

An aerial photograph of a beach. The top half of the image shows the ocean with white, foamy waves breaking onto a sandy shore. The bottom half of the image shows the vast, flat expanse of the beach sand. A single, dark, elongated object, possibly a piece of driftwood or a small structure, lies diagonally across the lower-left portion of the sand.

Ascension Island Beach Nature Reserves Management Plan

2023-2028



The Ascension Island Beach Nature Reserves Management Plan presents a strategic approach to the management of the Long Beach, South West Bay and North East Coast Nature Reserves. The ambition is to protect the internationally-important biodiversity found within the reserves, whilst also encouraging recreational use of the area. This management plan details what actions will be taken, the evidence-base for those actions and the methods that will be used to monitor their success.

The Management Plan has been created through an open consultation process allowing the people of Ascension, policy makers and international supporters to be involved in decision-making, providing confidence that there is an agreed vision for managing the reserves.



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Introduction

Ascension Island is a remote overseas territory of the United Kingdom located at the centre of the Atlantic Ocean. The island is only 97km² and over 1,300km from its nearest neighbour St Helena.



Though small, Ascension supports globally-important biodiversity including at least 67 endemic species found nowhere else in the world. It also provides a nesting site for over half a million seabirds and the second largest breeding population of green turtles in the Atlantic.

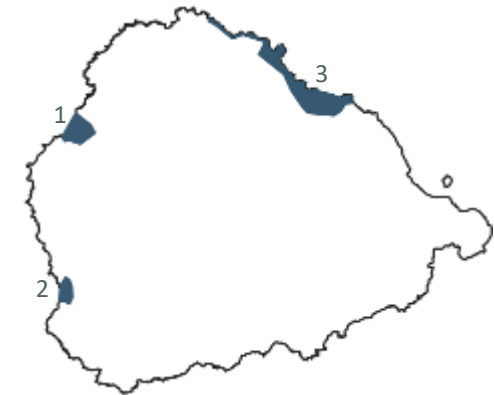
Protecting biodiversity is one of the Ascension Island Government (AIG)'s strategic objective and a commitment under the Convention on Biological Diversity. The island's network of ten Protected Areas is central to meeting this commitment and achieving Target 3 of the post-2020 Global Biodiversity Framework (see opposite). All of the Protected Areas have legal status and are underpinned by management plans. This plan covers the three Beach Nature Reserves on Ascension.

There are three Nature Reserves centred around Ascension's largest beaches that have been designated under the National Protected Areas Ordinance, 2003. All three are important nesting areas for the Endangered green turtle. Between them contain up to 29,000 nests a year, approximately 70% of the total nests on the island.

1. Long Beach

2. South West Bay (Pan Am Beach)

3. North East Coast



The aim of the Beach Nature Reserves is to protect the most significant areas of habitat for nesting green turtles, spawning land crabs and endemic scaly crickets. These species, and the others present on the coast, are inter-dependent and we want to conserve the whole ecosystem and the natural processes that support it.

The Nature Reserves include beach habitats as well as the land surrounding them and the waters adjacent to them. This prevents damaging activity on the beaches themselves and any indirect negative impacts on the beaches caused by activities in the surrounding areas. The North Coast Nature Reserve extends beyond the beaches to include lava flows that are important scaly cricket habitat.

Ascension's coastal areas are important recreational sites for people living on Ascension and visitors to the island. With careful management and the support of the island community, there is enough space for both wildlife and humans to share and enjoy Ascension's beaches.

The post-2020 Global Biodiversity Framework Target 3:

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.

Strategic objectives

Conserve the natural features of the Beach Nature Reserves

1. The size of the breeding green turtle and land crab populations on the Beach Nature Reserves are maintained or increased.
2. Scaly crickets extend their range into suitable inland habitat following the control of invasive, non-native crickets.
3. The area of suitable beach habitat is maintained in the face of climate change impacts and litter.

Support ecosystem functions and natural processes within the Beach Nature Reserves

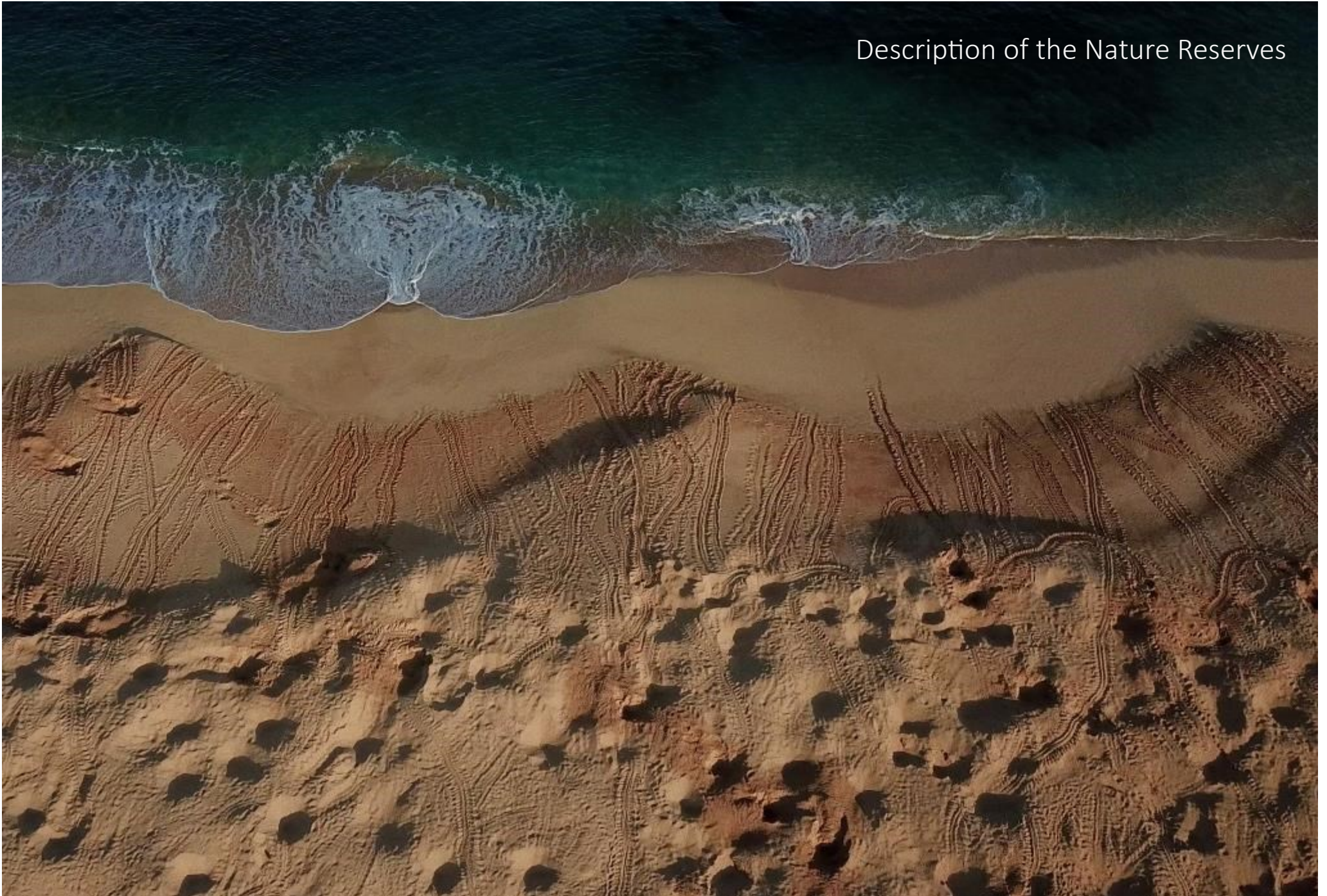
4. No non-native shrubs are present on the beaches or scaly cricket habitat within the Beach Nature Reserves.
5. Non-native predators and competitors are controlled to levels where they have no significant impact on turtle, land crab or scaly cricket populations.
6. All sources of light, noise and chemical pollution on the Beach Nature Reserves are assessed and minimised.

Promote and celebrate the Beach Nature Reserves

7. There is a high level of awareness amongst the Ascension community and visitors about the importance of the Beach Nature Reserves and the actions individuals can take to avoid damage and disturbance to their natural features.
8. Ascension's beaches, and the turtles, land crabs and scaly crickets they support, are a source of pride for the people of Ascension.



Description of the Nature Reserves



Long Beach Nature Reserve

Long Beach is the largest beach on Ascension and the most important green turtle nesting site on the island accounting for between a quarter and a third of the total Ascension nesting population. Long Beach is close to Georgetown, the main settlement on Ascension, and is a popular area for recreation.

Size: 0.61km². The Nature Reserve extends landward from the beach to cover the lower slopes of Cross Hill. This ensures that any land use changes that could affect the beach habitat can be controlled. The inner part of Clarence Bay is also included within the Nature Reserve to protect the high densities of mating turtles that congregate there in the breeding season .

Protected species: green turtle, Ascension frigatebird.

Historic uses: Turtles were harvested from Long Beach and the Turtle Ponds were created to store live turtles. The beach was also used for landing equipment and materials for large infrastructure projects, most recently the runway repair in 1994. Sand was extracted from Long Beach over centuries for many uses including construction projects, surfacing and bunkers at the golf course.

Current uses:

- A full-sized football pitch is located at the rear of Long Beach. The pitch is used every week during a three month playing season and during matches there are many vehicles and people congregate in the area.
- A beach hut is located at the northern end of the beach. This contains information for visitors and is open for school groups and events. The outdoor seating and bbq area is frequently used by members of the public.
- The Turtle Ponds at the southwest end of the beach are a designated Area of Historical Interest. They contain another seating and bbq area and the lower ponds is a popular paddling and swimming area for children.
- The AIG Conservation Team run weekly turtle tours for the public on Long Beach between January and April.
- A track runs behind the beach and splits into access for the beach hut or an off-road track to Comfortless Cove.



South West Bay (Pan Am) Nature Reserve

South West Bay is known locally as Pan Am Beach. It hosts the third largest population of nesting green turtles on Ascension. The rock formations at the seaward edge of the beach can be treacherous for turtles returning to the sea and through the nesting season the AIG Conservation Team make daily visits to check for stranded turtles. The nature reserve sits within the US Airforce (USAF) Base Area, and management of the land is the responsibility of USAF and its contractors. They manage a beach hut at the south of the beach that is accessed via a dirt track that runs behind the beach. The end of the runway and buildings associated with the military base lie just outside of the reserve boundary at the top of the slope behind the beach. A pipeline carrying aircraft fuel runs roughly parallel to the reserve's eastern boundary.

Size: 0.30km². The Nature Reserve includes the bay adjacent to the beach and extends inland to the break of the slope of the clinker cliff behind the beach.

Protected species: green turtle, Ascension frigatebird.

Historic uses: The presence of a small building called the Turtle Turner's Hut at the north end of the beach indicates harvesting of turtles once occurred on the beach.

Current uses:

- A beach hut is located at the southern end of the beach. This is managed by USAF and their contractors and is frequently used by people working on the USAF Base and members of the wider island community for gatherings and small events.
- There are popular rock fishing spots at the north and south ends of the Nature Reserve
- There is a small installations within the Nature Reserve linked to the US military mission on the island, but this is set back from the beach habitat.
- The old Turtle Turner's Hut is still present to the north of the beach area. This is no longer in use.



North East Coast Nature Reserve

North East Bay is the main site on the island for land crab spawning and the second most important beach on Ascension for nesting turtles. It was also one of the earliest landing sites for sailors coming ashore on Ascension. In 2023, the original North East Bay Nature Reserve was extended to include coastal habitat to the northwest and southeast that is important for Ascension's endemic scaly crickets. The area is remote and there are no houses within 2km of the reserve.

Size: 1.34km². The Nature Reserve covers the coastline from Lady's Loo south to the Ariane Site. The reserve includes the water within North East Bay and the slope behind the beaches.

Protected species: green turtle, land crab, scaly crickets.

Historic uses: Early sailors took advantage of the relatively sheltered bay and anchored off North East Bay to access the island.

Current uses:

- There are four beach huts within the nature reserve, though only one (managed by the MOD contractor Mitie) is in a good state of repair and frequently used.
- The AIG Conservation Team organises land crab tours for members of the public to coincide with the mass spawning events.
- Though not within the nature reserve boundary, the Ariane satellite earth observation station is located just to the east of North East Bay at the end of the surfaced road.
- Rocks on the east side of North East Bay are popular recreational fishing sites.
- Popular walks to Porpoise Point and Boatswain Bird View pass through the reserve.



Historical use and exploitation

Turtle harvesting

The abundance of fresh turtle meat drew sailing vessels to Ascension from the time of the island's discovery. Long Beach was the centre of this activity and harvesting of turtles intensified in the 19th century with the construction of the Turtle Ponds at the southern end of Long Beach. At its peak in 1845, 1500 female turtles were killed in a single year (Huxley 1999). As well as being eaten on the island and visiting vessels, turtle meat was exported back to the UK.

Land crab culling

In the late 19th century land crabs were killed in large numbers because they were considered an agricultural pest. Between 1879 and 1887 335,535 were killed.



Sand Extraction

Sand from Ascension's beaches has been used for construction and infrastructure projects on the island. The removal of sand from beaches is no longer permitted and the last large-scale extraction was in 2016 to surface the playground in Georgetown.

Landing sites

Getting cargo ashore on Ascension has always been challenging due to the lack of a pier that can be pulled alongside. For very large infrastructure projects, materials have sometimes been brought onto the island by amphibious landings at Long Beach. The last time this happened was in 1994 for operation 'Red Horse,' a partial resurface the runway. This resulted in significant damage to the beach and beach landings were not permitted for the most recent runway repair project in 2020.



Beach huts

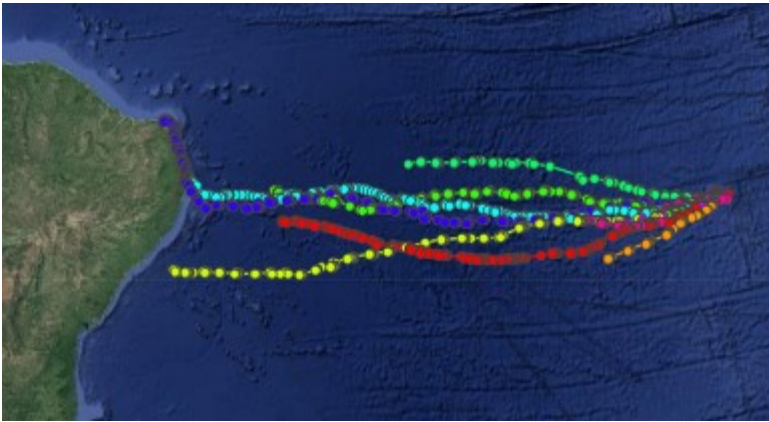
There are beach huts at all of the three nature reserves. Most are still in use, but three of the original four at North East Bay are now in a state of disrepair. The huts are used by the island community for gatherings and parties.

Protected Species



Protected species - Green Turtle (*Chelonia mydas*)

IUCN Status: Endangered CMS: Appendix I



Distribution and population structure: Green turtles are found in tropical and subtropical areas worldwide. Ascension hosts the second largest nesting population of green turtle in the Atlantic. The Ascension turtles spend most of their lives in feeding grounds off the coast of Brazil (Hays *et al.* 2002) and undertake breeding migrations to Ascension roughly every 3-4 years (Mortimer & Carr, 1987).

Turtles return to the beaches where they hatched to breed as adults. This results in isolation and genetic divergence between populations. The Ascension green turtles are genetically distinct from other Atlantic populations (Bowen *et al.* 1992) and there is a weak difference between turtles nesting on beaches on Ascension's east and west coasts (Weber *et al.* 2012).

Life History: Green turtles reach maturity at 17-35 years old and can live for over 70 years (Hirth 1997). Breeding occurs in coastal waters around the Ascension coast between November and March and females come ashore to nest between November and June, with a peak in mid March. Females lay an average of six nets within the season each containing 100-120 eggs. The sex of hatchlings is determined by nest temperature I the middle part of the incubation. Temperatures around 29°C produce an even sex ratio (Tilley *et al.* 2019). Temperatures above this produce an excess of females. Hatchlings emerge 45-60 days after laying and make their way to the ocean.



←Adult turtle

Female
digging nest→



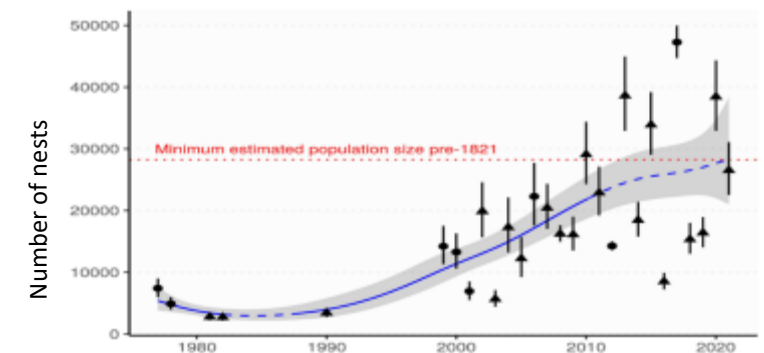
←Female laying
eggs

Hatchlings
emerging from
nest→



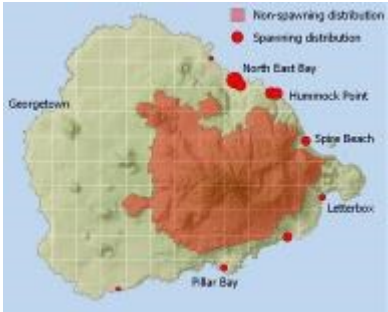
Habitat use: Green turtles require beaches with at least 1m depth of sand to nest in. They are vulnerable to disturbance during nesting and beaches should be free of light and noise pollution. Turtles mate in shallow water often adjacent to the nesting beaches. Adults do not feed during the breeding season, but hatchlings may feed within Ascension's waters as they make their way to the Brazilian coast.

Population trends: The Ascension turtle population was harvested from the time the island was discovered by humans in 1501 until the mid 20th century (Huxley 1999). The protection of turtles led to a rebound in the population and numbers have returned to levels seen before industrial scale exploitation began.



Protected species - Land crab (*Johngarthia lagostoma*)

IUCN Status: Not evaluated



Distribution and population structure: This species of land crab is only found on Ascension and three small Brazilian islands in the western Atlantic (Trindade, Fernando de Noronha and Atol das Rocas). The Ascension land crabs are genetically distinct from populations on the other islands. On Ascension, land crabs are found at their highest densities on the middle and upper slopes of Green Mountain for most of the year, but are present throughout the island (Hartnoll *et al.*, 2016). Crabs undertake long migrations to spawn at sites around the coast, but the main mass spawning events occur at North East Bay. The crabs on Ascension occur in a range of colour morphs from yellow to dark purple. The genetic basis for this variation is poorly understood and interbreeding between the morphs occurs.

Life history: Spawning occurs around ten days after the full moon between January and May. On average each female produces 72,000 eggs and may spawn more than once in a year (Hartnoll *et al.*, 2010). The females dash into the surf to release their eggs into the water. These then develop through a number of planktonic larval phases over the course of two to three weeks. The final megalops larval stage emerge onto land and moult into small crabs that make their way towards the higher altitude areas of the island. Adult land crabs are mainly vegetarian but will also scavenge carcasses. They can live for between 40 and 50 years, making multiple spawning migrations in that time.



← Mass spawning event

Females releasing eggs →



← Megalops larvae

Adult living on the mountain →



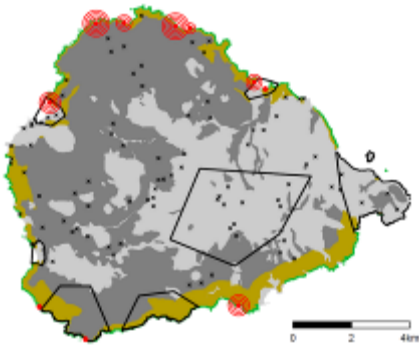
Habitat use: After their larval phase, land crabs live on land but adapt their behaviour to avoid desiccation. They are mostly found in the wetter, more vegetated slopes of Green Mountain and spend most of the day in burrows, emerging mainly at night or following rain. The migration to spawn at the coast occurs over many weeks and requires crabs to occupy drier habitats along the route.

Population trends: It has not been possible to produce an accurate estimate of the land crab population size on Ascension. This makes it difficult to assess whether the population is stable, increasing or declining. There are anecdotal reports that there are fewer crabs at spawning events and no mass migrations of megalops have been recorded since the 1970s.



Protected species - Scaly crickets (*Discophallus* spp.)

IUCN Status: Not Evaluated



Distribution and population structure: This scaly cricket genus *Discophallus* is endemic to Ascension Island and nearby islet Boatswainbird Island. Five species have been described (Gorochov 2009), of which three are assumed to be localised to mainland Ascension. There exists considerable difficulty in their taxonomy though, with species having been formally described by characters which are not readily apparent in live or recently-collected individuals. All *Discophallus* crickets are confined to volcanic coastline, and although incredibly illusive they occur around much of Ascension's most barren shores. Very little is known about the population structure of the genus, but cricket-targeting traps set in known *Discophallus* habitat collect a minority of mature adults and a majority of small juveniles.

Life history: There are still large gaps in our knowledge of the life history and ecology of Ascension's scaly crickets. Closely related species of the scaly cricket family (Mogoplistidae) are known to preferentially lay eggs on driftwood, which presumably aids their dispersal to oceanic islands (Vahed 2020). No such resources would naturally be available on Ascension, and thus it is plausible that the crickets lay their eggs on damp sand, within rocky crevices or on scavenged food resources. It is presumed that *Discophallus* lifespans are short and that they develop rapidly, in line with other scaly crickets (Vahed 2020).



Habitat use: These crickets are most frequently detected in and close to rocky habitat where lava flows meet the sea. Studies by Ashmole & Ashmole (1997) originally linked *Discophallus* with the youngest and most barren flows on the island, however recent research has suggested that the genus exists there only refugially and that they are competitively displaced from older flows by the non-native cricket *Grylloides sigillatus* (Sharp, in review). On coasts, *Discophallus* likely scavenges on carcasses of fish, turtles and crabs.

Population trends: Nothing can be derived about the absolute population of *Discophallus* species, given the complexity in such work for insects and the difficulty distinguishing species. Significant declines in population at the genus-level can be inferred, however, through habitat degradation by invasive species. Quantitative analysis indicates that around half of *Discophallus* habitat has been lost through inter-specific competition with *non-native crickets*. It is therefore extremely likely that populations have been declining since the late 1800s.

Other native invertebrates

Other native and endemic invertebrate species exist on the Beach Nature Reserves in addition to the scaly crickets. Currently little is known about their ecology and there is still some doubt about how many species are present, how they relate to each other and whether they are native or endemic. More research is needed to understand these species and so no management objectives, actions or monitoring have been specifically designed for them. However, they will benefit from many of the actions in this plan and it is important to recognise their important roles in the beach ecosystem.



Phaleria sp. darkling beetle: This beetle, probably a single species, has been detected only on North East beach. It is around 5mm in length and belongs to the hyper-diverse Tenebrionidae family of beetles. The species belongs to a genus that is well-known for naturally colonising islands and evolving into new species, and may represent a presently-undescribed endemic species. Limited data suggests that this beetle may have fascinating ecology—it is observed in abundance as the terrestrial land crabs migrate onto the beach during spawning. In particular, it can be seen scavenging on crab carcasses and has been observed to seemingly target the unspent eggs attached to deceased female crabs. As such, this *Phaleria* beetle is likely an important component of Ascension's native beach ecosystems.

Pseudosinella miratio springtail: *Pseudosinella miratio* is one of three known *Pseudosinella* species which are endemic to Ascension (Christiansen 1998). They appear to achieve niche separation by specialising on different habitats; this species is coastal and abundant on the majority of sandy beaches. Springtail taxonomy is notably difficult, but identification of this species is at least partially simplified by its blue/purple pigmentation. Little is known of the species' ecology but it is most likely that the springtail is a generalist scavenger on fish, turtle and crab carcasses. It could be expected that this coastal specialist was the original *Pseudosinella* coloniser of Ascension, and that the other two inland and cave-living species (*P. ashmoleae* and *P. lava* respectively) radiated from it. However, presence and absence of certain important morphological features suggest that this species is unexpectedly derived from the cave-living species. The evolutionary origin of these species therefore remains unclear. The pictured springtail is a *Pseudosinella* species closely-related to those on Ascension.



Woodlice, including *Niambia* spp.: Various woodlice species have been detected on Ascension's sandy beaches and the majority appear to be native or endemic. Either one or both of the endemic *Niambia* species (*N. duffeyi* and *N. longiantennata*) as well as around two probably-native species have been trapped at Long Beach and North East Bay. Woodlice are generally scavengers and detritivores, so all species present on the beaches are integral parts of the ecosystems through decomposing vertebrate carcasses. Two native woodlice have been retrieved from inside turtle nests, where it appears that they were feeding on deceased hatchling embryos underneath the sand. This evidence suggests that turtle mortality is a key aspect of woodlouse beach ecology.

Threats to the Beach Nature Reserves



Threats to the Beach Nature Reserves—Summary

Threat		Impact	Natural features affected	Severity of threat
Climate change	Sea level rise and increased swells	Inundation of turtle nests; reduced beach area	Green turtle, scaly crickets Beach habitat	High
	Increased temperature	Death of turtle hatchlings and skewed sex ratio. Desiccation of land crabs.	Green turtle Land crab	High
Invasive non-native species	Encroachment of non-native shrubs and plants	Reduction in area of suitable turtle nesting habitat. Harbouring non-native predators	Green turtle, Land crab, scaly crickets Beach habitat	High
	Rats myna birds and ants	Predation of turtle hatchlings, land crabs and scaly crickets	Green turtle, Land crab	High
	Non-native crickets	Competition for food and space with scaly crickets	Scaly crickets	High
Pollution	Littering	Entanglement and ingestion Toxicity associated with plastics Spoils recreational experience	Green turtle Land crab Beach habitat	Medium
	Spill incidents	Toxic to marine life Spoils recreational experience		Low
	Light pollution	Abandonment of turtle nesting attempts Attraction of turtle hatchlings away from ocean	Green turtle	Medium
Development	Removal of sand from beaches	Reduced area and suitability of turtle nesting habitat	Beach habitat	Low
		Disruption to erosion and deposition patterns		
Human activity	Human disturbance of turtles	Abandonment of turtle nesting attempts	Green turtle	Medium
	Vehicle collisions	Killing of land crabs	Land crab	High

Climate change

Description: Climate change will have a profound effect on Ascension's Beach Nature Reserves. Modelling predicts that by 2100:

- Air temperatures will rise by between 0.7 And 2.4°C depending on global CO₂ emission reductions.
- Sea temperatures will increase by between 0.6 And 1.4 °C depending on global CO₂ emission reductions.
- Sea levels are predicted to rise by 22.5 mm.
- The ocean will become more acidic with pH decreasing by between 0.06 to 0.11 depending on global CO₂ emission reductions.
- Storm events and high swells will become more frequent and more severe

Natural features threatened:

Rising sea levels and increased storm events will result in a loss of beach habitat, especially if there are barriers to the beaches migrating landward. This will reduce the available habitat for nesting turtles and endemic invertebrates. Long Beach is predominantly made from shell sand. Ocean acidification will reduce the survival of shelled animals and over time reduce the material available to create beaches.

Green turtle populations are vulnerable to increases in air temperature. The sex of hatchlings is determined by temperature and if nests are above 28.7°C in the middle third of the incubation period, then all hatchlings will be female (Tilley *et al.* 2019). The sex ratio of Ascension hatchlings is already thought to be 90% female and this will rise as temperatures increase (Tilley *et al.* 2019). Above 35°C there is significant egg and hatchling mortality (Howard *et al.* 2014). Increased swells and storm events will also result in higher incidences of nest wash out.

Land crabs will be at increased risk of desiccation if air temperatures rise. Any alteration to the pattern of ocean currents around the island that could reduce larval retention and recruitment rates.

Legislation and policy:

No legislation directly addresses this threat. The National Protected Areas Ordinance, 2003, restricts any further development in the Nature Reserves that could result in additional barriers to the landward migration of the beaches.

Actions:

- Enable landward migration of beaches
- Beach shading



Digital elevation model of South West Bay demonstrates that sea level rise and increased swells will result in increased inundation of green turtle nests.

Non-native species

Description: Over 75% of the plant species present on Ascension are non-native. Some of these species are highly invasive and threaten habitats and native species. Mexican thorn (*Prosopis juliflora*) is a particularly aggressive shrub that is colonising large swathes of Ascension and has spread onto beach habitats in all three of the Beach Nature Reserves. Annual weeds such as heliotrope and Mexican poppy are also established on the beaches and a large and persistent seed sources exists.

Black rats (*Rattus rattus*) and myna birds (*Acridotheres tristis*) are present on the Beach Nature Reserves. They cannot survive exclusively on the beach habitat, but move in from surrounding areas. The non-native cricket *Gryllobates sigillatus* has spread across Ascension and is able to survive by scavenging on sand and rocky habitats close to the coast. The non-native ant species of Ascension appear unable to survive unaided on beach habitat, but the spread of Mexican thorn trees allows them to colonise these areas. Ants, including big-headed ant (*Pheidole megacephala*), *Monomorium subopacum* and *Solenopsis globularia* are predators of endemic invertebrates.



Natural features threatened: The area of beach habitat has been reduced by the spread of non-native shrubs. If left unchecked, Mexican thorn would eventually lead to the replacement of beach habitat with shrubland in the Nature Reserves.

Non-native rats and mynah birds predate green turtle hatchlings, land crabs and endemic invertebrates. The presence of non-native shrubs provides cover and a source of moisture that allows rodents and non-native ants to survive within the Beach Nature Reserves and so exacerbates the level of predation. Non-native shrubs and annual weeds create a root structure within the sand that makes it difficult for adult females to excavate nests or for hatchlings to emerge safely.

To a large extent land crabs have adapted to the presence of non-native plants on Ascension and probably benefit from the greater food source and cover these provide. Land crabs also scavenge on the corpses of dead rats. However, rats may predate small crabs and there is competition between rodents and crabs for food..

The non-native cricket *Gryllobates sigillatus* competes with the endemic *Discophallus* crickets and has pushed *Discophallus* out of approximately half its natural range.

Actions:

- Non-native plant removal
- Rodent control
- Non-native cricket control

Legislation and policy: The Biosecurity Ordinance, 2020, places restrictions on imports to Ascension and provides powers to treat or destroy contaminated cargo with the intention of reducing the risk of new introductions. Legislation cannot address the threat of existing non-native species.

Pollution

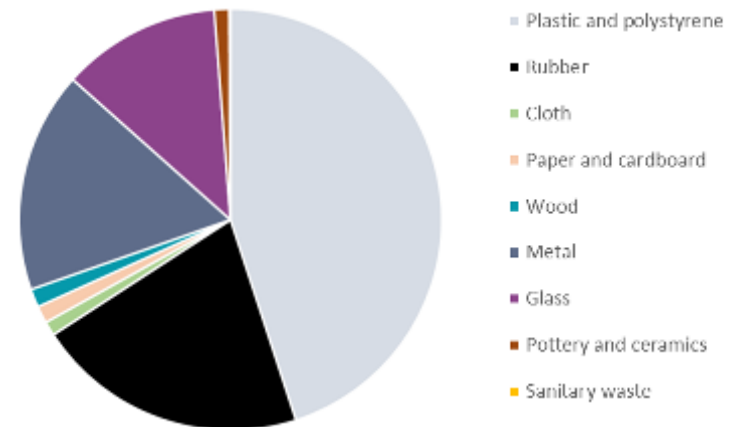
Description: The beaches of Ascension are relatively free from pollution sources, but Litter is present, particularly around the Beach Huts. Most of this litter is in the form of plastic or glass bottles, cigarette butts and drinks cans. These forms of waste, as well as discarded food, provide resources to damaging invasive invertebrates including the American cockroach (*Periplaneta americana*). At other parts of the Ascension coast, litter is clearly being washed in from probably from vessels or the African coast. However, this is not evident on the three Beach Nature Reserves and litter derived from the island is the main problem. Plastic waste poses a particularly pernicious problem as it can persist in the environment for hundreds of years. In the past, waste was dumped into the ocean at the south end of Long Beach and this has created a legacy of scrap metal and tyres that wash up onto the beach.

There are no fixed pollution discharges into the Beach Nature Reserves. However, a wastewater tank is currently located on Long Beach and abundant plant growth would suggest there is some leakage. Water from Georgetown swimming pool is also pumped out into the ocean at Long Beach. During heavy rainfall events run off from the land can be deposited on the Beach Nature Reserves. This was seen in May 2022 at Long Beach.



←Result of sediment run off onto Long beach in May 2022

Composition of litter collected on Ascension's beaches 2017—2019→



Natural features threatened: Green turtles are vulnerable to entanglement and potentially the ingestion of waste, though they do not feed around Ascension and so are unlikely to ingest plastic around the island. Waste food will attract non-native rodents and invertebrates and pose a threat to endemic invertebrates. The recreational value of the Beach Nature Reserves is reduced by the presence of litter and pollution.

Legislation and policy: The National Protected Areas Ordinance, 2003 give the Administrator powers to restrict development or discharge that could pollute a Protected Area. The National Protected Areas Regulations, 2014, prohibit the dumping of refuse or other items likely to cause pollution. The Litter Ordinance, 1971, makes it an offence for anyone to deposit litter in a public place on Ascension. The Environmental Protection (Overseas Territories) Order, 1988, prohibits the dumping of substances or articles or the scuttling of vessels within Ascension's territorial waters without a licence.

Actions:

- Litter clearance
- Reduce plastic waste
- Litter awareness campaign

Light Pollution

Description:

Artificial light from surrounding buildings, military installations, beach huts, street lights, vehicle headlights and torches can illuminate the beach nature reserves. Long Beach is particularly impacted by the outside lights of surrounding houses and vehicles driving on the roads close to the southern end of the beach. It also received the most visitors, some of whom are unaware of the consequences of using white torches and flash photography on the beach. South West Bay is affected by lights from the nearby runway and receives a high level of light pollution when there are aircraft movements at night. North East Bay is the least affected by artificial lights and the main risk comes from infrequent visitors illuminating the beach with headlights or torches.



Natural features threatened:

Green turtle adult females are disturbed by light and can abandon nesting attempts. Newly-emerged turtle hatchlings move towards light as a way of finding the sea. Artificial light sources can disrupt this behaviour and cause hatchlings to head in the wrong direction and fail to reach the ocean.

Legislation and policy: The National Protected Areas Regulations, 2014 prohibit the installation of artificial lighting that illuminates the beach or the lighting of beach huts after 9pm. The track behind Long Beach is closed to vehicles between 21:00 and 07:30 each day during the turtle nesting season.

Actions:

- Reduce light pollution
- Turtle watching guidelines

Disturbance to natural ecosystem cycling

Description: Coastal ecosystems rely on the input of nutrients from the much more productive marine environment. The natural death of marine animals sometimes results in them being washed onto beaches and the coast. These carcasses provide the most important source of food for many coastal species that are adapted to scavenge on them.

As a result, the health of coastal ecosystems is heavily dependent on the health of adjacent marine ecosystems. While a mass fish die off may provide a temporary food bonanza for the coastal scavengers, in the long-term they rely on healthy marine environments to provide a more consistent supply of food that has died from natural causes.

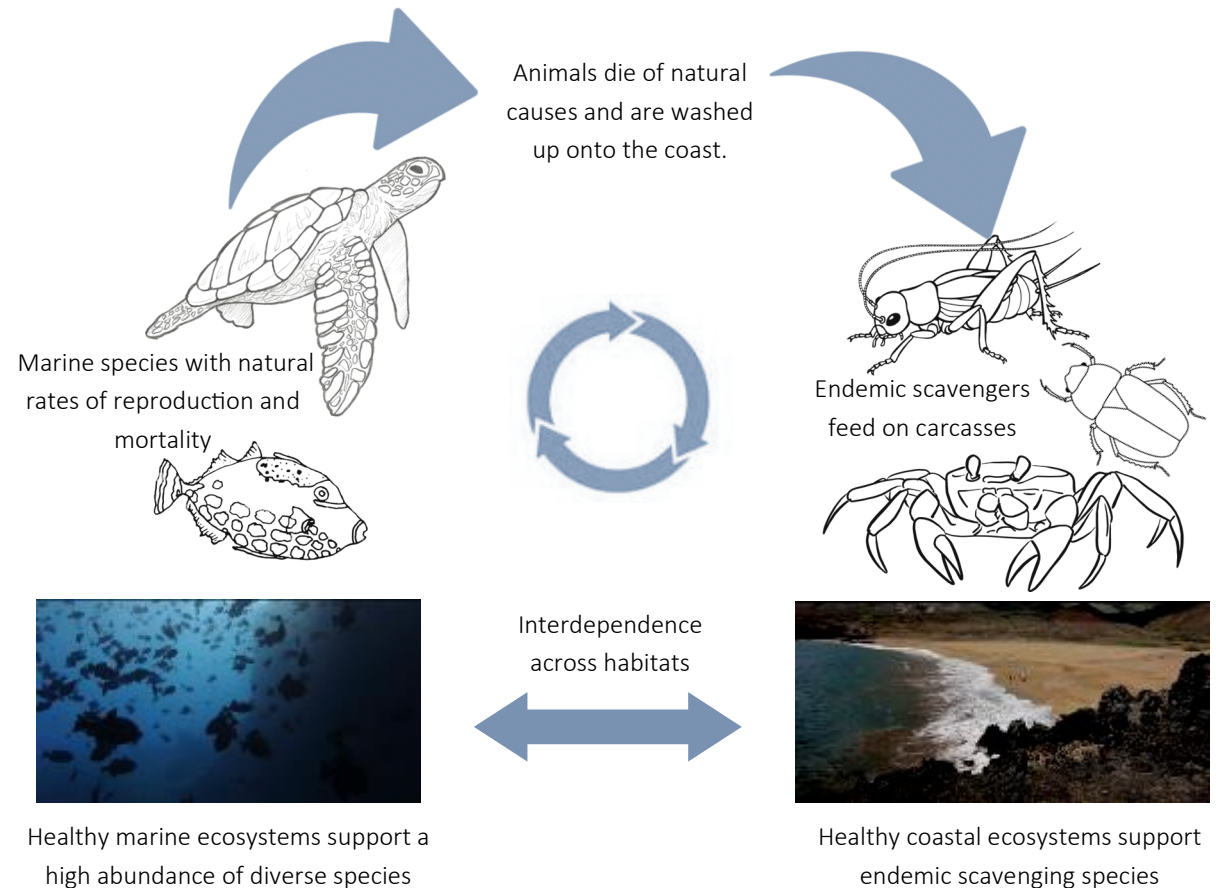
Carcasses can be unsightly and create unpleasant smells, but it is important to recognise their importance to coastal ecosystems. If carcasses are removed, then it greatly reduces food availability.

Natural features threatened:

Endemic invertebrates including the scaly crickets, beetle, springtail and woodlice are scavengers, and therefore rely on the presence of carcasses as a food resource. The presence of such food will always be unpredictable on a short timescale, but any long-term reduction in the number of carcasses caused by damaged marine environments or the removal of carcasses from the coast will threaten these endemic species.

Legislation and policy:

No legislation directly addresses this threat, though the National Protected Areas Ordinance, 2003, and the Fisheries (Conservation and Management) Ordinance, 2015, contribute to the effective management of Ascensions Marine Protected Area.



Actions:

- Retention of carcasses within coastal ecosystems

Human activity

Description: Disturbance or injury to the protected species found within the Nature Reserves can result from human activity. This can be a reaction to the presence of humans in the reserve, or result from activities such as driving or fishing. In most cases there is no intention to cause harm and disturbance to nesting turtles is often the result of people who want to experience this amazing spectacle getting too close or taking photographs.

Natural features threatened: Female turtles can abandon nesting attempts if disturbed. People viewing the turtles on beaches can inadvertently cause disturbance by getting too close or creating noise. Likewise groups on beaches or at beach huts can be a source of light or noise pollution. There is little risk of turtle being caught as bycatch in fisheries around Ascension, but this is a significant cause of mortality for Ascension's turtles when they are foraging along the Brazilian coast.

Land crabs are frequently killed on Ascension's road, particularly when they are more active after heavy rain.

Legislation and policy: The National Protected Areas Regulations, 2014, prohibit the intentional or reckless disturbance of a protected species within a Protected Area and provide powers to close parts of the nature reserves to avoid disturbance. Green turtles and land crabs are both protected species.

Actions:

- Turtle tours
- Turtle watching guidelines
- Land crab awareness campaign

Development

Description: Development is defined in the National Protected Areas Regulations, 2014 as *'any change in use of land, the erection of any structure and the carrying out of any drainage or sewerage scheme, dredging otherwise than for the purpose of mining.'* The removal of sand from the beaches could also fall into this threat category. The National Protected Areas Ordinance, 2003, places severe restrictions on what development can take place in the Nature Reserves (see below), meaning this threat is limited to illegal activity or recreational developments the Administrator sees fit to permit.

Natural features threatened: Development within the beach areas could reduce the extent of the beach habitat or damage its condition. Developments adjacent to the beaches could affect the beach habitat by altering natural processes such as patterns of water run off or sand deposition and erosion.

Green turtles could be affected by developments adjacent to the beaches if they result in increased disturbance through light and noise pollution.

Legislation and policy: The National Protected Areas Ordinance, 2013 and Regulations, 2014, prohibit development within Nature Reserves unless they are permitted by the Administrator. The Administrator can only permit development for conservation or recreational purposes. The removal of sand from a Nature Reserve requires permission from the Administrator and cannot take place within the MPA.

Actions:

- Impact assessments

Legislation and Policy



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. The CBD Post-2020 Global Biodiversity Framework contains 23 targets covering the main areas of biodiversity protection. The relevant targets are referenced in this plan.

Green turtles are listed on Appendix I of the **Convention on the Conservation of migratory species of wild animals** (CMS). As a result they must be given: *strict protection on them striving towards strictly protect the animal, conserving or restoring the places they live, mitigating obstacles to migration and controlling other factors that might endanger them.*

Green turtles are included in the **Convention on International Trade in Endangered Species of Wild Fauna and Flora** (CITES) meaning the export or trade in live turtles or their body parts is strictly regulated.

The need for well-managed area-based protection is also a foundation the **UK Overseas Territories Biodiversity Strategy** and fulfills Ascension's obligations to protect habitats and species under the **Ascension Environmental Charter** signed in 2001.

The three Beach Nature Reserves form part of a network of ten protected areas on Ascension. Local legislation provides the legal basis for the establishment and management of the nature reserves.

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. The Ordinance also provides powers to introduce regulations

to protect nature reserves and to appoint Reserve Wardens to enforce these regulations.

Long beach, South West Bay and North West Bay Nature Reserves were designated under the **Natural Protected Areas Order, 2014**.

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. The following species found within the Beach Nature Reserves are protected by this ordinance: green turtle, land crab, Ascension frigatebird, Ascension's 11 species of endemic fish and all shark 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 (including sand) is prohibited. The MPA overlaps with the beach nature reserves and extends up to the mean high water spring tideline. The MPA will help to protect habitats used by green turtles on their migration to and from Ascension.

Legislation and Policy

The National Protected Areas Regulations

All or any of the following are prohibited within the three Beach Nature Reserves 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;
- the occupation of beach huts after 9:00p.m. during turtle season;
- the lighting of beach huts after 9:00p.m. during turtle season;
- allowing of unaccompanied dogs;
- allowing dogs off their leash between sunset and sunrise;
- the driving or parking of any motor vehicle on the beach;
- water skiing and the operating of jet skis during turtle season;
- pitching or erecting any tent on the beach during turtle season;
- the installation of artificial lighting fixtures that are directly visible from the beach, or which indirectly illuminate the beach.

Implementation policy

The restrictions above 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 strong presumption against all of these activities taking place in the nature reserves, but the Administrator or 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:

- Development within the Beach Nature Reserves can only be permitted by the Administrator if it is for the purpose of nature conservation or sport and recreation (National Protected Areas Ordinance 4(b)(ii))
- 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 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 only 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.
- Sand extraction from the nature reserves will not be permitted unless there are very exceptional circumstances and no alternative, Sand extraction cannot occur below the mean high water spring tide mark because of the prohibition on extracting sand from the MPA.

Legislation and Policy

Designated zones

The National Protected Areas Regulations prohibit the driving or parking of a vehicle in the Nature Reserves other than on a designated road or track or in a signed parking zone and the making of fires other than in a portable stove or grill, or in designated fire pits. The maps below shows the designated roads, tracks, parking areas and fire pits where these activities can take place without a permit.





Long Beach



South west Bay



Map legend

-  Road or track
-  Parking area
-  Fire pit
-  Nature reserve boundary

North East Coast



Map legend

-  Road or track
-  Parking area
-  Fire pit
-  Nature reserve boundary



Legislation and Policy

Use of Beach Huts

Beach Huts are an important part of life on Ascension and are well-used by the community. However, their presence can lead to the disturbance of turtle and crab populations through noise and light pollution and they are often a source of litter.

There are a total of six beach huts across the three Beach Nature Reserves, with three of the four at northeast Bay in a state of disrepair. Like all buildings on Ascension, the huts are owned by the Crown, but they are operated by AIG Conservation (Long Beach), Mitie (Northeast Bay) and USAF (South West) Bay. The huts are used for private events and the outdoor space around them are open for public use.

The National Protected Area Regulations aim to strike a balance between allowing people to enjoy the beach huts and avoiding significant disturbance to wildlife and pollution in the Nature Reserves. The huts cannot be occupied or artificially lit after 9pm within the turtle nesting season (1st December to 30th June) and music cannot be played at a level that annoys other people within the Nature Reserves.

There will be a presumption in favour of allowing the repair and upgrade of existing functional beach huts, but an increased effort to provide guidance and encouragement for people to use the huts in a responsible manner that reduces impacts on the Nature Reserves. A key part of this will be a anti-littering campaign.

There will be a presumption against permitting the development of new beach huts in the Nature Reserves or the restoration of the two most derelict huts at Northeast Bay to prevent any increase in impacts on wildlife. The derelict huts at Northeast will be removed to reduce the risk to public safety and potential for pollution.



Enforcement and Application of legislation

Enforcement action is always be carried out with proportionality, consistency and accountability to ensure it is fair and seen to be fair. 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.

Personnel from the American Base and their contractors are exempt from the provisions of the National Protected Areas Regulations, 2014 when performing their function and duties under the Bahamas Agreement. However, the National Protected Areas Ordinance, 2003, does still apply to Base personnel meaning they are still subject to restrictions on any development within a Nature Reserve. The USAF have their own 'Final Governing Standards for Environmental Protection on Ascension Island' that seek to reduce the environmental impact of USAF installations and operations.

Reserve wardens and other employees of the Ascension Island Government Conservation Directorate are also not subject to the National Protected Areas Regulations when performing their work duties.



Actions

This section describes the management actions that will be undertaken in the next five years to protect the natural features of the Beach Nature Reserves. These actions are designed to address the threats identified in the previous section and to build support and resilience in the Nature Reserves so that the objectives of this plan are met. All of the actions will be led by the Ascension Island Government Conservation and Fisheries Directorate, but many will require the support of other organisations and volunteers from the Ascension Island community to be successful. Targets have been identified for all of the actions to ensure they are on track and are completed within the lifespan of the management plan. The table below shows the duration of actions (shaded areas) and target completion dates (red lines). These targets will form the basis of the Management Plan Implementation monitoring described on p.35.

[illegible]

Non-native species control

Action	Description	Targets
Non-native shrub removal	Remove all non-native shrubs such as Mexican thorn and tree tobacco through best-practice mechanical means such as cutting and applying herbicide to the cut stumps, ring barking and bark flaying. Control efforts will focus on the beach habitat and buffer zones around them. Maintenance checks will be carried out at a minimum of six-month intervals to identify and remove new seedlings and regrowth.	<ul style="list-style-type: none"> All non-native shrubs removed from beaches by 2023. Buffer zones cleared by 2026.
Clearance of annual weeds from beach habitat	Annual weeds will be hand pulled from the beaches at least every six months and preferably before they set seed. This is likely to be an ongoing process because of the large source of wind-blown seeds present across the island. Where possible, weed clearance will be incorporated into community beach cleans to allow members of the public to assist with protecting the Nature Reserves.	<ul style="list-style-type: none"> Annual weeds cleared from beach habitat in all three nature reserves every six months.



Long Beach 2006 pre-clearance work



Long Beach 2020 post-clearance work



Non-native species control

Action	Description	Targets
Rodent control	Set poison bait boxes at Long Beach and North East Bay and replenish as required through the period when turtle hatchlings and spawning land crabs are present on the beaches. The openings to the boxes are small enough to prevent the entry of adult land crabs. The type of poison used will be varied over the years to prevent the evolution of resistance in the rat and mouse population.	Set ten boxes on each beach and check every fortnight between January and August every year.



Action	Description	Targets
Non-native cricket control	Custom-made cricket traps baited to attract non-native crickets without attracting endemic <i>Discophallus crickets</i> are positioned 30m from the sea at regular 100 m intervals along the coast of North East Coast NR. The traps are modified buckets with entry holes that are 10 mm in diameter, making them inaccessible to land crabs. Traps are part-filled with water and closed with a lid to prevent excessive evaporation. The exact details of the trap design and deployment pattern will be refined through research trials.	Set traps every 100m parallel to coastline at a minimum frequency of every 6 months for most parts of NE Coast NR, and every month at accessible sites close to NE Bay during the turtle monitoring season.
Non-native ant control	Granular poison bait targeted specifically at the invasive ant species <i>Solenopsis globularia</i> is deployed at 10 stations 20m apart along a 200m stretch of the rocky coast close to the beach hut at Long Beach. The bait is placed inside sealed pipe with small entry holes to prevent impacts on non-target species.	Set bait every three months at 10 stations over a 200m length coast at Long Beach.

Pollution

Action	Description	Target
Litter clearance	AIGCFD to organise beach cleans with volunteers from the local community to remove litter. Attempts will be made to remove all litter, but the focus will be on plastic litter that poses the greatest threat to ecosystems. Any waste that is too large to be removed will be dragged clear of the tide line to prevent it being swept into the ocean.	Community beach cleans organised every six months on the Beach Nature Reserves with the aim of removing all litter and particularly all plastic litter.
Reduce plastic waste	Reduce the volume of plastic waste on the island by prohibiting the import of certain single use plastics and improving waste management practices. Explore the feasibility of local plastic recycling facilities.	Reduce single use plastic imports and endogenous plastic litter on beach reserves by 30% by 2025 compared to 2022 baselines.
Reduce light pollution	Replace all street lights adjacent to Beach Nature Reserves with red light bulbs. No installation of new public lighting visible from the beaches. Awareness campaign with local residents and beach hut users to reduce outside light usage at sensitive times of the year.	Red light bulbs installed in all street lights by 2023. Information displayed at all beach huts and distributed to all residents living close to Long Beach by 2023.
Litter awareness campaign	Provide information about the negative impacts of litter, with a focus on plastics and organics, and ensure littering is seen as an antisocial behaviour through the use of social media, school visits, posters and media articles. Raise awareness of the law against littering and the potential fine. Target beach huts and parking areas within the Nature Reserves.	Engage with at least 50% of school children and 10% of the island community on an annual basis.



Climate change adaptation

Action	Description	Target
Enable landward migration of beaches	Remove non-essential structures on the landward side of beaches within the Nature Reserves and allow sand to build up in these areas following high swell and storm events. This will eventually result in the landward migration of the beaches.	All barriers to migration of Nature Reserve beaches assessed by 2023 Removal of all non-essential barriers by 2026.



Long Beach: The presence of a track and football pitch at the rear of Long Beach prevents the natural landward migration of the beach.

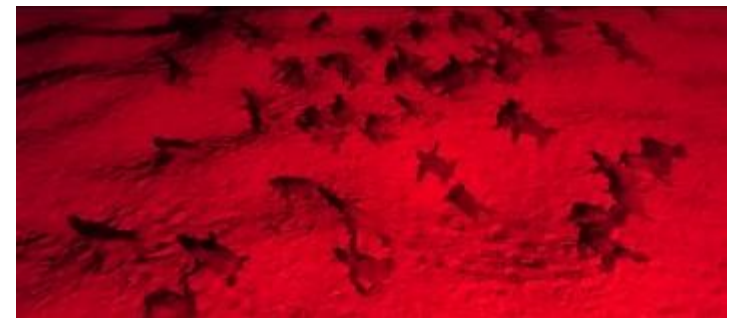


South West Bay: A track to the rear of the southern section of the beach prevents its natural migration.



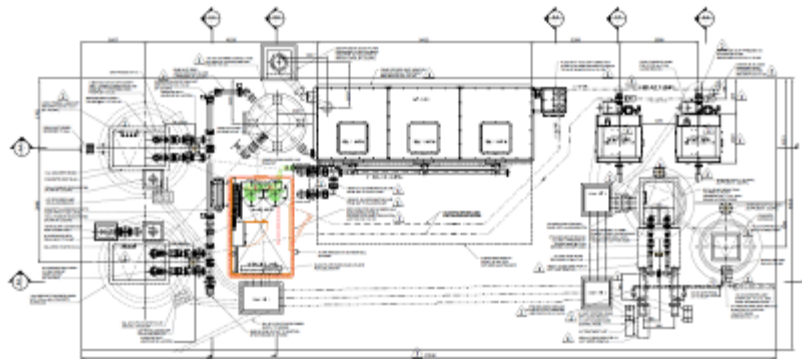
North East Bay: There are no artificial barriers to the landward migration of the beach at North East Bay, but rocks behind the beach constrain its extent.

Action	Description	Target
Beach shading	Use the results of beach shading trials to consider shading areas of beach habitat or translocating nests into purpose built shaded hatcheries with the aim of reducing nest temperatures and producing male hatchlings.	Assess effectiveness by 2023. Install shaded areas if appropriate by 2025.



Impact assessment

Action	Description	Target
Impact assessment	Establish an effective system of development control that includes the requirement for robust impact assessments before the Administrator permits any development within the Nature Reserves under section 3 of the National Protected Area Regulations, 2014. Development on the Nature Reserves can only be permitted if it is for the purpose of nature conservation or sport and recreation (National Protected Areas Ordinance 4(b)(ii)). For permission to be granted for any development, the assessment must conclude that there will be no negative impact on the Nature Reserve objectives.	Environmental Impact Assessments are carried out on all new development proposals that could impact the Beach Nature Reserves. No developments that are assessed as having a potential negative impact on the Nature Reserve objectives are permitted.



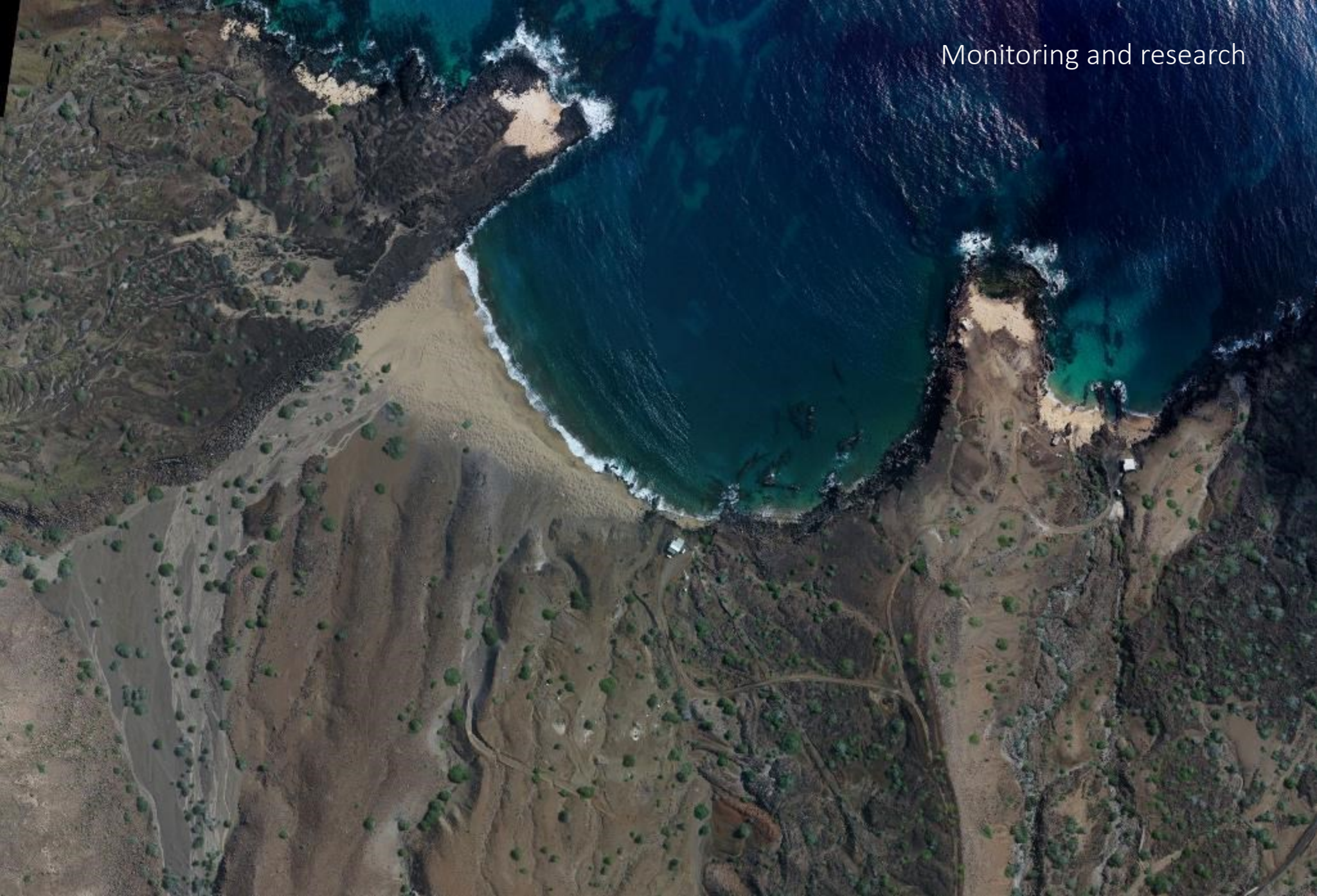
Allow ecosystem functioning

Action	Description	Target
Retention of carcasses within coastal ecosystem	As far as possible all carcasses washed up onto the beaches and coastline within the Nature Reserves will be left to allow scavenging by endemic invertebrates. The exception will be where a carcass is in the vicinity of a beach hut or other well-used area where it might pose a risk to human health or people's enjoyment of the area. In those instances the carcass will be buried on the beach to a depth of 20cm, which will still allow access by invertebrates and ensure the energy is retained within the coastal ecosystem. Attempts will be made to free live turtles that have become trapped, but dead turtles will not be removed unless they are in well-used areas.	All carcasses are either left on the coast or buried

Public engagement

Action	Description	Target
Turtle tours	Provide weekly tours for members of the public and visitors, imparting information and enabling people to view nesting turtles without causing disturbance.	Tours offered weekly according to demand.
Turtle watching guidelines	Deliver presentations to RAF personnel and Two Boats School ahead of turtle nesting season describing how to watch turtles responsibly. Posters, press articles and videos describing responsible turtle watching behaviour created and distributed ahead of turtle season.	Engagement information distributed annually ahead of turtle season.
Land crab awareness campaign	Organise two public tours to coincide with mass spawning events at North East Bay. Target drivers with a video, poster and road sign campaign to reduce land crab road deaths.	Deliver annual tours to at least 50 people very year. Reduce land crab road deaths by 20% relative to 2022 baselines.
Invertebrate awareness campaign	Install interpretation sign at North East Bay describing the endemic invertebrates present in the Nature Reserve and highlight their role in coastal ecosystems. Produce a booklet celebrating Ascension's endemic invertebrates and distribute on the island.	Install sign at North East bay by 2024. Create and distribute at least 100 copies of the booklet by 2024.
Events at Long Beach Hut Visitor Centre	Hold engagement events at the Long Beach Visitor Centre to celebrate the importance of Ascension's Beach Nature Reserves and encourage shared stewardship of the areas. Events will be aimed at school pupils, employing organisations and the general public.	Hold at least four events annually at Long Beach Visitor Centre engaging a minimum of 200 people.



An aerial photograph showing a coastal landscape. A wide, light-colored sandy beach runs along the left and bottom edges of the frame. To the right of the beach, the terrain rises into a rugged, brownish-grey rocky cliff face. The ocean is a deep turquoise color, with white surf visible where it meets the shore. A small, white, rectangular structure is situated on the beach near the bottom center. The overall scene suggests a remote or protected coastal environment.

Monitoring and research

Monitoring and evaluation - Monitoring delivery of the Management Plan

Monitoring is essential to ensure that management actions are completed and that they are making a positive contribution towards protecting the natural features of the Nature Reserves and achieving the Management Plan objectives (p.5). Monitoring can be divided into: two broad areas:

- **Monitoring management action implementation** - have planned management actions been completed and outputs achieved?
- **Performance monitoring** - are the plan objectives being achieved?

Though connected, these need to be treated separately so we can distinguish between situations where biodiversity is declining because the actions weren't carried out properly and other instances where the actions were completed but weren't sufficient to achieve the objectives. This is important for guiding the future management responses: in the first situation efforts to complete the actions would be redoubled; in the second new actions would need to be identified.

Each of the Actions in the proceeding pages is linked to measurable targets. These will form the basis for our management action implementation monitoring and achievement of those targets will be reviewed annually by AIGCFD.

Performance monitoring is more difficult and the next two pages describe how the natural features of the Natures Reserves and the threats they face will be monitored to measure whether this Plan's objectives are being met. This monitoring will largely be delivered by the AIGCFD, though volunteers and external partners will also be involved.

This Management Plan aims to be a working document with space for new actions and targets to be added where necessary. Annual evaluation of the plan will take place with a short report, infographics and progress information distributed through the local newspaper and via the AIG website and AIG Conservation's social media. This ensures full transparency and means AIGCFD are accountable for maintaining the Nature Reserves and achieving the objectives set out in this plan.

Annual evaluations will allow the AIGCFD to improve management of the Nature Reserves by learning from experience through an adaptive management approach. As further information becomes available and techniques and technologies advance, management of the Nature Reserves should become more effective and better targeted. The Research section of this plan describes priority areas for further information to improve management.

The Management Plan will have a detailed review every 5 years by AIGCFD in consultation with the Ascension Island community, external partners and funders with amendments incorporated for the following 5 years.



Monitoring and evaluation - Monitoring the natural features of the Beach Nature Reserves

Description	Metric	Frequency	Objective monitored
Turtle nesting and productivity	Number of emerging green turtle females on three protected beaches.	Annual	1
	Number of emerging green turtle females and nesting attempts on all Ascension beaches	Every five years	1
	Beach area, nest location, temperature and hatch success	15 nests on each NR annually	3
Land crab abundance and	Number of crabs on 100m transect on North East Bay during spawning events	Three times a year in Feb Mar and Apr	1
	Growth rates of individually tagged crabs	Measurements taken annually	1
Scaly cricket recovery	Catch per unit effort of scaly crickets in non-lethal traps deployed at North East Coast Nature	Biannual	2
Public attitudes	Percentage of island community aware of Beach Nature Reserves and threats they face.	Biennial	7
	Percentage of island community reporting pride in natural features of the Nature Reserves.	Biennial	8

Green turtles: Estimate the number of turtles nesting on Long Beach, Northeast Bay and South West Bay by raking the beaches clear of turtle tracks, and counting the new ones the following morning. Approximately every five years, the same counting method is used to estimate the number of tracks and nests on all of Ascension's 22 turtle beaches. Record nest temperature through the incubation period at 15 nests on each of the three Nature Reserve Beaches by placing a continuous temperature recorder in the nest at the time of laying.



Land crabs: At the three main spawning events on North East Bay, the number of crabs present along a 100m long 1m wide transect is recorded. Scan crabs at the spawning events to identify and measure tagged crabs to build up a picture of size at age and growth rates.

Scaly crickets: Record the number of scaly crickets caught in non-lethal traps will be set along 50m transects running perpendicular to the coast at 100m intervals along the coastline of the North East Coast Nature Reserve. The relative abundance of non-native ants can also be measured using the same traps.



Public attitudes: Questionnaires conducted annually to collect people's views about the Nature Reserves. Efforts will be made to get responses from a minimum of 50 people and capture the views of all sectors of the community.

Monitoring and evaluation - Monitoring threats to the Beach Nature Reserves

Description	Metric	Frequency	Objective monitored
Non-native crickets and ants	Visual index of abundance of crickets caught in control traps	1-6 months	2
Litter accumulation and removal	Weight of litter accumulating on beaches per year categorised by type	Annual	3
	Weight of waste removed from beaches per year categorised by type	Annual	3
Light pollution	Number, type and duration of lights visible from the Beach Nature Reserves	Monthly Jan—May	6
Non-native shrubs	Number of non-native shrubs present within the Nature reserves and buffer zones	Annually	4
Non-native predators	Amount of rodenticide bait taken on Long Beach and North East Bay	Fortnightly Jan—Aug	5
	Incidence of rodent predation on hatchlings	Weekly or fortnightly Jan—Aug	5

Non-native crickets: Use a grid system to visually assess the amount killed in control traps (p.33). Record the number of non-native crickets and ants in non-lethal traps used to census scaly cricket population to provide an estimate of relative background abundance.

Litter: A protocol for regular monitoring of plastic waste on the Beach Nature Reserves and other sites across the island is being developed as part of a Darwin-funded project in collaboration with the Zoological Society of London. This will enable regular and standardized monitoring of the quantity and composition of plastic waste to create time series data.

Light pollution: Once a month between January and April one hour visual surveys will be carried out of the number and duration of lights visible from the beaches. This will include fixed lights on buildings and installations as well as vehicle headlights and torches. The type of light and a qualitative measure of intensity (strong/moderate/weak) will be recorded.

Non-native shrubs: Drone surveys of the Nature Reserves and 100m buffer zones around them will be carried out annually on Long Beach and North East Bay to record the number, location and species of shrubs present. The drone cannot be used on South West Bay and walkover surveys will be undertaken there instead.

Non-native predators: Rodent bait boxes are set at Long Beach and North East Bay during the turtle nesting season. The amount of bait taken from the boxes each fortnight will be assigned to one of four categories (0%, 25%, 50% and 100%) and used as a proxy for rodent abundance in the area. The incidence of dead turtle hatchlings displaying signs of rodent predation will be recorded during turtle monitoring each week on Long Beach and every fortnight on South West Bay and North East Bay.



Research

There are still gaps in our knowledge that prevent the effective management of the Beach Nature Reserve and the protected and endemic species found there. Research efforts will focus on filling these gaps. Current priorities for research include:

- Climate change - improved understanding of likely sea level and temperature rise.
- Most effective and efficient methods for non-native plant and predator control
- Green turtles—Number of males contributing to the population by taking genetic samples from hatchlings. Threats on migration route and foraging grounds. Incidence of vessel strike on Ascension.
- Land crabs— method for monitoring recruitment rates. Migration routes to and from spawning sites.
- Invasive cricket and ant species —evaluate biocontrol options and refine baited trapping methods for population reduction at scale. Investigate population dynamics of invasive cricket *Gryllodes sigillatus* and identify any environmental drivers of seasonal trends.
- Undertake species-level research on population status, ecology and threats to scaly crickets and establish whether the *Phaleria* beetle is endemic.

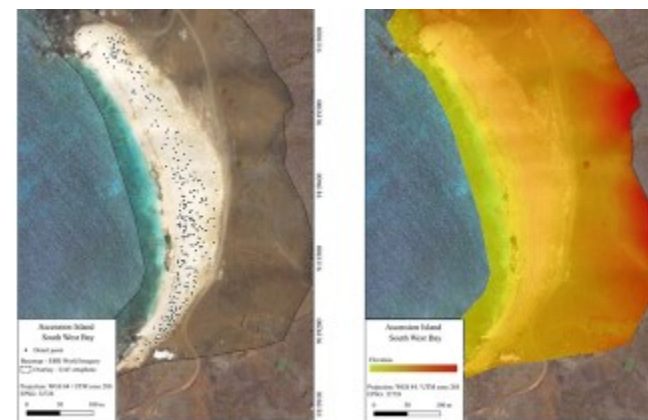
We will seek research partners and external funding to allow us to undertake this work. There are already well-established links with the University of Exeter (green turtles), Dr Richard Hartnell at the University of Liverpool (land crabs), the Zoological Society of London (plastic waste) and the Centre for Agriculture and Bioscience International (biocontrol agents). We will explore future opportunities with these and other partners to extend the current monitoring and research.

Resource limitations means our focus must be on the questions we need answered to improve management. However, Ascension's biodiversity is of global significance and we want to promote Ascension as an international research hub. This could enable a wider range of range of research to be undertaken using the resources of external partners and scientific organisations. Ascension would benefit from the knowledge and awareness this generates, but research can also be damaging and so it is important that it is

controlled and managed.

Research Permits: All research on Ascension requires a Research Permit issued by the AIG. This allows the impact, ethics and potential benefit of the research to be evaluated before the work can proceed. No permits will be issued for research that is highly destructive and has no benefit for Ascension. Conditions can be applied to permits to reduce harm or increase the benefits of the research.

As part of the permit application, all researchers undertake to provide AIG with copies of the raw data collected and any published work that arises from it. This ensures AIG builds a comprehensive repository of the research undertaken on the island and that management decisions can be improved based on the growing body of information available.



References

- Ashmole, P. N., & Ashmole, M. J. (1997). The Land Fauna of Ascension Island: New Data from Caves and Lava Flows, and a Reconstruction of the Prehistoric Ecosystem. *Journal of Biogeography*, 24(5), 549–589.
- Bowen, B.W., Meylan, A.B., Ross, T.P. & Limpus, C.T. (1992) Global population structure and natural history of the green turtle (*Chelonia mydas*) in terms of matriarchal phylogeny. *Evolution* 46, 865–881.
- Christiansen, K. A. (1998). New species of *Pseudosinella* (Collembola) from Ascension Island. *Journal of Natural History*, 32, 149–156.
- Gorochoy, 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.
- Hartnoll RG, Mackintosh T & Pelembe TJ (2006) *Johngarthia lagostoma* (H. Milne Edwards, 1837) on Ascension Island: a very isolated land crab population. *Crustaceana—International Journal of Crustacean Research*. 79, 197–215.
- Hartnoll RG, Broderick AC, Godley BJ, Musick S, Pearson M, Stroud SA & Saunders KE (2010) Reproduction in the Land Crab *Johngarthia lagostoma* on Ascension Island. *Journal of Crustacean Biology* 30, 83–92.
- Hays G, Broderick AC, Godley BJ, Lovell P, Martin C, McConnell BJ & Richardson S (2002) Biphasal long-distance migration in green turtles. *Animal Behaviour* 64, 895–898.
- Hirth, H.F. (1997) Synopsis of biological data on the green turtle *Chelonia mydas*. US Fish and Wildlife Service.
- Howard, R., Bell, I. & Pike, D.A. (2014). Thermal tolerances of sea turtle embryos: current understanding and future directions. *Endangered Species Research*. 26: 75-8.
- Huxley, R. (1999). Historical Overview of Marine Turtle Exploitation, Ascension Island, South Atlantic
- Mortimer, J.A. & Carr, A. (1987) Reproduction and migrations of the Ascension Island green turtle (*Chelonia mydas*). *Copeia* 1987, 103–113.
- Tilley, D., Ball, S., Ellick, J., Godley, B.J., Weber, N., Weber, S. & Broderick, A.C. (2019). No evidence of fine scale thermal adaptation in green turtles. *Journal of Experimental Marine Biology and Ecology*. 514: 110-117.
- Vahed, K. (2020). The Life Cycle of the Atlantic Beach-Cricket, *Pseudomogoplistes vicentae* Gorochoy, 1996. *Journal of Insect Conservation*, 24(3), 473–485.
- Varela, Miguel, Patrício, Ana, Anderson, Karen, Broderick, Annette, DeBell, Leon, Hawkes, Lucy, Tilley, Dominic, Snape, Robin, Westoby, Matt and Godley, Brendan (2019) Assessing climate change associated sea-level rise impacts on sea turtle nesting beaches using drones, photogrammetry and a novel GPS system. *Global Change Biology*, 25 (2). pp. 753-762. ISSN 1354-1013
- Weber, S.B., Broderick, A.C., Groothuis, T.G.G., Ellick, J., Godley, B.J. & Blount, J.D. (2012) Fine-scale thermal adaptation in a green turtle nesting population. *Proceedings of the Royal Society B: Biological Sciences* 279, 1077–1084.

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