

Letterbox Nature Reserve and Boatswain Bird Island Sanctuary Management Plan
Ascension Island
2023-2028



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Introduction

Introduction

Ascension Island

Ascension Island is a remote overseas territory of the United Kingdom (UKOT) located at the centre of the Atlantic Ocean. Ascension is a young volcanic island 97km² in size, lying 1504km from the coast of Africa and 2232km from Brazil.

Letterbox Nature Reserve



Though small, Ascension supports globally-important biodiversity including 67 endemic species found nowhere else in the world. It is a nesting site for over half a million seabirds and the second largest turtle rookery in the Atlantic.

Protecting biodiversity is one of the Ascension Island Government (AIG)'s strategic objectives and a commitment under the Convention on Biological Diversity. The island's Protected Areas are central to meeting this commitment and achieving Target 3 of the post-2020 Global Biodiversity Framework. All of the Protected Areas have legal status and are underpinned by management plans. This plan covers the Letterbox Nature Reserve and Boatswain Bird Island Sanctuary.

This management plan will focus on the Letterbox Nature Reserve (NR). However, due to the fluid movement of seabirds between the Letterbox NR and adjacent Boatswain Bird Island, this management plan will also incorporate management actions for Boatswain Bird Island Sanctuary. The Letterbox NR and Boatswain Bird Island Sanctuary were designated in 2014 under the National Protected Areas Ordinance, 2003. In 2023, the Letterbox NR was extended to cover the expanding range of nesting masked boobies and other seabirds. All wildlife protected areas on Ascension Island are managed by the Ascension Island Government Conservation and Fisheries Directorate (AIGCFD).



The Letterbox NR and Boatswain Bird Island were identified as Important Bird Areas (IBA) by the Royal Society of the Protection of Birds (RSPB) in 2006 (Rowlands et al. 2006) This was a global initiative to identify, protect and manage a network of sites which are important for the long-term viability of naturally occurring bird populations.

The Letterbox NR is home to thousands of nesting seabirds of eight species. The Critically Endangered endemic plant Ascension spurge (*Euphorbia origanoides*) grows in several locations across the reserve—at Razors Edge, Wig Hill along to Little White Horse Hill and on the Letterbox plateau. Adjacent to the Letterbox NR is Boatswain Bird Island Sanctuary. Boatswain Bird Island is a 5 hectare islet, home to internationally important populations of ten species of breeding seabirds. Boatswain Bird Island Sanctuary also hosts the world's largest known pseudoscorpion—*Garypus titanius*, which grow to 12mm.

The Letterbox Peninsula was created by a range of volcanic processes, which create an interesting geological backdrop for reserve visitors. White Horse Hill is a fine example of a lava dome complex with the pale lava characteristic of magma that has a high silica content and flows less easily than basalt. The Letterbox Peninsula itself was formed by a trachyte lava dome and has three fissures 5-10m wide and as much as 10m deep, which split the peninsula. The "Devils Inkpot" is a black basaltic lava flow with a rumpled appearance caused by the lava cooling quickly. At only 1,000 years old, it is one of the younger lava flows on island and loose sharp rocks can make it a challenge to traverse.

Reserve Descriptions

Letterbox NR: The Letterbox NR is a nesting site for eight of Ascension's seabirds including the Ascension frigatebird (*Fregata aquila*), which is classed as Vulnerable by the IUCN. Other seabirds nesting here in good numbers are the masked booby (*Sula dactylatra*), brown booby (*Sula leucogaster*), tropicbirds (*Phaethon spp.*) and noddies (*Anous spp.*).

The Ascension spurge was once widespread across Ascension Island. However, introduced pest species and ongoing drought has caused their population to fragment. The Ascension Island sedge, *Cyperus appendiculatus* var. *appendiculatus*, is endemic with around 17-25% of the worlds' population found on the Letterbox NR.

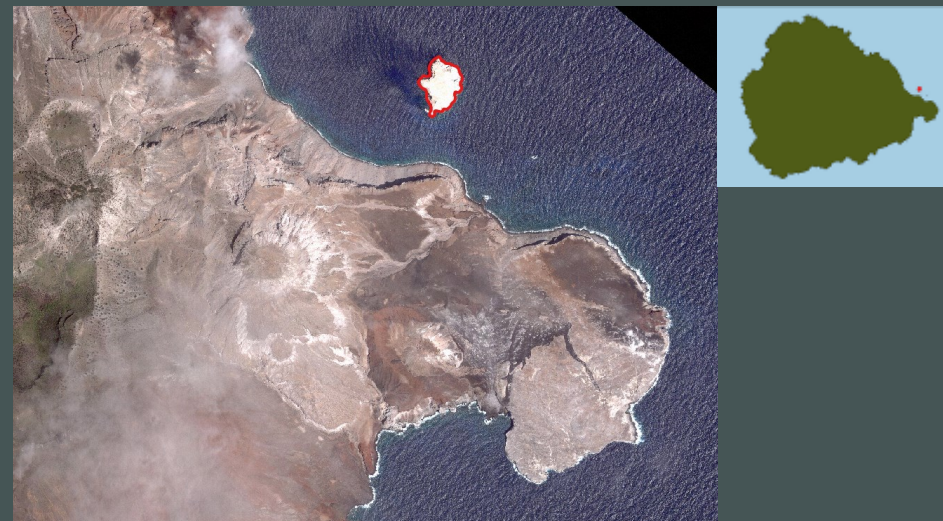
Boatswain Bird Island Sanctuary: Boatswain Bird Island is home to 10 of 11 nesting seabird species found on Ascension Island. It is rodent-free, which provides a safe haven for nesting birds. It is for this reason that it is the nesting site for the South Atlantic Storm Petrel (*Oceanodromo helena*), which is only found on Ascension and neighbouring Saint Helena. The steep island cliffs provide excellent nest sites for red-footed boobies (*Sula sula*), noddies and tropicbirds that nest here on all available cliff ledges.

Boatswain Bird Island is home to the world's largest pseudoscorpion (*Garypus titanius*), which is classed as Critically Endangered on the IUCN Red List. Two species of scaly crickets from the *Discophallus* genus are endemic to the islet.

Access: The Letterbox NR is best accessed via the Martyr Wade track from the NASA road. The track is difficult to traverse, requiring a suitable 4WD vehicle and regular landslides can make it problematic. The track may only be used by AIG Conservation staff and emergency service vehicles with a locked gate preventing public vehicle access. Reserve visitors are able to enter on foot and walk anywhere in the area. Access to Boatswain Bird Island is not permitted except with permission from the Administrator.



Letterbox NR boundary



Boatswain Bird Island

Strategic and Operational Objectives



Conserve the seabirds nesting on the Letterbox NR and Boatswain Bird Island Sanctuary.

- The size of the seabird populations in the Letterbox NR and Boatswain Bird Island Sanctuary are maintained or increased.



Protect and conserve the critically endangered Ascension spurge (*Euphorbia origanoides*).

- The population size and distribution of the Ascension spurge is maintained or increased.



Conserve Ascension's endemic invertebrates including *Discophallus* scaly crickets and pseudoscorpions.

- Scaly crickets extend their range into suitable inland habitat following the control of invasive, non-native crickets.
- Boatswain Bird Island Sanctuary continues to be protected from new introduced species.



Facilitate natural ecosystem functions and processes within the reserve.

- No non-native shrubs are present in seabird nesting areas within the reserve.
- Non-native predators are controlled to a level they have no significant impact on the seabird, Ascension spurge or scaly cricket populations.



Encourage recreational use of the protected areas, compatible with conservation objectives, to promote the health and wellbeing of people on Ascension.

- There is a high level of awareness about the importance of the protected areas for seabirds, Ascension spurge and scaly crickets.
- The Letterbox NR and Boatswain Bird Island Sanctuary are a source of pride for Ascension islanders.



Species of the Protected Areas

Species of the Letterbox Nature Reserve and Boatswain Bird Island Sanctuary



Ascension frigatebird (*Fregata aquila*)

Length: 89-96cm, Wingspan: 196-201cm. Vulnerable.

Endemic to Ascension Island, this species nests on the Letterbox NR and Boatswain Bird Island Sanctuary with an estimated population of 10,000 nesting pairs.

Female Ascension frigatebirds have a blue eye ring while males can be identified by their red gular pouch, which they inflate as part of their breeding display. Males also perform a mating ritual of wing flapping and rapid bill snapping to attract a mate. Juvenile Ascension frigatebirds may be identified by their white head and stomach (left below).

Colonial nesters, the Ascension frigatebird lays a single white egg on bare ground, which is incubated for 43-50 days. The chick fledges at 6-7 months but remains dependent on the parents for several months post-fledging.

The Ascension frigatebird has a varied diet. They feed mainly on flying fish and other surface fish. They also predate turtle hatchlings, sooty tern hatchlings and will harass other birds to steal their food (kleptoparasitism).

The breeding population of the Ascension frigatebird was once restricted to Boatswain Bird Island when feral cats were present on the mainland. Introduced to Ascension in the 1800s, the cats decimated the islands seabird populations, A feral cat eradication was undertaken from 2002-2004. However, the frigatebird did not return to nest on the main island for 10 years with two nesting attempts in 2012. Since then the mainland population has expanded dramatically and in the 2022-2023 breeding season there were 1,588 nesting attempts recorded during the height of the incubation period.



Masked booby (*Sula dactylatra*)

Length: 81-92cm, Wingspan: 152cm. Least concern.

Masked boobies have a pan-tropical distribution. They nest across the Letterbox NR and on Boatswain Bird Island Sanctuary. They were the first species to recolonise the Ascension mainland after the initial feral cats were removed from the area. Since then this species has continued to spread across the Letterbox NR. In 2022 there were 2604 nesting attempts in the Letterbox NR. Masked boobies lay 1-2 eggs in a shallow depression on the ground. The eggs are incubated by both parents for 39-48 days. The second chick typically does not survive and is killed by the stronger sibling. The chick will fledge after 120 days. Masked boobies feed by plunging head first into the water, sometimes diving from as high as 30m. They feed primarily on fish and squid, usually during daylight hours. The species is usually faithful to a nesting location, though ringing recoveries have shown fairly extensive dispersal tendencies.



Masked booby

Brown booby (*Sula leucogaster*)

Length: 64-74cm, Wingspan: 132-150cm. Least concern.

Brown boobies are found worldwide across tropical regions. They nest on Boatswain Bird Island Sanctuary, offshore stacks and in 2022, 240 nests were recorded in the Letterbox NR. The species nests in small loose colonies in the southeast of the Letterbox peninsula or singularly across the rest of the reserve near frigatebird colonies. Brown boobies lay 1-2 blue chalky eggs on the ground in a mound created with shells, stones, twigs and feathers. Both sexes share incubation duties for 43 days until the egg hatches. Usually only one chick is raised with the second chick unable to compete for food. The chick fledges after 96-120 days. Brown boobies forage at a low height over inshore waters for small fish driven to the surface by marine predators, primarily feeding on flying fish and squid during daylight hours.



Brown booby

Red-footed booby (*Sula sula*)

Length: 70cm, Wingspan: 152cm. Least concern (population declining).

The red-footed booby can be found across tropical oceans. On Ascension, they nest primarily on Boatswain Bird Island with an estimated population of <50 pairs. A handful of nesting birds can also be found on Ascension's offshore stacks. This species has several morphs worldwide with the white and brown morph occurring on Ascension. Red-footed boobies lay a single chalky blue egg in a nest built from twigs and grasses. The egg is incubated by both parents and hatches after 44-46 days. The chick will fledge after 91-139 days and receives additional support from the parents for a further 3-6 months. Red-footed boobies are powerful and agile fliers but clumsy in take-off and landing. When not breeding, this species spends most of its time at sea. Red-footed boobies feed on flying fish, other small bait fish and squid by plunging into the water to gather food.



Red-footed booby

Brown noddy (*Anous stolidus*)

Length: 40-45cm, Wingspan: 79-86cm. Least concern

The brown noddy is found worldwide. They nest in small loose colonies across Letterbox NR on elevated cliffs, with an estimated population of >50 pairs. Brown noddies also nest on the Wideawake Fairs NRs, Boatswain Bird Island and on suitable habitat around the coast including offshore stacks. Brown noddies potentially navigate long distances, but its precise dispersal throughout world range is poorly known. The brown noddy creates a platform nest of shingle and lays a single egg. Incubation is performed by both parents for 35-38 days. Adult noddies often forage close to the island, feeding the young frequently. Brown noddy chicks grow quickly, reaching the weight of the adult bird after only 3 weeks. The chick fledges at 6 weeks, however, it is supported by the adults for several more weeks.



Brown noddy

Black noddy (*Anous minutus*)

Length: 35-39cm, Wingspan: 66-72cm. Least concern

The black noddy breeds across tropical and sub-tropical seas. The black noddy is a colonial nester, nesting around the cliffs surrounding South-East Bay and on offshore stacks as well as Boatswain Bird Island. Hundreds of black noddies regularly roost near the south east of the Letterbox peninsula. Black noddies lay a single egg in a nest built on a cliff ledge. Both parents incubate for 30-37 days. The parental birds leave the chick unattended after just a few weeks, feeding frequently until the chick is ready to fledge after only 6 weeks. The fledgling is further supported for several more weeks. Black noddies feed on small fish and squid caught on the sea surface. They have also been known to kleptoparasitise food from other seabirds. Black noddies are usually found within 80km of nesting sites, coming ashore daily to roost.



Black noddy

Fairy tern (*Gygis alba*)

Length: 28-33cm, Wingspan: 70-87cm. Least concern

Also known as the white tern, this distinctive species nests across the tropical oceans of the world. The fairy tern nests on the cliff side of Benji Hill and in cliff overhangs above Spire Beach in the Letterbox NR. It also nests in good numbers around Ascension Island, notably in Green Mountain National Park where it nests in eucalyptus trees. The fairy tern lays a single egg on a level ledge in inaccessible locations. Both adults share the incubation of the egg for 28-36 days. Newly hatched chicks have well-developed feet for grip on precarious nesting sites. The chick fledges at 48-60 days. This species hovers above the water and dives into the sea surface to feed upon small fish, squid and crustaceans. They have an undulating flight pattern with deep, slow wingbeats and a strong flight that enables sustained periods of hovering. An inquisitive species, fairy terns are often seen on their own or in small groups around the island year round.



Fairy tern

Red-billed tropicbird (*Phaethon aethereus*)

Length: 46-50cm, Wingspan: 99-106cm. Least concern (global population declining).

Widespread throughout tropical oceans, the red-billed tropicbird can be found nesting on offshore stacks and in suitable habitat around the Ascension coastline. It is also known as “boatswain bird” due to the similarity of its shrill call to a boatswain’s whistle. A small population of around 50 pairs nest around the Letterbox NR with several hundred more nesting on Boatswain Bird Island Sanctuary. Aggressive at the nesting site, this species may oust other seabirds for nesting habitat. The red-billed tropicbird is monogamous and faithful to the nest site. They lay a single egg on inaccessible ledges or in crevices. The chick fledges after 80 days and receives no additional parental care once leaving the nest.



Red-billed tropicbird

Yellow-billed tropicbird (*Phaethon lepturus*)

Length: 38-40cm, Wingspan: 89-96cm. Least concern.

This species can be found across the tropical oceans. It is the smallest, most common and most widely distributed of the three *Phaethon* species. This species is approximately twice as abundant as its larger relative on Ascension Island where it nests on offshore stacks and inaccessible cliffs around the coastline. Around 100 pairs nest around the coastal edges of the Letterbox NR, favouring the steep cliffs around Southeast Bay. The yellow-billed tropicbird lays a single egg in a scrape on the ground, incubating for 42-44 days. The chick fledges after 70-85 days. This species can breed several times per year if nesting attempts are unsuccessful, depending on weather and availability of nesting habitat. The yellow-billed tropicbird disperses widely across the ocean outside of the breeding season. They feed primarily on fish and squid, which they catch by surface plunging- this species is a poor swimmer.



Yellow-billed tropicbird

South Atlantic storm petrel (*Oceanodroma helena*)

Length: 19-21cm, Wingspan: 43-46cm. Vulnerable.

This species is unique to Ascension and neighboring Saint Helena. It nests in the remains of the buildings created on Boatswain Bird Island for guano extraction in 1960s. This species was long recognised as the Madeiran storm petrel, however, recent genetic analysis has differentiated it into its own distinct species. The South Atlantic storm petrel lays a single white egg in a burrow or crevice, incubating for around 42 days. The chick takes 68-73 days to fledge from the nest. This species spends most of its time at sea and is nocturnal at breeding sites to avoid harassment from noddies or frigatebirds. The South Atlantic storm petrel relies on predatory fish to facilitate feeding, pushing prey to the surface, which the petrels take advantage of. They will graze on invertebrates, small vertebrates and pieces of bait fish from the water surface.



South Atlantic storm petrel

Ascension spurge (*Euphorbia origanoides*)

This perennial, dwarf shrub forms low hemispherical domes up to 1m in diameter and 40cm high. Endemic to Ascension, this species is classified as Critically Endangered. The Ascension spurge has reddish, dichotomously branched stems with oval, olive green leaves and creamish-white flowers.

The Ascension spurge population fluctuates annually depending on rainfall. Once widespread across the Letterbox NR, the local population is limited to several fragmented populations. A census in March 2023 recorded 1379 plants within the NR. This includes populations on the plateau, around Wig Hill and Little White Horse Hill.

Seed dispersal is predominantly via wind. However, water is also an important dispersal agent following heavy deluges. The Ascension spurge occurs on arid landscapes in areas of low and sporadic rainfall. Populations that survive longer drought periods are often found in small crevices and gullies where evapotranspiration rates are lower and have increased water availability compared to exposed sites. The Ascension spurge lays dormant in a seed bank for a number of years (5+) while it waits for adequate rainfall, regenerating rapidly when conditions are favourable.

Ascension spurge was once widespread in the low lying areas of the island however it is estimated that changes in distribution have led to a 50% reduction in the areas occupied. There is evidence of genetic divergence between east and west coast populations, potentially linked to a dispersal barrier to seeds and pollinators caused by the prevailing south-easterly trade winds. The closest relative is believed to be *E. trinervia* which is native to coastal regions of tropical West Africa.

Sedges and grasses

The Ascension Island sedge, *Cyperus appendiculatus* var. *appendiculatus* is endemic to Ascension. A survey in 2008 estimated that 17-25% of the worlds population of this subspecies was found within the Letterbox NR. However, it is likely that this proportion has increased since as other island populations have crashed in recent droughts.

The Ascension trident grass, *Aristida adscensionis*, is native to Ascension and still moderately widespread across the island. This species has declined substantially in the past 150 years and is becoming rarer in many of the places where it naturally occurred. The Letterbox NR, however, holds some strong populations of this grass. The coastal cup grass, *Eriochloa procera*, population is limited on Ascension, with the Letterbox NR being a key hotspot for this species.



Ascension spurge growing on Letterbox, with Boatswain Bird Island Sanctuary in background



Cyperus appendiculatus var. *appendiculatus*

Ascension scaly crickets (*Discophallus* spp.)

The *Discophallus* genus of scaly crickets are endemic to Ascension Island and likely arrived via rafting (Ashmole & Ashmole 2000; Gorochov 2009). There are five sister species, of which two are known only from Boatswain Bird Island Sanctuary: *D. amplus* and *D. philipi*. The two are similar in appearance and of similar body length (15-18 mm; Gorochov 2009).

As these two *Discophallus* species have only ever been observed or collected on a handful of occasions (Duffey 1964; Ashmole & Ashmole 2000), nothing is known of their ecology. Without access to Boatswain Bird Island Sanctuary it is impossible fully to assess the threats to *D. amplus* and *D. philipi*. There also exists some doubt over the species-level taxonomy of the *Discophallus* genus which cannot be addressed without island access.

Other scaly cricket taxa are known to be associated with Ascension's coastal habitat, where they breed and scavenge (Vahed 2020). It has been suggested that *Discophallus* may scavenge on guano (Ashmole & Ashmole 2000).



Ascension-endemic pseudoscorpions (Order: Pseudoscorpiones)

Boatswain Bird Island Sanctuary is home to several species of pseudoscorpion, all of which are endemic to the islet. The most notable species is the Critically Endangered *Garypus titanius* (pictured left), which is widely regarded as the largest pseudoscorpion in the world at around 15 mm body length (Beier 1961; Ashmole & Ashmole 2000). Two more endemic species are considerably smaller: *Stenowitzius duffeyi* and *Neocheiridium* sp. The *tiny Neocheiridium* species is known from only a single heavily-damaged specimen collected from the islet.

All pseudoscorpion species are thought to have reached the island via phoresy, the process of "hitchhiking" on larger organisms. It is thought that the Boatswain Bird Island Sanctuary species would naturally occupy large areas of the Ascension mainland, but introduced species have reduced their populations.

Pseudoscorpions have been described as "abundant" on Boatswain Bird Island Sanctuary where they are likely active nocturnal predators of invertebrates on the bird guano. Nothing is known of any of their respective threats or population statuses.



Historical and recreational use of the
Letterbox NR

History of the Letterbox Nature Reserve

In 1673, Father Navorette visited Ascension Island and reported that there was a “cache or letterbox” where passing ships left messages for those travelling in the opposite direction. The cleric failed to record the location of this letterbox but it is unlikely to have been in the area now known as Letterbox peninsula given its inaccessibility by sea.

There was no further mention of letterboxes until 1913 when a green tin box was found, this time at Letterbox. Letters were left in the hope that walkers would take them to the Georgetown Post Office. This was in use until 1942. The letterbox has since been replaced with a new box that remains in the same location on the reserve.

In 1942 the British military used the Letterbox peninsula for bombing practice. Craters can be found on the plateau and used bullet cartridges can be found amongst the lava.

Current recreational use of the reserves

The Letterbox NR is popular with hikers, naturalists, geologists and photographers. Reserve visitors are submersed in a raw and barren landscape and can appreciate nature surrounded by dramatic landscapes. Before entry to the reserve, there are two information boards to describe the wildlife and guidelines for how to behave around nesting birds. There are no other visitor facilities available.

A Cultural Ecosystem Services report on Ascension Island (Canelas *et al.* 2019) found that the Letterbox NR and the seabirds nesting there are greatly appreciated by islanders (see word cloud). The reserve was described by as:

“remarkable for its views, lava formations and rocks”

“[it’s] very intense and difficult to get there, but seeing all the birds is amazing!”

“since they eradicated the cats, this is again an important nesting place for all the seabirds”



Animals associated with Ascensions natural environment.



The Ascension Heritage Society produces a guidebook (last published 2020) to 43 designated hikes across the island. Completing these hikes is a popular island pastime and seven of these hikes are found within the Letterbox NR.

The hikes are indicated in the map above:

1. Spire Beach
2. Louie's Ledge
3. Letterbox
4. South-east point
5. Wig Hill
6. Crater Cliff
7. White Horse Hill




Each hike varies in difficulty with hikers following uneven and sometimes narrow footpaths to the chosen location. Hikes within the reserve require walkers to be well prepared. There are no visitor facilities on the reserve and this area of Ascension has no mobile phone reception and limited other communication options.





Threats to the Protected Areas

Threats to the Letterbox NR/Boatswain Bird Island Sanctuary

There are a range of threats to the health of the Letterbox Nature Reserve and to Boatswain Bird Island Sanctuary. Some of these threaten the successful achievement of the strategic objectives set out in this management plan. These threats are coded using a traffic light system to reflect the severity of the threat.

 **High:** Major effect on the health of the ecosystem/species of the reserves

 **Medium:** Some effect on the health of the ecosystem/species of the reserves

 **Low:** Minimum effect on the health of the ecosystem/species of the reserves



Invasive flora

A number of invasive plant species have been recorded on the Letterbox NR including:

- Wild tomato (*Solanum* spp.)
- Guava (*Psidium* spp.)
- Tree tobacco (*Nicotiana* spp.)
- *Casuarina* spp.
- Mexican poppy (*Argemone mexicana*)
- *Lantana* spp.
- Swamp flat-sedge (*Cyperus* spp.)

These plants can grow rapidly and quickly produce viable seed. Left uncontrolled, they may outcompete native plants for resources such as water, nutrients and available habitat. They can also introduce plant diseases and support other non-native species such as rodents and ants, further exacerbating the pressure on the Letterbox NR. Many of the non-native plant species are invading from the western edge of the Letterbox NR and through watercourses flowing in from outside of the NR.

In some areas of the reserve, it will not be possible to completely eradicate these non-native plant species. Priority areas for control have been identified, which follow natural watersheds. Within these areas key invasive plants are removed to prevent them encroaching into important habitat for nesting seabirds or for the Ascension spurge.

Left: Invasive flora can be seen on the further hills where they are encroaching onto the Letterbox NR. The summit of White Horse Hill (right in the image) is now covered in guava—a site which has been favourable for masked boobies.

Threats to the Letterbox NR/Boatswain Bird Island Sanctuary



Introduced Fauna

A number of non-native species have been introduced to Ascension that are detrimental to the wildlife found on the Letterbox NR and Boatswain Bird Island Sanctuary.

Rodents:

Rodents were introduced to Ascension Island via passing ships, sometime before 1701. Black rats (*Rattus rattus*) and house mice (*Mus musculus*) can be found throughout the island. These highly adaptable species forage on fruit, seeds and plants and will predate small animals and eggs. Rodents have a high fecundity and short generation times allowing populations to grow rapidly in favourable conditions.

The seabirds on Ascension have not evolved alongside rodents and consequently many individuals do not react to their presence with an anti-predatory response. Some masked boobies however have been recorded with dead rats next to them that had evidently been killed by the nesting bird.

Rodents are a real threat to the Ascension Spurge. Alongside rabbits (*Oryctolagus cuniculus*), they graze on this Critically Endangered plant, which is already struggling in marginal conditions. The impact of rodents on native invertebrates is unquantified on Ascension however other studies have shown they can greatly reduce island invertebrate populations through predation or reducing food availability.

Domestic cat (*Felis catus*)

Cats were introduced to Ascension in 1815 to control the rodent population. Feral cats predated the nesting seabirds, decimating the seabird population on Letterbox. During this period, some masked boobies attempted to nest, however, they were unsuccessful with eggs and young chicks easily predated by cats.

A feral cat eradication was undertaken in 2002-2004 by the RSPB. This has greatly increased the local seabird population, releasing them from predation pressures. Several pet cats remain on island, but all are registered through the AIGCFD. Each cat is monitored regularly to ensure it remains with the owner and advice is given to prevent the cat turning feral. If a cat goes missing, AIGCFD may assist to recapture the animal and return it to the owner.

Non-native invertebrates

A number of non-native invertebrate species can be found across the Letterbox NR which are detrimental to the Ascension spurge. Aphids, mealybugs, scale and whiteflies are farmed by ants to milk honeydew. The ants carry the honeydew back to the nest while the aphids harvest and eventually kill the plant. Ants are also known to move aphids to other plants continuing the cycle.

Non-native American cockroaches (*Periplaneta americana*) have been introduced to Ascension and some have been recorded on Boatswain Bird Island Sanctuary. It is likely that they are competing for resources with the giant pseudoscorpion found there but this has not been quantified.

Introduced invertebrates are also having an impact on the endemic and native invertebrates of the Letterbox NR. Non-native jumping spiders (family: Salticidae) are abundant and likely predated native invertebrate species. Similarly, the non-native biting centipede (*Scolopendra morsitans*) is abundant and will actively predate native invertebrates.

Threats to the Letterbox NR/Boatswain Bird Island Sanctuary



Climate Change

The global climate is changing at an unprecedented rate due to the increased levels of carbon dioxide in the atmosphere produced by the burning of fossil fuels. The following changes are predicted for Ascension by the end of the 21st century:

- Air temperatures will rise by between 0.7 And 2.4°C depending on global CO₂ emission reductions (Intergovernmental Panel on Climate Change)
- The ocean will become warmer and more acidic with temperatures increasing by between 0.6 And 1.4 °C and pH decreasing by between 0.006 and 0.11 depending on global CO₂ emission reductions.
- Sea levels will rise by between 0.3 and 0.6m (Intergovernmental Panel on Climate Change).
- Storm events and high swells will become more frequent and more severe.

This will have a profound effect on Ascension's biodiversity if species are unable to evolve quickly enough to cope with the changing conditions.

Impacts of climate change on Ascension spurge:

The Ascension spurge evolved on the low arid environments of Ascension and requires rain to stimulate growth in the seeds. The seeds are viable for approximately five to ten years. Climate change could result in prolonged drought conditions that exceed this period. Even small reductions in the frequency or quantity of rainfall could have significant impacts on spurge populations already growing in marginal environments.

Conversely, climate change may increase the frequency of storms and rainfall. The Ascension spurge undergoes a cyclical boom following heavy winter rains (normally every 5 years). An increase in annual rainfall as a result of climate change may allow this species to thrive, allowing seed dispersal to other suitable habitat.

Impacts of climate change on seabirds:

Rising sea levels, rising sea temperatures and shifts in oceanic currents will greatly disrupt marine ecosystems and make prey items increasingly difficult for seabirds to find. During the nesting period when seabirds are tied to the island, travelling increased distances for food will not be energy efficient, resulting in a population decline as adults fail to nest successfully.

Increased offshore storms makes feeding more difficult for seabirds that surface feed as the increased turbidity makes viewing food sources more difficult. If storms and swells increase, the cliffs of Boatswain Bird Island and the SE Bay are likely to be damaged, potentially reducing the availability of habitat for cliff-nesting species such as tropicbirds, noddies and red-footed boobies.

Periods of heavy rainfall may cause temporary water-flows through the reserve, washing out seabird nests. Chicks are particularly vulnerable to heavy rains with downy feathers becoming waterlogged, causing hypothermia and eventually death. Frigatebirds are especially vulnerable to increased rainfall. This species lacks the waterproof oil for feathers and during period of rain they may become waterlogged and unable to take off. It has been noted that heavy rainfall during nesting can increase the likelihood of nest abandonment as the adults take to the skies.

Heavy rains cause raingrass (*Enneapogon cenchroides*) to flourish, which provides an additional food source for rodents, creating a short term rodent boom and thus an increase in predation pressures on seabird eggs and chicks. In 2022 there was an explosion of raingrass on the Letterbox plateau and an increase in the local mice population. This is concerning for the Ascension spurge found here, which is sensitive to grazing.



Threats to the Letterbox NR/Boatswain Bird Island Sanctuary

Disturbance

It is important to balance the benefits of people experiencing and valuing wildlife with potential negative impacts on wildlife from human presence. Note that dogs are not permitted on the Letterbox NR.

Human presence can alarm incubating seabirds, causing them to leave the nest (right above). At best, this is wasted energy, at worst they may abandon the nesting attempt. Time spent off the egg exposes the egg to harmful UV rays and it is possible the developing embryo may overheat during disturbance periods.

Unattended eggs and chicks are well-camouflaged against the lava, making them susceptible to trampling or the weather. Disturbance to the Letterbox seabirds causes them to leave the nest unattended which may then be predated by a nearby frigatebird.

Entry onto Boatswain Bird Island would cause catastrophic disturbance to the seabirds nesting here due to the number and density of nests. For this reason, access is prohibited unless under the provision of the island Administrator. There is no safe area in which to land on the island as previous infrastructure has been damaged by the sea which further restricts access.



Boats which circle Boatswain Bird Island and anchor next to the arch may cause disturbance to nesting birds, particularly cliff nesters. This is a popular site for SCUBA diving, snorkeling and spear fishing.

Threats to the Letterbox NR/Boatswain Bird Island Sanctuary



Litter

There is a legacy of litter on the Letterbox NR as it was previously used for military target practice. The remains of large chunks of rusty metal and bullet shells litter the reserve. This took place before the area was occupied by nesting birds and therefore before it became a NR.

There is increasing awareness and evidence that seabirds are using plastic items as nesting material. Young chicks can become entangled in these items leading to injury or even death. A study in the 2022-2023 breeding season showed 18% of Ascension's brown boobies had plastic items within their nest structure. This was investigated further and the plastic mostly consisted of fishing line and a nylon tubing (shown right).

It is well documented that seabirds are vulnerable to ingesting plastic found within the marine environment, mistaking plastic for food items which can be fatal. Even small plastic fragments can have long-term impacts, scarring the digestive tract, which leaves the bird more vulnerable to illness (Charlton-Howard *et al.* 2023).

The Ascension frigatebird is attracted to bright, shiny objects seen on the ocean surface, mistaking them for food items. The Ascension frigatebird often scoops up fishing lures. These birds may become entangled in fishing line that can impede their movements causing them to fall to the ground or into the water where their feathers may become waterlogged and they can subsequently drown. If fishing line is cut or snaps, the birds may continue to be entangled until they finally succumb to their fate (right below)





Legislation

Legislation and Policy

The designation and management of nature reserves is an important part of Ascension's approach to protecting its biodiversity and meeting its commitments under international agreements and strategies.

International agreements and strategies

The [Convention on Biological Diversity](#) (CBD) has been extended to Ascension and provides the overarching context for biodiversity protection on the island. Target 3 of the CBD Post-2020 Global Biodiversity Framework reads:

Ensure and enable that by 2030 at least 30 per cent of terrestrial, inland water, and of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem functions and services, are effectively conserved and managed through ecologically representative, well-connected and equitably governed systems of protected areas and other effective area-based conservation measures, recognizing indigenous and traditional territories, where applicable, and integrated into wider landscapes, seascapes and the ocean, while ensuring that any sustainable use, where appropriate in such areas, is fully consistent with conservation outcomes, recognizing and respecting the rights of indigenous peoples and local communities, including over their traditional territories.

The need for well-managed area-based protection is also a foundation of the [UK Overseas Territories Biodiversity Strategy](#) and fulfills Ascension's obligations to protect habitats and species under the [Ascension Environmental Charter](#) signed in 2001. Letterbox NR and Boatswain Bird Island Sanctuary form part of a network of ten protected areas on Ascension. Local legislation provides the legal basis for the establishment and management of these protected areas. .

Ascension protected areas legislation

The [National Protected Areas Ordinance, 2003](#) provides the Governor with powers to designate Nature Reserves 'primarily for the purpose of maintaining a proper balance in the natural ecology of the area.' It also limits the type of development that can be permitted within a Nature Reserve and allows the restriction of activities that could be harmful to a Nature Reserve or Wildlife Sanctuary. The Ordinance also provides powers to introduce regulations to protect Nature Reserves and to appoint Reserve Wardens to enforce these regulations.

The Letterbox NR and Boatswain Bird Island Sanctuary were designated under the [Natural Protected Areas Order, 2014](#). Their boundaries are shown on page 6.

The [National Protected Areas Regulations, 2014](#), prohibit a list of potentially harmful activities on the Nature Reserves without prior permission from the Administrator or Reserve Warden (see overleaf). They also provide powers for the Administrator to close all or part of a nature reserve for the purposes of management, wildlife protection or public safety.

Other relevant Ascension legislation

Under the [Wildlife Protection Ordinance, 2013](#), it is an offence to willfully take, kill, trade or molest any of 40 species listed in the ordinance. All of the seabirds nesting on the Letterbox NR and on the Boatswain Bird Island Sanctuary are protected through this ordinance. The Ascension spurge and Giant pseudoscorpion is also listed as protected species.

The [Biosecurity Ordinance, 2020](#), introduced import control measures and powers to inspect and treat cargo, vessels and aircraft arriving on Ascension with the aim of reducing the likelihood of introducing new non-native species to the island.

The [Ascension Island Marine Protected Area](#) was designated in 2019 under the National Protected Areas Ordinance. The MPA covers 100% of Ascension's Exclusive Economic Zone (EEZ), an area of over 445,000km². Within the MPA, large-scale commercial fishing and mineral extraction is prohibited. The MPA protects the food source for the seabirds nesting on the Letterbox NR and Boatswain Bird Island Sanctuary. It also protects the inshore marine environment along the coastal edges of these protected areas.

The National Protected Areas Regulations

All or any of the following are prohibited within the Letterbox NR if done without the prior permission of the Administrator or Reserve Warden:

- any development;
- the improving or altering of any existing structure;
- the removal of sand, soil or rock;
- the intentional or reckless disturbance to, or damage or injury to, any protected species;
- the dumping of refuse, chemicals, abandoned vehicles, scrap metal, mining spoils, toxic or other wastes, bilges, oil and other petroleum products, pesticides and other items harmful to animals or plants, or unsightly items;
- the driving or riding of motor vehicles other than on other than on a designated road or track or in a signed parking zone;
- parking a vehicle, except in a signed parking zone;
- the making of fires without a permit other than in a portable stove or grill, or in designated fire pits;
- playing any musical instrument, radio, sound system, television or other item which produces or reproduces music, to the annoyance of other persons;
- the use or possession by any person, other than a Warden acting in the course of his or her duties, of any type of firearm, air gun, cross bow, bow and arrow or slingshot;
- Allowing any dogs or cats within the reserve;

There are no designated roads, tracks, parking zones, camping sites or fire pits within the Letterbox NR .

Boatswain Bird Island Sanctuary

In addition to the prohibitions set above, the following are prohibited within all Sanctuaries if done without the prior permission of the Administrator

- Access by the public, unless with the prior written approval of the Administrator in form S/1 set out in the Schedule;
- The intentional introduction, either temporary or permanent, of any animal or plant not indigenous to the site; and
- The removal of any artefact.

Enforcement

Education and awareness raising are the preferred methods to ensure compliance, and proportionate enforcement action will only be taken when this approach has been exhausted. The maximum penalty for an offence under the National Protected Areas Ordinance or Regulations is a fine of £20,000 or imprisonment for 12 months. All warranted Reserve Wardens, Fishery Protection Officers and Police Officers are able to take enforcement action.

Implementation policy

The restrictions are designed to prevent activities that might harm the natural features of the nature reserves or reduce people's enjoyment of the areas. There is a presumption against all of these activities taking place in the Nature Reserves, but the Administrator and Reserve Warden have discretion to permit them on a case by case basis. When deciding whether to permit an activity, the Administrator or Reserve Warden must consult the Director of Conservation and will consider the following:

- Whether an activity is consistent with the objectives of this management plan. The onus will be on the person proposing the activity to demonstrate that it will not conflict with the objectives. Activities that would have a significant negative impact on the nature reserve objectives will not be permitted.
- Whether the activity will have a significant and/or long-term impact on the natural features of the Nature Reserves. Activities that would have a significant or long-term impact on the natural features of the Nature Reserve will not be permitted. Decisions of this nature must be referred to the Administrator and cannot be made by a Reserve Warden.
- Whether the activity is necessary for the island's military mission or critical functions. Such activities can be permitted if all alternatives have been exhausted and all available mitigations have been put in place. Decisions of this nature must be referred to the Administrator and cannot be made by a Reserve Warden.
- Where there is doubt or lack of evidence about an activity's impact, the precautionary principle will be applied and the activity will not be permitted.
- Restrictions on public access to the nature reserves will only be authorised by the Administrator where it is necessary to prevent the risk of significant disturbance or trampling of the natural features or where there is a risk to public safety. Restrictions will be in place for the shortest time period and over the minimum area possible.



Action Plan

Action plan

The following section describes a number of actions to be achieved in the next five years. Actions are prioritised (High, Medium or Low) according to the positive changes they will make to the Letterbox NR. Actions are arranged according to the threats that they address. Each is numbered for identification with clear targets and suggested timeframes to measure success.

1. Clearance of invasive flora

Proposed: Removal of key invasive plants from designated boundaries within the NR.

Purpose: Protect the NR and relevant species from the threats of invasive species.

Outcome: No invasive plant species found in seabird nesting or Ascension spurge habitat.



	Description	Target	Priority
1a	Monitor and remove new recruits of plants within the watershed above Razors Edge.	Watershed cleared of invasive plants	HIGH PRIORITY
			Twice annually
1b	Monitor and remove new recruits encroaching onto Wig Hill from the western edge towards the Ascension spurge sites on Little White Hill and Little White Horse Hill.	Wig Hill remains free of invasive flora	HIGH PRIORITY
			Area checked every quarter
1c	Remove Waltheria and swamp flat-sedge within 200m boundary of Ascension spurge areas.	Boundary of 200m around Spurge sites free of non-native plants	MEDIUM PRIORITY
			Ongoing
1d	Clearance of guava from White Horse Hill	Plateau of White Horse Hill free of invasive guava	MEDIUM PRIORITY
			Cleared by Year 5

2. Predator control

Proposed: Control the rodent (black rat and house mouse) populations in the Letterbox NR. Manage local populations of rabbits and sheep so they are unable to graze on Ascension spurge. Manage domestic cats on island to prevent individuals from turning feral. Maintain the rodent-free status of Boatswain Bird Island Sanctuary.

Purpose: Protect the Ascension spurge in the Letterbox NR from grazing pressure. Protect the nesting seabirds of the Letterbox NR from predation. Protect Boatswain Bird Island seabirds from non-native species.

Outcome: No grazing on the Ascension spurge or predation of seabird eggs/chicks.



	Description	Target	Priority
1	Remove invasive plant species in NR, which harbour local rodent populations (see action point 1 for details).	No invasive plant species within 500m buffer zone around Ascension spurge sites.	HIGH PRIORITY Ongoing
2a	Maintain a working register of domestic cats on island. Any domestic cats which become feral should be caught and rehabilitated where possible. All cats on island neutered or spayed. AIGCFD work closely with cat owners to minimise the likelihood of cats straying, providing advice and support. Cat owners should be well informed about the Dog and Cat Ordinance, Cap A10 to ensure they are	No domestic cats go feral. No feline predation on native wildlife.	HIGH PRIORITY Year 1
2b	Rabbit proof fencing installed around mature spurge plants at Little White Horse Hill restoration site to protect from grazing. Regular maintenance of the fence is required.	No evidence of rabbit grazing on protected Ascension spurge plants	HIGH PRIORITY Ongoing
2c	Extend fencing around Little White Horse Hill restoration site to encompass Ascension spurge growing outside of the current fenced area.	No evidence of rabbit grazing on protected Ascension spurge plants	HIGH PRIORITY Year 1
2d	Following any observation of high grazing on spurge, increase the number of baited boxes around restoration sites and fill weekly or more frequently if necessary. Additional bait may be hand strewn.	No signs of rodent predation on Ascension spurge	HIGH PRIORITY Completed by Year 5

3. Conservation of the Ascension spurge

Proposed: Protect and maintain population of Ascension spurge on Letterbox NR.

Purpose: Protect the native fauna of the NRs from the impacts cause by invasive non-native species and climate change.

Outcome: Healthy, self sustaining population of Ascension spurge at Letterbox NR.



	Description	Targets	Priority
3a	Protect and maintain wild population of Ascension spurge providing fencing and shade to individuals where necessary.	Self sustaining wild population of Ascension spurge in the Letterbox NR	HIGH PRIORITY
			Ongoing
3b	Control pest invertebrates found on Ascension spurge. This involves examining individual plants and treating with a species-specific insecticide. Individual pests may be carefully removed and killed on site. During periods of high mealy bug infestation, station ant bait traps strategically around the Ascension spurge sites.	No plant death caused by invertebrates	HIGH PRIORITY
			Ongoing
3c	Maintain a viable stock of cultivated plants at Kew and on Ascension Island. Each nursery should hold 200 plants, 50 specimens from each sub-population. These will provide a potential source for restoration work.	50 Letterbox spurge plants held in a nursery on Ascension Island . 50 Letterbox spurge plants at Kew	HIGH PRIORITY
			Ongoing
3d	Maintain a viable, ex-situ seed bank at Kew’s Millennium Seed Bank and on Ascension Island. Collect, clean, dry and bank seed from all wild Ascension spurge populations.	Viable seed bank of Letterbox spurge kept on island and at Kew Gardens	HIGH PRIORITY
			Ongoing
3e	In collaboration with Kew gardens, produce a propagation document to develop cultivation techniques for the Ascension spurge.	Propagation document produced by end of Year 1	HIGH PRIORITY
			Year 1
3f	Establish a new wild population of plants from the Letterbox provenance at other sites on Ascension (NASA site) where the climate is likely more suitable for Ascension spurge.	New wild population established	HIGH PRIORITY
			Year 3
3g	Ensure all island organisations are familiar with and adhere to strict biosecurity control measures. All importations should be suitably cleaned and treated to prevent entry of non-native flora and fauna. All non-native species should be destroyed on entry to the island to prevent colonisation.	No new established populations of non-native species	HIGH PRIORITY
			Ongoing

4. Public engagement

Proposed: Organise public engagement events for school children and islanders.

Purpose: Encourage recreational use of the Letterbox NR. Educate islanders about the importance of the NR and Wildlife Sanctuary and the species found there.

Outcome: Higher engagement between islanders and the Letterbox NR and Boatswain Bird Island Sanctuary.



	Description	Target	Priority
4a	Classroom lesson about Ascension's seabirds.	Minimum of 2 year groups engaged.	MEDIUM PRIORITY
			Annually
4b	Improved signage on the reserves describing the importance of the area for biodiversity and the regulations in place to protect the NR.	New signage erected in reserve	MEDIUM PRIORITY
			Year 1
4c	Create videos, posters, islander articles and social media posts regarding the protected areas and the wildlife found there.	Minimum of 10 items on social media regarding Letterbox NR and Boatswain Bird Island Sanctuary	HIGH PRIORITY
			Annually
4d	Develop wildlife watching guidelines for visitors to the protected areas to minimise disturbance.	Wildlife watching guidelines created and distributed. Guidelines made available on government website for visitors to the area.	HIGH PRIORITY
			Year 1



Monitoring and Research

Environmental monitoring/research

To assess the success of the NR and Sanctuary and the species found there, monitoring will take place. This monitoring will ensure that management actions set out in this document are accomplished and that they make a positive contribution towards environmental protection through achieving the Management Plan objectives (page 7).

Monitoring will be assessed in two approaches:

1. **Monitoring Management Plan actions** - Have management actions been completed and outputs achieved?
2. **Performance Monitoring** —are the Management Plan objectives being achieved?

Separating these types of monitoring will allow distinguishing between biodiversity declining because actions were carried out properly or if biodiversity loss was a result of actions being completed but were insufficient to achieve the objectives. This will guide future management responses, determining if more effort is required or if new actions need to be established. These will be reviewed annually by AIGCFD .

Each monitoring action in the proceeding pages is linked to the Management Plan objectives using the objective icons. A brief description of what is monitored , methodology and target is provided. Monitoring will be delivered by the AIGCFD alongside volunteers and external partners.

Research effort will be targeted to fill the knowledge gaps identified on the right. Priority has been given to research that will help to inform and improve management of the wildlife of Letterbox NR and Boatswain Bird Island Sanctuary.

Current knowledge gaps

There are a number of knowledge gaps which limit the effectiveness of current management. These have been identified and described below.

Seabirds:

- Population size and trends of seabirds nesting on Boatswain Bird Island
- Population size and trends of seabirds nesting on the cliffs around the SE Bay
- Productivity of brown boobies– does the plastic in the nest impact fledgling success?
- Distribution and foraging locations of Ascension’s seabirds
- Factors determining productivity and population size of seabirds
- Impacts of rodents on seabird population
- Predicted impacts of climate change on seabird productivity and survival

Ascension spurge:






- Adaptability to climate change
- Seed bank viability
- Life history responses under different environmental conditions

Endemic and native invertebrates:

- Taxonomy of *Discophallus* crickets, and assessment of whether Boatswain Bird Island Sanctuary scaly crickets are different species to the mainland.
- Taxonomy of Ascension pseudoscorpions.
- Scanning of potential biocontrol agents to target known Boatswain Bird Island Sanctuary invasive invertebrates
- Breeding behaviour of endemic invertebrates
- Microhabitat and resource requirements
- Competitive interactions with non-native invertebrates

	Monitoring	Details		Objective
A	Population census of seabirds nesting on the Letterbox NR	Annual census performed during the peak incubation period for frigatebirds and masked boobies. While performing counts, record all seabird species encountered. Census performed manually and using a UAV.		<ul style="list-style-type: none"> Record trends in the Letterbox NR nesting seabirds Identify areas of population expansion.
B	Population census of frigatebirds and masked boobies nesting on Boatswain Bird Island	Annual census performed during the peak incubation period for these species. Census performed using a UAV and AI technology to process the images.		<ul style="list-style-type: none"> Record trends in the Boatswain Bird Island nesting seabirds Identify if Ascension's seabird population is increasing or if population increases on the mainland are a result of relocation.
C	Productivity monitoring of frigatebird and masked boobies	Productivity monitoring of 6 frigatebird colonies. Productivity monitoring of 100 masked booby nests selected at random across the Letterbox plateau.		<ul style="list-style-type: none"> Analyse trends in the breeding success of these two species and where possible make links of productivity to other environmental factors.
D	Monitor changes in prey composition and trophic position of frigatebirds and masked boobies	Collect regurgitate samples and a minimum of 20 breast feather samples from frigatebirds and masked boobies.		<ul style="list-style-type: none"> Determine if seabird diet changes over time and investigate potential causes of this.
E	Monitor the wild Ascension spurge population.	Carry out bi-annual census– once in the warm and once in the wet season to determine annual trends.		<ul style="list-style-type: none"> Understand trends in the wild Ascension spurge population. If necessary, take conservation action as described in Action Plan 3.
F	Monitor soil moisture levels.	Record the soil moisture levels at a range of depths from surface roots down to tap root (2m). Loggers deployed in areas which are irrigated regularly and in areas which are not watered. Loggers also deployed at other island locations as potential Ascension spurge restoration sites.		<ul style="list-style-type: none"> Determine the appropriateness of the NR for a long-term sustainable Ascension spurge population. Look for alternative locations on island which may be more suitable for the Ascension spurge to thrive.

	Research	Details		Objective
A	Determine the population size of the frigatebirds and masked boobies nesting on Boatswain Bird Island.	Trial effectiveness of remote cameras to monitor nesting seabirds. Joint project with the University of Oxford (DPLUS1020)		<ul style="list-style-type: none"> Establish a baseline population size for frigatebirds and masked boobies Determine if remote cameras may be used for productivity monitoring of Boatswain Bird Island Sanctuary seabirds.
B	Methods for control the invasive flora of the NRs.	Establish best-practice methods to control invasive species found on the Letterbox NR.		<ul style="list-style-type: none"> Establish best-practice methods used for future control of invasive flora.
C	Determine the impacts of pollution on Ascension's seabirds	<ul style="list-style-type: none"> Quantify and qualify the litter items used in brown booby nests on the Letterbox NR (DPLUS176). Dissection of freshly dead seabirds to collect stomachs for plastic analysis as part of DPLUS176. 		<ul style="list-style-type: none"> Is there an increase in the volume of plastics used in brown booby nests. Where does this originate from and can it be stopped at the source? Determine the main items of pollution which Ascensions seabirds ingest. Reduce litter found in reserves and in surrounding MPA by identifying items and reducing them at the source.
D	Determine the dispersal of Ascensions seabirds outside of the breeding season.	Track frigatebird and masked boobies outside of the breeding season using satellite tags (DPLUS195)		<ul style="list-style-type: none"> Understand the spatial use of the Atlantic Ocean by these species to ensure they are protected in all aspects of their life cycle.
E	Estimate rodent population on the NRs	Establish baseline population for rodents and create an effective programme to monitor the population and the success of bait control. Quantify direct predation pressures on seabirds.	 	<ul style="list-style-type: none"> Control local rodent population to ensure they are not having an impact on seabird productivity.
F	Predict the impact of climate change on the Ascension spurge.	Use data from DPLUS113 to make recommendations for potential mitigation measures to protect this species and to create self-sustaining wild populations.		<ul style="list-style-type: none"> Determine the appropriateness of the NR for a long-term sustainable Ascension spurge population. Look for alternative locations on island which may be more suitable for the Ascension spurge to thrive.
G	Assess the potential of biocontrol agents.	Experimentation of breeding ladybirds for biocontrol in nurseries and on wild populations of Ascension spurge.		<ul style="list-style-type: none"> Reduce pest invertebrates on Ascension spurge by using bio control which may be more effective and less damaging to individual plants.

	Research	Details		Objective
H	Assess the potential of biocontrol agents.	Risk assess potential biocontrol agents for Mexican thorn (DARWIN plus project DPLUS134) and other invasive species- .		<ul style="list-style-type: none"> Control invasive species around NRs to reduce impact on seabirds and Ascension spurge as described in this Management Plan.
I	Baseline survey of invertebrates in the Letterbox NR.	Survey invertebrates in the Letterbox NR to produce a comprehensive list of those in the NRs through DARWIN Plus project DPLUS135. Highlight endemic species or species of conservation value and the highest priority non-native invertebrates.		<ul style="list-style-type: none"> Determine if non-native invertebrates affect seabird productivity. Understand the potential impacts of non-native invertebrates on the Ascension spurge population. Understand the potential impacts of non-native invertebrates on endemic and native invertebrates. Apply to the IUCN for endemic invertebrates to be added to the IUCN red-list– a critical indicator of the health of the worlds biodiversity. Red List described pseudoscorpion and scaly cricket endemic species. Determine if conservation measures are required to maintain endemic and native invertebrate populations.
J	Potential impacts of climate change on Ascensions seabirds	Climate change modeling performed as part of DARWIN plus project DPLUS113 .		<ul style="list-style-type: none"> Determine potential impact of climate change and develop mitigation where possible.
K	<i>Discophallus</i> taxonomy	Genetic assessment of whether or not the Boatswain Bird Island Sanctuary species are in fact distinct from those on the Ascension mainland.		<ul style="list-style-type: none"> Determine genetic distinctness via barcoding of existing specimens. Assess whether all <i>Discophallus</i> species can be successfully conserved through management solely on the mainland.
L	Pseudoscorpion taxonomy	Taxonomic description and DNA barcoding of <i>Neocheiridum</i> sp. to confirm its status as an endemic species.		<ul style="list-style-type: none"> Taxonomic evaluation of the only known <i>Neocheiridum</i> specimen. Genetic barcoding of all species to confirm distinctness to pseudoscorpions found elsewhere.

References

- Ashmole, P., & Ashmole, M. (2000). St Helena and Ascension Island: A Natural History. Anthony Nelson.
- Beier, M. (1961). Pseudoscorpione von der Insel Ascension. Annals and Magazine of Natural History: Including Zoology, Botany and Geology, 13(3), 593–598.
- Charlton-Howard, H. S., Bond, A. L., Rivers-Auty, J., Lavers, J.L. (2023) 'Plasticosis': Characterising macro– and microplastic– associated fibrosis in seabird tissues. Journal of Hazardous Materials, 450, 131090
- Duffey, E. (1964). The Terrestrial Ecology of Ascension Island. Journal of Applied Ecology, 1(2), 219–251.
- Gorochov, A. v. (2009). Crickets of the Family *Mogoplistidae* (*Orthoptera*) from Ascension and Saint Helena Islands, Atlantic Ocean. Proceedings of the Zoological Institute RAS, 313(1), 23–32.
- Rowlands B.W. (2006) Ascension Island (pp 19-28) in S.M. Sanders, ed. Important Bird Areas in the United Kingdom Overseas Territories. Sandy, UK: RSPB
- Vahed, K. (2020). The Life Cycle of the Atlantic Beach-Cricket, *Pseudomogoplistes vicentae* Gorochov, 1996. Journal of Insect Conservation, 24(3), 473–485.

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