

Pitcairn Islands



M. de L. Brooke



Mitsuki Iwago/Minden Pictures/FFA

Bristle-thighed Curlews

General introduction

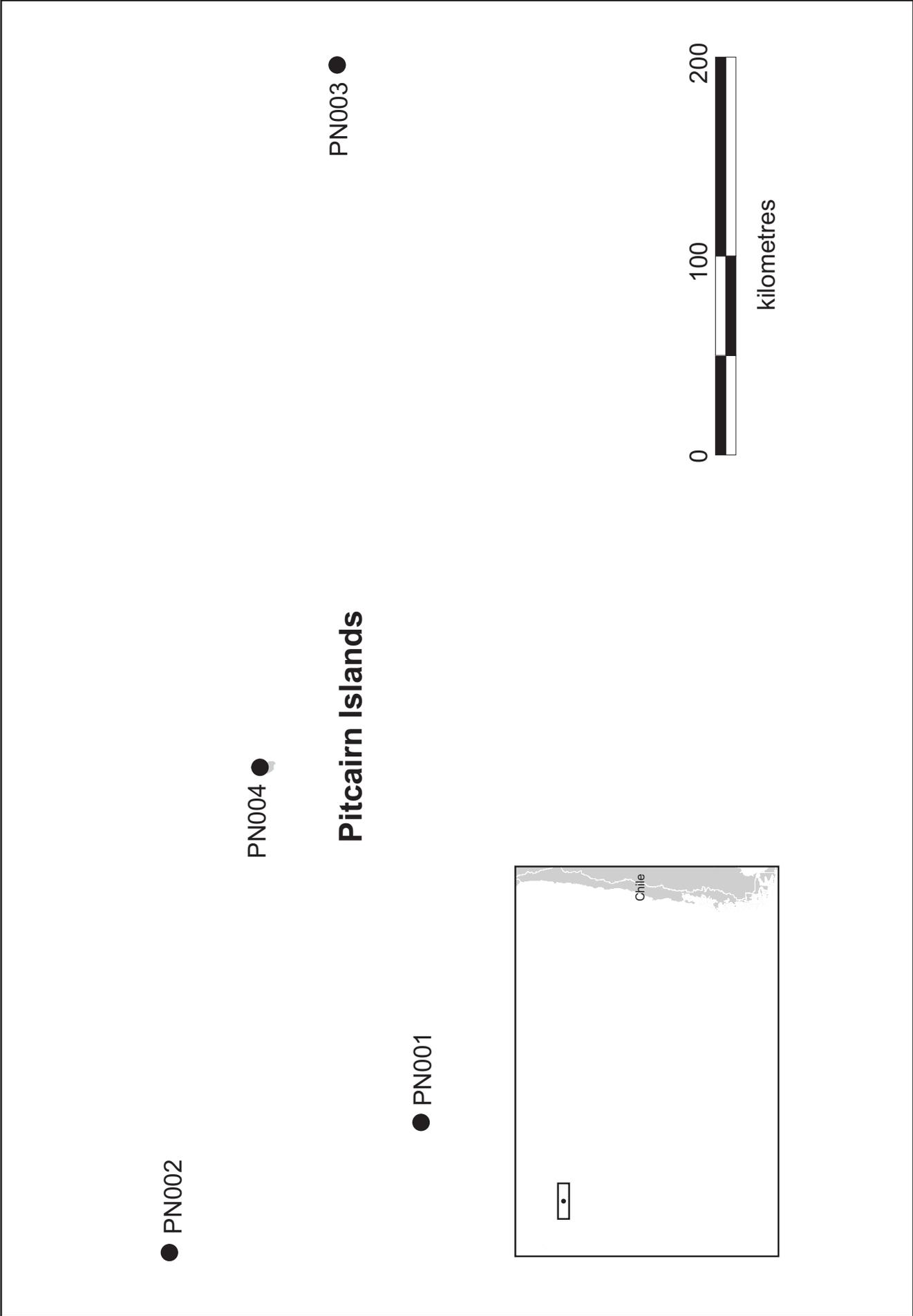
The Pitcairn Islands lie in the central South Pacific, about 300 miles to the south-east of the Gambier Islands of French Polynesia. The group comprises four islands: Pitcairn itself, Henderson, Oeno and Ducie. Only Pitcairn, a rugged but small volcanic island (2 square miles/5 square km), is inhabited. The World Heritage Site of Henderson (14 square miles/37 square km) is a raised coral island to the north-east of Pitcairn, while Oeno and Ducie are tiny, low atolls to the north and east respectively. Further details are supplied in the site accounts of the four islands.

The group is chiefly renowned for its association with the *Bounty* mutineers who arrived on Pitcairn in January 1790. Since that time, and apart from two interruptions during the 19th century, the island has been continuously occupied by the mutineers and their descendants.

It was only in 1808 that the mutineers' hideaway and the fledgling community were discovered. The first constitution emerged in 1838, and formally incorporated the island into the British Empire. Since that time the connection to Great Britain has continued so that, today, the Pitcairn Islands are

one of the UK's Overseas Territories. In practice this means that local decisions are taken by the 10-strong Island Council. Decisions about what might be termed foreign affairs are handled by the British Administration in consultation with the Island Council. A commissioner based in Auckland, New Zealand, is responsible for arranging much of the island's supplies and for philatelic issues, an important source of income. The Governor of the Pitcairn Islands is based in Wellington where his principal role is as British High Commissioner to New Zealand. There is also an officer in the Overseas Territory Department of the Foreign and Commonwealth Office in London with responsibility for Pitcairn matters.

Broadly the population grew during the 19th century and reached a peak of 233 in 1937. It then began to dwindle, mainly because of emigration to New Zealand. By 1963 the population was down to 86. This was the time that, because of the expansion of commercial aviation, large ocean liners ceased to call at Pitcairn and give the islanders the opportunity to trade their wares with the passengers. Since



Pitcairn Islands

that time, the population has continued to fall and currently totals about 40 Pitcairners plus 10 expatriates. The expatriates normally include a schoolteacher, a nurse and a Seventh Day Adventist pastor.

On average, three supply ships, trans-Pacific container vessels with several containers of goods for Pitcairn, call each year. The goods are man-handled into the island's longboats, which are able to enter the small harbour of Bounty Bay. These longboats are the key physical communication link for there is, at present, no airstrip. Other freighters may stop briefly offshore from Pitcairn, giving people the opportunity to exchange goods in kind and send mail. About six to ten cruise ships visit each year, while yachts arrive on an ad hoc basis.

For many years, the Pitcairners, some of whom are keen

radio ham operators, relied on radio links with the outside world. However, telecommunications links have recently improved. An expensive direct-dial telephone link is available and e-mail arrived in 2002.

Fishing and gardening are popular among Pitcairners. However, the days when the islanders were self-sufficient are long gone. Income is needed and is generated in several ways. Most islanders have government jobs – public service posts that are largely funded by the sale of the island's postage stamps. Also important is the sale, to cruise ships and other visitors, of a variety of goods (e.g. postcards, T-shirts and wooden carvings). These goods may also be sold by mail order. Recently, the export of high-grade honey has proved profitable.

Ornithological importance

Visiting the Pitcairn group in 1956, Williams (1960) recorded 28 species, of which most were seabirds. Only two species were introduced, one of which (the Ring-necked Pheasant) has since become locally extinct. The Sir Peter Scott Commemorative Expedition (1991–92) observed a further 10 species that had not been recorded previously.

There are nine species of global conservation concern found in the Pitcairn Islands (see the table below). In addition, over 90% of the world's population of Murphy's Petrels nest on Ducie. Henderson is probably the principal breeding site for the endangered Henderson Petrel.

The occurrence of globally threatened and restricted-range species at Important Bird Areas in the Pitcairn Islands

Key species	A1	A2	PN001	PN002	PN003	PN004
Henderson Petrel <i>Pterodroma atrata</i>	EN					X
Phoenix Petrel <i>Pterodroma alba</i>	EN			X		
Henderson Crake <i>Porzana atra</i>	VU	EBA215				X
Henderson Fruit-dove <i>Ptilinopus insularis</i>	VU	EBA215				X
Henderson Lorikeet <i>Vini stepheni</i>	VU	EBA215				X
Henderson Reed-warbler <i>Acrocephalus taiti</i>	VU	EBA215				X
Bristle-thighed Curlew <i>Numenius tahitiensis</i>	VU		(X)*	X	(X)*	X
Pitcairn Reed-warbler <i>Acrocephalus vaughani</i>	VU	s137	X			

(X)* = occasionally seen

Henderson is an Endemic Bird Area (EBA 215), with four restricted-range species: the Henderson Crake, the Henderson Fruit-dove; the Henderson Lorikeet; and the Henderson Reed-warbler. Pitcairn is a Secondary Area (s137)

with one restricted-range species, the Pitcairn Reed-warbler.

Oeno, Ducie and Henderson are all important areas for seabirds as they hold more than 10,000 pairs on a regular

Important Bird Areas in the United Kingdom Overseas Territories

basis. More information can be found in the respective island site accounts, below.

The only wader present in significant numbers is the

Bristle-thighed Curlew. A few migrants from the Northern Hemisphere visit the Pitcairn Islands during the winter months.

Conservation infrastructure and Protected Area system

The British Government has taken the lead in linking the islands to the wider arena of international conservation. Henderson is a World Heritage Site, while both Oeno and Ducie are possible future Ramsar sites. The following international conventions relevant to nature conservation and environmental protection have been extended to the Pitcairn Islands: Vienna Convention on Substances that deplete the Ozone Layer; Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matters; Convention for the Protection of the Natural Resources and Environment of the South Pacific Region; Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar); Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES); Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage); Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention); International Convention on the Regulation of Whaling.

The Pitcairn conservation officer is responsible for biosecurity on Pitcairn and was instrumental in setting up the nursery, which is now used for propagating endemic plants (see the Pitcairn site account, below). He also takes the lead in addressing pest problems (e.g. fruit fly) on the island. Along with other islanders he visits Henderson and Oeno about once a year, Ducie more rarely. The visits are usually too brief to permit active conservation management, but at least mean that any major conservation problems will not go unnoticed for extended periods.

Now that a management plan has been published for Henderson, a management committee will be established. The committee's remit will include considering whether it would be feasible and beneficial for a more or less permanent ranger to be stationed on Henderson.

Further reading

See full details at end of chapter.

Procter and Fleming (1999), Salt (2000), Stattersfield *et al.* (1998).

Overview of the inventory

The distribution of key species on the islands and the main threat they face – alien invasive species – means it is not appropriate or practical to select sites within the islands.

All four islands in the Pitcairn group qualify as IBA sites (see the table below). Further details are provided in the individual site accounts.

Sites of global conservation importance

IBA code	Site name	A1	A2	A4i	A4ii	A4iii
PN001	Pitcairn	X	X			
PN002	Oeno	X		X	X	X
PN003	Ducie			X	X	X
PN004	Henderson	X	X	X	X	X

It will be evident from the 'General introduction' to this chapter that visiting the Pitcairn Islands is not easy, and it is for this reason that the biological data on which these accounts are based have mostly been accrued in an ad hoc manner. Important contributions have come from D. R. Tait, who visited Henderson for about five months in 1912 to prospect (unsuccessfully) for economically viable phosphate deposits, from the 1922 visit of the American Whitney South Sea Expedition, from the Mangareva

expedition of 1934, from a short Smithsonian-sponsored visit in 1987, from the 1991–92 Sir Peter Scott Commemorative Expedition to the Pitcairn Islands, and from a Trinity College, Dublin, botanical expedition to Pitcairn in 1997. Additional observations derive from interested persons making short visits or, for example, schoolteachers recording their observations. However, the infrastructure for the regular monitoring of fauna and flora is not yet in place.

Site accounts

PN001: Pitcairn Island

Ref number	PN001
Admin region	Pitcairn
Coordinates	25°04'S 130°06'W
Area	500 ha (approx)
Altitude	0–347 m
IBA categories (details below)	A1, A2
Status	No formal protection to site; local government regulations extend general protection to wildlife

Site description

Pitcairn is a rugged volcanic island, 2 square miles (5 square km) in area, which reaches a maximum height of 347 m. Much of the coastline is either cliff or extremely steep slope. There is no fringing reef.

Lying towards the south of the trade wind belt, the island enjoys a mild climate with easterly winds predominating, markedly so in the austral summer. The mean annual temperature (measured at a weather station at 264 m) is 21.2°C, with about a 10° difference between the warmest and coldest months. The mean annual rainfall is 1,716 mm, with no marked seasonal variation.

Pitcairn is the only inhabited island in the wider Pitcairn group. It has been inhabited almost continuously since the *Bounty* mutineers and their Polynesian consorts settled in 1790. There was an earlier period of Polynesian settlement, but this had ended before the arrival of the mutineers and there is little knowledge of its effect on the bird population. The last half-century has seen a steady dwindling of the human population, which in 2003 numbered about 50.

Both tropical and temperate fruits and vegetables thrive in the fertile volcanic soil, and extensive areas are given over to their cultivation, mostly for local consumption. Other areas of the island are dominated by introduced plants, notably *Lantana camara* and Rose Apple *Syzygium jambos*, both of which invade other communities and thereby threaten native plants. Guava *Psidium cattleianum* is also widespread. There are also conspicuous areas where all topsoil has been lost, and heavy erosion is evident. As a result of these several processes – horticulture, alien species and erosion – native vegetation is now restricted to small pockets, which are principally situated close to the island's summit ridge or in steep valleys on the south side of Pitcairn.

Birds

See the accompanying table for details of key species. Pitcairn Island qualifies as an IBA because it is the only nesting locality of the Globally Vulnerable Pitcairn Reed-warbler. Although now separated as a full species, the warbler has in the past been considered conspecific with the Henderson Reed-warbler and the Rimatara Reed-warbler. The Pitcairn Reed-warbler has not been subject to any detailed study, but it appears to be distributed throughout the island in all habitats vegetated with shrubs or trees. If its density is similar to that of the Henderson Reed-warbler, then its population may be around 1,500. There are no other breeding landbird species and, because of the presence of feral cats and Pacific rats, seabirds breed only on inaccessible cliffs in small numbers.

Other threatened/endemic wildlife

The flora of Pitcairn includes 80 species of native vascular plants, of which 10, two ferns and eight angiosperms, are endemic. A total of 51 of the native vascular plants are threatened. Particular concern attaches to the endemic *Coprosma benefica*, known from only 11 individuals, and the endemic fern *Angiopteris chauliodonta*, restricted to small and fragmented populations. Other species (e.g. *Cyclophyllum barbatum*, *Psydrax odoratum*) are becoming rare as they are utilised by the islanders. Their populations could be enhanced by nursery propagation (see 'Conservation issues/threats', below). Several species are poorly dispersed on Pitcairn (e.g. *Coprosma*, *Psydrax*, *Xylosma suaveolens*) due to the lack of a frugivorous bird to disseminate fruit.

Eight of Pitcairn's 26 species of extant land snail are endemic; three survive only in small remnants of native vegetation around 1 hectare in extent. If Rose Apple or *Lantana* were to invade these remnants and create an understorey inimical to these taxa, they would probably become extinct.

Key species

Criteria	Key species	Number of breeding pairs/ individuals (if known)	Notes
A1, A2	Pitcairn Reed-warbler <i>Acrocephalus vaughani</i>		Common in most habitats

Conservation issues/threats

For the obvious reason that it is the only inhabited island in the Pitcairn group, Pitcairn is the most ecologically disturbed. Nonetheless, it remains of significant conservation interest, notably from a botanical point of view. The preservation of the native flora will require a combination of measures, including ex-situ propagation, in-situ protection and control of Rose Apple.

To aid ex-situ propagation, a small nursery was started in 1998. The critically threatened *Coprosma* (see above) is a good candidate for propagation, from cuttings and seeds, followed by planting out. Propagation of *Angiopteris* from spores is likely to be difficult because the gametophyte is mycotrophic, but is worth attempting.

While the Rose Apple has not yet invaded the southern flank of Pitcairn, this will probably happen in due time if not prevented. Ideally, the best pockets of native vegetation should be weeded periodically – for example, in Faute Valley and Tautama. Funding for the labour involved is required. Consideration should also be given to protecting at least parts of these areas from goats by fencing.

Other important pockets of native vegetation (e.g. Brown's Water, home to a high number of endemic and threatened species) should be protected from road encroachment.

The large tracts of Rose Apple growing over Pitcairn are of little wildlife value. In the long term, it would be ideal if this introduced invasive species could be replaced by native and, especially, threatened species. To this end, seedlings grown in the nursery could be planted out in small areas where the Rose Apple has been cleared. This general methodology will perhaps need refining in the light of experience, but is certainly to be preferred to wholesale clearance of Rose Apple. Since little grows underneath Rose Apple, such clearance would

undoubtedly be accompanied by loss of topsoil and erosion. The ideas are now being tested in a project run by Trinity College, Dublin, and funded by the Foreign and Commonwealth Office, London.

Since the Pitcairn Reed-warbler appears able to co-exist with Pacific Rats *Rattus exulans* and with feral cats, and to live in a variety of altered and disturbed habitats, there appears to be no immediate cause for concern. This would change were other rat species to reach Pitcairn.

In 1997 and 1998, two attempts to eradicate rats were made using hand distribution of poison baits. If successful, the eradication would have contributed to human welfare, allowed the recolonisation of Pitcairn by surface-nesting seabirds, and would have reduced the risk that Oeno (see that island's site account, below) would be re-invaded by rats. While the attempts certainly reduced the rat population to a very low level, with immediate evident benefits to the islanders' fruit and vegetable crops, neither attempt was entirely successful. Inevitably, it is impossible to be certain about the reason(s) for failure, but there is wide agreement that, in the event of a third attempt, the period of monitoring by dedicated personnel after the main bait distribution should be lengthened to several months.

There is a population of free-ranging goats on Pitcairn. When numbers increase beyond about 100 (the situation at the time of writing) their impact on the vegetation and erosion visibly escalates. Regular culling appears justified.

Further reading

See full details at end of chapter.

Brooke (1995a), Graves (1992), Kingston (2001), Kingston and Waldren (2002, 2003), Kingston *et al.* (2004), Preece (1995a), Spencer (1995), Waldren *et al.* (1995a, 1995b).

Site accounts

PN002: Oeno Island

Ref number	PN002
Admin region	Pitcairn
Coordinates	23°56'S 130°45'W
Area	1,000 ha (approx) (lagoon, fringing reef and 80 ha motu)
Altitude	0–4 m
IBA categories (details below)	A1, A4i, A4ii, A4iii
Status	No formal protection to site; local government regulations extend general protection to wildlife

Site description

Oeno is a low oceanic atoll to the north of Pitcairn. The fringing reef is approximately circular and about 2.5 miles (4 km) in diameter. It is breached by a single passage, on the northern margin. Through this passage, shallow-draft boats (e.g. the Pitcairners' longboats) may enter the lagoon, which is uniformly shallow, less than 3 m deep, with scattered reefs. There is a single motu, about 80 ha in extent, south-west of the centre of the lagoon. North of the motu and intermittently connected to it, a sandspit runs towards the reef.

Oeno is a remarkably undisturbed atoll. The margin comprises either sandy beach or reef flat. Behind this lies shoreline scrub, often dominated by *Suriana maritima*. At the south end of the motu is closed forest of *Argusia argentea* and *Pisonia grandis*, the canopy reaching 7–9 m. Most of the rest of the motu is clothed in more or less open *Argusia* scrub. In total there are only 16 vascular plant species present, but this includes the endemic *Bidens henderonensis* var. *oenoensis*. There is also a stand of coconut trees, introduced by the Pitcairners, at the north of the island.

Because the entrance to the lagoon is too shallow to allow the passage of ocean-going yachts, and because there is no secure anchorage outside the reef, Oeno is rarely visited.

Once or twice a year, the Pitcairners visit the island to camp in the vicinity of the coconut grove. The visits, typically in the southern summer, normally last around a week and are viewed as holidays.

Birds

See the accompanying table for details of key species. Oeno's chief ornithological importance is the Murphy's Petrel colony, estimated in 1991 at 12,500 pairs and therefore the second largest in the world. It would be worthwhile to assess whether the 1997 eradication of Pacific Rats *Rattus exulans* from Oeno has been followed by an increase in the population of Murphy's Petrels. Similarly, in the light of likely decreases in the breeding populations of Herald and Kermadec Petrels between 1922, the year of the Whitney Expedition visit, and 1991–92, checking for signs of recovery of these populations would be valuable. Unfortunately, monitoring this situation will be difficult because of the intrinsic difficulty of reaching the island and because the Pitcairners' holiday visits to the island are usually in the austral summer rather than during the Murphy's Petrels' winter nesting season.

Phoenix Petrels apparently disappeared from Oeno between the Whitney visit in 1922 and the 1991–92

Key species

Criteria	Key species	Number of breeding pairs/ individuals (if known)	Notes
A1	Phoenix Petrel <i>Pterodroma alba</i>	12–20 individuals	May nest: see text
A1, A4i	Bristle-thighed Curlew <i>Numenius tahitiensis</i>	Up to 100 over-wintering	Approx 1% of the global population
A4ii	Murphy's Petrel <i>Pterodroma ultima</i>	12,500 pairs (1991)	
A4ii	Red-tailed Tropicbird <i>Phaethon rubricauda</i>	500–1,000 pairs (1991)	
A4iii	More than 10,000 pairs of seabirds breed regularly at this site		

Important Bird Areas in the United Kingdom Overseas Territories

expedition, but perhaps 12–20 pairs were present in 1997 and 1998.

Oeno supports populations of other seabirds, notably Red-tailed Tropicbirds (500–1,000 pairs), Masked Boobies (250–300), Red-footed Boobies (25), Greater Frigatebirds (100) and Common White-terns (<1,000). It is also important as a wintering site for the Bristle-thighed Curlew. In January 1990 about 100 were recorded.

It is possible that the widespread Spotless Crake breeds on Oeno for it is seen regularly. Otherwise there are no landbirds.

Other threatened/endemic wildlife

The flora of Oeno is poor in species. Only the local variety of *Bidens henderonensis* is endemic; this was not seen in 1991–92, but was relocated in 1997. On the other hand, the marine mollusc fauna is much richer. Around 240 taxa are known, of which about 2% are endemic to the Pitcairn group. One species, a liotinine gastropod, belongs to a genus (and therefore species) known only from Oeno.

Conservation issues/threats

The vegetation of Oeno could alter drastically, with consequences for birdlife, if certain plant species (e.g. *Lantana camara*) reached the island. Great care should be taken to avoid the accidental or deliberate introduction of exotic species. For example, soil, seeds or seedlings should not be taken to Oeno from Pitcairn. If newly arrived weedy species are noticed, they should be uprooted and destroyed immediately. All food waste should be properly buried.

Rats were eradicated from the island in 1997. The project was carried out by Wildlife Management International Limited with funding from the British Department for International Development. As discussed above, logistic difficulties have precluded any monitoring of the impact of this on seabird nesting success or numbers. The most likely route of re-invasion is if rats were transported from

Pitcairn, where they are still present, to Oeno in a Pitcairn longboat. This is a real risk since the longboats are loaded with provisions alongside the Pitcairn jetty and then unloaded while at anchor only some 10 m from Oeno's beaches. When loading for a trip to Oeno, the Pitcairners should take every precaution to ensure that their longboats are rat-free.

Tourist visits to Oeno are actively being planned. If such visits are well managed they need not harm the island's wildlife. It is, however, essential that the operators undertake the strictest precautions to ensure that neither animals nor plants are inadvertently introduced. The risk of such introductions would be greatly increased if ever tourists stayed overnight on Oeno. Equally important, any developments that depend on dredging or blasting a deeper channel through the reef passage, and across the lagoon to the motu, should be absolutely prohibited. The risk of altering the sedimentation pattern of the entire lagoon is high, with potentially severe consequences for the marine molluscs. At worst, the ensuing change in water flow could lead to the disappearance of most of the island.

Oeno appears to qualify as a Ramsar site and therefore its designation should be promoted after full consultation. Ramsar designation does not preclude ecologically sensitive visits or sustainable local exploitation of reef fish, but would recognise and help perpetuate Oeno's importance as a haven for birds and as a rare example of a pristine Polynesian lagoon.

Further reading

See full details at end of chapter.

BirdLife International (2000), Brooke (1995a, 1995b), Del Hoyo *et al.* (1992), Pandolfi (1995), Preece (1995b), Spencer (1995) Waldren *et al.* (1995a).

Site accounts

PN003: Ducie Island

Ref number	PN003
Admin region	Pitcairn
Coordinates	24°41'S 124°47'W
Area	800 ha (approx) (lagoon, fringing reef and 60 ha motu)
Altitude	0–5 m
IBA categories (details below)	A4i, A4ii, A4iii
Status	No formal protection to site; local government regulations extend general protection to wildlife

Site description

Ducie is a low oceanic atoll of exceptional remoteness at the extreme south-east of Polynesia. It is the southernmost atoll in the world. The fringing reef is oval, roughly 1.9 miles (3 km) along the east–west axis and 1.5 miles (2.5 km) along the north–south axis. The single passage at the south-west corner faces south-west and experiences the full impact of the prevailing heavy swells. It is not navigable. The principal motu, called Acadia Island, has an area of 55 ha and stretches for about 2.2 miles (3.5 km) along the northern reef. Three other small motus are named Edwards, Pandora and Westward; all can be reached by walking from Acadia over the reef at low tide. Their combined land area is about 5 ha.

The central lagoon, up to 12 m deep, is characterised by a well-preserved death assemblage of a formerly prolific coral fauna, encrusted by a much sparser live coral assemblage. Presumably the formerly abundant corals have been killed by influxes of cold water at this island, which is towards the southern limit of coral growth.

Ducie's remoteness is evident in the depauperate flora. Acadia is covered in a monospecific forest of *Argusia argentea*. A second woody species, *Pemphis acidula*, was

recorded in 1991, and there are records from the 1922 Whitney Expedition of a grass and a vine. No other vascular plants are known.

Ducie receives visits once or twice a year from cruise ships, which land their passengers on the north shore of Acadia. It is quite possible that there are other visits that are unrecorded, but probably infrequent.

Birds

See the accompanying table for details of key species. Over 90% of the world's Murphy's Petrels nest on Ducie, making the atoll of supreme importance for this species. It is also important for two other surface-nesting *Pterodroma* petrels: the Herald and the Kermadec. All three species may benefit from the 1997 eradication of Pacific Rats *Rattus exulans*. It is also possible that Henderson Petrels may begin to nest again on Ducie. However, Ducie's extreme remoteness probably precludes any monitoring of population recoveries.

The fourth seabird species contributing to Ducie's status as an IBA is the Christmas Island Shearwater *Puffinus nativitatis*. Because of the species' sub-annual breeding cycle, the current population estimate, a minimum of 3,000 pairs, is not especially reliable, but it makes Ducie one of

Key species

Criteria	Key species	Number of breeding pairs (if known)
A4ii	Murphy's Petrel <i>Pterodroma ultima</i>	250,000 pairs (1991)
A4i	Common White-tern <i>Gygis alba</i>	5,000 pairs (approx) (1991)
A4ii	Herald Petrel <i>Pterodroma heraldica</i>	10,000–100,000 pairs (1991)
A4ii	Kermadec Petrel <i>Pterodroma neglecta</i>	30,000 pairs (approx) (1991)
A4ii	Christmas Island Shearwater <i>Puffinus nativitatis</i>	3,000 pairs (approx) (1991)
A4ii	Red-tailed Tropicbird <i>Phaethon rubricauda</i>	500–1,000 pairs (1991)
A4iii	More than 10,000 pairs of seabirds breed regularly at this site	

Important Bird Areas in the United Kingdom Overseas Territories

the species' largest colonies, holding around 5% of the known world breeding population.

Phoenix Petrels, considered Globally Endangered, apparently disappeared from Ducie between the Whitney visit in 1922 and the 1991–92 expedition.

The populations of Common White-terns (5,000 pairs) and Red-tailed Tropicbirds (500–1,000) are substantial. Other seabird species breed in lesser numbers.

There are no landbirds on Ducie.

Other threatened/endemic wildlife

For all taxonomic groups hitherto investigated, Ducie has proved to be poor in species. This is a consequence of its isolation at the extreme south-east of Polynesia, the source of nearly all taxa. Somewhat perversely, the very paucity of species is what makes the atoll so interesting to students of biogeography.

Conservation issues/threats

The vegetation of Ducie could alter drastically, with consequences for birdlife, if certain plant species (e.g. *Lantana camara*) reached the island. Great care should be taken to avoid the accidental or deliberate introduction of exotic species. For example, soil, seeds or seedlings should not be taken to Ducie. Visitors should be reminded of the

need to take the greatest care not to carry seeds ashore on clothing, on footwear or in camera bags. This reminder should be given on Pitcairn if the visitors are planning to reach Ducie from the west or, with the cooperation of the Chilean authorities, on Easter Island, if the visitors are coming from the east.

Rats were eradicated from the island in 1997. The project was carried out by Wildlife Management International Limited with funding from the British Department for International Development and the World Wide Fund for Nature (British Section). Logistic difficulties have precluded any monitoring of the impact of this on seabird nesting success or numbers. The fact that Ducie is visited only rarely means the chance of reintroduction is low.

Ducie appears to qualify for Ramsar status, therefore its designation should be promoted after full consultation. Ramsar designation would recognise and help perpetuate Ducie's importance as a haven for birds and as a thriving example of biogeographic processes.

Further reading

See full details at end of chapter.

Brooke (1995a, 1995b, 2004), Del Hoyo *et al.* (1992 and 1996), Florence *et al.* (1995), Pandolfi (1995).

Site accounts

PN004: Henderson Island

Ref number	PN004
Admin region	Pitcairn
Coordinates	24°20'S 128°19'W
Area	3,700 ha
Altitude	0–33 m
IBA categories (details below)	A1, A2, A4i, A4ii, A4iii
Status	UNESCO World Heritage Site

Site description

Henderson Island is, without question, one of the world's best remaining examples of an uplifted coral atoll. Compared to other such raised atolls, it has suffered limited disturbance. Thus, the original ecosystem is largely intact and the number of introduced species is low. Uplift occurred via lithospheric flexure when the oceanic floor became loaded under Pitcairn Island. The island now rises 33 m above sea level and is believed to have been emergent for approximately 380,000 years. Thus, the island plateau is what was formerly the lagoon floor. It is cloaked in dense vegetation, growing on poor limestone soil and coral rubble. There is no permanent water and the rocks are often savagely fissured. The fact that the island is uplifted, and therefore, unlike a low atoll, secure from the devastating effects of periodic inundation during tropical storms, has been important in permitting the evolution of the wide range of endemic species and a generally higher terrestrial species diversity.

There are fringing reefs along the east, north and north-west coasts. Behind each of these is a beach, with beach-back vegetation, before steep slopes or cliffs rise to the plateau. Where there is no reef, the sea beats directly against sheer 30 m cliffs. The tidal range is small, about 1 m.

Weather records have only been maintained during 1991–92 when the average daily maximum varied from 29.6°C (February 1991) to 24.2°C (June 1991); the comparable minima in those two months were 22.2°C and 15.7°C, respectively. Total rainfall from February 1991 to January 1992 was 1,623 mm.

Archaeological studies have revealed that Henderson was occupied by Polynesians from early in the 8th century AD for at least the next 600 years. While the human population may have reached 100, it is uncertain whether there was seasonal ebb and flow between Henderson and Pitcairn when, for example, people travelled to Henderson to exploit turtles during their nesting season. Certainly the Polynesians ate birds in large numbers. They introduced Pacific Rats *Rattus exulans*. They also burned the northern and eastern margins of the plateau inland from their habitation sites, at least partly to make way for cultivated species. Whether these several impacts – bird harvesting, rats, horticulture – had any great lasting impact on the plant communities is uncertain. However, at least six of 22 land snail species disappeared because of the Polynesian impact.

The impact on birds was also profound. Five landbird

species, of which four were endemic to Henderson, disappeared. In addition, two or three seabird species were locally extirpated, while the Gadfly Petrels that continue to breed (see 'Birds', below) are probably present in numbers much lower than formerly. Notwithstanding this undeniable impact, the crux of the conservation perspective, that Henderson is the Pacific's most pristine raised coral island, is not undermined.

Henderson was not discovered by European seafarers until Pedro Fernandez de Quiros passed without landing in 1606. The island received its present name when next visited in 1819, by the *Hercules* under the command of Captain Henderson. Pitcairners started regularly to use two woods, *Toa Cordia subcordata* and *Miro Thespesia populnea*, collected from the island, shortly after the First World War when they were taught artisanal carving techniques by an Austrian named Edward Laeffler. The exploitation of these two species, both of which were probably introduced by the Polynesians, has continued to this day, with the Pitcairners visiting the island once every one or two years. Provided due care is taken, exploitation can continue indefinitely on a sustainable basis.

Because crossing the reef is potentially dangerous, passing yachtsmen rarely set foot on Henderson. However, cruise ships land their passengers once or twice a year, either on the north or north-west beach.

In the early 1980s, an American strip-mining millionaire proposed building a home and airstrip on Henderson. After intense lobbying by the conservation community, the proposal was rejected by the British Government. In 1988, the island was inscribed as a World Heritage Site because it is such a remarkable example of a raised coral atoll. At the time of the inscription, it was widely realised that scientific knowledge of the island was limited. This was partly rectified in 1991–92 when the Sir Peter Scott Commemorative Expedition to the Pitcairn Islands took place. Concentrating its multi-disciplinary scientific efforts on Henderson, the expedition involved 34 people from seven countries in the field over a 15-month period. Since then, only brief scientific visits have taken place, the last in 2003 to finalise a management plan for the island (2004–2009). Monitoring changes in the island's fauna and flora will remain difficult because of the island's exceptional remoteness and ruggedness – the very features that have contributed to preserving it thus far.

Important Bird Areas in the United Kingdom Overseas Territories

Key species

Criteria	Key species	Number of breeding pairs/ individuals (if known)	Notes
A1, A4ii	Henderson Petrel <i>Pterodroma atrata</i>	16,000 pairs (approx)	Henderson is probably the principal breeding station
A1, A2	Henderson Crane <i>Porzana atra</i>		Common across island
A1	Bristle-thighed Curlew <i>Numenius tahitiensis</i>		Up to 50 overwintering
A1, A2	Henderson Fruit-dove <i>Ptilinopus insularis</i>		Common across island
A1, A2	Henderson Lorikeet <i>Vini stepheni</i>		Occurring patchily across island
A1, A2	Henderson Reed-warbler <i>Acrocephalus taiti</i>		Common across island
A4i	Common White-tern <i>Gygis alba</i>	Possibly as many as 10,000 pairs (1991)	
A4ii	Herald Petrel <i>Pterodroma heraldica</i>	11,100 pairs (1991)	
A4ii	Kermadec Petrel <i>Pterodroma neglecta</i>	10,000 pairs (approx) (1991)	
A4iii	More than 10,000 pairs of seabirds breed regularly at this site		

Birds

See the accompanying table for details of key species. Henderson Island is of great ornithological importance, both for its landbirds and its seabirds. All four breeding landbird species are endemic to the island. Of pre-eminent interest is the flightless Henderson Crane, one of possibly seven species of flightless rail extant on Pacific islands. Population estimates in 1987 and, using perhaps a more reliable technique, in 1991–92 were 3,240 and 6,200 individuals, respectively. While some eggs may be lost to the introduced Pacific Rats *Rattus exulans*, the cranes are very aggressive towards the rats, and have co-existed with them for some 800 years. There is no immediate concern for the cranes, provided other predators do not reach Henderson.

The Henderson Fruit-dove is an endemic representative of a widespread Pacific genus. Its diet includes most fruit species available on the island, but the watery *Procris pedunculata* is especially important. Population estimates in 1987 and 1991–92 were 3,420 and 3,140 individuals, respectively.

The Henderson Reed-warbler, formerly considered

conspecific with the Pitcairn Reed Warbler, has been the subject of a detailed single-season breeding study, which established that about one-third of breeding territories were occupied not by pairs but by trios. Such trios, either two male/one female or one male/two females, were of birds unrelated to each other. Population estimates in 1987 and 1991–92 were 10,800 and 9,500 individuals, respectively.

The scarcest of the landbirds is the Henderson Lorikeet, which feeds on nectar, pollen fruit and also arthropods. No nest has ever been found. It is the only species of *Vini* living in habitats relatively little altered by man. A population estimate in 1987 was 720–1,820 individuals.

A two-day, and therefore necessarily superficial, inspection visit to Henderson in November 2000 and a six-week visit in 2003 confirmed that all four species remained present in numbers that did not appear to have altered substantially from those suggested by the prior surveys.

Henderson Island also qualifies as an IBA on account of substantial populations of three surface-nesting Gadfly Petrel

species. The most important of these is that of the endangered Henderson Petrel. While the situation of this species on French Polynesian islands to the north-west of the Pitcairn Islands requires clarification, it seems likely that the majority, perhaps the overwhelming majority, of this taxon breeds on Henderson, where there are 16,000 pairs. The populations of Herald and Kermadec petrels are 11,100 and 10,000 pairs, respectively – in both cases about 20% of the species' world populations.

There are also about 2,500 pairs of Murphy's Petrels, a small number in comparison with those on Ducie and Oeno.

Up to 50 Bristle-thighed Curlews winter regularly on the island.

The Common White-tern population on Henderson numbers thousands and could be as high as 10,000 pairs. There are also small populations of other, widespread tropical seabirds.

A study of the four petrel species in 1991–92 found heavy predation of their chicks by Pacific Rats. If such predation occurs every year, then it is probable that either the petrel populations are in long-term decline or are sustained by immigration. To check whether the 1991–92 situation was typical, a return visit was made in July/August 2003. Predation of chicks of the Murphy's Petrel was as heavy in 1991. Study of the other three species is made more difficult by their habit of nesting scattered at low density across the entire island and breeding more or less throughout the year.

Other threatened/endemic wildlife

Thanks to the work of the Sir Peter Scott Commemorative Expedition, the land flora and fauna of Henderson Island are reasonably well documented. Among the better-studied groups in which dispersal is limited, endemism is high. Thus, seven of 16 species of land snail and nine of 63 native vascular plant species are endemic. As with the landbirds, most of the endemic vascular plants are widespread across the island and not in immediate danger. Endemism is also likely to be comparably high in the insect fauna, where about 180 species are known to date. Because Henderson is so remote, this total is below what might be expected on the basis of the island's area.

Endemism is lower in some other groups, either because natural dispersal is high (e.g. lichens) or because the species on Henderson include a considerable proportion that 'hitchhiked' to the island in prehistoric times, probably during the Polynesian occupation (e.g. lizards).

During a breeding season that lasts from about December–April, approximately 10 Green Turtles *Chelonia mydas* (EN) lay annually on Henderson. While this number is trivial globally, it represents about 1% of the French Polynesian total.

Conservation issues/threats

When Henderson was designated a World Heritage Site by UNESCO, it was on condition that the British Government proceeded to develop an agreed management plan for the site. Such a plan was drafted on contract by the Sir Peter Scott Commemorative Expedition and presented to government in 1992. The draft was circulated for comment, and various

criticisms, none apparently severe, were raised. However, the sheer logistical difficulties of getting all legitimately interested parties together to resolve the criticisms meant that the draft was shelved in the mid-1990s. Only in 2002 did the government department responsible, the Foreign & Commonwealth Office, resolve the issue. A management plan was published in 2004. In order to highlight the important conservation issues, the following account draws on objectives outlined in the Management Plan.

- 1 A management structure is required. Without such a structure and a self-sustaining authoritative body to safeguard Henderson, there is the risk that the objectives of the plan will not be achieved.
- 2 The introduction of alien fauna and flora must be prevented. This is a key objective since Henderson's importance derives, in large measure, from the paucity of alien species.
- 3 The removal of biological, geological and Polynesian archaeological material should be controlled.
- 4 Reef damage should be prevented.
- 5 The exploitation of Miro and Toa woods by the Pitcairners should be sustainable.
- 6 Tourism and associated visitor impact should be strictly controlled. For example, visitors should be made aware of the risk of introducing alien species. Such risks multiply hugely if visitors stay overnight. It is advisable to prohibit tourists from entering the plateau, a restriction that would not materially reduce their chances of seeing the interesting species.
- 7 Future monitoring and research should contribute to the conservation of Henderson and other Pacific island ecosystems.

Regardless of whether their damage to petrel breeding success is intermittent or continuous, the eradication of Pacific Rats *Rattus exulans* from Henderson would be desirable. However, the size of the island means that the necessary poison bait would have to be broadcast by helicopter. To achieve this would require the support of a ship offshore. In addition, captive populations of all four endemic landbird species would need to be established ahead of the eradication work, in case significant numbers of these birds were poisoned by the bait. In other words, rat eradication on Henderson may not presently be feasible at sensible cost using currently available techniques, but the situation should be kept under review.

Further reading

See full details at end of chapter.

Benton (1995), Blake (1995), Bourne and David (1983), Brooke (1995a, 1995b, 1995c, 2004), Brooke and Hartley (1995), Brooke and Jones (1995), Brooke and Rowe (1996), Brook *et al.* (2004), Del Hoyo *et al.* (1996), Florence *et al.* (1995), Gill (1993), Graves (1992), Jones *et al.* (1995), Preece (1995a), Spencer (1995), Thibault and Bretagnolle (1999), Trevelyan (1995), Waldren *et al.* (1995a), Weisler (1995), Wragg (1995).

References

- Benton, T. G. (1995) Biodiversity and biogeography of Henderson Island's insects. *Biological Journal of the Linnean Society* 56: 245–59.
- BirdLife International (2000) *Threatened birds of the world*. Barcelona and Cambridge, UK: Lynx Edicions and BirdLife International.
- Blake, S. G. (1995) Late Quaternary history of Pitcairn Island, Pitcairn Group. *Biological Journal of the Linnean Society* 56: 43–62.
- Bourne, W. R. P. and David, A. C. F. (1983) Henderson Island, Central South Pacific, and its birds. *Notornis* 30: 233–52.
- Brooke, M. de L. (1995a) The modern avifauna of the Pitcairn Islands. *Biological Journal of the Linnean Society* 56: 199–212.
- Brooke, M. de L. (1995b) The breeding biology of the Gadfly Petrels *Pterodroma* spp. of the Pitcairn Islands: characteristics, population sizes and controls. *Biological Journal of the Linnean Society* 56: 213–31.
- Brooke, M. de L. (1995c) Seasonality and numbers of turtles nesting on the Pitcairn Islands. *Biological Journal of the Linnean Society* 56: 325–7.
- Brooke, M. de L. (2004) *Albatrosses and petrels across the world*. Oxford: Oxford University Press.
- Brooke, M. de L. and Hartley, I. R. (1995) Nesting Henderson Reed-warblers *Acrocephalus vaughani taiti* studied by DNA fingerprinting: unrelated coalitions in a stable habitat? *Auk* 112: 77–86.
- Brooke, M. de L. and Jones, P. J. (1995) The diet of the Henderson Fruit Dove *Ptilinopus insularis*. I. Field observations of fruit choice. *Biological Journal of the Linnean Society* 56: 149–65.
- Brooke, M. de L. and Rowe, G. (1996) Behavioural and molecular evidence for specific status of dark and light morphs of the Herald Petrel *Pterodroma heraldica*. *Ibis* 138: 420–32.
- Brooke, M. de L., Hepburn, I. and Trevelyan, R. J. (2004) *Henderson Island World Heritage Site Management Plan 2004–2009*. London Foreign & Commonwealth Office.
- Del Hoyo, J., Elliot, A. and Sargatal, J., eds (1992 and 1996) *Handbook of birds of the world*. Vols 1 and 3. Barcelona: Lynx Edicions.
- Florence, J., Waldren, S. and Chepstow-Lusty, A. J. (1995) The flora of the Pitcairn Islands: a review. *Biological Journal of the Linnean Society* 56: 70–119.
- Gill, B. J. (1993) The lizards of the Pitcairn Island Group, South Pacific. *New Zealand Journal of Zoology* 20: 161–4.
- Graves, G. R. (1992) The endemic landbird of Henderson Island, Southeast Polynesia: notes on natural history and conservation. *Wilson Bulletin* 104: 32–43.
- Jones, P. J., Schubel, S., Jolly, J. N., Brooke, M. de L. and Vickery, J. A. (1995) Behaviour, natural history, and the annual cycle of the Henderson Island Rail (*Porzana atra*). *Biological Journal of the Linnean Society* 56: 167–83.
- Kingston, N. E. (2001) *The flora and vegetation of Pitcairn Island – its phytogeography and conservation*. Unpublished PhD thesis, University of Dublin.
- Kingston, N. E. and Waldren, S. (2002) A conservation assessment of the pteridophyte flora of the Pitcairn Islands. *The Fern Gazette* 16: 404–10.
- Kingston, N. E. and Waldren, S. (2003) The plant communities and environmental gradients of Pitcairn Island: the significance of invasive species and the need for conservation management. *Annals of Botany* 92: 31–40.
- Kingston, N. E., Waldren, S. and Smyth, N. (2004) Conservation genetics and ecology of *Angiopteris chauliodonta* Copel (*Marattiaceae*), a critically endangered fern from Pitcairn Island, South Central Pacific Ocean. *Biological Conservation* 117: 309–19.
- Pandolfi, J. M. (1995) Geomorphology of the uplifted Pleistocene atoll at Henderson Island, Pitcairn Group. *Biological Journal of the Linnean Society* 56: 63–77.
- Preece, R. C. (1995a) Systematic review of the land snails of the Pitcairn Islands. *Biological Journal of the Linnean Society* 56: 273–307.
- Preece, R. C. (1995b) The composition and relationships of the marine molluscan fauna of the Pitcairn Islands. *Biological Journal of the Linnean Society* 56: 339–58.
- Procter, D. and Fleming, L. V., eds (1999) *Biodiversity: the UK Overseas Territories*. Peterborough, UK: Joint Nature Conservation Committee.
- Salt, R. (2000) *Guide to Pitcairn* (revised edn). Auckland, NZ: Pitcairn Islands Government.
- Spencer, T. (1995) The Pitcairn Islands, south Pacific Ocean: plate tectonic and climatic contexts. *Biological Journal of the Linnean Society* 56: 13–42.
- Stattersfield, A. J., Crosby, M. J., Long, A. J. and Wege, D. C. (1998) *Endemic bird areas of the world*. Cambridge, UK: BirdLife International Conservation Series 7.
- Thibault, J.-C. and Bretagnolle, V. (1999) Breeding seabirds of Gambier Islands, eastern Polynesia: numbers and changes during the 20th century. *Emu* 99: 100–7.
- Trevelyan, R. (1995) The feeding ecology of Stephen's Lory and nectar availability in its food plants. *Biological Journal of the Linnean Society* 56: 185–97.
- Waldren, S., Florence, J. and Chepstow-Lusty, A. J. (1995a) A comparison of the vegetation communities from the islands of the Pitcairn Group. *Biological Journal of the Linnean Society* 56: 121–44.
- Waldren, S., Florence, J. and Chepstow-Lusty, A. J. (1995b) Rare and endemic plants of the Pitcairn Islands, South-Central Pacific Ocean: a conservation appraisal. *Biological Conservation* 74: 83–98.
- Weisler, M. I. (1995) Henderson Island prehistory:

Pitcairn Islands

colonization and extinction on a remote Polynesian island.
Biological Journal of the Linnean Society 56: 377–404.

Williams, G. R. (1960) The birds of the Pitcairn Islands,
Central South Pacific Ocean. *Ibis* 102: 58–70.

Wragg, G. M. (1995) The fossil birds of Henderson Island,
Pitcairn Group: natural turnover and human impact, a
synopsis. *Biological Journal of the Linnean Society* 56: 405–14.

