray-finned fish), 60 species are hard corals, 32 are Molluscs, six Echinoderms, three Crustaceans, one Arachnid and one Insect, 46 Bird species, 16 Cartilaginous fish, 19 Mammals and seven Reptiles.

Of the 465 **Actinopterygii (Ray-finned fish)** that occur in the water of the Pitcairn Island group, 462 occur in the marine biome and three in the freshwater / marine biome.

Six Ray-finned fish are classified as threatened including the Endangered (EN) *Cheilinus undulatus* / the Humphead Wrasse: and five Vulnerable (VU) (*Istiophorus platypterus*

(Sailfish), *Thunnus obesus* (Bigeye Tuna), *Makaira nigricans* (Blue Marlin), *Mola mola* (Ocean sunfish), and *Epinephelus polyphekadion* (camouflage grouper)).

441 of the 465 species are classified as of Least Concern (LC), and one as Near Threatened (NT). Seventeen species are classified as Data Deficient (DD). Many of these species have widespread occurrence and face no threat from alien and invasive species.

Of the 60 **hard corals** assessed in the Pitcairn Island Group, 34 are classified as of Least Concern (LC), 16 as Near Threatened (NT) and ten as Vulnerable (VU). There are no listed threats to these species from alien and invasive species.

Of the 32 **Molluscs** assessed 25 occur in the Marine biome, one in Freshwater and six taxa in the Terrestrial biome. The terrestrial Mollusc *Lamellidea oblonga* occurs through human inhabited parts of the Pacific. The spread of alien plants is known to have impacts on its habitat. These impacts have not been explicitly recorded in the Pitcairn Island group (Barker 2012). There is not much detailed information on the other five terrestrial species. Three species are classified as Data Deficient (DD), and five species as Vulnerable (VU) including *Philonesia filiceti, Philonesia pitcairnensis, Sinployea pitcairnensis, Tubuaia fosbergi, Diastole tenuistriata*. 24 species are classified as of Least Concern (LC). No explicit alien and invasive species threats have been recorded in the Pitcairn Island group.

Of the fourteen **Echinoderms** assessed, seven are listed as Data Deficient (DD), and six of Least Concern (LC). One species is classified as Vulnerable (VU), this is the white teatfish, *Holothuria fuscogilva* which has been overfished.

Of the three **Crustaceans** listed, one each are listed as Data Deficient (DD) and of Least Concern (LC). *Birgus latro*, the Coconut crab, an Indo-Pacific species that is under threat from exploitation, habitat destruction is listed as Vulnerable (VU).

The lone **Arachnid** *Heteroonops tetraspinosus,* assessed is listed as of Least Concern (LC) and is apparently under no severe threat

The Odonata (**Insecta**), Red glider (*Tramea transmarina*) has stable populations and is listed as of Least Concern (LC)

Of the 46 **bird** species assessed that are present on the Pitcairn Island group, nine are listed as Vulnerable (VU), three Endangered (EN), three Near Threatened (NT) and 31 as of Least Concern (LC).

The three bird species that are classified as Endangered (EN) include the Pitcairn Reed-warbler (*Acrocephalus vaughani*), the Henderson Petrel (*Pterodroma atrata*), and the Polynesian Storm-petrel (*Nesofregetta fuliginosa*)

The Pitcairn Reed-warbler is endemic to Pitcairn Island in the Pitcairn Island group, population declines have been attributed to degradation and loss of habitat due the spread of the alien and invasive *Syzygium jambos* (Rose apple) and the conversion of natural areas to garden land. Feral goats before their eradication were one of the key causes of degradation of habitat. Predation by rats and cats are also known to be a threat (BirdLife International. 2020. *Acrocephalus vaughani*. The IUCN Red List of Threatened Species 2020).

The Henderson Petrel known to breed on Henderson Island is under threat from the Polynesian rat (*Rattus exulans*). An eradication attempt failed in 2011 and the threat remains (BirdLife International. 2018. *Pterodroma atrata*. The IUCN Red List of Threatened Species 2018).

The Polynesian Storm-petrel is listed as 'extant' and not known to breed in the Pitcairn Island group. On its breeding sites in French Polynesia and elsewhere invasive rats, introduced cats are known to be a threat (BirdLife International. 2018. *Nesofregetta fuliginosa*. The IUCN Red List of Threatened Species 2018).

The Henderson Fruit-dove (*Ptilinopus insularis*), the White-winged Petrel (*Pterodroma leucoptera*), Cook's Petrel (*Pterodroma cookii*), the Collared Petrel (*Pterodroma brevipes*), the Juan Fernandez Petrel (*Pterodroma externa*), the Henderson Reed-warbler (*Acrocephalus taiti*), the White Petrel (*Pterodroma alba*), the Henderson Lorikeet (*Vini stepheni*) and the Henderson Crake (*Zapornia atra*) are listed as Vulnerable (VU).

The Henderson Fruit-dove is confined to Henderson Island of the Pitcairn Island group. There are no known direct impacts of the presence of the Pacific rat. Rats are known to be seed predators and could be limiting seedling germination. The introduction of the Black rat (*Rattus rattus*) could have more serious impacts. The introduction of colonizing alien vegetation could degrade habitats (BirdLife International. 2016. *Ptilinopus insularis*. The IUCN Red List of Threatened Species 2016).

The White-winged Petrel is known to breed in Australia, French Polynesia, and New Caledonia; it is not known to breed on the Pitcairn Island Group but is listed as present. The threat to this species on its breeding areas are predatory mammals like rats (BirdLife International. 2018. *Pterodroma leucoptera*. The IUCN Red List of Threatened Species 2018)

Cook's Petrel is endemic to New Zealand and is known to breed on some of its islands. It is listed as present in the Pitcairn Island group (BirdLife International. 2018. *Pterodroma cookii*. The IUCN Red List of Threatened Species 2018)

The Collared Petrel is native to Fiji and Vanuatu and is known to breed there. It also breeds in both American and Western Samoa and the Cook Islands. The key threat is predation by introduced mammals such as the rats and the Small Indian mongoose (*Herpestes auropunctatus*). It is known to be present in the Pitcairn Island group (BirdLife International. 2018. *Pterodroma brevipes*. The IUCN Red List of Threatened Species 2018).

The Juan Fernandez Petrel is native to Chile (where there are breeding populations) and French Polynesia, Guam, Mexico, and the Hawaiian Is. (United States). The main threat to this species is predation by introduced and invasive mammals, cats, rats, dogs and pigs (BirdLife International. 2018. *Pterodroma externa*. The IUCN Red List of Threatened Species 2018).

The Henderson Reed-warbler is endemic to Henderson Island of the Pitcairn Island group. There are no known direct impacts of the presence of the Pacific rat. The introduction of the Black rat (*Rattus rattus*) could have more serious impacts (BirdLife International. 2019.

Acrocephalus taiti (amended version of 2016 assessment). The IUCN Red List of Threatened Species 2019).

The White petrel is native to and breeding in French Polynesia, Kiribati and the Pitcairn Island group. It is listed as Extinct in Tonga. The most significant threat remains predation by introduced rats. No threats have been recorded in the Pitcairn Island group (BirdLife International. 2022. *Pterodroma alba*. The IUCN Red List of Threatened Species 2022).

The Henderson Lorikeet is restricted to Henderson Island. The presence of the Polynesian rat seems to have little impact on the species. Although assessors mention that the introduction of the Black rat and the Norwegian rat could have severe impacts. Introduction of diseases such as Avian malaria and Avian pox is another threat. Habitat degradation due to the spread of alien and invasive plant species is a potential threat (BirdLife International. 2022. *Vini stepheni*. The IUCN Red List of Threatened Species 2022)

The Henderson Crake is endemic to Henderson Island. The presence of the Polynesian rat seems to have little impact on the species. Although assessors mention that the introduction of the Black rat and the Norwegian rat could have severe impacts. Introduction of diseases such as Avian malaria and Avian pox is another threat. Habitat degradation due to the spread of alien and invasive plant species is a potential threat (BirdLife International. 2022. *Zapornia atra*. The IUCN Red List of Threatened Species 2022)

The Tahiti Petrel (*Pseudobulweria rostrata*), Mottled Petrel (*Pterodroma inexpectata*) and the Bristle-thighed Curlew (*Numenius tahitiensis*) all classified as Near Threatened (NT), are listed as present on the Pitcairn Island group, however, no invasive alien species related threats have been described.

The Herald Petrel (*Pterodroma heraldica*) is listed as of Least Concern (LC); it has a wide native range, but 20% of this species population have been recorded on Henderson Island, where predation by the Pacific rat is a threat. Majority of this species breeding populations are established on Ducie island where rats were eradicated in 1997.

Table 3 Birds endemic or native to the Pitcairn Island group and threats

Name	*Island Present*	*Threats*	*IUCN Red List category*
Pitcairn Reed-warbler (*Acrocephalus vaughani*),	*Pitcairn Island*	population declines have been attributed to degradation and loss of habitat due the spread of the alien and invasive *Syzygium jambos* (Rose apple) and the conversion of natural areas to garden land. Feral goats before their eradication were one of the key causes of degradation of habitat. Predation by rats and	*Endangered*

		cats are also known to be a threat	
Henderson Petrel (*Pterodroma atrata*)	*Henderson Island*	The Henderson Petrel known to breed on Henderson Island is under threat from the Polynesian rat (*Rattus exulans*). An eradication attempt failed in 2011 and the threat remains	*Endangered*
The Henderson Fruit-dove (*Ptilinopus insularis*)	*Henderson Island*	The Henderson Fruit-dove is confined to Henderson Island of the Pitcairn Island group. There are no known direct impacts of the presence of the Pacific rat. Rats are known to be seed predators and could be limiting seedling germination. The introduction of the Black rat (*Rattus rattus*) could have more serious impacts. The introduction of colonizing alien vegetation could degrade habitats	*Vulnerable*
Henderson Reed-warbler (*Acrocephalus taiti*)	*Henderson Island*	There are no known direct impacts of the presence of the Pacific rat. The introduction of the Black rat (*Rattus rattus*) could have more serious impacts	*Vulnerable*
Henderson Lorikeet (*Vini stepheni*)	*Henderson Island*	The presence of the Polynesian rat seems to have little impact on the species. Although assessors mention that the introduction of the Black rat and the Norwegian rat could have severe impacts. Introduction of diseases such as Avian malaria and Avian pox is another threat. Habitat degradation due to the spread of alien and invasive plant species is a potential threat	*Vulnerable*
Henderson Crake (*Zapornia atra*)	*Henderson Island*	The presence of the Polynesian rat seems to have little impact on the	*Vulnerable*

		species. Although assessors mention that the introduction of the Black rat and the Norwegian rat could have severe impacts. Introduction of diseases such as Avian malaria and Avian pox is another threat. Habitat degradation due to the spread of alien and invasive plant species is a potential threat	
The Herald Petrel (*Pterodroma heraldica)*	*Henderson Island*	20% of this species population have been recorded on Henderson Island, where predation by the Pacific rat is a threat. Majority of this species breeding populations are established on Ducie island where rats were eradicated in 1997.	*Least Concern*

Nineteen **Mammals** are listed for the Pitcairn Island group. One mammal each are listed as Vulnerable (VU) and Near Threatened (NT); 16 as of Least Concern (LC) and one Data Deficient (DD). Except for the Leopard seal (*Hydrurga leptonyx*) which is a terrestrial marine species, all listed mammalian species occur in the marine biome.

Seven **reptiles** are listed for the Pitcairn Island group, however only one species is listed as being Endangered (EN). This is the green turtle (*Chelonia mydas*). The Green turtle has a circum-global distribution. It is known to breed on Henderson's east beach between January and March. The Henderson Island Management plan is committed to protect the habitats of all endangered species.

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An annotated inventory of designated natural areas and ecosystems with notes on threat/pressures on these areas

This section lists all the designated areas of the Pitcairn Island group (see Table 4) and briefly describes threats for each entity.

Pitcairn Island group

In 2016, around 841910 sq kms around the Pitcairn Islands group was designated as a Marine Reserve, with an intention of protecting one of the world's most intact marine ecosystems, home to over 1250 species of marine life.

The area encompasses 99% of Pitcairn Islands groups Exclusive Economic Zone (EEZ). Traditional subsistence fishing is allowed within the zone of each island but all manner of extractive activity including fishing, oil and gas exploration, and mineral mining is prohibited.

On-going threats include illegal fishing and other related activities.

Pitcairn Island

Pitcairn Island is designated as a Key Biodiversity Area (KBA) and an Important Bird Area (IBA).

Pitcairn is the only inhabited island of the Pitcairn group. A volcanic island of 5 square kms, it is home to over 63 species of indigenous vascular plants, nine of which are endemic. Only three of eight endemic terrestrial snails of Pitcairn remain in small pockets of native vegetation. It is designated as an IBA due to it being the only nesting place of the Endangered Pitcairn Reed warbler *Acrocephalus vaughani.*

Habitat loss due to land use change, and habitat degradation due to the spread of alien and invasive species are a major threat to this island and its ecosystem. Alien and invasive plant species including the Rose apple (*Syzygium jambos*), Lantana (*Lantana camara*) and Strawberry guava (*Psidium cattleianum)* are widespread and displacing native species. Introduced predators including the Pacific rat (*Rattus exulans*), House mouse (*Mus musculus)* and cats (*Felis catus*) prey on juvenile birds and eggs and cause population declines of nesting birds.

Henderson Island

Henderson Island is listed as a UNESCO World Heritage Site since 1988, being the only raised coral atoll with a virtually intact ecosystem. The introduction of alien and invasive species has been limited causing little or no damage to the ecosystem due to alien plants [to be confirmed].

Henderson Island is also designated as a Key Biodiversity Area (KBA), an Important Bird Area (IBA), an Endemic Bird Area (EBA) and an Alliance for Zero Extinction site (AZE).

Henderson Island is designated as an IBA and EBA due to its richness in bird species both land and sea birds. Henderson is home to several threatened and endemic birds including the Henderson Petrel, Henderson Fruit-dove, Henderson Reed-warbler, Henderson Lorikeet

Henderson Crake, and the Herald Petrel. Please refer to Section 3 for details on threats to individual threatened species.

The EBA designation of Henderson Island is triggered by the presence of the restricted range endemic species Henderson Fruit-dove, Henderson Reed-warbler, Henderson Lorikeet and Henderson Crake

The AZE designation of Henderson Island is triggered by the occurrence of the Endangered (EN) Henderson Petrel

The presence of the Pacific rat is a major threat to the Henderson Petrel. The impact of the Pacific rat on the other bird species does not seem to be significant [to be confirmed]. The introduction of other rat species could have a severe potential impact.

Table 4: List of designated areas of biodiversity value in the Pitcairn Island group

Name of Island	***Name of site***
Pitcairn Island group	Marine Reserve
Pitcairn Island	Important Bird Area IBA
Pitcairn Island	Key Biodiversity Area KBA
Henderson Island	World Heritage Site WHS
Henderson Island	Important Bird Area IBA
Henderson Island	Endemic Bird Area EBA
Henderson Island	Alliance for Zero Extinction Site AZE
Oeno Island	Important Bird Area IBA
Oeno Island	Key Biodiversity Area KBA
Ducie Island	Important Bird Area IBA
Ducie Island	Key Biodiversity Area KBA

Oeno Island and Ducie Island

Oeno Island and Ducie Island are designated as both Key Biodiversity Areas (KBA) and Important Bird Areas (IBA). Both atolls are uninhabited and rarely visited.
Oeno has very limited vascular flora, trees and shrubs mostly recorded on the central islet. 16 vascular plant species have been recorded, and this includes the endemic *Bidens hendersonensis var. oenoensis*. The second largest colony in the world of Murphy's Petrel, the Near Threatened (NT) *Pterodroma ultima* is found on Oeno.

Ducie Island hosts around 90% of the global population of Murphy's Petrel. It also hosts large populations of the Herald Petrel and the Kermadec Petrel (*Pterodroma neglecta*)
The eradication of the Pacific rat from these two islands in 1997 has proved beneficial for these surface nesting Petrels.
The flora of Ducie island is almost nonexistent. Only two species have been recorded.

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An annotated inventory of at-risk invasive species in neighbouring countries with pathways of introduction and dispersal

The inventory of at-risk species with potential pathways was developed by filtering the list of known alien and invasive species from two countries that have the most traffic and movement to and from the Pitcairn Island group. The two countries considered for this horizon scanning exercise are French Polynesia and New Zealand. All results and associated data are included in worksheets in the Excel file **Appendix 4 Pitcairn pathways**

The methodology used to distil a list of at risk known invasive alien species that could potentially be introduced to the Pitcairn Island group is as follows:

The national checklists of alien and invasive species compiled in the Global Register of Introduced and Invasive Species (GRIIS), for French Polynesia, New Zealand were merged, and all known invasive species flagged (See worksheets **French Polynesia and New Zealand for their national checklists**).

The list was filtered through the consolidated list of known invasive species globally compiled from the global GRIIS dataset

Recorded potential pathways of introduction were documented for the known invasive species from the merged lists (see worksheet **risk species_pathways**). The pathway category used is the schema that was approved during a 'Subsidiary Body for Scientific and Technological Advice' meeting, of the Convention on Biological Diversity (See worksheet **Pathway schema**)

A guidance was also developed to interpret the categories. Please follow the link to IUCN, 2017 below

Malumphy et al (2019) completed a horizon scanning exercise to identify 'Priority Invasive Alien Pests that pose a Threat to the Pitcairn Islands'. A list of the top 34 species that could pose a risk to the Pitcairn Island group were identified and tabulated with the potential pathways of introduction. This has been included in worksheet – **Malumphy et al 2019**.

The IUCN ISSG is working on a tool to help agencies complete a comprehensive horizon scanning exercise to better manage and prevent the introduction of alien and invasive species. The tool is being finalised after the beta version was peer reviewed. In the coming months we will commit to run the Pitcairn horizon scanning through this new and improved tool.

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An annotated inventory of all invasive species prevention, management/control related projects undertaken on Pitcairn and on-going initiatives.

This section focuses on the alien and invasive species management and control action implemented and planned in the Pitcairn Island group over the past two decades and on-going.

Removal of Pacific rats (*Rattus exulans*)

Pacific rats and their impacts on the breeding success of Petrel spp. was discovered in 1991-1992.

The eradication of Pacific rats was undertaken in 1997 on the islands of Ducie and Oeno using ground-based baiting. This eradication attempt was successful, with no reinvasions recorded subsequently. Monitoring showed the positive impacts on the breeding success of the Petrel spp. There were two failed eradication attempts implemented on inhabited Pitcairn Island in 1997 and 1998.

With the adoption of aerial baiting, an eradication was attempted on Henderson Island in 2011 with the dropping of 75 tonnes of brodifacoum-containing bait. Reinvasion was recorded in 2012.

A Darwin Funding initiated project undertook a project that aimed to maintain, monitor and advance solutions to Invasive Alien Species (most notably the Pacific rat) for the Pitcairn Islands, particularly with reference to protecting endemic rare birds, whilst sharing experiences, capacity and best practice with other Pacific countries and territories (implementation period 2012-2016).

Removal of Feral Goats (*Capra hircus*)

As part of the INTEGRE project the government of the United Kingdom undertook to remove feral goats from Pitcairn island. Two of several objectives of the project included limiting erosion and the removal of feral goats whose trampling degraded habitats and made them more prone to erosion.

Over 500 goats were removed from the island; leaving a small cohort of feral goats that were further removed by the community

The Rose apple project (*Syzygium jambos*)

Rose apple (*Syzygium jambos*) was intentionally introduced to the Island group as a timber species to the island in the 1800's. Rose apple proved to be invasive and a threat to native and endemic species, through the mechanism of habitat degradation. During the late 2000, a Research project was conceived for implementation.

This research project investigated ways of controlling “Rose apple” and developed propagation protocols for many of the native and endemic species, which were used to replant areas where “Rose apple” was treated. The local community were fully involved with this project.

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