

Ascension Island Biodiversity Action Plan

MASKED BOOBY



Photo: S. Weber

SUMMARY

Taxonomy: Kingdom: Animalia; Phylum: Chordata; Class: Aves; Order: Pelecaniformes; Family: Sulidae;
Species: *Sula dactylatra*

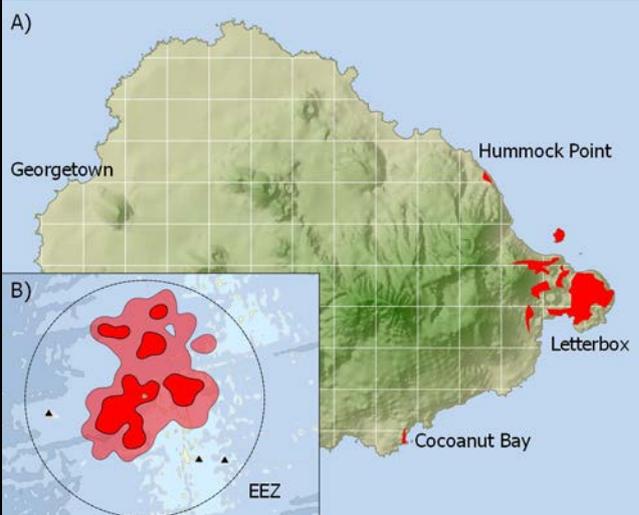
Nativeness: Native, breeding

Description: Large, pelagic, ground-nesting seabird with predominantly white plumage and a distinctive orange bill and feet. Adult males and females are morphologically similar but can be distinguished by their calls. Juveniles are greyish brown above with a pale belly. Most prey (mainly flying fish) is obtained by plunge diving from a height of 10-30m. Often feeds in association with schools of tuna that drive prey to the surface.

IUCN Red List status: Least concern 

Local trend: Probably increasing 

Threats: The major threat to masked boobies is overfishing of tuna; secondary threats include invasive alien species, collisions with wind turbines and climate changed-induced habitat alteration.

| 2. Distribution | |
|--|---|
| Global | |
| <p>Masked boobies have a near pan-tropical distribution, occurring in all oceans except the eastern Atlantic, northern Indian Ocean and central-eastern Pacific. Major south Atlantic nesting colonies are located at Atol das Rocas, Brazil (ca. 5000-7000 pairs) [1] and Ascension Island, UK (ca. 4500 pairs) [2], with smaller colonies located on St Helena (UK), Trindade (Brazil), Fernando de Noronha (Brazil) and the Abrolhos Archipelago (Brazil) [3].</p> | |
| Local | |
| <p>Nesting: Masked booby nesting at Ascension Island is currently concentrated on the summit plateau of Boatswain Bird Island and around the Letterbox Peninsula in the east of the Island (Fig. 1). Small numbers of nests can also be found in the vicinity of Coconut Bay and Hummock Point (Fig. 1). However, historical records and sub-fossil remains indicate that the species once bred more widely across the coastal lowlands, with putative nesting colonies to the north and east of Sisters Peak and close to South Gannet Hill [4]. The mainland colonies were extirpated by feral cats following human settlement of the island in 1815 and, despite unsuccessful re-colonisation attempts, nesting was confined to Boatswain Bird Island until 2002 when a campaign to eradicate feral cats was initiated [2,5].</p> <p>Foraging: Masked boobies nesting at Ascension Island forage over a wide expanse of open ocean, although predominantly within the Territory’s 200 nm maritime zone (Opell et al. in review). On average, the foraging trips of breeding birds extend to a maximum of 140 km from the Island, although occasional displacements of over 300 km have been recorded.</p> |  <p>Figure 1: A) Distribution of masked booby nesting colonies as of December 2014 (AIG Conservation Department, unpublished data). Sites at which subfossil remains of masked boobies have been discovered are also shown (digitised from [4,6,7]). B) Foraging distribution of 53 breeding adults tracked using GPS devices. The 50% utilisation distribution (or core use area) is shown in dark red and the 95% utilisation distribution (or home range) in faded red. The boundary of Ascension Island’s 200 nm exclusive economic zone (EEZ) is also shown.</p> |

| 3. Status | | |
|---|--|----------------------------------|
| GLOBAL | Population estimate: Unknown | IUCN status: Least concern |
| <p>The global population size has not been formerly assessed, although Pitman et al. [8] speculate that it is probably upward of 225,000 breeding pairs. Masked boobies are believed to be decreasing globally but the rate of decline does not meet thresholds for Vulnerable under the IUCN Red List classification scheme [9].</p> | | |
| LOCAL | Population estimate: >4,500 breeding pairs | Local trend: Probably increasing |
| <p>Due to the inaccessibility of the main masked booby colony on Boatswain Bird Island, assessment of population size and trends is challenging. Dorward estimated 1,300 pairs nesting on Boatswain Bird Island in 1958 [5] and Ratcliffe et al. estimated that there were 4,500 pairs breeding on Boatswain Bird Island at the peak of nesting in 2002 [2]. Recent population trends may be more readily inferred from the rapid recovery of mainland nesting colonies since the start of the feral cat eradication, increasing from 3 nests in 2002 to a minimum of 1,537 nests in 2015 [2] (AIG Conservation Dept. unpublished data). However, despite recent growth, the population is likely to be considerably smaller than it once was. Historical accounts and charts suggest that impressive booby colonies once occurred across many parts of the main island but disappeared sometime between 1840 and 1880 as a result of cat predation [10].</p> | | |

| 4. Ecology | |
|---|--|
| Habitat & diet | |
| <p>Masked boobies are amongst the most pelagic species of the Sulidae family, preferring to forage over deep water [11], often in association with subsurface predators such as dolphins and yellowfin tuna (<i>Thunnus albacares</i>) [12]. Flying fish feature prominently in their diets [5,11]; however, at least 11 prey species have been identified in regurgitates at Ascension Island, including large numbers of juvenile redlip blennies <i>Ophioblennius atlanticus</i> [5]. Masked boobies breed on tropical oceanic islands and nest on bare ground, showing a preference for open, level terrain with sand or gravel substrates [5].</p> | |
| Reproduction & life history | |
| <p>Masked boobies typically lay clutches of two eggs, although only a single chick is fledged [5]. Eggs are incubated for around 6 weeks and chicks fledge at approximately 5.5 months, although parents may continue to feed their young at the nest site for a further 3 - 4 weeks [5]. Breeding success at Ascension Island is comparatively low at 9-37 % [2,5]. Egg laying is frequently reported to peak between May and July [5], although there is clearly substantial variation in breeding phenology among years (AIG Conservation unpublished data).</p> | |
| Taxonomy & population structure | |
| <p>Masked boobies nesting at Ascension Island are genetically distinct from Caribbean and Indo-Pacific populations [13]. No phylogenetic analyses have been conducted within the South Atlantic, however there are no recorded migrations of ringed birds between Ascension Island and either Brazilian or St Helenian nesting populations, suggesting limited demographic connectivity.</p> | |

| 4. Threats* | | |
|--|----------------|----------------|
| 5.4.4 Fishing & harvesting aquatic resources: Unintentional effects, large scale | Impact: | MEDIUM |
| <p>Ascension Island lies within an area of high tuna long-lining effort [14], which poses both direct and indirect threats to seabirds. Although local observer data are lacking, evidence from national fisheries observer programmes in the Atlantic, Pacific and Indian Oceans suggest that direct mortality of boobies due to incidental capture in pelagic longlines is very low [15–17], probably because these species prefer active prey and do not typically pursue fishing vessels in search of discards [14,18]. The indirect impacts of fishing on marine food webs may therefore be of greater concern. Although masked boobies feed by plunge diving, they are only able to access prey within the top two metres of the water column [19]. Consequently they rely heavily upon subsurface predators, such as yellowfin tuna, to drive their prey within reach [12]. Declines in tuna abundance linked to overfishing would therefore have potentially significant impacts on masked booby survival and breeding success. The Atlantic yellowfin and bigeye tuna fisheries are currently regarded as sustainable by the regional regulator, ICCAT, although there has been a long term decline in their populations since the 1960s [20]. The impact this has had on masked boobies is unknown.</p> | | |
| 8.1.2 Invasive non-native/alien species/diseases: named species | Impact: | LOW |
| <p>Feral cats were previously the major threat to masked boobies on Ascension Island [21] but were successfully eradicated between 2001 and 2006 [2]. Ship rats (<i>Rattus rattus</i>) still occur in all mainland habitats, including the booby nesting colonies of the Letterbox Peninsula [22], and appear to be rapidly increasing in number following the feral cat eradication [23]. They are not generally considered to be a significant predator of booby eggs and chicks [8,24,25], although data from Ascension Island is lacking. The rapid spread of invasive, drought tolerant shrubs such as <i>Prosopis juliflora</i>, <i>Psidium guajava</i> and <i>Nicotiana glauca</i> over much of Ascension Island’s previously barren coastal lowlands also poses a potential threat to ground nesting seabirds. These species have not yet reached the booby nesting colonies of the Letterbox Peninsula, but unless their spread is controlled it is likely that encroachment will occur in future. Several perennial and annual weeds such as <i>Waltheria indica</i>, <i>Heliotropium curassivicum</i>, <i>Chenopodium murale</i> and wild tomato (<i>Solanum</i> sp.) are also increasingly expanding their range into the seabird nesting areas of the Letterbox Peninsula. Masked boobies require a clear, flat area to take off and land and tend to avoid nesting in areas of dense vegetation [8], so the spread of weeds could significantly reduce the extent of suitable nesting habitat.</p> | | |
| 11.1 Climate change & severe weather: habitat shifting and alteration | Impact: | UNKNOWN |

| | |
|---|--------------------|
| <p>Few data exist on the interactions between climate, oceanography and seabird productivity at Ascension Island; however, it appears that the importance of the Island as a seabird breeding station relates to its position within a zone of seasonally elevated productivity driven by the westward-flowing South Equatorial Current [10,26]. Any changes in current strength and position as a result of climate change could therefore have significant impacts on the productivity of the marine ecosystem and food availability for seabirds. Indeed, mass seabird breeding failures periodically occur at Ascension Island and there is circumstantial evidence to suggest that these are related to climate anomalies such as ENSO [27].</p> | |
| 3.3 Energy production & mining: renewable energy | Impact: LOW |
| <p>In April 2010, five 53.5 m wind turbines were erected adjacent to the BBC power station complex at English Bay [28] and have since become a small but consistent source of seabird mortality. The turbines sit on an important coastal fly-way for birds commuting to and from Boatswain Bird Island [27] and are estimated to kill 30-40 seabirds annually, 40 % of which are masked boobies (AIG Conservation, unpublished data).</p> | |
| <p>*Threats are classified and scored according to the IUCN-CMP Unified Classification of Direct Threats [29]</p> | |

| 5. Relevant policies and legislation | |
|--|--|
| International | |
| <p>Ascension Island and Boatswain Bird Island are currently designated as Important Bird Areas by birdlife international.</p> | |
| Local | |
| <p>Masked boobies are protected under the Wildlife Protection Ordinance 2013, which prohibits the killing, capture or taking of seabirds or their eggs on Ascension Island without license.</p> <p>The majority of masked booby nesting is contained within protected areas designated under the National Protected Areas Order 2014. Boatswain Bird Island is designated as a Sanctuary, and the Letterbox Peninsula is designated as a Nature Reserve. The National Protected Areas Regulations 2014 restrict all forms of development within protected areas and prohibit access to Boatswain Bird Island without permit.</p> | |

| 6. Management notes | |
|--|--|
| <p>Preventing over-fishing and preserving foraging associations between tuna and seabirds is probably the most pressing management issue facing masked boobies, but may be difficult to influence locally due to the highly migratory nature of tuna species. Regional stock management at the ICCAT level may therefore be the only effective means of achieving this goal. Nonetheless, research into the behaviour of tuna within Ascension Island’s marine zone is urgently needed to establish whether more resident populations exist that can be effectively protected at a local level. A 2014 review of Ascension’s inshore and offshore fisheries conducted by Cefas [30,31] and an earlier report by Envirofish [32] proposed a number of measures to strengthen fisheries management within Ascension Island’s EEZ, including improved licensing, enforcement and data collection. There are also growing calls to close offshore areas to commercial fishing of any kind, subject to alternative funding sources being found to meet the costs of enforcement. Irrespective of the final model of marine protection that is adopted, monitoring of seabird productivity and population trends will continue to form an important part of any broadly based system for assessing the health of Ascension’s marine ecosystem. Masked boobies in particular are accessible indicator species and regular monitoring of fledging success should be continued indefinitely, supplemented if possible by periodic dietary studies and GPS tracking to characterise any shifts in foraging behaviour.</p> <p>Following the eradication of feral cats, threats to nesting masked boobies are now thought to be relatively minor. However, without management, some degradation of nesting habitat by invasive weeds will almost certainly occur in the long-term. Preventing the spread of woody species into the important nesting areas of the Letterbox Peninsula should still be practical through frequent, low-level management and would be best organised through a formal site management plan to give continuity of action. Although rat predation is not thought to be significant for boobies, periodic monitoring of rat densities on the Letterbox Peninsula would also be prudent to establish long term trends and detect emergent threats.</p> | |

SPECIES ACTION PLAN**OBJECTIVES**

1. Monitor and promote seabird re-colonisation of the mainland through the effective protection and management of nesting habitat, including the control of invasive species.
2. Establish relationships between surface oceanography, tuna distribution and seabird foraging and productivity, developing predictive models of how these may be affected by future climate change and fishing scenarios.
3. Ensure the sustainable management of fish stocks in Ascension Island's maritime zone through robust fisheries science, legislation and enforcement, including the creation of marine protected areas where appropriate.
4. Promote awareness of the importance of Ascension Island's flora and fauna, both locally and internationally.

| PROPOSED ACTION | OUTCOME(S) | TIMEFRAME | PROPOSED START | PRIORITY | LEAD* |
|--|-----------------------------|-----------|----------------|----------|-----------------------------|
| Policy & Legislation | | | | | |
| Develop an implementation plan for reforming Ascension Island's fishing policies and marine protection legislation, taking into account the recommendations of previous consultancy reports and the outcome of deliberations on the future of the Territory's commercial offshore fishery. | 1 policy document; | 1 year | March 2015 | HIGH | Director of Fisheries (AIG) |
| Repeal the blanket IBA designation for Ascension Island and designate the Letterbox Peninsula and the Wideawake Fairs as more spatially-relevant IBAs. | 2 IBAs designated | 2 months | February 2015 | LOW | RSPB |
| Management | | | | | |
| Produce management plans for all nature reserves and sanctuaries, including timetables for the routine control of invasive species, and integrate into the BAP. | 6 management plans produced | 1 year | March 2015 | MEDIUM | Head of Conservation (AIG) |

| PROPOSED ACTION | OUTCOME(S) | TIMEFRAME | PROPOSED START | PRIORITY | LEAD* |
|---|---|-----------|----------------|----------|--------------------------------------|
| Recruit, train and equip two permanent, core-funded rangers to assist with the implementation of protected areas management plans, in particular the control of invasive species encroaching on key wildlife habitat and amenity areas. | 2 staff recruited | 2 months | April 2015 | MEDIUM | Head of Conservation (AIG) |
| Establish, map and maintain exclusion zones for <i>Prosopis juliflora</i> , <i>Nicotiana glauca</i> , <i>Casuarina equisetifolia</i> and other invasive drought-tolerant shrubs and trees within all coastal reserves. | 6 exclusion zones cleared and mapped | 6 months | June 2015 | HIGH | National Park Warden (AIG) |
| Research & monitoring | | | | | |
| Collate and analyse existing oceanographic and fisheries resources relating to Ascension Island's exclusive fishing zone and surrounding waters, integrating spatial datasets into GIS wherever possible. | 1 report produced | 1 year | September 2014 | MEDIUM | Marine & Fisheries Unit (AIG) |
| Map the movements and seasonal migrations of yellowfin tuna caught within Ascension Island's EEZ using tracking technologies and the deployment and recovery of mechanical tags. | 15 fish tracked; 100 fish tagged | 1 year | November 2014 | MEDIUM | Marine & Fisheries Unit (AIG) |
| Monitor the success of a spatially and temporally representative sample of mainland masked booby nests in each year | 100 nests monitored | 1 year | January 2015 | MEDIUM | Seabird Conservation Scientist (AIG) |
| Ring a representative sample of masked boobies nesting in each year to enable studies of dispersal, re-nesting rates and life-history characters | 100 birds ringed | 1 year | January 2015 | LOW | Seabird Conservation Scientist (AIG) |
| Characterise the diets of breeding masked boobies through opportunistic sampling of regurgitates | All regurgitate analysed; 1 report produced | 1 year | January 2015 | LOW | Seabird Conservation Scientist (AIG) |

| PROPOSED ACTION | OUTCOME(S) | TIMEFRAME | PROPOSED START | PRIORITY | LEAD* |
|---|--|-----------|----------------|----------|--------------------------------------|
| Conduct fortnightly surveys to estimate seabird mortality resulting from collisions with wind turbines at the BBC Wind Farm | 24 surveys completed; 1 report produced | 1 year | October 2014 | MEDIUM | Seabird Conservation Scientist (AIG) |
| Produce a revised population size estimate of masked boobies nesting at Ascension Island to update the 2001/2 census. | 1 academic paper produced | 1 year | September 2016 | LOW | Seabird Conservation Scientist (AIG) |
| Clean existing seabird monitoring data stored within the AEIOU database and update the database structure in line with current monitoring and research needs | 1 database produced | 1 year | February 2015 | MEDIUM | Seabird Conservation Scientist (AIG) |
| Collate all existing seabird ringing data from Ascension Island into a centralised database | 1 database produced | 1 year | September 2014 | MEDIUM | Seabird Conservation Scientist (AIG) |
| Install fixed rodent monitoring lines on the Letterbox Plateau and initiate quarterly indexing of rat abundance | 30 stations installed; 4 surveys completed | 1 year | June 2015 | MEDIUM | Seabird Conservation Scientist (AIG) |
| Communication & Awareness Raising | | | | | |
| Erect visitor information boards at access points and key features within all nature reserves and national parks, establishing a strong protected areas identity and awareness on Ascension Island. | 10 signs installed | 6 months | January 2016 | MEDIUM | National Park Warden (AIG) |
| Publish a free guide booklet on Ascension Island's protected areas network to be made available at ports of entry, visitor attractions and other outlets. | 500 booklets produced | 3 months | June 2015 | LOW | Tourism & Media Officers (AIG) |

| PROPOSED ACTION | OUTCOME(S) | TIMEFRAME | PROPOSED START | PRIORITY | LEAD* |
|--|-----------------------|-----------|----------------|----------|--------------------------------|
| Celebrate World Ocean's Day as a focus for awareness raising activities associated with Ascension Island's marine environment. | 1 event organised | 1 day | June 2015 | MEDIUM | Head of Conservation (AIG) |
| Arrange a vehicle tour for Island residents to view nesting seabirds in Letterbox Nature Reserve, providing an opportunity for families and less mobile members of the community to experience the wildlife of this remote part of the Island. | 1 event organised | 1 day | April 2015 | LOW | Head of Conservation (AIG) |
| Produce an updated visitor information leaflet on the the biology and conservation of seabirds at Ascension Island | 500 leaflets produced | 1 month | February 2015 | LOW | Tourism & Media Officers (AIG) |

References

1. Schulz-Neto A (2004) Aves Marinhas do Atol das Rocas. In: *Aves marinhas e insulares brasileiras: bioecologia e conservacao*. Editora da UNIVALI, Itajai, SC. pp. 169–192.
2. Ratcliffe N, Bell M, Pelembe T, Boyle D, Benjamin R, White R, Godley B, Stevenson J & Sanders S (2010) The eradication of feral cats from Ascension Island and its subsequent recolonization by seabirds. *Oryx* **44**, 20.
3. Branco JO (2004) *Aves marinhas e insulares brasileiras: bioecologia e conservacao*. Editora da UNIVALI, Itajai, SC.
4. Bourne WR., Ashmole NP, Ashmole MJ & Simmons KEL (2003) The distribution of guano and bird bones on Ascension Island, South Atlantic Ocean. *Bulletin of the British Ornithologists' Club* **123**, 250–257.
5. Dorward DF (1962) Comparative biology of the white booby and the brown booby *Sula* spp. at Ascension. *Ibis* **103**, 174–220.
6. Ashmole NP (1963) Subfossil bird remains on Ascension Island. *Ibis* **103**, 382–389.
7. Olson SL (1977) Additional notes on subfossil bird remains from Ascension Island. *Ibis* **119**, 37–43.
8. Pitman RL, Ballance LT, Bost C & others (2005) Clipperton Island: pig sty, rat hole and booby prize. *Marine Ornithology* **33**, 193–194.
9. Birdlife International (2015) Species factsheet: *Sula dactylatra*. In: *IUCN Red List for birds*. Downloaded from <http://www.birdlife.org> on 03/03/2015.
10. Stonehouse B (1962) Ascension Island and the British Ornithologists Union Centenary Expedition 1957-59. *Ibis* **103**, 107–123.
11. Schreiber RW & Clapp RB (1987) Pelecaniform feeding ecology. In: *Seabirds: feeding biology and role in marine ecosystems* (ed. J. P. Croxall). Cambridge University Press, Cambridge, UK. pp. 173–188.
12. Au DW & Pitman RL (1988) Seabird relationships with tropical tunas and dolphins. In: *Seabirds and other marine vertebrates. Competition, predation and other interactions*. (ed. J. Burger). Columbia University Press, New York. pp. 174–212.
13. Steeves TE, Anderson DJ & Friesen VL (2005) A role for nonphysical barriers to gene flow in the diversification of a highly vagile seabird, the masked booby (*Sula dactylatra*). *Molecular Ecology* **14**, 3877–3887.
14. Huang H-W (2011) Bycatch of high sea longline fisheries and measures taken by Taiwan: Actions and challenges. *Marine Policy* **35**, 712–720.
15. Huang H-W & Liu K-M (2010) Bycatch and discards by Taiwanese large-scale tuna longline fleets in the Indian Ocean. *Fisheries Research* **106**, 261–270.
16. Huang H-W & Yeh Y-M (2011) Impact of Taiwanese distant water longline fisheries on the Pacific seabirds: finding hotspots on the high seas: Impact of Taiwanese distant water longline fisheries on the Pacific seabirds. *Animal Conservation* **14**, 562–574.
17. Yeh Y-M, Huang H-W, Dietrich KS & Melvin E (2013) Estimates of seabird incidental catch by pelagic longline fisheries in the South Atlantic Ocean: Seabird bycatch in the South Atlantic Ocean. *Animal Conservation* **16**, 141–152.
18. Blaber SJM, Milton DA, Smith GC & Farmer MJ (1995) Trawl discards in the diets of tropical seabirds of the northern Great Barrier Reef, Australia. *Marine Ecology Progress Series* **127**, 1–13.
19. Weimerskirch H, Corre M, Gadenne H, Pinaud D, Kato A, Ropert-Coudert Y & Bost C-A (2009) Relationship

- between reversed sexual dimorphism, breeding investment and foraging ecology in a pelagic seabird, the masked booby. *Oecologia* **161**, 637–649.
20. Cullis-Suzuki S & Pauly D (2010) Failing the high seas: a global evaluation of regional fisheries management organizations. *Marine Policy* **34**, 1036–1042.
 21. Ashmole NP, Ashmole MJ & Simmons KEL (1994) Seabird conservation and feral cats on Ascension Island, South Atlantic. In: *Seabirds on Islands: Threats, Case Studies and Action Plans*. BirdLife International, Cambridge, UK. pp. 94–121.
 22. Dawson E (2013) *The diet and distribution of invasive ship rats (Rattus rattus) on Ascension Island*. MSc Thesis. University of Exeter, Exeter, UK.
 23. Hughes BJ (2014) *Breeding and population ecology of sooty terns on Ascension Island*. PhD Thesis. University of Birmingham, Birmingham, UK.
 24. Priddel D, Hutton I, Olson S & Wheeler R (2005) Breeding biology of Masked Boobies (*Sula dactylatra tasmani*) on Lord Howe Island, Australia. *Emu* **105**, 105–113.
 25. Jones HP, Tershy BR, Zavaleta ES, Croll DA, Keitt BS, Finkelstein ME & Howald GR (2008) Severity of the Effects of Invasive Rats on Seabirds: A Global Review: *Effects of Rats on Seabirds*. *Conservation Biology* **22**, 16–26.
 26. Scullion J (1990) *Review of the Fish Resources, Fisheries and Oceanography within the Exclusive Fishing Zone of Ascension Island*. Report to the Overseas Development Administration (DFID) and the St Helena Government. 77 pp.
 27. Bourne WR. & Simmons KEL (2001) The distribution and breeding success of seabirds on and around Ascension in the tropical Atlantic Ocean. *Atlantic Seabirds* **3**, 187–202.
 28. Doerr K (2010) Ascension: English Bay Wind Farm. *The Islander*. Issue No. 2223, April 2010.
 29. Salafsky N et al. (2008) A Standard Lexicon for Biodiversity Conservation: Unified Classifications of Threats and Actions. *Conservation Biology* **22**, 897–911.
 30. Reeves SA & Laptikovsky V (2014) *A review of fisheries management options for Ascension Island waters. 1: offshore fisheries*. Unpublished report to Ascension Island Government and the Foreign and Commonwealth Office. Cefas, Lowestoft, Suffolk, UK. 133 pp.
 31. Armstrong MJ & Reeves SA (2015) *A review of fisheries management options for Ascension Island waters. 2: inshore fisheries*. Unpublished report to Ascension Island Government and the Foreign and Commonwealth Office. Cefas, Lowestoft, Suffolk, UK. 78 pp.
 32. Hecht T & Malan P (2007) *The Ascension Island fisheries with recommendations for management*. Report to the Ascension Island Government. Enviro-Fish Africa (Pty) Ltd., Grahamstown, South Africa.