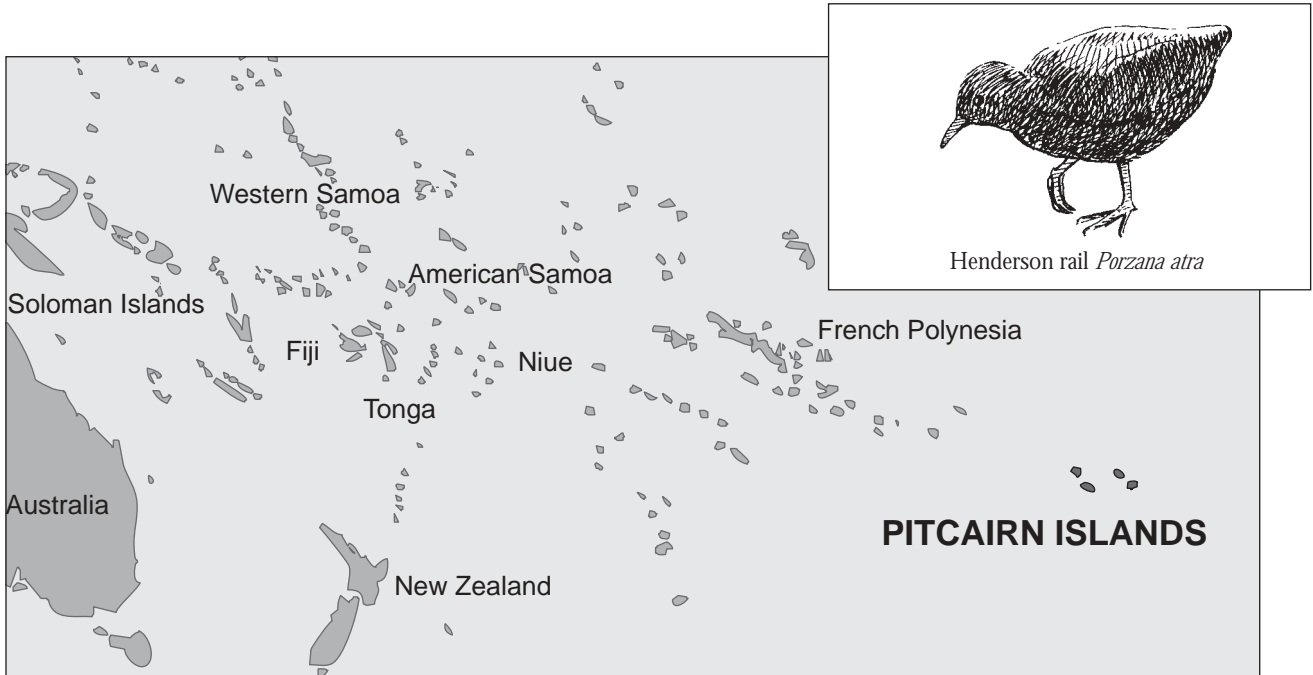


## 12: The Pitcairn Islands



### Introduction

The Pitcairn Islands comprise four islands located in the South Pacific Ocean, roughly equal distance (4,800 km) from the continental land masses of South America and Australasia, and close to the Tropic of Capricorn. Of the four islands, only Pitcairn, a small, volcanic island, is inhabited; the other three coral islands, Henderson, Oeno and Ducie are uninhabited. The total land area of the Pitcairn Islands is 43 km<sup>2</sup> (Pitcairn 7.5 km<sup>2</sup> and Henderson 37 km<sup>2</sup>).

The population of Pitcairn is approximately 60. The main employment of the small Pitcairn workforce is in local government and community service sectors. Supplementary income is provided by the sale of wood carvings or curios, mainly to cruise ship passengers and, to a limited extent, by mail order. The introduced hardwoods, miro and toa, which grow on Henderson are prized for carving. The UK Government has previously leased fishing rights within Pitcairn waters to Japanese fishery interests under a three-year licence

in the late 1980s. Pitcairners report frequent incidents of illegal commercial fishing by Korean, Taiwanese and other fishing vessels within the 200-mile exclusive economic zone (Hepburn 1992).

### International obligations relevant to nature conservation

- Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention)
- Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention)
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- Convention for the Protection of the Natural Resources and Environment for the South Pacific Region

- International Convention on the Regulation of Whaling

## Implementation

**World Heritage Convention:** Henderson Island was inscribed on the World Heritage List of Natural Sites in 1988.

**Ramsar Convention:** the UK Government is considering the possibility of listing Ducie Atoll as a Ramsar site under the Convention.

## Protected areas

Henderson Island is a World Heritage site and a management plan for the island has been prepared to ensure the conservation of this unique raised coral atoll and its associated biodiversity.

## Habitats of major significance

Pitcairn is a small, high island, reaching 333 m. There is one settlement, Adamstown, below which is the only sheltered landing on the island, Bounty Bay. There is much evidence of extensive Polynesian occupation on Pitcairn, where the local pitchstone was quarried and exported throughout Polynesia. However, this large population had disappeared by the time of the island's colonisation by the Bounty mutineers in 1790. Until relatively recently the small population of islanders lived a subsistence existence. As a result, much of the cultivatable land on the island has been used to grow a wide variety of crops. In addition, many non-food plants have been introduced to the island (e.g. Norfolk Island pine *Araucaria heterophylla* and rose-apple *Syzygium jambos*). The feral goat population has also seriously affected the local habitat. Much of the local woods, used for fuel, building and carving for export, have also been over-exploited. As a result, the island has been extensively changed by the islanders' occupation. There is one strip of native vegetation left on the island, and this runs along a ridge at the Highest Point. Here there are the remnants of 'cloud forest' with a small number (c. 30) of surviving tree ferns.

Henderson is the world's best remaining example of an elevated coral atoll ecosystem and is thought to be of outstanding value in this regard (Fosberg, Sachet & Stoddart 1983). This is particularly so because of the relatively low level of disturbance in comparison with other raised coral atolls. Henderson remains little disturbed, largely as a result of its remoteness, and its inhospitable nature. Unlike other oceanic islands, it has suffered relatively little human modification, and few exotic species occur.

Henderson Island is a raised coral island, uplifted by the lithospheric flexure caused by the crustal loading of the volcanic island of Pitcairn. The old lagoon floor of Henderson is now raised to an elevation of about 30 m. As a result of the elevation, the island plateau is protected from the periodic inundation of the sea during cyclones, which is a feature so typical of lower atolls. This has allowed the continued existence on the island of colonising species and, as a result, a diverse fauna and flora has developed with many endemic elements.

The surface of the island is, in large part, reef-rubble interspersed with areas of dissected limestone, surrounded by steep limestone cliffs undercut on all sides except to the north. There are three main beaches, to the north, north-west and north-east. Tidal range at spring tides is probably about 1 m, and tides are semi-diurnal. Freshwater is almost completely absent on Henderson, only occurring as drippings in caves, and as a spring below high tide level in the north (its flow and permanence is unknown). The geology of the island is summarised by Fosberg *et al.* (1983), who conclude that the limestones are of late Tertiary age. It is also suggested that much of the inland topography may be karst features.

There is a fringing reef at least 200 m wide to the north, north-west and north-east sides of the island, backed by a wide beach (St John and Philipson 1962). Reefs off the north and north-east beaches are seaward sloping reef platforms without reef crests, and are not typical fringing reefs. Coral

cover is about 5%, dominated by cauliflower coral *Pocillopora* with fire coral *Millepora* becoming dominant at depths greater than 7 m (Paulay 1989). Submassive acropora coral *Acropora* colonies are also present on the buttresses and solid substratum (Richmond in litt.). In total, 19 genera and 29 species of coral were collected in 1987 (Paulay 1989).

Henderson is characterised by difficult terrain and very dense vegetation. As a result of the porosity of the limestone, there has been little build-up of soil, so in the island interior the underlying fossil coral is bare. There are gross structures, such as old reef units and erosion features (coral pinnacles, reaching up to 5 m high), as well as the smaller fragments of individual coral colonies, fossil clams (often still in growth positions) and other gastropods. Fossil urchins have also been found in the interior. Growing on top of this terrain is a vegetation made up of some 63 native species including nine endemic taxa (Florence *et al.* 1995, Fosberg *et al.* 1983).

There is considerable evidence of an extensive period of Polynesian occupation on Henderson. The population may have reached as many as 100. The Polynesians are likely to have lived solely on the coastal fringes of the island, and the plants they cultivated became extinct after the Polynesians disappeared (Brooke *et al.* 1991). Henderson remains, perhaps, the only example of a Pacific Island where the present vegetation and fauna even resembles approximately its native condition.

Oeno and Ducie are remarkably undisturbed coral atolls. Oeno Atoll consists of a small central island surrounded by a lagoon. The lagoon is relatively shallow with scattered coral patch reefs separated by sand. Ducie Atoll is the most remote of the Pitcairn Islands. It is 469 km east of Pitcairn itself, and rarely visited by the islanders. An atoll about 1.6 km in diameter, it consists of four islands surrounding some 60% of the lagoon. The largest is Acadia, about 2.4 km miles long and up to 250 m wide, with a maximum elevation of about 3 m.

## Species of major significance

### Biodiversity assessment

A major independent multi-disciplinary expedition, based on Henderson Island from January 1991 to March 1992, gathered considerable information on the current and historical ecology of Henderson and on the other islands in the group. Results from the Sir Peter Scott Commemorative Expedition (Benton and Spencer 1995) provide a substantially improved basis for assessing the conservation value of the islands' biota. The introduced rat populations on Pitcairn and Henderson Islands have been the subject of a recent successful rat eradication project funded by the FCO.

### Plants

Oeno and Ducie have relatively sparse vascular floras; only two vascular plant species are recorded from Ducie. Henderson and Pitcairn support richer floras with a high number of endemic and endangered species. Over half of the flora of Pitcairn is either threatened or likely to be so whilst less than 20% of the flora of Henderson is threatened (Waldren, Florence & Chepstow-Lusty 1995). Notes on some of the threatened and endemic species follow, a fuller account is given by Waldren *et al.* (1995).

### Trees and shrubs

*Abutilon pitcairnense* (Malvaceae): probably extinct—a site known 20 years ago was searched without success, and is now invaded by *Lantana camara*. A shrub, endemic to Pitcairn.

*Bidens hendersonensis hendersonensis* (Compositae) (VU): a shrub or tree endemic to Henderson Island, it occurs with var. *subspathulata* in gaps in the plateau forest. The population of both varieties together is calculated to be about 40,000 individuals. Regeneration appears to be good although the species appears to be monocarpic.

*Bidens hendersonensis oenoensis* (Compositae) (CR): a

tree or shrub endemic to Oeno Island where it was known to occur under *Argusia argentea* trees. A botanical expedition in 1991 failed to find any living specimens despite thorough searches.

*Bidens hendersonensis subspathulata* (Compositae) (VU): a variety endemic to Henderson Island, it occurs with the type variety in open gaps in the plateau forest. The total combined number of individuals of the two varieties has been calculated to be about 40,000.

*Bidens mathewsii* (Compositae) (VU): locally frequent on the southern and western coasts, on cliffs and steep slopes, it may formerly have occurred in scrub and thickets above these slopes. A low spreading shrub, but may grow more erect in taller vegetation; endemic to Pitcairn.

*Coprosma rapensis benifica* (Rubiaceae) (CR): a small tree endemic to Pitcairn Island found in degraded areas of forest at moderate altitude. Only ten individuals of flowering size seen in 1997.

*Geniostoma hendersonense* (Loganiaceae): a shrub endemic to Henderson, occurring in shrubby vegetation in open sites, such as cliff sites and the central *Timonius* thicket area. Widespread and fairly common in suitable habitat with a population estimated to consist of approximately 120,000 individuals. No specific threats have been identified and no conservation measures are required.

*Glochidion comitum* (Euphorbiaceae) (EN): apparently endemic to Pitcairn Island, this species has only recently been described as distinct from *G. pitcairnense*. Widespread in disturbed scrub and open forest. Population probably 500–1,000 mature individuals.

*Glochidion pitcairnense* (Euphorbiaceae) (VU): a tree known only from Henderson and Pitcairn Islands and from Mangareva in the Gambier Islands (French Polynesia). On Henderson the species is relatively common, numbering about 20,000 individuals in plateau and beach forest. The

population is smaller, with less than 250 individuals, on Pitcairn and confined to remnant forest and scrub, where it is threatened with cutting and the spread of the invasive *Syzygium jambos*. No regeneration has been observed.

*Hernandia stokesii* (Hernandiaceae) (VU): recorded from Henderson Island, it is commonly found rooted in deep crevices within a restricted range in the north-west of the island. There are estimated to be 500 individuals here.

*Homalium taypau* (Flacourtiaceae) (VU): restricted to hillsides and valleys on Pitcairn Island the species is still common and forms the dominant component of the vegetation that remains. At least 2,000 individuals survive. The spread of invasive exotics such as *Syzygium jambos* and also the loss of habitat pose some threat.

*Ixora fragrans* (Rubiaceae): a shrub possibly endemic to Henderson, which is common in plateau forest with a population, calculated to be between 150,000 and 200,000 individuals. No threats to the species have been identified and no conservation measures are needed.

*Myrsine hosakae* (Myrsinaceae) (VU): one of the least common of the Henderson Island endemics. Up to 7,000 individuals may exist, scattered in the plateau forest. The species is dioecious and may be suffering from the heavy predation of fruits, often before they are ripe, by doves. *Ex situ* germination tests have failed so far as many seeds appear to lack embryos.

*Myrsine aff. niauensis* (Myrsinaceae): not found in 1997, only two collections known. Restricted to Pitcairn and apparently endemic. Probably extremely rare, less than 250 plants estimated to survive.

*Nesoluma st. johnianum* (Sapotaceae) (VU): a common tree endemic to Henderson Island and co-dominant in the plateau forest with *Xylosma suaveolens*, it also occurs in scrub vegetation and on cliff slopes. The total population is estimated

to number between 20,000 and 40,000 individuals and is under no threat at present.

*Santalum insulare hendersonensis* (Santalaceae) (VU): endemic to Henderson Island where in the plateau forests it is a semi-decumbent tree, becoming more shrubby and scarcer in cliff and more open communities. The total population size is calculated to be between 2,000 and 4,000 plants. The regeneration potential of the taxon is likely to be affected by poor fruiting performance. It is also partially parasitic which hampers the cultivation of the plant *ex situ*.

*Sesbania coccinea atollensis* (Leguminosae) (DD): this shrubby subspecies is endemic to the eastern Pacific and is very rare on Henderson. The population is probably considerably less than 50 individuals; no specific threats are known.

*Xylosma suaveolens haroldii* (Flacourtiaceae) (EN): a tree endemic to Henderson and Pitcairn Islands. On Henderson it is widespread in plateau forest and drier areas. The population on Pitcairn has declined through habitat loss and cutting. There are 250 mature individuals on Pitcairn Island which may have its own distinct subspecies, but this has yet to be determined. Very few individuals there are expected to survive. The total population on Henderson is estimated to be about 10,000 trees. Seeds are dispersed by the endemic fruit dove *Ptilinopus insularis* on Henderson but dispersal on Pitcairn Island is limited by the lack of frugivorous birds.

### Non-woody plants

*Angiopteris chauiodontia* (Marattiaceae) (E): a large fern endemic to Pitcairn, inhabiting damp shady stream sides, growing on a rich loam. Extremely rare with only two populations known with a population size of probably less than 20. In need of immediate conservation measures. *Ex situ* cultivation and re-introduction are priorities and remaining sites must be closely guarded. Spore germination has proved a problem and the species is not known in cultivation.

*Ctenitis cumingii* (Dryopteridaceae) (E): a fern,

endemic to Pitcairn, requiring humid shady lanes on deep soils. Very rare, population thought to consist of less than 25 individuals. Threats include the spread of exotic species, maintenance work on trackways and damage to native vegetation.

*Peperomia hendersonensis* (Piperaceae) (V): a succulent, terrestrial or epilithic herb with decumbent branches, endemic to Henderson. Found to occur in shade in limestone crevices and on the forest floor. Widespread and common with a population of at least one million individuals and is therefore not threatened.

*Peperomia pitcairnensis* (Piperaceae) (V): a small herb, apparently endemic to Pitcairn, but the taxon is very poorly known. Thought to occur in rocky woodlands. Likely threats are removal of native vegetation and invasion of woodlands by exotics.

### Invertebrates

Almost all the insects on Henderson are derived from the west, despite the islands easterly location, and most are likely to be indigenous. The orders showing the most diversity are *Lepidoptera* (c. 53 spp.), *Coleoptera* (c. 38 spp.), *Diptera* (c. 37 spp.), *Hymenoptera* (c. 21 spp.), *Homoptera* (c.14 spp.) and *Heteroptera* (4 spp.). The weevils, *Heteroptera* and *Homoptera* show considerable endemism and may be examples of intra-island radiation. Henderson sustains a much greater insect fauna than nearby Ducie Atoll (Benton 1995).

The biodiversity of the arthropods on Henderson is markedly small, which is perhaps due to the location of the island, topographic uniformity of the central plateau and its comparative youth. The mite fauna is rich (particularly in oribatids) and many are seemingly endemic. In addition, there are in the region of 26 species of spider and nine species of isopod, with three endemic to Henderson. Species belonging to *Diplopoda*, *Chilopoda*, *Amphipoda*, *Pseudoscorpions*, *Diplura*, *Protura* and *Collembola* are also represented (Benton & Lehtinen 1995).

The land snail fauna of the Oeno and Ducie atolls is poor and each atoll supports fewer than six species. The molluscan fauna of Henderson is more diverse, with at least 16 species belonging to seven families; in the region of eight are presumed to be endemic, at least at the level of subspecies. Pitcairn Island was found to support 26 species of land snail on a recent expedition. Seven of these species are thought to be prehistoric adventives and a further three are likely to be prehistoric introductions. The threats to the land snails on the Pitcairn Islands are the invasion of the exotic rose-apple (Benton & Spencer 1995) and predation by the Pacific rat which is presumed to have been responsible for the extinction of at least six species (Preece 1995a).

The marine molluscan fauna of the Pitcairn Islands comprises of 80 taxa recorded on Ducie and Pitcairn, 240 on Oena and 320 on Henderson. Significant faunal differences occur between the four islands in the group, which are related to the different character of each island. The molluscs of the Pitcairn Islands appear to be impoverished in comparison with those found on islands farther west. Most of the fauna is composed of widespread Indo-West Pacific species, with a few appearing to be endemic (Preece 1995b).

## Fish

The fish of the Pitcairns show a low degree of endemism (Benton & Spencer 1995). Of the reef fishes, the family showing the greatest representation is the Labridae with 21 species (Irving *et al.* 1995).

## Marine turtles

Both green turtles *Chelonia mydas* (EN) and hawksbill turtles *Eretmochelys imbricata* (CR) occur around the Pitcairn Islands. A small number of green turtle females (c. 10) nest on the east beach of Henderson Island (Brooke 1995a).

## Birds

The Pitcairn Islands are categorised as a high priority Endemic Bird Area by ICBP. The endemic birds are described below based on Collar, Crosby & Stattersfield (1994). The islands also support large and internationally significant seabird populations. Ducie is perhaps the world's main breeding station of Murphy's petrel *Pterodroma ultima*, with over 200,000 breeding pairs; in addition, many other seabirds found in the locality breed here in large numbers (Rehder & Randall 1975; Brooke 1995b; Brooke 1995c).

Henderson rail *Porzana atra*: a flightless, omnivorous species which occurs in the plateau forest and surrounding scrub. The population likely to be at the carrying capacity for the island as most territories have more than two adults, the population is considered stable (Jones 1995).

Henderson lorikeet *Vini stephensi*: an omnivorous species restricted to forest on Henderson Island. In 1992 the population was estimated to be about 1,200 pairs (Graves 1992).

Henderson fruit-dove *Ptilinopus insularis*: confined to the interior forest of Henderson Island, it is a specialist frugivore. The population numbers 3,500–4,000 (Graves 1992; Brooke & Jones 1995).

Pitcairn reed-warbler *Acrocephalus vaughani*: endemic to the Pitcairn Islands and Rimatara in the Tubuai Islands, French Polynesia, occurring as three races: *taiti*, *vaughani* and *rimatarae* on Henderson, Pitcairn and Rimatara. On Henderson (where the population was estimated to be c. 10,800 in 1987) it is found throughout the forest, foraging in all substrates and at all levels; on Pitcairn it is rarely found at ground level, perhaps because of the presence of cats and humans (Pratt *et al.* 1987; Graves 1992).

## Mammals

There is little information available about the marine mammals of the Pitcairn Islands. It is

probable that cetacean species occasionally occur in the surrounding waters, and further investigation is required to identify the species present.

## Species protection

- **The Fisheries Zone Ordinance:** this provides the legislative basis for fisheries management.
- **Local Government Regulations 1971 (Part IV):** this covers animals and wildlife. Section C deals specifically with wildlife and is concerned primarily with species protection. The legislation generally prohibits the killing or taking eggs of wild birds or, subject to the authority of the Wild Bird Protection Committee, controls the extent to which certain prescribed species may be exploited. An amendment in 1982 adds species which are protected (three whales, three seabirds and two turtles) and sets conditions under which they may be captured, killed or harassed, and extends protection to migratory species as a means of implementing the Bonn Convention within the Pitcairn Islands. The amendment extends the remit of the committee to be responsible for implementation of this Convention.

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Steve Waldren & Naomi Kingston, Trinity College Botanic Garden, Dublin; Michael de L. Brooke, University of Cambridge.

## Key names and addresses

Office of the Governor of the Pitcairn Islands, The British Consulate-General, Private Bag, Auckland, New Zealand. Fax: 64 9 3031836).

The Island Magistrate, Pitcairn Island, South Pacific Ocean, via New Zealand.

Pitcairn Working Group of the UK Dependent Territories Conservation Forum, c/o Dr M. de L Brooke Department of Zoology, University of Cambridge, Downing Street, Cambridge CB2 3EJ, UK

## Conservation agencies

Administrative responsibility for conservation regulations is borne by the Office of the Governor of the Pitcairn Islands, based in New Zealand. Access to the islands requires a licence issued by the Governor in consultation with the Island Council.

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