IUCN Conservation Outlook Assessment 2017 **(archived)**
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Please note: this is an archived Conservation Outlook Assessment for Henderson Island. To access the most up-to-date Conservation Outlook Assessment for this site, please visit https://www.worldheritageoutlook.iucn.org.

Henderson Island

SITE INFORMATION

Country:
United Kingdom of Great Britain and Northern Ireland (UK)
Inscribed in: 1988
Criteria:
(vii) (x)

Site description:

Henderson Island, which lies in the eastern South Pacific, is one of the few atolls in the world whose ecology has been practically untouched by a human presence. Its isolated location provides the ideal context for studying the dynamics of insular evolution and natural selection. It is particularly notable for the 10 plants and four land birds that are endemic to the island. © UNESCO

SUMMARY

2017 Conservation Outlook

Significant concern

The remote and uninhabited Henderson Island has so far been relatively well preserved, primarily because of the limited anthropogenic pressure. However, the biodiversity values of the island remain very highly threatened by rat predation and competition. The impact of rat predation on petrel chick mortality is extremely high. Other endemic land bird and invertebrate populations are also likely suppressed by rat predation, and the composition of native flora may be substantially altered due to rat predation of seeds and seedlings. Rat predation is likely to be responsible for a decrease of petrel abundance from an estimated >1 million pairs on the island before rat arrival to just 40,000 pairs today (Brooke et al. 2010). This will impact on ecological processes of the island, as previously millions of seabirds would have provided a crucial nutrient source for the island's ecosystem via their guano. The endemic Henderson Petrel will also likely go extinct without intervention to eradicate the rats (Brooke et al. 2010), although the population may have been stable between 1991 and 2015 (Oppel et al. 2017). A rat eradication programme was undertaken in 2011, but was not successful due to unknown reasons. Securing the status of Henderson island's unique biodiversity critically depends on eradication of invasive rats (Dawson et al. 2015). The site is also at risk of potential future invasive alien species introductions, which could occur relatively easily through uncontrolled or poorly managed visitation and have a devastating effect on several key values of the island. The site would benefit from additional efforts to eradicate rats, as well as efforts to effectively enforce visitor regulations. The increasing accumulation of plastic debris along the beaches is a threat to the natural beauty of the island that will require action at global scales, and cannot be averted by site-specific mitigation measures.

Current state and trend of VALUES

High Concern
Trend: Deteriorating

The impacts of rat predation on petrel chick mortality on Henderson Island have been estimated at > 99% for Murphy's petrel (Pterodroma ultima; Lavers et al. 2016), 60-80% for Henderson petrel (Oppel et al. 2017), and may be similarly high for Kermadec (Pterodroma neglecta) and Herald petrels (Pterodroma heraldica; Brooke 1995a). Rat predation is likely to be responsible for a decrease of petrel abundance from an estimated >1 million pairs on the island before rat arrival to just 40,000 pairs today (Brooke et al. 2010). This will impact on ecological processes of the island, as previously millions of seabirds would have provided a crucial nutrient source for the island's ecosystem via their guano. Henderson petrel will also likely go extinct without intervention to eradicate the rats (Brooke et al. 2010), although the population may have been stable between 1991 and 2015 (Oppel et al. 2017). Landbird populations are also likely affected by rat predation, but the effect is difficult to quantify; as many as 25% of Henderson Crake chicks are likely killed by rats (Jones et al. 1995). Similar effects of rat predation on native invertebrates and plants are likely to occur, but no data exist to quantify these effects.

Overall THREATS

High Threat

The key threat to the World Heritage values of Henderson Island continues to be rat predation and competition and its effects on avifauna, invertebrates, and the wider ecological processes of the island. Possible future species introductions are also a significant threat. This implies that uncontrolled or poorly managed visitation, as the main invasive alien species vector, remains a potential threat to the site.

Overall PROTECTION and MANAGEMENT

Some Concern

Henderson Island is generally sufficiently well-protected, primarily because of its remoteness, but would benefit from additional efforts to eradicate rats following

the unsuccessful 2011 rat eradication programme, as well as efforts to effectively enforce visitor regulations (including the 2007 Code of Conduct), i.e. through the requirement for visitors to undergo rigorous biosecurity procedures and be accompanied by a ranger.

FULL ASSESSMENT

Description of values

Values

World Heritage values

▶ **Raised and forested coral atoll of exceptional natural beauty**
Criterion:(vii)

As an extremely remote and near-pristine island, Henderson Island is the world's only forested coral atoll with its landscape and ecology virtually intact, and with ongoing geological and biological processes (Pandolfi, 1995).

▶ **Exceptionally rich endemic flora**
Criterion:(x)

7 endemic species of flowering plants on a land area of only 43 km2 (Florence et al., 1995, Waldren et al. 1995)

▶ **Exceptionally rich endemic avifauna**
Criterion:(x)

4 endemic species of land birds: Henderson crake Porzana atra (VU: 5,755–12,749 in 2015; Oppel et al. 2016a), Henderson lorikeet Vini stepheni (VU: 554 - 3,014 in 2015; Lavers et al. 2016), Henderson fruit dove Ptilinopus insularis (VU: 4,476 - 10,072 in 2015; Lavers et al. 2016) and Henderson reed warbler Acrocephalus taiti (VU: 7,194 - 28,776 in 2015; Lavers et al. 2016) and one endemic seabird: the Henderson Petrel (Pterodroma atrata EN: 19,987 pairs in 2015; Oppel et al. 2017) on a land area of only 43 km2 (BirdLife International, 2016).

- **Exceptionally rich endemic invertebrate fauna**
  Criterion:(x)

  All the island's 16 species of land snail (Preece 1995) and about 30% of the 180 insect species may be endemic (Benton 1995). Additional groups of invertebrates may show a similar level of endemism (Benton and Lehtinen 1995), and a large proportion of the invertebrate fauna may not be described yet (Churchyard et al. 2016).

- **Important seabird nesting area (including of globally threatened species)**
  Criterion:(x)

  ca. 40,000 pairs of breeding seabirds (12 species), including ca. 20,000 pairs of the endemic and Endangered Henderson petrel (Pterodroma atrata; Brooke 1995a,b).

Other important biodiversity values

- **Rich terrestrial and coastal marine biota**

  6 vegetation communities comprising 71 species of vascular plants, 20 of bryophytes and 30 of lichens (Waldren et al. 1995), 5 terrestrial reptile species that may be native or may have been introduced by Polynesian settlers (Havery et al. 2017), and occasional nesting of Green Turtles Chelonia mydas (EN), regular occurrence of Humpback Whale Megaptera novaeangliae, rich marine invertebrate fauna (including 29 species of coral) and coastal ichthyofauna (190 species, Lambrides and Weisler 2015).

Assessment information

Threats

Current Threats

High Threat

In general, the uninhabited Henderson Island is well protected by its remoteness and hostile living conditions. The only exception is the presence of the introduced Polynesian Rat, which has a major negative impact on ground-nesting petrel species, and probably on endemic landbirds and endemic invertebrate populations.

► Logging/ Wood Harvesting

Very Low Threat
Inside site, localised(<5%)

Very limited impact of reportedly well-regulated miro removal. No visits since 2004 reported in 2016.

► Solid Waste

Low Threat
Inside site, localised(<5%)

The North and East beaches on Henderson are deposits of large quantities of floating rubbish washed ashore by the sea. This pattern was already evident in the 1990s (Benton, 1995b), but has been amplified by the exponential increase in global production and discards of plastic materials. Parts of the eastern beach of Henderson resemble a rubbish dump, and waste has accumulated for decades and is buried by sand. In 2015, the total amount of plastic waste deposited on Henderson’s beaches was estimated at 37.7 million pieces weighing a total of 17.6 tonnes, with up to 30 items per square meter beach surface (Lavers and Bond 2017).

► Tourism/ visitors/ recreation

Low Threat
Inside site, localised(<5%)

Generally, the island is little visited, due to its extreme remoteness. Impacts of visitors are likely restricted to the coral reef, beaches, and vegetation along the beach fringe and the marginal areas of the coral plateau. Direct impacts by visitors in the interior plateau are unlikely. Although some

damage to coral and vegetation may occur, and some disturbance to nesting birds, these are unlikely to significantly affect populations. However, there is little appreciation of biosecurity among commercial boat operators bringing visitors to the island, and the greatest threat from visitors to the island is the potential introduction of non-native species (see Potential Threats below).

▶ Invasive Non-Native/ Alien Species

High Threat
Inside site, throughout(>50%)

The impacts of rat predation on petrel chick mortality on Henderson Island have been estimated at > 99% for Murphy’s petrel (Pterodroma ultima; Lavers et al. 2016), 60-80% for Henderson petrel (Oppel et al. 2017), and may be similarly high for Kermadec (Pterodroma neglecta) and Herald petrels (Pterodroma heraldica; Brooke 1995a). Rat predation is likely to be responsible for a decrease of petrel abundance from an estimated >1 million pairs on the island before rat arrival to just 40,000 pairs today (Brooke et al. 2010). This will impact on ecological processes of the island, as previously millions of seabirds would have provided a crucial nutrient source for the island’s ecosystem via their guano. Henderson petrel will also likely go extinct without intervention to eradicate the rats (Brooke et al. 2010), although the population may have been stable between 1991 and 2015 (Oppel et al. 2017). Landbird populations are also likely affected by rat predation, but the effect is difficult to quantify; as many as 25% of Henderson Crake chicks are likely killed by rats (Jones et al. 1995). Similar effects of rat predation on native invertebrates and plants are likely to occur, but no data exist to quantify these effects. An attempt to eradicate rats in 2011 was not successful (Amos et al. 2016), and by 2015 rat populations had recovered to levels similar to those before the eradication attempt (Churchyard et al. 2013, Lavers et al. 2016).

Potential Threats

High Threat

There is a high threat of additional invasive alien species introductions to the island, which might have adverse effects on all or parts of its biodiversity.

► Invasive Non-Native/ Alien Species

High Threat
Inside site, throughout(>50%)

The example of the rat predation effect on petrel populations shows that any species introduction, which might happen easily through unregulated visitation, may lead to major impacts on the native flora and fauna, and hence to the island's ecosystem, landscape and beauty. The high degree of endemism in all taxonomic groups present makes the island community extremely vulnerable to invasive alien species. Although the island is rarely visited, there is little appreciation of biosecurity among commercial boat operators bringing visitors to the island, and very little regulation or enforcement of regulation. In 2015 a biological expedition likely introduced some non-native plants, but the invasion could be contained. Although the risk is very small that further species are introduced, the potential consequence of the introduction of other mammalian predators or highly invasive plants could be catastrophic.

Protection and management

Assessing Protection and Management

► Relationships with local people

Mostly Effective

Not applicable - no permanent local population; island is only occasionally visited by Pitcairn Islanders and foreign research and conservation expeditions generally hire local staff. Willingness and capacity of Pitcairn administration to enforce biosecurity regulations during visits is limited.

► Legal framework

Mostly Effective

Local Government Regulations Part IV provide for wildlife protection and fishery management, the Lands and Administration of Estates Ordinance applies restrictions on possession, occupation and transference of land (UNEP-WCMC, 2011). Regime effective but there should be a requirement that all

visiting cruise ships have to be accompanied by a local ranger, and must have very stringent biosecurity controls in place. A ranger on the island would pose a risk of further species invasions and would decrease the site's protection and natural values as an uninhabited island almost untouched by human development.

▶ Enforcement

Some Concern

Due to remoteness no enforcement is possible, but little enforcement is needed. Concerns exist over the enforcement of biosecurity regulations.

▶ Integration into regional and national planning systems

Data Deficient

Site managed by Pitcairn Island Council according to Pitcairn Island OST planning (UNEP-WCMC, 2011), but no information about integration into formal planning available.

▶ Management system

Mostly Effective

System generally sufficient. A rat eradication operation was conducted in 2011, but the operation failed to kill every rat on the island (Amos et al. 2016). A 5-year management plan was published (Brooke et al., 2004), and implementation started in 2005, but no update is available. The Pitcairn government and the RSPB are still committed to restore Henderson Island and will likely aim at another rat eradication operation in the 2020s to restore the island's ecosystem.

▶ Management effectiveness

Some Concern

The rat eradication operation in 2011 was unsuccessful (Amos et al. 2016), but the failure was not due to poor planning or poor execution (Torr and Brown 2012). The cause for the failure is poorly understood, but surviving rats are still susceptible to the toxin used in 2011 (Amos et al. 2016) and a new eradication operation should be attempted in the 2020s.

► Implementation of Committee decisions and recommendations

Mostly Effective

Request at 12.COM to involve Pitcairn Islanders in the management of the site increasingly met over subsequent years.
Request at 12.COM to review legal status of island and upgrade its status to nature reserve or similar not met to date.
Recommendation at 12.COM to include adjacent marine areas in site not followed to date.
Recommendation at 26.COM to urgently implement and improve 1995 management plan followed by 29.COM.
Request at 29.COM to continue updating the WHC about the implementation of the management plan and state of conservation partly met by 32.COM.
Request at 31.COM to report on fundraising progress for rat eradication and bird monitoring partly met by 32.COM.
Request at 32.COM to finalize plans for rat eradication mostly met by 34.COM.
Request at 32.COM to consider establishing a ranger at the site partly met by 34.COM.
Request at 32.COM to report on conservation status and efforts met by 34.COM.

► Boundaries

Highly Effective

Appropriate, but no inclusion of adjacent coastal marine areas in World Heritage Site. In September 2016 a fully protected marine reserve was established surrounding the Pitcairn archipelago, thus formally protecting the marine areas around Henderson.

► Sustainable finance

Serious Concern

No permanent management on site, no operational budget, but little on-site management needed once the threat of invasive rats has been eliminated. No financing for another eradication attempt exists.

► Staff training and development

Mostly Effective

Only part-time manager off-site currently. Off-site management is appropriate for this site. Manager should accompany visitors.

▶ Sustainable use

Highly Effective

Limited miro harvest considered sustainable, not practiced since 2004. No other use pressure or potential, due to remoteness.

▶ Education and interpretation programs

Data Deficient

N. a. – because of remoteness and limited number of direct stakeholders.

▶ Tourism and visitation management

Mostly Effective

Tourist numbers very limited, visitor guide and code of conduct published in 2007 – remoteness and risk of invasive alien species introduction do not favor large-scale tourism promotion.

▶ Monitoring

Some Concern

No regular systematic monitoring, but scientific expeditions in 2009, 2011, 2012, 2013, and 2015 provided some monitoring data to inform design and outcome of the rat eradication attempt. Further monitoring expeditions may be required in preparation for another eradication attempt, and follow-up monitoring of such an attempt would be necessary to assess the response of native biodiversity to the management intervention.

▶ Research

Mostly Effective

Research expeditions in 1991/1992 provided much of the knowledge about the island’s ecosystem (Benton and Spencer 1995), further expeditions in 2009 and 2011 led to an unsuccessful rat eradication attempt (Torr and Brown 2012), and expeditions in 2013 and 2015 provided more information on bird populations and rat ecology following the failed eradication attempt

(Churchyard et al. 2013; Lavers et al. 2016). Because the cause of the 2011 eradication failure remains unknown, more research may be necessary to improve the chances of success of a second eradication attempt.

Overall assessment of protection and management

Some Concern

Henderson Island is generally sufficiently well-protected, primarily because of its remoteness, but would benefit from additional efforts to eradicate rats following the unsuccessful 2011 rat eradication programme, as well as efforts to effectively enforce visitor regulations (including the 2007 Code of Conduct), i.e. through the requirement for visitors to undergo rigorous biosecurity procedures and be accompanied by a ranger.

► Assessment of the effectiveness of protection and management in addressing threats outside the site

Some Concern

The rat predation threat requires funding and additional research/management to be completely eliminated, but a single successful eradication could remove this threat. Besides the existing invasive rat threat, all conceivable potential threats would originate from outside of the island, particularly through uncontrolled visitation and invasive alien species introduction. A permanent ranger presence would likely exacerbate the risk of invasive species as considerable infrastructure would be required to establish adequate habitation on this extremely remote island. To effectively enforce visitor regulations (including the 2007 Code of Conduct), visitors should be required to undergo rigorous biosecurity procedures and be accompanied by a ranger.

► Best practice examples

The eradication attempt in 2011 followed international best practice for rodent eradication operations on tropical islands (Keitt et al. 2015; Torr and Brown 2012), and endemic avifauna was safeguarded by best practice husbandry during the operation (Oppel et al. 2016a).

State and trend of values

Assessing the current state and trend of values

World Heritage values

▶ **Raised and forested coral atoll of exceptional natural beauty**

Low Concern
Trend:Deteriorating

Integrity of ecosystem and landscape has been stable. However, increasing amounts of solid waste in the Pacific ocean are deposited on Henderson Island owing to ocean current patterns, leading to enormous and increasing quantities of plastic rubbish that adversely affect the natural beauty of the island.

▶ **Exceptionally rich endemic flora**

Data Deficient
Trend:Deteriorating

No abundance, reduction or loss of endemic flora has been reported and no new threat factors have arisen since inscription. Rats are likely to affect relative abundance of endemic flora through consumption of most palatable seeds, which was inferred by the abundance of seedlings emerging in study plots following the temporary reduction of the rat population after the 2011 eradication attempt (Churchyard et al. 2013; Lavers et al. 2016). Pandanus tectorius, which may or may not be a natural species (Waldren et al. 1999), may outcompete endemic flora, but quantitative data on the extent of Pandanus cover is not available. Cocos nucifera (coconut) is an invasive species on many islands, and forms dense monospecific stands along parts of the beaches of Henderson, but is mostly absent from the coral plateau. No data on the possible expansion of coconut are available, but existing stands have been mapped in 2015 (Lavers et al. 2016).

▶ **Exceptionally rich endemic avifauna**

High Concern
Trend:Deteriorating

Most endemic bird species have been negatively affected by rat predation and competition and a continuous slow decline with a potential to lead to extinction of one species (Henderson Petrel Pterodroma atrata) has been inferred (Brooke 1995a; Brooke et al. 2010). Bird monitoring after the 2011 rat eradication attempt indicated a slight recovery of the Henderson reed warbler and the Henderson fruit dove during the phase when the rat population was temporarily reduced, suggesting that populations of these species may be suppressed by rat predation (Lavers et al. 2016). However, confounding factors such as a drought that may have naturally lowered baseline population estimates in 2011 complicate this assessment.

► Exceptionally rich endemic invertebrate fauna

Data Deficient
Trend:Data Deficient

Invertebrate fauna relatively little studied and may be particularly vulnerable to invasive alien species, but no abundance reduction or loss of endemic invertebrates has been reported and no new threat factors have arisen since inscription. No research has been carried out but rats are likely to be significantly affecting overall abundance and community structure of endemic invertebrate fauna.

► Important seabird nesting area (including of globally threatened species)

High Concern
Trend:Deteriorating

Among the nine breeding seabird species, Henderson Petrel Pterodroma atrata and other Pterodroma spp. have been particularly threatened by rat predation (Brooke 1995a), and a continuous slow decline with a potential to lead to extinction has been inferred (Brooke et al. 2010). However, an expedition in 2015 provided some reassurance that the decline of Henderson Petrels may not be as rapid as previously feared (Oppel et al. 2017). No robust data exist on population sizes or trends of other seabird species.

Summary of the Values

► Assessment of the current state and trend of World Heritage values

High Concern

Trend: Deteriorating

The impacts of rat predation on petrel chick mortality on Henderson Island have been estimated at > 99% for Murphy's petrel (Pterodroma ultima; Lavers et al. 2016), 60-80% for Henderson petrel (Oppel et al. 2017), and may be similarly high for Kermadec (Pterodroma neglecta) and Herald petrels (Pterodroma heraldica; Brooke 1995a). Rat predation is likely to be responsible for a decrease of petrel abundance from an estimated >1 million pairs on the island before rat arrival to just 40,000 pairs today (Brooke et al. 2010). This will impact on ecological processes of the island, as previously millions of seabirds would have provided a crucial nutrient source for the island's ecosystem via their guano. Henderson petrel will also likely go extinct without intervention to eradicate the rats (Brooke et al. 2010), although the population may have been stable between 1991 and 2015 (Oppel et al. 2017). Landbird populations are also likely affected by rat predation, but the effect is difficult to quantify; as many as 25% of Henderson Crake chicks are likely killed by rats (Jones et al. 1995). Similar effects of rat predation on native invertebrates and plants are likely to occur, but no data exist to quantify these effects.

► Assessment of the current state and trend of other important biodiversity values

Good

Trend: Stable

No deterioration of the other natural values of the site and no emerging factors that would make a negative trend likely have been reported since inscription.

Additional information

Benefits

Understanding Benefits

► Collection of genetic material

The island may serve as a reservoir of genetic material of miro and tau stocks for the future (UNEP-WCMC, 2011) and may hold genetic resources of global importance among its endemic biota.

► Importance for research

As one of the few nearly pristine raised coral atolls, the site has generated significant scientific knowledge since discovery (Benton and Spencer 1995) and could provide a reference for the ecological restoration of other islands in the wider South Pacific if rats can be successfully eradicated.

Invasive rats may limit certain aspects of research, but the presence of rats, the temporary suppression, and the development of techniques for successful eradication also provide interesting opportunities for applied research (Amos et al. 2016; Brooke et al. 2013; Cuthbert et al. 2012; Oppel et al. 2016a; Oppel et al. 2016b).

Summary of benefits

The nature conservation benefits of this remote and uninhabited site exceed other types of benefits significantly, although there are also additional minor and potential benefits.

Projects

Compilation of active conservation projects

№	Organization/individuals	Project duration	Brief description of Active Projects

1	RSPB	From: 2009 To: 2016	The Henderson Island Restoration Project aims at securing endemic land bird and seabird populations, native flora and invertebrate fauna through the eradication of invasive rats. Ultimately, the project’s goal is to restore a fully functional natural ecosystem of a raised coral atoll, but no funding is available to plan or execute a rat eradication operation (see site needs below).

Compilation of potential site needs

№	Site need title	Brief description of potential site needs	Support needed for following years
1	Invasive rat eradication	The eradication of invasive rats from Henderson Island is the single most important management activity to safeguard and restore the site's unique values. Currently no financial resources exist to conduct a second rat eradication attempt. However, technical and logistical expertise exist within the RSPB and the Pitcairn government to plan and execute a rat eradication operation if funding was made available.	From: 2017 To: 2025

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