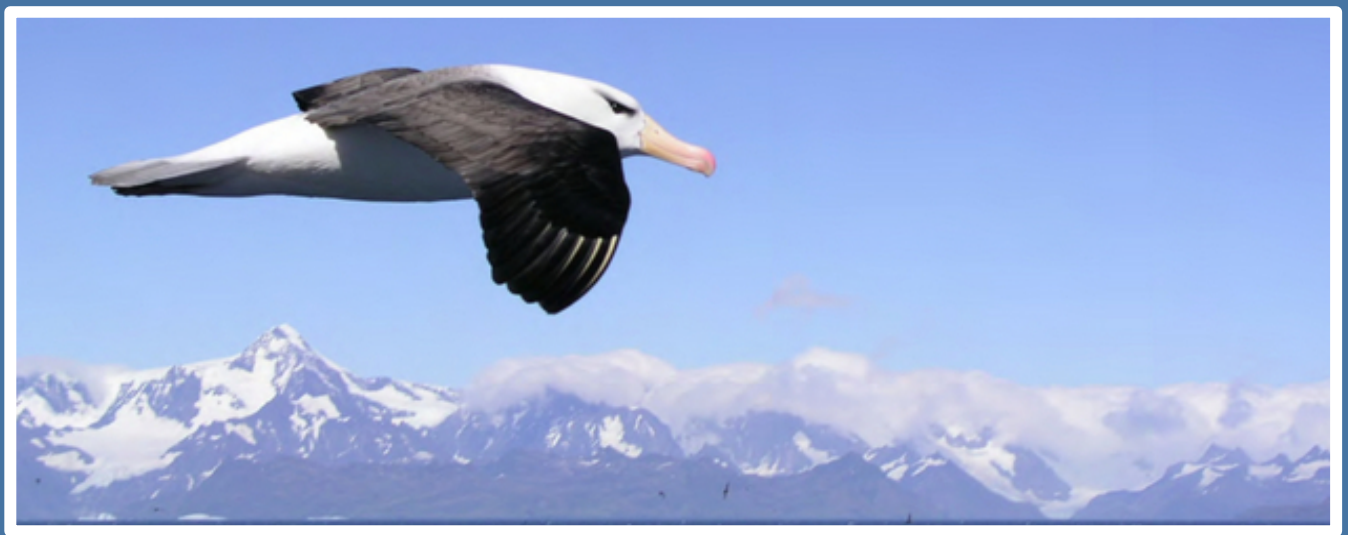


Conservation Action Plan for Black-browed Albatrosses at South Georgia (2016-2020)



Conservation Action Plan for Black-browed Albatrosses at South Georgia (2016-2020)

For enquiries relating to this plan contact:
Government of South Georgia & the South Sandwich Islands
Government House
Stanley
Falkland Islands
FIQQ 1ZZ

Recommended citation: Government of South Georgia & the South Sandwich Islands (2016) Conservation Action Plan for Black-browed Albatrosses at South Georgia (2016-2020). Government House, Stanley, Falkland Islands

Cover photo credit: Martin Collins

LIST OF ACRONYMS

ACAP	Agreement on the Conservation of Albatrosses and Petrels
BAS	British Antarctic Survey
CAMLR	Convention on the Conservation of Antarctic Marine Living Resources
CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources
CCSBT	Commission for the Conservation of Southern Bluefin Tuna
CEMP	CCAMLR Ecosystem Monitoring Programme
Defra	Department for Environment, Food & Rural Affairs (UK)
EEZ	Exclusive Economic Zone
FAO	Food and Agriculture Organization of the United Nations
FCO	Foreign & Commonwealth Office (UK)
FIG	Falkland Islands Government
GSGSSI	Government of South Georgia & the South Sandwich Islands
IAATO	International Association of Antarctic Tour Operators
IATTC	Inter-American-Tropical-Tuna-Commission
ICCAT	International Commission for the Conservation of Atlantic Tunas
JNCC	Joint Nature Conservation Committee
RFMO	Regional Fisheries Management Organisation
RSPB	Royal Society for the Protection of Birds
SC-CAMLR	Scientific Committee of CAMLR
SEAFO	South East Atlantic Fisheries Organisation
SGS	South Georgia Surveys
SGSSI	South Georgia & the South Sandwich Islands

TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
1. Introduction	4
1.2 Goal.....	5
1.3 Aim	5
2. Current state of knowledge.....	5
2.1 Breeding distribution, population trend and conservation status	5
2.2 Marine distribution and diet.....	8
2.3 Threats.....	11
2.3.1 Land-based threats.....	11
2.3.2 At-sea threats	12
2.3.3 Climate change.....	16
3. Policies, plans and legislation relevant for management	17
3.1 National instruments	17
3.2 International instruments	18
3.2.1 Agreement on the Conservation of Albatrosses and Petrels (ACAP).....	18
3.2.1.1 ACAP Priority Populations.....	18
3.2.2 The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR).....	19
4. Monitoring and research	19
5. Framework for action.....	20
Components of the Conservation Action Plan	20
Implementation.....	21
Prioritisation	22
<i>Component 1: Long-term monitoring of Black-browed Albatross population dynamics at South Georgia</i>	<i>22</i>
<i>Component 2: Long-term monitoring of the foraging ecology and diet of Black-browed Albatrosses at South Georgia.....</i>	<i>24</i>
<i>Component 3: Monitoring and management of potential land-based threats to Black-browed Albatrosses breeding at South Georgia.....</i>	<i>26</i>
<i>Component 4: Understanding marine-based threats to South Georgia Black-browed Albatrosses, in order to implement and promote best practice management approaches within and outside SGSSI waters to address these.....</i>	<i>27</i>
<i>Component 5: Understanding the potential impacts of climate change on the ecology and population dynamics of South Georgia Black-browed Albatrosses.....</i>	<i>32</i>
<i>Component 6: Raising awareness of the plight of Black-browed Albatrosses at South Georgia, and the actions that are required and being undertaken to improve their conservation status.....</i>	<i>33</i>
<i>Component 7: Participating in international conservation and fisheries fora to promote actions that will help support the conservation of Black-browed Albatrosses from South Georgia.....</i>	<i>35</i>
<i>Component 8: Reviewing the Conservation Action Plan to evaluate accomplishments and update information on priority needs</i>	<i>36</i>
Acknowledgements.....	48
References	48
Appendix 1: Black-browed Albatross breeding sites at South Georgia	54

EXECUTIVE SUMMARY

South Georgia is a globally important breeding site for Black-browed Albatrosses *Thalassarche melanophris*. The species is currently listed globally as Near Threatened by the IUCN. From 2003 to 2013 it was categorised as Endangered, but its threat status was downlisted in 2013 due largely to recent data on the population in the Falkland Islands, which increased substantially over the last decade. In contrast to the population in the Falkland Islands, and in southern Chile, which has also shown a substantial increase in recent years, Black-browed Albatrosses from South Georgia have remained in decline, continuing a negative trend from the 1970s. The Black-browed Albatross is included in Annex 1 of the multi-lateral Agreement on the Conservation of Albatrosses and Petrels (ACAP), which the United Kingdom ratified in 2004, and extended to the relevant Overseas Territories, including South Georgia and the South Sandwich Islands. The long-term decline of the South Georgia population of Black-browed Albatrosses has led to it being identified as one of only eight ACAP high priority populations. In order to strengthen and co-ordinate efforts to improve the conservation status of South Georgia Black-browed Albatrosses, the Government of South Georgia and the South Sandwich Islands (GSGSSI) has developed this Conservation Action Plan.

Incidental fisheries mortality (bycatch) is currently considered to be the main threat to the South Georgia population of Black-browed Albatrosses. Bycatch of seabirds has been reduced to negligible levels in fisheries operating around South Georgia, and the residual threat is currently attributed to fisheries operating outside of the South Georgia and the South Sandwich Islands Maritime Zone. Fisheries operating in the Benguela Upwelling region off southern Africa and those managed by Regional Fisheries Management Organisations (RFMOs) - intergovernmental organisations through which States collaborate on fishery conservation and management measures relating to the high seas and migratory fish stocks and associated species – are considered particularly important. Amongst the RFMOs, fisheries managed by the International Commission for the Conservation of Atlantic Tunas (ICCAT) and the Commission for the Conservation of Southern Bluefin Tuna (CCSBT) are considered to present the greatest risk to South Georgia Black-browed Albatrosses. Reducing seabird bycatch within all of these fisheries, while maintaining effective bycatch mitigation measures within South Georgia waters, is therefore critical to improve the conservation status of Black-browed Albatrosses from South Georgia.

Although Black-browed Albatrosses are not currently considered to be threatened by any land-based processes at South Georgia, a number of potential threats are considered in this plan to determine if these factors warrant further investigation and action.

The overall goal of this Conservation Action Plan is to ensure the recovery and long-term survival of Black-browed Albatrosses at South Georgia by understanding the nature and extent of the threats they face, and by implementing, facilitating or promoting the required conservation actions to reduce or eliminate these threats. The aim of the Plan is that by 2020, the decline of Black-browed Albatrosses at South Georgia will have ceased. The Plan serves as a framework to facilitate a co-ordinated, collaborative and proactive approach to the conservation of South Georgia

Black-browed Albatrosses. It outlines briefly the current state of knowledge relating to the ecology, distribution, and population dynamics of South Georgia Black-browed Albatrosses, and the threatening processes impacting the population. It also includes information on the suite of national and international policies, plans and legislation relevant to the conservation of the species at South Georgia. Following and informed by these introductory sections, the plan then presents a Framework for Action, in which the goal and the recommended actions are described. In order to highlight the most urgent actions, the Plan distinguishes between *Priority Actions* and *Associated Activities*. The former are those that are required to create the step-changes needed to achieve the goal of this plan. These actions and activities fall into eight areas of work, or components of the Conservation Action Plan, that are outlined below, in no order of importance:

1. Long-term monitoring of Black-browed Albatross population dynamics at South Georgia.
2. Long-term monitoring of the foraging ecology and diet of Black-browed Albatrosses at South Georgia.
3. Monitoring and management of potential land-based threats to Black-browed Albatrosses breeding at South Georgia.
4. Understanding marine-based threats to South Georgia Black-browed Albatrosses in order to implement and promote best practice management approaches within and outside SGSSI waters to address these.
5. Understanding the potential impacts of climate change on the ecology and population dynamics of South Georgia Black-browed Albatrosses.
6. Raising awareness of the plight of Black-browed Albatrosses at South Georgia, and the actions that are required and being undertaken to improve their conservation status.
7. Participating in international conservation and fisheries fora to promote actions that will help support the conservation of Black-browed Albatrosses from South Georgia.
8. Reviewing the Conservation Action Plan to evaluate accomplishments and update information on priority needs.

For each of these components, a brief summary of previous or current research, monitoring and management initiatives is provided, which together with the introductory sections on the current state of knowledge, serves to inform and underpin the actions that are specified. A summary of the actions pertaining to each component, their relative priority rating, and the key partner organisations, is provided in Tables 1 and 2.

It is important to note that there are a number of actions included in the implementation framework that are not, or will not be, implemented directly by GSGSSI, but by partner organisations. It is not the intention of GSGSSI to prescribe these actions to external agencies, but rather to recognize that they form a vital component of the conservation framework, and to help facilitate their implementation through engaging with and supporting as appropriate the external agencies in carrying them out.

The implementation period for this Conservation Action Plan is 2016-2020, which is set to coincide with the time frame for the Biodiversity Action Plan for South Georgia

& the South Sandwich Islands and the overarching South Georgia & the South Sandwich Islands Strategy. However, given the long-term nature of the overall goal, it is anticipated that the Conservation Action Plan will need to be extended beyond this five-year period. Routine reviews of performance against the stated actions, and an overall assessment at the end of the implementation period, will be used as the basis for drafting a revised Action Plan for the subsequent five-year period.

1. INTRODUCTION

1.1 Background

The Black-browed Albatross *Thalassarche melanophris* is the most abundant albatross breeding at South Georgia. However, owing to long-term and ongoing population declines at South Georgia, it is also one of the most threatened of all substantial (>10% global numbers) albatross populations. In order to bolster efforts to better understand the factors contributing to the long-term decline in numbers of Black-browed Albatrosses at South Georgia, and to address these threats, the Government of South Georgia and the South Sandwich Islands (GSGSSI) has identified the need for a dedicated Conservation Action Plan for this species at South Georgia.

GSGSSI has recently adopted *The Biodiversity Action Plan for South Georgia & the South Sandwich Islands (2016-2020)*, which serves to guide the management and protection of the Territory's environment and biodiversity. The Vision of the Biodiversity Action Plan is '*To work in partnership with experts and stakeholders in the UK and the rest of the world to conserve the biodiversity and ecosystem function of the South Georgia & the South Sandwich Islands' environment for the benefit of all human kind, and to facilitate responsible access, ensuring that the Territory remains at the forefront of cutting-edge environmental management best practice.*' The Biodiversity Action Plan seeks to ensure that species and habitats receive adequate protection, and outlines a number of objectives to achieve this goal. In light of ongoing population declines at South Georgia, one of the tasks identified in the Biodiversity Action Plan is to develop Conservation Action Plans for the globally important populations of Black-browed, Wandering and Grey-headed Albatrosses (Activity 3.2.4).

This Conservation Action Plan is intended to serve as a framework to guide, in an informed, prioritised and co-ordinated manner, actions required to improve the conservation status of Black-browed Albatrosses at South Georgia. The scope of the Conservation Action Plan is limited to the South Georgia population of Black-browed Albatrosses (i.e. the actions identified are targeted specifically at this population, for which GSGSSI have ultimate responsibility). However, given the importance of the South Georgia population, improvements in the trends of this population will positively influence the overall conservation status of the species. Furthermore, given their wide-ranging nature, the ultimate responsibility for addressing threats to South Georgia Black-browed Albatrosses varies. This Conservation Action Plan includes measures that are the direct responsibility of GSGSSI, but importantly also includes 'external' actions that involve other nations and organisations. In these latter cases, GSGSSI aims through outreach, collaboration and diplomatic engagement to promote and assist where possible the management of these 'external' threats to South Georgia Black-browed Albatrosses.

The Conservation Action Plan provides a summary of the current state of knowledge of the population and conservation status of Black-browed Albatrosses at South Georgia, threats that they face, and identifies priority actions required to improve their conservation status. It is not a legally binding document, and is not intended to

be a comprehensive review of all available information, but rather a tool to facilitate effective conservation action.

1.2 Goal

To ensure the recovery and long-term survival of Black-browed Albatrosses at South Georgia by understanding the nature and extent of the threats they face, and importantly to reduce or eliminate these threats by implementing or promoting the required conservation research and management actions.

1.3 Aim

By 2020 the decline of Black-browed Albatrosses breeding at South Georgia will have ceased.

2. CURRENT STATE OF KNOWLEDGE

2.1 Breeding distribution, population trend and conservation status

The Black-browed Albatross has a circumpolar breeding distribution with populations at the Falkland Islands, a number of islands in southern Chile, South Georgia, Crozet and Kerguelen (French Southern Territories in the Indian Ocean), Heard and McDonald Islands and Macquarie Island (Australia), and Campbell and Antipodes Islands (New Zealand). The majority of the global breeding population occurs in the Falklands (c. 72%), the islands of southern Chile (c.19%) and South Georgia (c. 8%) (Agreement on the Conservation of Albatrosses and Petrels 2010).

Black-browed Albatrosses are known to breed at about 20 locations on the mainland and offshore islands of South Georgia, sometimes in mixed colonies with Grey-headed Albatrosses *Thalassarche chrysostoma*. The majority of these breeding sites are located in the northwest of the archipelago, with fewer sites in the south and southeast, at Rumbolds Point, Clerke Rocks, and Annenkov, Cooper and Green Islands (Fig. 1). Colonies are typically located on steep coastal headlands and cliffs covered in tussock grass (*Poa flabellata*).

The Black-browed Albatross is a colonial and annually breeding species, although 25% of successful breeders and 33% of failed breeders defer breeding in the following year (Croxall et al. 1998). The total breeding season lasts about eight months. Adults return to colonies in late September. Incubation extends from late October to early January, the brood period from early to late January, and post-brood chick rearing from late January to April-May (Prince et al. 1994; Tancell et al. 2016).

Annual monitoring by the British Antarctic Survey (BAS) of Black-browed Albatross study colonies at Bird Island indicates a long-term decline in breeding numbers since the mid-1970s (Fig. 2). Archipelago-wide surveys conducted in 2003 (Poncet et al. 2006) and 2014 (Poncet et al. in press), the latter including only a subset of locations (amounting to c. 30% of the total South Georgia population), show that the long-term decline of Black-browed Albatrosses at Bird Island is similar to the rest of the island

group. Between 2003 and 2014 numbers of Black-browed Albatrosses breeding at South Georgia (all locations surveyed in both years) decreased by 18% (1.8% per annum), similar to the trend at Bird Island over the same period, which showed a decline of 15%, or 1.5% per annum (Poncet et al. in press).

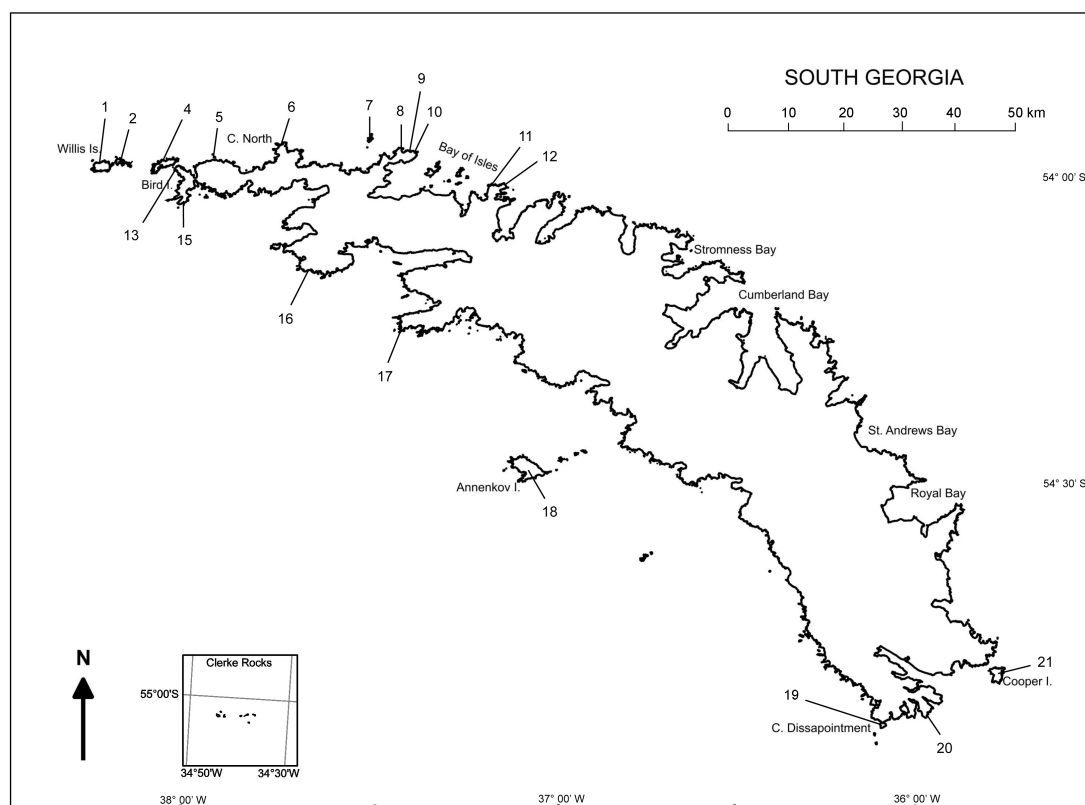


Figure 1: Breeding locations of Black-browed Albatrosses at South Georgia. Numbers refer to the locations listed in Appendix 1. Note that the Location Numbers are consistent with the numbers that have been used in previous counts and publications (e.g. Poncet et al. 2006, in pres) of Black-browed and Grey-headed Albatrosses at South Georgia. The missing numbers (3, 14) refer to locations at which Grey-headed Albatrosses breed, but not Black-browed Albatrosses. The position of Clerke Rocks (breeding location 22) is some 55 km southeast of the main island.

In addition to annual counts of nesting birds, BAS has conducted annual demographic monitoring of ringed Black-browed Albatrosses at Bird Island from 1975/76 onwards to determine and monitor inter alia juvenile (0-3 years), immature (from first return to first breeding) and adult survival rates and individual reproductive success. Demographic monitoring indicates a marked reduction in adult and juvenile survival rates since the mid 1980s, which has been attributed mostly to incidental mortality associated with commercial fisheries (Croxall et al. 1998; Phillips et al. 2005). Furthermore, male Black-browed Albatrosses have a much lower (by 2%) survival rate than females at South Georgia (Croxall et al. 1998). Although the reasons for this difference are not entirely clear, it might reflect differences in relative overlap with fisheries, or males competing more vigorously for fisheries discards and

bait and thus excluding females from around fishing vessels. Breeding success has been variable, with no consistent long-term pattern over the monitored period (Phillips et al. 2011).

In sharp contrast to the South Georgia population trend, Black-browed Albatrosses breeding at the Falkland Islands and southern Chile (which together with South Georgia support the majority of the global population) have shown substantial increases over the last decade or so (Wolfaardt 2012; Robertson et al. 2014, 2016). These increases have been attributed to reduced levels of seabird bycatch and in the case of the Falklands population is also thought to be associated with favourable feeding conditions (Wolfaardt 2012). That the Black-browed Albatross population at South Georgia continues to decline, suggests that, in contrast to the populations in the Falkland Islands and southern Chile, at least some of the fisheries they encounter remain a threat, that other factors are affecting the population, or a combination thereof (see section 2.3.2.1).

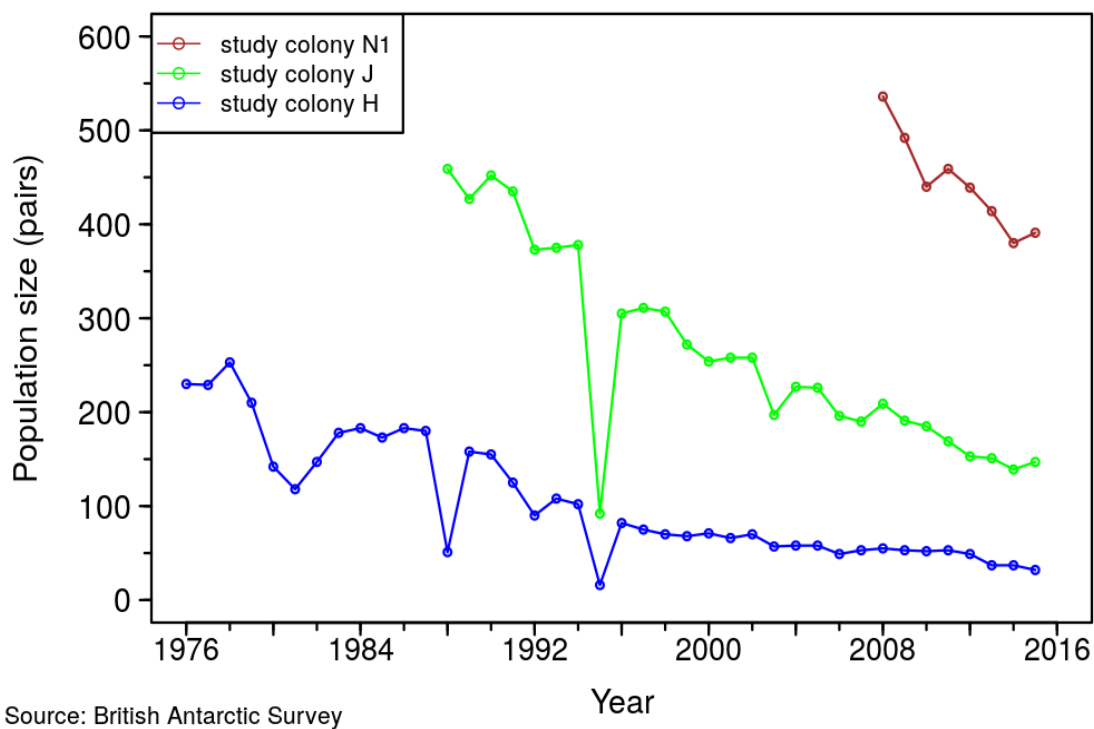


Figure 2: Population trends of Black-browed Albatross at three study colonies at Bird Island, South Georgia. Data provided by British Antarctic Survey (BAS).

The Black-browed Albatross is listed on Annex 1 of the Agreement on the Conservation of Albatrosses and Petrels (ACAP). The species is currently listed as **Near Threatened** by the International Union for Conservation of Nature's (IUCN) Red List of Threatened Species. It was previously (from 2003 to 2013) listed as **Endangered**. However due largely to the most recent survey of the population in the

Falkland Islands, which revealed an increase of at least 4% per annum between 2005 and 2010, and provided evidence for a longer-term increase, the species was downlisted to Near Threatened in 2013 (BirdLife International 2016). The poor conservation status of the South Georgia population of Black-browed Albatrosses has led to it being included in the list of high priority ACAP populations (see below).

2.2 Marine distribution and diet

Extensive data on the distribution of Black-browed Albatrosses from South Georgia are available from tracking work conducted by BAS at Bird Island since the early 1990s. These data have been collected through the deployment of a range of devices (including satellite-transmitters, GPS loggers or geolocators) on breeding adults, non-breeding adults, prebreeders (immatures) and juveniles.

The tracking data have revealed important insights on the distribution of South Georgia Black-browed Albatrosses, including their overlap and potential interaction with fisheries (see below). Both breeding and non-breeding birds have extensive foraging ranges that vary according to age, life-history category, breeding stage and sex. Although Black-browed Albatrosses tend to concentrate in shelf and shelf-slope waters, they will also feed over much deeper water (Prince et al. 1998; Petersen et al 2008). During incubation (late October to early January), when foraging trips are far longer than during chick rearing, males and females forage in different areas with little overlap. Females tend to forage northwest of South Georgia, largely in pelagic waters, but also on the Patagonian shelf, whereas males tend to forage to the east of South Georgia (Phillips et al. 2004). During the chick-rearing period (January to April), breeding adults of both sexes remain largely in waters south of the Antarctic Polar Front, and show little overlap with fishing effort due to the time-area closure of the South Georgia Patagonian Toothfish *Dissostichus eleginoides* fishery (Phillips et al. 2011; Fig. 3).

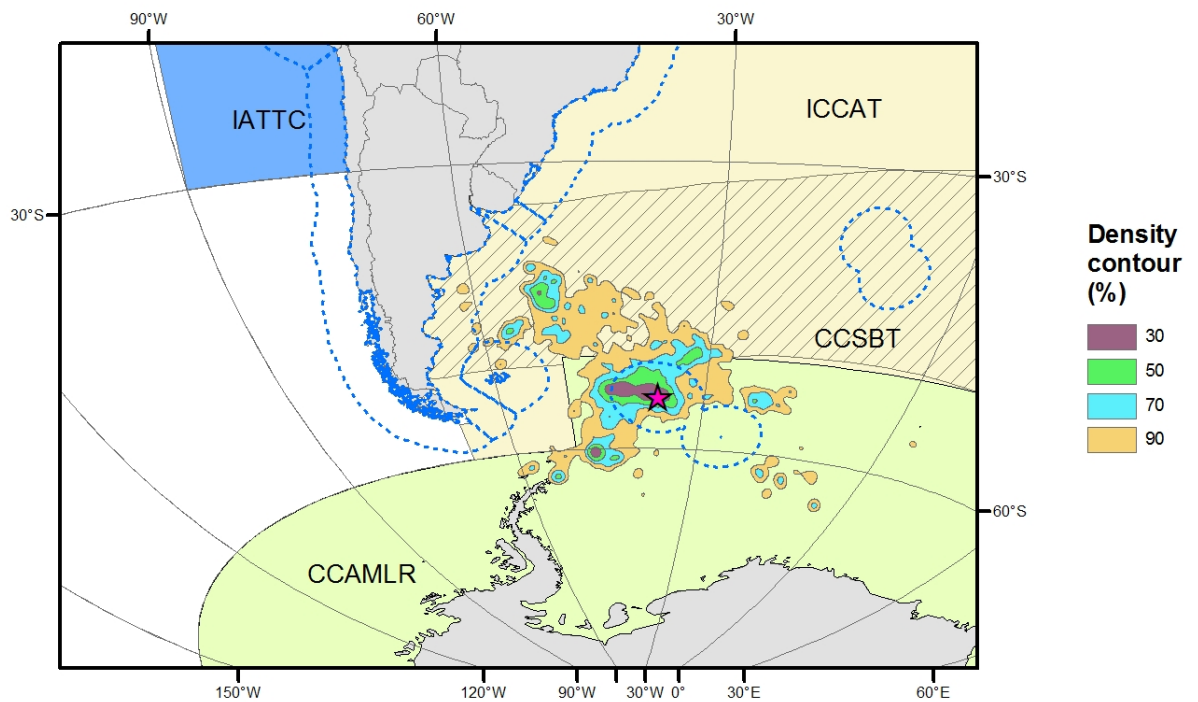


Figure 3: Density distribution of Black-browed Albatrosses from Bird Island, South Georgia during the breeding season in relation to the main Regional Fisheries Management Organisations (RFMOs) and other fisheries management areas with which they overlap. The blue dotted lines outline areas of national jurisdiction. The 30% contour indicates areas of highest concentration, within which breeding birds spend 30% of their time. The 90% contour encompasses 90% of their breeding distribution. Data provided by BAS.

Most (> 90%) of the South Georgia population of Black-browed Albatrosses spend the non-breeding period in the highly productive Benguela upwelling region off southwest Africa, where they overlap with a number of longline and trawl fisheries (Phillips et al. 2005, Petersen et al. 2008; Fig. 4). Although most males spend the majority of the non-breeding period in the Benguela region, a very small proportion adopt a different strategy, travelling to southeastern Australia, or remaining in the southwest Atlantic, mainly on the Patagonian Shelf (Phillips et al. 2005; Fig. 4).

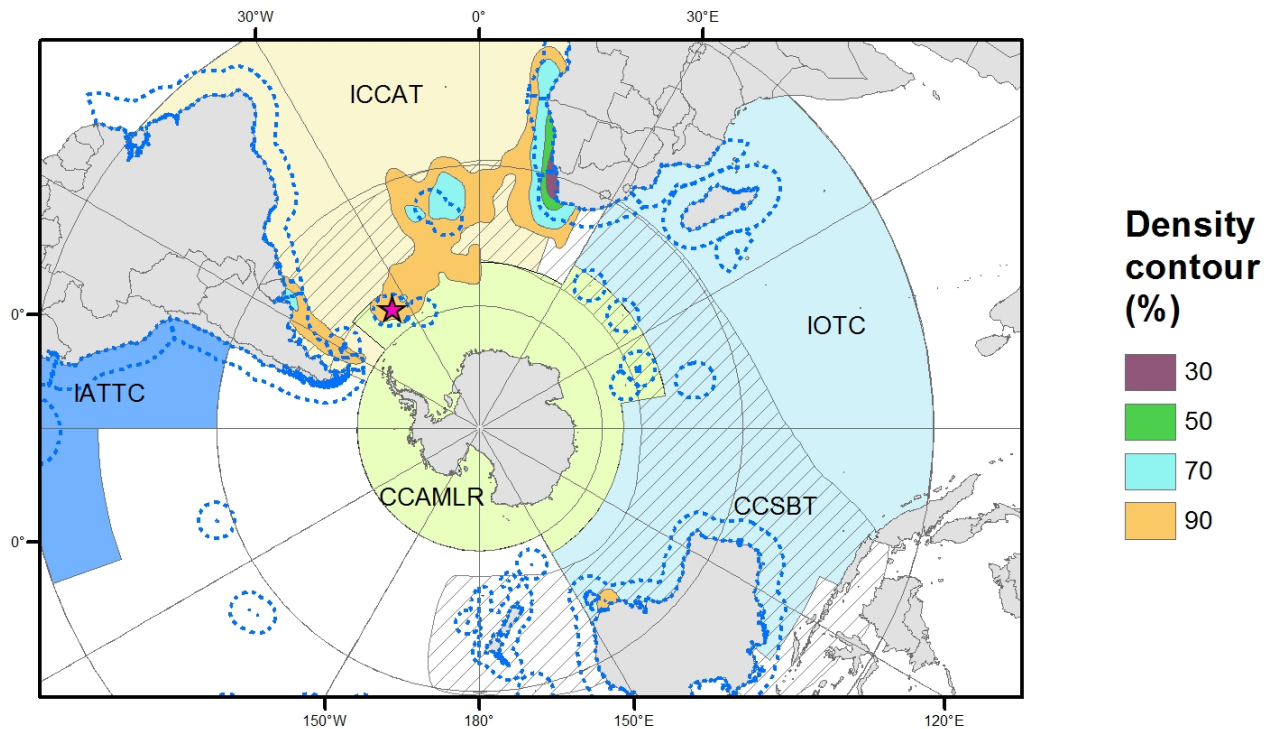


Figure 4: Density distribution of Black-browed Albatrosses from Bird Island, South Georgia during the non-breeding period in relation to the main RFMO and other fisheries management areas with which they overlap. The blue dotted lines outline areas of national jurisdiction. The 30% contour indicates areas of highest concentration, within which breeding birds spend 30% of their time. The 90% contour encompasses 90% of their non-breeding distribution. Data provided by BAS.

The diet of Black-browed Albatrosses at South Georgia has been studied extensively by BAS through long-term monitoring initiatives at Bird Island using both morphological analysis to identify prey remains from physical attributes and biochemical analysis of tissue samples. The former approach, which has been used on Black-browed and Grey-headed Albatrosses, involves inducing regurgitation by chicks immediately after they have been fed, and was found not to have any deleterious effects on subsequent survival or fledging mass of sampled chicks (Phillips 2006). The BAS diet monitoring programme of Black-browed Albatrosses at Bird Island, which forms part of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) Ecosystem Monitoring Programme (CEMP), has provided one of the longest albatross diet time-series for any site (McInnes et al. 2016). The diet is diverse, with fish (including species obtained from commercial fishing operations), squid and crustaceans (*Euphausia superba*) all comprising important components, proportions of which can vary considerably between years (Prince 1980; Rodhouse and Prince 1993; Reid et al. 1996; Xavier et al. 2003; Alvito et al. 2015). Black-browed Albatrosses commonly associate in large numbers with fishing vessels and activities. Although this association may have positive effects, through access to fishing offal and discards (Thompson and Riddy 1995), it increases their risk of being incidentally killed.

2.3 Threats

Albatrosses face threats both on land (at their breeding colonies) and at sea. ACAP has established a set of criteria to assess the scope (proportion of population affected) and severity (intensity) of threats at each breeding site and for each breeding population. A factor or process is only considered a threat if it has been documented in some way at the island group in question, and is likely to have a negative impact (population decline in the next decade) on the species or population. Potential or suspected threats are thus not included in the ACAP threat assessment process.

Given the lack of evidence for any land-based threats (such as human disturbance and introduced predators) or disease, and the negligible bycatch of birds within South Georgia and CCAMLR waters currently, the observed decline of Black-browed Albatrosses at South Georgia has been attributed to bycatch associated with commercial fishing operations outside of this region (Agreement on the Conservation of Albatrosses and Petrels 2010; Poncet et al. 2006; in press).

Black-browed Albatrosses are not currently considered to be threatened by any land-based factors or processes at South Georgia. The following section summarises information on potential threats or factors that may impact the population in some way, and thus require further investigation.

2.3.1 Land-based threats

There is no evidence of any substantial land-based threats to Black-browed Albatrosses at South Georgia. However, it is considered useful and important to learn more about potential threats on land, especially disease, and to maintain management actions that serve to protect albatross breeding sites at South Georgia.

Initiatives to eradicate Norway Rats *Rattus norvegicus*, House Mice *Mus musculus* and Reindeer *Rangifer tarandus* have recently (2015) been completed, with post eradication monitoring currently underway. Although there is no evidence that any of these introduced mammals were a threat to Black-browed Albatrosses at South Georgia, their eradication is a significantly positive contribution to the conservation of the terrestrial ecosystems of South Georgia.

The remote nature of their breeding sites and their highly pelagic marine distributions likely afford some protection to albatrosses from contact with pathogens. However, information on the prevalence and potential impacts of pathogens on seabirds, including Black-browed Albatrosses, at South Georgia is limited. During the 2004/05 breeding season several hundred adult Chinstrap Penguins *Pygoscelis antarctica* were found dead in the colony at Cooper Bay. Subsequent analyses of tissue material confirmed avian cholera, caused by the bacterium *Pasteurella multocida*, to be the cause of death. Large numbers of Chinstrap Penguins were reported dead in the colony again in 2010, and it is suspected that that these deaths were also the result of an outbreak of avian cholera. Consequently, the site has remained closed to visitors ever since. There have been no recorded incidents of disease affecting Black-browed Albatrosses at South Georgia. However, avian cholera is responsible for mortality events in several species in Antarctica (Leotta et al. 2001, 2003), and is

likely to be the major cause of the decline in the closely related Indian Yellow-nosed Albatross *Thalassarche carteri* population at Amsterdam Island, where it is also considered a risk for the Amsterdam *Diomedea amsterdamensis* and Sooty Albatross *Phoebastria fusca* (Weimerskirch 2004), highlighting the potential for diseases to impact albatrosses on remote sub-Antarctic islands. Also of interest is an incident in the Falkland Islands, where approximately 1000 adult Black-browed Albatrosses were found dead in the breeding colony at Steeple Jason Island in November 2010. Although biological samples were examined, the analysis of these by a specialist laboratory was inconclusive and the cause of death was recorded as acute septicemia (Agreement on the Conservation of Albatrosses and Petrels 2011). Moreover, it is likely that most albatrosses are immunologically naïve to infectious diseases, rendering them susceptible to opportunistic pathogens. Climate change may lead to increases in pathogen transmission and disease, which could act synergistically with other threats such as fisheries mortality.

2.3.2 At-sea threats

2.3.2.1 Incidental mortality associated with fisheries (seabird bycatch)

Incidental mortality of seabirds in fisheries (hereafter “bycatch”), particularly of albatrosses and petrels, became a major conservation concern in the late 1980s (Brothers 1991). Initial evidence came from numerous recoveries in longline fisheries of Wandering Albatrosses ringed at South Georgia (Croxall and Prince 1990) and estimates of very high levels of seabird bycatch from the Japanese tuna fishery off Australia (Brothers 1991). Subsequently, observations from trawl fisheries operating in the Falkland Islands (Sullivan et al. 2006), Argentina (Favero et al. 2010) and South Africa (Watkins et al. 2008) have highlighted that these fisheries are a major source of mortality for albatrosses and petrels. Black-browed Albatrosses are amongst the most common victims of bycatch in commercial fishing operations in pelagic longline fisheries Bugoni et al. 2008; Jiménez et al. 2010; Anderson et al. 2011; Yeh et al. 2013), demersal longline fisheries (Otley et al. 2007, Favero et al. 2013) and trawl fisheries (Sullivan et al. 2006; Watkins et al. 2008). All evidence indicates that bycatch continues to represent the most severe and immediate threat to South Georgia Black-browed Albatrosses, and is the main factor implicated in its decline and poor conservation status. Their distribution overlaps with a number of major longline and trawl fisheries with which they potentially interact.

The fishery for Patagonian Toothfish in South Georgia waters was initiated in the late 1980s and expanded rapidly during the early 1990s, when there was considerable illegal, unregulated and unreported (IUU) fishing (Government of South Georgia and the South Sandwich Islands 2013). Between 1996 and 2006, Black-browed Albatrosses comprised 44% of the total seabird bycatch associated with the toothfish fishery. This figure, and those provided in the remainder of the paragraph, are from the annual reports of the Scientific Committee for the Conservation of Antarctic Marine Living Resources, and have also been summarised in other key publications (SC-CAMLR, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006; Croxall 2008, Varty et al. 2008). Seabird bycatch rates in the Patagonian Toothfish fishery around South Georgia have since been reduced from very high levels in the mid 1990s (an estimated 5755 seabirds were killed in Subarea 48.3 in 1997 alone) to

zero in 2006 and 2007. Black-browed Albatrosses were also incidentally killed in the Mackerel Icefish *Champsocephalus gunnari* trawl fishery; bycatch associated with this fishery has also since been substantially reduced. Bycatch rates within these fisheries have remained negligible ever since, and only three Black-browed Albatross have been caught in the Maritime Zone since 2010. This achievement is due largely to the prescription by CCAMLR of a range of mandatory technical and operational bycatch mitigation methods that have been implemented, and in some cases further strengthened, by the GSGSSI, with co-operation and support from the fishing industry. These mitigation measures include the closure of CCAMLR Subarea 48.3 for fishing between September and mid-April each year (which coincides with the breeding season of Black-browed Albatrosses at South Georgia), a suite of prescribed technical bycatch mitigation measures, and an international scheme of independent on-board scientific observers. Moreover, there are regular patrols undertaken by the GSGSSI fisheries patrol vessel Pharos SG. There has been no evidence of IUU fishing within South Georgia waters in recent years.

In spite of the ongoing success in reducing bycatch of seabirds within fisheries operating in South Georgia and CCAMLR waters, the Black-browed Albatross population at South Georgia continues to decline, and remains in a highly threatened state. This suggests that at least some of the other fisheries they encounter remain a threat, that other factors are affecting the population, or a combination thereof.

Within the breeding season, birds are likely to be most at risk during the incubation period, when their foraging ranges are greater (taking them out of South Georgia and CCAMLR waters) and trips are of longer duration than during chick rearing (see Fig. 3). Tracking of incubating birds from Bird Island has revealed that females in particular forage northwest of the island in pelagic waters, where they overlap with pelagic longline fisheries (Tancell et al. 2016), but also on the Patagonian Shelf, where they overlap and potentially interact with a number of trawl fisheries (Phillips et al. 2004). However, it is during the non-breeding period that birds are likely to face the greatest bycatch risk. The great majority of non-breeding adults migrate across the South Atlantic to overwinter in the Benguela upwelling region, where they forage within the Exclusive Economic Zones (EEZs) of South Africa, Namibia, and even Angola, and in international waters managed by Regional Fisheries Management Organisations (RFMOs) (Phillips et al. 2005; Petersen et al. 2008; Fig. 4). During their return migration to breed at South Georgia, birds consistently use a number of relatively fixed areas in the South Atlantic, including a large area along the mid-Atlantic ridge around Tristan da Cunha from mid July to early September (Phillips et al. 2005).

Large numbers of Black-browed Albatrosses have been recorded as bycatch in a range of pelagic longline and trawl fisheries within these areas (Ryan et al. 2002; Watkins et al., 2008; Petersen et al. 2009; Tuck et al. 2011; Yeh et al. 2013). Moreover, a large proportion of the Black-browed Albatrosses killed in South African waters are immature birds (Ryan et al. 2002; Petersen et al. 2009; Rollinson et al. in prep.), which are probably resident in the area for their first 3-4 years, and during which time they remain vulnerable throughout the year to bycatch in longline and trawl fishing.

Overall, although some South Georgia Black-browed Albatrosses use the waters of the southwest Atlantic, including along the Patagonian shelf, the southern Indian Ocean and south-east Australia, the evidence provided by tracking and bycatch data suggests that the main threat comes from fisheries in the central and eastern South Atlantic. These include fisheries within the EEZs of South Africa, Namibia and potentially Angola, and importantly extensive pelagic longline fisheries operating in international waters, in areas regulated by two key RFMOs: the International Commission for the Conservation of Atlantic Tunas (ICCAT) and the Commission for the Conservation of Southern Bluefin Tuna (CCSBT). The area managed by the South East Atlantic Fisheries Organisation (SEAFO) is also important for Black-browed Albatrosses, but the fishing effort managed by SEAFO is currently very low.

During the last decade there has been a strong international determination to address the high level of incidental seabird mortality in fisheries, both within EEZs and on the High Seas. This has led to a range of recent policy instruments, including the development and adoption of ACAP, and the relatively recent adoption (within the last five years) of seabird conservation measures (bycatch mitigation measures) by ICCAT and the other tuna RFMOs. This progress has been achieved through a collaborative and evidence-based approach to engaging with RFMOs by BirdLife International, ACAP and a number of active states, involving inputs and collaboration from many scientists. Coincident and linked with these policy developments, has been an increasing effort to quantify the extent of seabird bycatch in fisheries, design and test technical and operational mitigation measures to reduce bycatch and implement management actions to mitigate known threats to seabird populations. These efforts, best illustrated by the CCAMLR example, have shown that by properly implementing an appropriate suite of fishery-specific mitigation measures, seabird bycatch can be progressively reduced, and virtually eliminated.

Although large numbers of seabirds, including Black-browed Albatrosses, have been recorded as bycatch in the pelagic longline and trawl fisheries operating in South African waters (Ryan et al. 2002; Watkins et al. 2008), recent estimates have shown a substantial reduction in bycatch levels for both of these fisheries. This decline has been attributed to a number of factors, including improved sample sizes compared to initial estimates, the adoption and improved use of bycatch mitigation and associated management measures, and particularly in the case of foreign (Asian-flagged) pelagic longline vessels, complete (100%) observer coverage of fishing effort (Petersen et al. 2009; Maree et al. 2014 Rollinson et al. in prep). On the basis of bycatch data for the period 2006-2013, Rollinson et al. (in prep) estimate that ca. 19 Black-browed Albatrosses were killed per annum in the pelagic longline fishery operating off South Africa, which is six times lower than the estimate of Petersen et al (2009), who estimated that from 1998-2005, 125 Black-browed Albatrosses were killed each year in this fishery. Similarly, the previously substantial levels of seabird bycatch (including Black-browed Albatrosses) estimated for the South African deep-water hake trawl fishery (Watkins et al. 2008), has been significantly reduced, especially for albatrosses, which showed a >95% reduction in mortality (Maree et al. 2014). This reduction was attributed primarily to the effectiveness of bird-scaring lines, which were introduced as a permit requirement in 2006, and to a lesser extent to a reduction in fishing effort (Maree et al. 2014). The previously high levels of bycatch within these fisheries undoubtedly contributed to the decline of the South

Georgia Black-browed Albatross population. One would expect that the substantial reductions in bycatch recorded recently within these fisheries should have a positive impact on the South Georgia population. However, the most recent (2014/15) census results show that the number of Black-browed Albatrosses at South Georgia continues to decline. This suggests either that the previously high levels of bycatch are still being manifest (e.g. through poor recruitment) or that bycatch in other areas remains a threat, perhaps in combination with the residual bycatch occurring within these South African fisheries, and climate change (see section 2.3.3).

Although seabird bycatch within Namibian fisheries has been considered to be a major problem for some time, it is only fairly recently that formal bycatch estimates have become available. Estimates of bycatch have been derived largely through the BirdLife International's Albatross Task Force (ATF), which was launched in Namibia in 2008, and indicate that large numbers of birds are killed by both the demersal longline and demersal trawl fisheries for hake *Merluccius spp.* The initial estimates indicate that over 20,000 seabirds were killed annually in the demersal longline fishery, and over 8,000 in the trawl fishery (BirdLife International Marine Programme 2016). The majority of birds killed in the demersal longline fishery were White-chinned Petrels *Procellaria aequinoctialis*, with smaller numbers of Atlantic Yellow-nosed *Thalassarche chlororhynchos* and Black-browed Albatrosses, whereas the majority of bycatch in the trawl fishery comprised Atlantic Yellow-nosed Albatrosses and White-chinned Petrels (BirdLife International Marine Programme 2016). Following these assessments of seabird bycatch, in November 2015 the Namibian Government gazetted separate regulations to mitigate bycatch of seabirds in its demersal longline and trawl fisheries for hake. The Namibian Government is also in the process of acceding to ACAP, and has actively participated in ACAP meetings over the last couple of years, thus providing good opportunities for collaborative work and engagement on bycatch issues.

There has been no formal assessment of levels of seabird bycatch within the Namibian pelagic longline fleet, but this is due to be initiated by the ATF in 2016.

Virtually nothing is known about levels of seabird bycatch associated with fisheries operating off of Angola. There have been some recent anecdotal reports of albatrosses being caught in fisheries, but these remain of an informal nature. Given their relative distributions, if albatrosses are being caught in fisheries off Angola, these are more likely to be Atlantic Yellow-nosed Albatrosses. However, the non-breeding distribution of South Georgia Black-browed Albatrosses does extend into Angolan waters (Phillips et al. 2005), and so it is possible that birds are being killed in fisheries there.

The extensive fisheries operating within the waters managed by ICCAT and CCSBT, especially in the central and eastern South Atlantic, are undoubtedly still contributing to bycatch of South Georgia Black-browed Albatrosses. An assessment of seabird-fishery interactions in the Atlantic Ocean showed that ICCAT longline fisheries catch substantial numbers of seabirds, with those breeding at South Georgia amongst the most adversely impacted (Tuck et al. 2011, Jiménez et al. 2012). Over the period of the assessment (2003-2006), 48,500 seabirds were estimated to have been incidentally killed in pelagic longline fisheries in the Atlantic Ocean, 32% of which were Black-browed Albatrosses (Klaer 2012).

Over the last five years all five of the tuna RFMOs, including ICCAT, have enacted seabird conservation measures aimed at reducing seabird bycatch that are informed by, but not completely aligned with, ACAP best practice advice. Notwithstanding this progress, the extent of implementation of effective mitigation measures within these RFMOs remains largely unknown. One of the key challenges now is to ensure that the adoption of policies requiring the use of seabird conservation measures by these and other fisheries management organisations is being translated into effective action on the decks of fishing vessels. In order to address this challenge, there is a need for improved data collection through at-sea observer programmes to provide much better information on bycatch rates, the effectiveness of bycatch mitigation measures and levels of compliance.

2.3.2.2 Ingestion of fishing hooks

Monitoring of marine debris and fishing gear associated with seabirds has been carried out annually by BAS at Bird Island since 1993/1994. A recent analysis of these data revealed that despite their known association with fishing vessels, very little fishing gear was found in nests or colonies of Black-browed Albatrosses (Phillips et al. 2010). The low incidence of fishing gear associated with nests and chicks may be at least partly due to the distribution of Black-browed Albatrosses during the chick-rearing period (January – April/May), when breeding birds remain largely at or south of the Antarctic Polar Front (Phillips et al. 2004). This coincides with the time-area closure of the South Georgia longline fishery for Patagonian Toothfish, thus limiting opportunities for ingesting fishing hooks.

2.3.2.3 Oil contamination

Seabirds are generally the most conspicuous victims of oil spill events. However, due largely to differences in foraging ecology, species vary in their susceptibility to oil pollution. Albatrosses tend to be less susceptible to oil contamination than diving species, such as penguins, and there has been no documented evidence that oil pollution has had anything more than a minor effect on Black-browed Albatrosses. Small numbers of oil-contaminated Black-browed Albatrosses have been recorded around the Falkland Islands. The causes of contamination incidents are often not known, and in the absence of known spills are generally likely to be due to oil discharged illegally or accidentally from vessels or from old wrecks. Given the current and planned oil development activities in the Falkland Islands, and their use of waters to the north and east of the Falklands during incubation, especially females (Phillips et al. 2004), South Georgia Black-browed Albatrosses could be at risk of becoming contaminated due to oil spill events that may occur as a result of these activities (Premier Oil Exploration & Production Limited 2015).

2.3.3 Climate change

Climate change is emerging as a potentially important issue for Southern Ocean seabirds, but its impacts are complex, difficult to predict, and even more difficult to mitigate. Potential impacts include changes to annual sea surface temperature and

marine productivity, and changes in wind, rainfall patterns and ambient temperature that could lead to increased exposure of nesting birds and chicks (Barbraud et al. 2012, Phillips et al. 2016). Through changes to marine and terrestrial environments, climate change may lead to modifications in the distribution, phenology, demography and population dynamics of seabirds, including Black-browed Albatrosses. Climate change may also influence the scale and severity of other threats. For example, changes in the distributions of fish species may, in addition to influencing the composition and availability of their prey, lead to modifications in fishing methods and the spatial and the temporal distribution of fishing effort, which has direct implications for albatross conservation. An increasing number of studies have documented combined impacts of both fisheries mortality and climate on albatross populations, which can interact in a complex manner (Rolland et al. 2008; Rolland et al. 2009a; 2009b; 2010; Barbraud et al. 2012). Warming conditions might also lead to a potential increase in the risk of disease transmission because of greater environmental stress in infected birds, and increased opportunities for the establishment of new vectors.

3. POLICIES, PLANS AND LEGISLATION RELEVANT FOR MANAGEMENT

3.1 National instruments

All of South Georgia is formally protected, and all visits to and activities within the archipelago are managed by means of a permit system. The main activities conducted within South Georgia, including its Maritime Zone, are commercial fishing, tourism and science. The Wildlife and Protected Areas Ordinance (2011) provides a legal basis for the environmental policies of GSGSSI. The legislation affords complete protection for indigenous flora and fauna of South Georgia (and the South Sandwich Islands), including Black-browed Albatrosses. The Ordinance establishes powers to designate and manage Specially Protected Species and Habitats (although none have yet been established), Specially Protected Areas (the process to establish these is currently underway) and Marine Protected Areas (see below).

Fisheries within the jurisdictional waters of South Georgia and the South Sandwich Islands are managed to the highest international standards, including the use and monitoring of progressive seabird conservation and management measures. The Fisheries (Conservation and Management) Ordinance (2000), and subsequent amendments, provides a framework for the issuing of fishing licenses, enforcement and penalties.

The South Georgia and South Sandwich Islands Marine Protected Area (MPA) was declared in 2012. The aim of this MPA, which occupies 1.07 million km², and includes large no-take zones in all coastal areas, is to ensure the protection and conservation of the regions marine biodiversity and ecological processes, whilst allowing sustainable and carefully managed fisheries. Details of the MPA, including management prescriptions and provisions for surveillance and monitoring, are included in the South Georgia and the South Sandwich Islands Marine Protected

Area Management Plan (Government of South Georgia and the South Sandwich Islands 2013).

The Biodiversity Action Plan for South Georgia and the South Sandwich Islands (2016-2020) provides a framework for environmental management of the Territory, outlining a range of environmental commitments and activities and how these will be implemented over the five year period: 2016-2020 (Government of South Georgia & the South Sandwich Islands 2016). This Conservation Action Plan for Black-browed Albatrosses at South Georgia responds to one of the tasks (3.2.4) listed in the Biodiversity Action Plan.

3.2 International instruments

3.2.1 Agreement on the Conservation of Albatrosses and Petrels (ACAP)

The management of South Georgia and its biodiversity is also informed by a number of International Treaties or Agreements. Chief amongst these in relation to Black-browed Albatrosses is ACAP. The United Kingdom (UK) was Party to the negotiation of the Agreement and ratified it in 2004, soon after it came into force, and this ratification has been formally extended to the relevant Overseas Territories, including South Georgia and the South Sandwich Islands. ACAP was developed under the broad auspices of the Convention on the Conservation of Migratory Species of Wild Animals (CMS), but is an international instrument in its own right. ACAP seeks to achieve and maintain a favourable conservation status for albatrosses and petrels globally. This objective is pursued through a framework for undertaking and coordinating international activity to mitigate known threats to populations of affected species listed in Annex 1 of the Agreement.

ACAP is the leading forum for technical advice and primary source of information on best practice approaches to eliminate or minimise seabird bycatch during fishing operations, with this information now used extensively by international organisations, and ACAP Parties and non-Party Range States, in the adoption and implementation of effective seabird conservation measures in their fisheries. A plan outlining guidelines for the implementation of ACAP at South Georgia and the South Sandwich Islands was published in 2010 (Wolfaardt and Christie 2010), and is currently being revised. This Conservation Action Plan for Black-browed Albatrosses at South Georgia is intended to complement and not replace the ACAP Plan for South Georgia and the South Sandwich Islands.

3.2.1.1 ACAP Priority Populations

At the sixth meeting of ACAP's Advisory Committee in 2011, a number of high priority populations (of ACAP species) were identified based on rates of decline and levels of threat. The aim of identifying the highest priority ACAP populations is to help target collaborative conservation efforts at the most threatened populations, especially when resources are scarce. The main criteria for determining ACAP high priority populations are that the population is declining by more than 3% per annum,

represents more than 10% of the global population, and for which a major underlying cause of the decline is incidental mortality in fisheries. Initially, five priority populations were identified, including Black-browed Albatrosses at South Georgia (Phillips et al. 2011). Parties responsible for these high priority populations are expected to develop a list of actions that prioritise research and conservation needs, and report to each ACAP Advisory Committee meeting on progress in implementing those activities. This Conservation Action Plan for Black-browed Albatrosses at South Georgia serves *inter alia* as the framework for prioritising research and management actions and reporting routinely to ACAP on progress.

3.2.2 The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR)

CCAMLR regulates fisheries activities in the Southern Ocean waters, including around South Georgia, by means of Conservation Measures and resolutions. These include the prescription, management and monitoring of seabird bycatch mitigation measures, for which CCAMLR has achieved considerable success, and is recognised as having set the gold standard. The Fisheries (Conservation and Management) Ordinance (2000) and subsequent amendments give effect to the GSGSSI's obligations under CCAMLR.

4. MONITORING AND RESEARCH

The great majority of monitoring and research on Black-browed Albatrosses at South Georgia has been carried out by BAS at Bird Island, on the north-west tip of South Georgia. This research was initiated by Lance Tickell in the late 1950s (Tickell and Pinder 1975), and has been continued by BAS from the early 1970s to the present day. Demographic monitoring of ringed birds has been conducted in a number of study plots annually since 1975, and represents one of the longest and most comprehensive studies of albatrosses. This long-term demographic monitoring has been used to monitor the trend in the numbers of Black-browed Albatrosses breeding at Bird Island (see Fig. 2) and the demographic processes and mechanisms (e.g. survival, recruitment and breeding success) associated with the observed trend (Croxall et al. 1990, 1998, Prince et al. 1994, 1998, Arnold et al. 2006). These data have been crucial for demonstrating the linkages between the observed decline in numbers of birds at South Georgia and bycatch, and thus leveraging support for the adoption of seabird conservation measures (Prince et al. 1998, Croxall 2008, Waugh et al. 2008, Tuck et al. 2011). In addition to the demographic monitoring conducted in the study colonies, BAS initiated a programme in 1976/77 to census all nesting Black-browed Albatrosses at Bird Island. These counts have been repeated at roughly ten year intervals ever since, and serve to complement the more detailed demographic monitoring, thus enabling an accurate assessment of the population trend of Black-browed Albatrosses at Bird Island.

The first complete (archipelago-wide) survey of Black-browed Albatrosses breeding at South Georgia was conducted in 1985/86 (Prince et al. 1994), with a subsequent survey conducted in 2003/04 (Poncet et al. 2006). The most recent survey was

conducted in 2014/15, which included only a subset (ca. 30%) of the total South Georgia population (Poncet et al. in press).

BAS has been at the forefront of the development and implementation of a diverse range of foraging ecology research (tracking of at-sea distribution and activity, provisioning rates, diet assessment by conventional means and through analysis of stable isotopes) conducted at Bird Island. This work has been carried out on a number of species at Bird Island, including Black-browed Albatrosses, tracking individuals throughout the year using the latest tracking and logging technology. These data have formed essential components of risk assessments of seabird-fisheries interactions, based on spatio-temporal overlap between seabird species susceptible to bycatch and effort data for fisheries likely to catch them (see Component 4 of the Framework for Action for further details).

5. FRAMEWORK FOR ACTION

This Plan is intended to serve as a tool to guide and prioritise conservation action for South Georgia Black-browed Albatrosses. It takes advantage of knowledge gained from extensive research and monitoring, and represents our best collective understanding of their current conservation needs. It is important to note that there are a number of important actions included in the implementation framework that are not, or will not be, implemented directly by GSGSSI, but by partner organisations, such as BAS. It is not the intention of GSGSSI to prescribe these actions to external agencies, but rather to recognize that they form a vital component of the conservation framework, and to help facilitate their implementation and support as appropriate the external agencies in carrying them out.

This plan seeks to achieve and maintain a favourable conservation status for Black-browed Albatrosses at South Georgia, and in so doing contribute towards the improved conservation status of Black-browed Albatrosses globally.

Components of the Conservation Action Plan

In order to achieve the goal of this plan, a number of priority actions and associated activities have been identified that fall into the following eight components, in no order of importance:

- 1. Long-term monitoring of Black-browed Albatross population dynamics at South Georgia.*
- 2. Long-term monitoring of the foraging ecology and diet of Black-browed Albatrosses at South Georgia.*
- 3. Monitoring and management of potential land-based threats to Black-browed Albatrosses breeding at South Georgia.*
- 4. Understanding marine-based threats to South Georgia Black-browed Albatrosses in order to implement and promote best practice management approaches within and outside SGSSI waters to address these.*

5. *Understanding the potential impacts of climate change on the ecology and population dynamics of South Georgia Black-browed Albatrosses.*
6. *Raising awareness of the plight of Black-browed Albatrosses at South Georgia, and the actions that are required and being undertaken to improve their conservation status.*
7. *Participating in international conservation and fishing fora to promote actions that will help support the conservation of Black-browed Albatrosses from South Georgia.*
8. *Reviewing the Conservation Action Plan to evaluate accomplishments and update information on priority needs.*

Implementation

The implementation period for this Conservation Action Plan is 2016-2020, which has been set to coincide with the time frame for the Biodiversity Action Plan for South Georgia & the South Sandwich Islands and the overarching South Georgia & the South Sandwich Islands Strategy. However, given the long-term nature of the overall goal, it is anticipated that the Conservation Action Plan will need to be extended beyond this five-year period. As the nature of threats to Black-browed Albatrosses at South Georgia is dynamic, an adaptive and flexible approach is required, that incorporates information collection and assessment, feedback and re-assessment. Routine reviews of performance against the stated objectives and actions, and an overall assessment at the end of the implementation period, will be used as the basis for drafting a revised Action Plan for the following five-year period.

Given their vast foraging ranges, and consequently the wide-ranging nature of threats to South Georgia Black-browed Albatrosses, their conservation is a matter of international concern and shared responsibility. GSGSSI will not be able to realise the goal of this Plan alone because many of the threats to South Georgia Black-browed Albatrosses occur outside of GSGSSI's area of jurisdiction. Even within GSGSSI's area of jurisdiction, a collaborative approach is required as a variety of stakeholders play key roles in the conservation and protection of Black-browed Albatrosses at sea and on land.

Whereas threats or management actions within the jurisdiction of GSGSSI will involve dedicated management or mitigation strategies, those that involve other nations will require a different approach, in which GSGSSI will need to engage with those nations (and organisations), and through multi-lateral agreements such as ACAP, to promote and assist seabird conservation measures. This is particularly the case for mitigating the threat of bycatch, which will only be properly addressed through a concerted international effort, especially on the High Seas (Areas Beyond National Jurisdiction).

There are a number of international conservation initiatives currently underway that are working to progress seabird bycatch on the High Seas and in other areas considered to be a risk for albatrosses and petrels (see Component 4 for further details). Although the scope of these initiatives includes all seabirds caught as bycatch, South Georgia Black-browed Albatrosses constitute one of the key components. Consequently, these initiatives are reflected in the Framework for

Action, even if GSGSSI are not a lead or formal partner organisation, to highlight opportunities for collaboration and synergies. The successful implementation of this Plan requires a coordinated partnership approach both within South Georgia and internationally.

Prioritisation

There are a number of important conservation and management actions already in place, and these should continue. However, in order to improve the conservation status of Black-browed Albatrosses at South Georgia, there is a need to go beyond what is currently being done, and to identify the highest priority actions that will create the step-changes needed to achieve the goal of this plan. The step-change actions that will most likely promote improvements to their conservation status are those that help enhance our understanding of the nature and extent of at-sea (fisheries) threats, and on the basis of this improved understanding adopt a targeted approach to addressing these threats. Actions which meet these criteria have been identified as **Priority Actions**, and have been treated separately from the remaining actions, which are called **Associated Activities** in this Plan. A summary of the Priority Actions is provided in Table 1. The Associated Activities are summarised in Table 2, in which the relative importance of each in relation to improving the conservation status of Black-browed Albatrosses from South Georgia is scored as **High, Medium** or **Low**.

It is important to note that there are some activities, such as those that relate to biosecurity, which are not considered to be a high priority for improving the conservation status of Black-browed Albatrosses at South Georgia, but are important for South Georgia generally.

Component 1: Long-term monitoring of Black-browed Albatross population dynamics at South Georgia

The breeding population of Black-browed Albatrosses has been monitored annually at Bird Island since the 1970s, and is one of the most comprehensively studied albatross populations globally. These data have been instrumental in demonstrating the long-term population decline at South Georgia, determining the demographic mechanisms for the decline, and identifying bycatch as the main driver of the ongoing decline. In establishing the link between the population decline and bycatch in fisheries, these data have been crucial in leveraging support for the adoption of bycatch mitigation measures in a range of fisheries. The majority of the current population monitoring takes place at Bird Island. Wider population censuses have taken place on three occasions since the mid 1980s, the most recent of which was conducted in 2014/15.

Accurate estimation of population size is critical for monitoring conservation status, and for identifying the key factors influencing changes in population size and demography of South Georgia Black-browed Albatrosses. It is important that the established long-term monitoring initiatives are maintained so that the population

trend of Black-browed Albatrosses at South Georgia can continue to be robustly monitored, and the factors influencing the trend understood. The population monitoring strategy at South Georgia includes a combination of annual monitoring of breeding numbers and breeding success, comprehensive demographic studies at a sample of study colonies at Bird Island to assess adult and juvenile survival, recruitment and other demographic parameters that help identify the underlying causes of population trends, and archipelago-wide censuses much less frequently.

It appears that the population trend for Black-browed Albatrosses at Bird Island is similar to that recorded for the rest of the archipelago (Poncet et al. 2006; in press). It is important to note that different census methodologies are used for each of these initiatives. The colonies at Bird Island are surveyed annually by direct ground counts, and numbers adjusted for breeding failure using data from study colonies that are visited regularly. The error associated with these counts is therefore expected to be very low. The archipelago-wide surveys are conducted using vessel-based photography, and although this method is considered optimal for sites outside of Bird Island, it has been found to underestimate the number of Black-browed Albatrosses by about 4% (Poncet et al. in press). In order to improve the representativeness of the monitoring strategy for Black-browed Albatrosses at South Georgia, it would be useful to initiate more regular (annual) counts at one or two more sites (i.e. away from Bird Island), including colonies at the southeast end of the island, to monitor numbers of birds breeding and breeding success. The expansion of the annual monitoring programme will also help facilitate a better interpretation of the results of the decadal archipelago-wide surveys.

Associated Activities

- 1.1 Encourage and support as appropriate BAS to continue long-term demographic monitoring of Black-browed Albatross at Bird Island (at established study colonies).
- 1.2 Encourage and support as appropriate the continuation of decadal counts by BAS of the number of Black-browed Albatrosses breeding at Bird Island (whole island).
- 1.3 Develop and implement photo-survey monitoring of population trends and breeding success of Black-browed Albatrosses at additional sites outside of Bird Island. Investigate the involvement of cruise-ship expedition staff and passengers at one site (Elsehul within the Paryadin Peninsula North Breeding Location; Location No. 13 in Fig. 1 and Appendix 1), and the use of the FPV *Pharos SG* to conduct similar photo-survey monitoring at Cooper Island. In both cases, protocols will need to be developed, including defining the colonies, providing reference photos and GPS co-ordinates (both of the colonies and the vessel's positions from which the photographs are to be taken – information which is available from the two previous photo-surveys in 2003/04 and 2014/15), and systems set up to curate the photographs and conduct counts. In order to monitor population trends, photos of incubating birds would need to be taken in November of each year. Repeat photos taken of the colony in early April can be used to calculate and monitor breeding

success. Photo-counts of these colonies should be conducted annually, or as frequently as possible.

- 1.4 Conduct a census of Black-browed Albatrosses breeding at South Georgia once every 10 years, using the same methodology and timing as previous surveys, and data from Bird Island to develop correction factors. The level of coverage should as a minimum be based on the same sites surveyed in 2014/15, which represents approximately 30% of the South Georgia population.
- 1.5 Ensure that all population status and trend data are routinely incorporated into the GSGSSI GIS and database, and submitted to ACAP.
- 1.6 Formally submit and present the paper on the 2014/15 survey of Wandering, Black-browed and Grey-headed Albatrosses at South Georgia (Poncet et al. in press) to the next meeting of ACAP's Population and Conservation Status Working Group, scheduled to take place in September 2017 in New Zealand.

Component 2: Long-term monitoring of the foraging ecology and diet of Black-browed Albatrosses at South Georgia

Based on extensive tracking and associated research undertaken by BAS at Bird Island, the at-sea distribution, foraging ecology and diet of South Georgia Black-browed Albatrosses, is relatively well known. These data have formed essential components of risk assessments of seabird-fisheries interactions, based on spatio-temporal overlap between seabird species susceptible to bycatch and effort data for fisheries likely to catch them. In this context the BirdLife Global Procellariiform Tracking Database (BirdLife International 2004), which serves as a repository for all albatross and petrel tracking data, has been a crucial tool for identifying actual and potential bycatch 'hotspots' in coastal waters and on the High Seas.

Although most age-classes and life-cycle phases of South Georgia Black-browed Albatrosses have been tracked at some point, the distribution of non-breeding birds (including juveniles, pre-breeders/immatures and sabbatical adult birds) is not as well known as breeding birds. This is due to a combination of sample sizes (limited numbers of birds that have been tracked, and the number of years for which data exists) and the resolution of the tracking data collected (based on the type of device used – non-breeding birds have generally been tracked with geolocators which are accurate to c. 200km and are of poor resolution around equinoctial periods). The priority actions for further tracking work should be based on filling gaps to expand and improve overlap analyses of albatross distribution with fishing effort, and thus advance knowledge of potential interactions between fisheries and Black-browed Albatrosses from South Georgia.

Given that all tracking of Black-browed Albatrosses has been conducted from Bird Island, efforts should be directed towards tracking birds from additional sites, especially sites that are much further east, which are most likely to show distributions that differ from Bird Island. Cooper Island would be a good candidate site in this respect. Tracking from sites away from Bird Island should be focused largely on non-breeding birds, as the available tracking data indicate that breeding birds are likely to

remain south of the Antarctic Polar Frontal Zone, where and during which time they show little overlap with fisheries. These priority actions are outlined in greater detail under Objective 4 dealing with marine-based threats.

The diet of South Georgia Black-browed Albatrosses is monitored by BAS at Bird Island as part of the long-term CCAMLR Ecosystem Monitoring Programme, through induced regurgitation of chicks. Knowledge of diet is important to understand possible changes in prey composition and implications for breeding and survival parameters. The Black-browed Albatross diet monitoring programme at Bird Island is one of the longest running diet studies on albatrosses, and it is important to maintain this long-term research to enable detection of dietary shifts, to understand the possible reasons for these shifts, and identify links between prey abundance and demographic parameters of Black-browed Albatrosses. In a recent review of methods used to analyse albatross diets, Bird Island was identified as one of the Key Dietary Monitoring Sites (KDMS) for Black-browed, Grey-headed and Wandering Albatrosses (McInnes et al. 2016). It is important to note that diet samples obtained through induced regurgitation provide information for one component of the breeding period (chick-rearing), and there remains a need to obtain dietary information for other parts of the breeding season, as well as from non-breeding birds using forensic techniques (e.g. stable isotope mixing models, fatty acids).

Associated Activities

- 2.1 Evaluate at-sea distribution data for South Georgia Black-browed Albatrosses with respect to gaps and limitations in sample size, and likely overlap with high risk fisheries, and on this basis identify priority age and life-cycle phases for which further tracking data are required. Systematically update and fill data gaps in a prioritized manner. See Priority Action 4.1 and Associated Activity 4.7 for further details.
- 2.2 Consider tracking non-breeding Black-browed Albatrosses from Cooper Island to investigate if their distribution differs from birds tracked at Bird Island, and thus determine if the non-breeding distribution shows some variation across the archipelago. Satellite-linked GPS devices would need to be used if there was a single visit, whereas use of GLS loggers would require multiple visits in successive years.
- 2.3 Ensure all tracking data are routinely submitted to the Global Procellariiform Tracking Database so that they can be used in future seabird-fisheries risk assessments.
- 2.4 Encourage and support as appropriate the continued implementation of the BAS long-term diet monitoring programme of Black-browed Albatrosses at Bird Island using existing methods (Phillips 2006).
- 2.5 Investigate methods to collect dietary information outside of the chick-rearing period, and from non-breeding birds.

Component 3: Monitoring and management of potential land-based threats to Black-browed Albatrosses breeding at South Georgia

There is no evidence that any land-based threats are currently affecting Black-browed Albatrosses at South Georgia. Visits to, and activities within, the archipelago are strictly managed by GSGSSI so as to ensure effective site protection, while at the same time encouraging responsible tourism and research.

One of the main objectives of the Biodiversity Action Plan for South Georgia and the South Sandwich Islands is to implement best practice biosecurity protocols, pre- and post-border monitoring and emergency response measures, especially since the completion of projects to eradicate rodents and reindeer from the island. A number of actions contained within the Biodiversity Action Plan are designed to support this biosecurity objective and thus reduce the risk of introducing non-native species and transmitting pathogens and diseases to South Georgia.

At least one, and probably two, outbreaks of avian cholera have occurred at South Georgia. In both cases, the outbreaks appear to have been restricted to Cooper Bay, where Chinstrap Penguins were the main victims. Although there have been no reported incidents of diseases impacting Black-browed Albatrosses at South Georgia, avian cholera has impacted albatrosses at other island groups, so it is important to screen birds at South Georgia to establish baseline levels of these (or other) pathogens.

Effective protection and management of the terrestrial environment of South Georgia, and activities within it, has helped ensure that land-based activities and processes are not currently threatening Black-browed Albatrosses. It is important that the stringent protection of breeding sites and management of human activities is maintained, and that knowledge regarding baseline levels of pathogens and disease in South Georgia Black-browed Albatrosses is improved.

A range of Specially Protected Areas were identified in the 2006 South Georgia Plan for Progress (Pasteur and Walton 2006), but have not been established in law. One of the priority actions of the Biodiversity Action Plan for South Georgia and the South Sandwich Islands is to work with stakeholders to identify locations that should be declared as Protected Areas under the Wildlife and Protected Areas Ordinance (2011). It is envisaged that a range of different Protected Area categories will be established, with the entire terrestrial environment of South Georgia being afforded some form of legal protection (Government of South Georgia and the South Sandwich Islands 2016). Black-browed Albatross breeding sites will be incorporated into this Protected Area planning process.

Associated Activities

- 3.1 Continue to support and manage responsible tourism activities at South Georgia.
- 3.2 Ensure that the South Georgia biosecurity protocols described within the Biosecurity Handbook (2016) are properly implemented, regularly reviewed, and improved where possible.

- 3.3 Implement all biosecurity activities listed under Objective 6 of the Biodiversity Action Plan for South Georgia and the South Sandwich Islands.
- 3.4 Determine baseline levels of pathogens and disease in Black-browed Albatrosses at South Georgia, and subject to the findings of this investigation develop and implement a long-term disease surveillance and response programme (see also 3.5). The sampling strategy should ideally include both Bird Island (visited by humans since the 1960s), and a colony that has experienced very little human visitation (e.g. Cape North, Paryadin Peninsula South). ACAP is in the process of developing guidelines for sampling that should be used to inform protocols at South Georgia.
- 3.5 Develop and implement a contingency that sets out rapid response remedial actions that should be implemented in the event of a disease outbreak and is based on best practice principles.
- 3.6 Ensure that the Black-browed Albatross breeding sites are included in the SGSSI Protected Areas planning process, and that these sites are optimally incorporated into the Protected Area Framework that is developed.

Component 4: Understanding marine-based threats to South Georgia Black-browed Albatrosses, in order to implement and promote best practice management approaches within and outside SGSSI waters to address these

Bycatch of Black-browed Albatrosses and other seabirds has been reduced to negligible levels within the jurisdictional waters of South Georgia and the South Sandwich Islands, and in CCAMLR waters more broadly. There is some evidence to suggest that IUU fishing may be taking place in some CCAMLR areas, including potentially in Subarea 48.2, just south of South Georgia, although the extent is hard to quantify. Nevertheless, all evidence indicates that the continued decline of Black-browed Albatross population at South Georgia is likely due, at least in part, to bycatch of birds associated with fisheries operating outside of South Georgia and CCAMLR waters. The conservation of South Georgia Black-browed Albatrosses is therefore dependent on the continued management of bycatch within South Georgia and CCAMLR waters (where breeding birds spend the majority of their time), and urgent efforts to reduce seabird bycatch in fisheries away from this area.

It is thus important that GSGSSI and the UK government complement national policy and actions (to maintain and improve seabird bycatch reduction efforts) with actions at an international level. This is best done by engaging, including through ACAP, the relevant RFMOs, and through bilateral and multilateral approaches with other nations, to promote and assist with the reduction of seabird bycatch in their waters. This is indeed one of the key objectives of ACAP, which requires Parties to take measures both individually and collectively, to achieve and maintain a favourable conservation status for albatrosses and petrels (Article II).

Tracking and bycatch data have highlighted that Black-browed Albatrosses from South Georgia overlap with a number of fisheries, and that those operating in the central and eastern South Atlantic are likely to have contributed to their long-term

decline. Longline and trawl fisheries managed by South Africa and Namibia, and pelagic longline fisheries managed by ICCAT and CCSBT, are all considered to be important.

Effective action to reduce seabird bycatch involves five key steps: a) recognising and understanding the spatio-temporal nature of the problem, b) setting requirements for mitigation measures ensuring these are based on or informed by best-practice advice, c) collecting bycatch and associated data, d) establishing systems to monitor compliance, and e) evaluating the effectiveness of mitigation measures, and based on this evaluation refining the requirements if necessary.

Both South Africa and Namibia, and all five tuna RFMOs, including ICCAT and CCSBT, have over the last five years adopted conservation and management measures that require the application of bycatch mitigation measures by vessels in areas overlapping with albatrosses and petrels. While this represents significant progress, and in the case of South African longline and trawl fisheries, has led to substantial reductions in bycatch, the extent to which these policies have translated into effective action within fisheries managed by the RFMOs, is largely unknown. There is therefore a need to ensure that data on bycatch are adequately collected and reported, that monitoring and surveillance efforts are sufficient to assess compliance, and to evaluate the effectiveness of the prescribed mitigation measures.

There are a number of international initiatives underway that are working towards improved seabird bycatch mitigation within RFMOs, and more broadly, and which are relevant to South Georgia Black-browed Albatrosses. The ACAP RFMO engagement strategy seeks to promote, through collaboration with Parties and other organisations such as BirdLife International, the adoption and implementation of best-practice seabird bycatch mitigation measures in all five tuna RFMOs, and the monitoring of their effectiveness. The main broad priority areas for ACAP engagement with RFMOs comprise the following:

- a) Participate in RFMO reviews of seabird conservation measures (ICCAT and IOTC will initiate reviews of their seabird conservation measures in September 2016).
- b) Promote the strengthening of seabird conservation measures within RFMOs (including advocating ACAP's recently (2016) revised best practice guidelines for mitigating seabird bycatch in pelagic longline fisheries).
- c) Work to strengthen RFMO bycatch data collection and reporting requirements, and the inclusion of appropriate seabird bycatch mitigation elements within RFMO compliance monitoring.

BirdLife International, through its local partner BirdLife South Africa, is leading the seabird bycatch component of an international project (*'Common Oceans Tuna Project'*) focusing on sustainable fisheries management and biodiversity conservation in tuna fisheries beyond Areas of National Jurisdiction. The project is currently underway, and is scheduled to continue until late 2018. The overall aims of the seabird bycatch component of the project are to enhance uptake of best practice seabird bycatch mitigation measures by pelagic longline fleets in the Atlantic and Indian Oceans, to strengthen the capacity of national institutions to manage and conduct analyses of seabird bycatch data, and to facilitate an assessment of the combined impacts of all tuna RFMOs on seabirds. The target audience of the project

and related work includes all of the main fishing nations that overlap with albatrosses and petrels in the Atlantic and Indian oceans, including those that have been identified as important for South Georgia Black-browed Albatrosses (South Africa, Namibia and the key Asian countries). The aims of the project are being pursued through a series of workshops and related activities focusing on seabird bycatch mitigation. These include: national awareness and observer training workshops, a pilot study in Cape Town, South Africa (used by many distant water fleets), to investigate the use of port-based outreach to support and monitor compliance in the use of seabird bycatch mitigation, and joint tuna RFMO seabird bycatch assessment workshops in 2016-2018, leading to the first ever global assessment of seabird bycatch in tuna fisheries. This programme of work, while broad in scope, is directly relevant to and important for the conservation of South Georgia Black-browed Albatrosses.

Monitoring by BAS of marine debris and fishing gear associated with seabird nests and colonies at Bird Island has shown that Black-browed Albatrosses breeding there are not currently adversely affected by discarded fishing gear. However, continued monitoring, including at additional sites, is considered useful to identify emerging issues such as changes in gear type or fishing practices that may impact seabirds.

Although South Georgia Black-browed Albatrosses have not been significantly impacted by oil pollution and contamination, ongoing monitoring and reporting of pollution and contamination incidents is considered useful, especially given the development of hydrocarbon activities in the Falkland Islands.

Priority Actions

- 4.1 Conduct detailed analysis of the overlap of Black-browed Albatrosses from South Georgia with fisheries.** Adopt a similar approach to that used for South Georgia Wandering Albatrosses and pelagic longline fisheries (Jiménez et al. 2015). This approach used a combination of GLS, PTT and GPS tracking data (accurate to c. 200km, c. 10km and c. 10m, respectively) and data on fishing effort at a resolution of 5 x 5 degree grid square (the best available for many fisheries). The outputs of this work have already been very helpful in identifying high-risk areas and fisheries for South Georgia Wandering Albatrosses, and would be similarly useful for Black-browed Albatrosses. Use existing PTT and GPS data from breeders, and GLS data from non-breeding Black-browed albatrosses to examine year-round overlap with all longline and trawl fisheries. The main aim of this analysis would be to get a much better understanding of the spatial and temporal (both seasonal and annual) overlap of birds with fishing fleets. This information will help identify more specifically those fleets that overlap with Black-browed Albatrosses from South Georgia, as well as the areas and seasons of highest bycatch risk, and thus inform a more focussed approach to engaging with these fleets to better understand and address bycatch impacts.
- 4.2 Report and disseminate results of overlap analyses to ACAP, BirdLife International and relevant RFMOs so that they can be used to conduct or update seabird-fisheries risk assessments, and help inform targeted**

engagement with fleets that overlap with South Georgia Black-browed Albatrosses.

- 4.3 Develop and implement collaborative strategies for mitigating fisheries bycatch, including via the provision of data and updates arising from activities in this Plan.** Most of the nations identified as having fleets that overlap with Black-browed Albatrosses are ACAP Parties or in the case of Namibia are in the process of acceding to ACAP, and one of the main objectives of ACAP is to provide a focus for international cooperation and the exchange of information and expertise in relation to albatross and petrel conservation. However, some of the key fleets operating in the ICCAT and CCSBT convention areas are not currently ACAP Parties, and should be engaged through the ACAP RFMO strategy (see 4.4) and other means (see 4.5). Outputs from the analysis of the overlap between South Georgia Black-browed Albatrosses and fishing effort outlined in Priority Action 4.1 will serve as a key input to this process.
- 4.4 Through the ACAP RFMO engagement strategy, strengthen the application of seabird bycatch mitigation measures within RFMOs and encourage better monitoring of compliance and effectiveness** (see Annex 5 of the 2016 ACAP SBWG report [AC9 Doc Rev 1](#) for detailed actions of the engagement strategy). ICCAT is of particular importance for South Georgia Black-browed Albatrosses, followed by CCSBT. In 2016, ICCAT will initiate a process to evaluate the effectiveness of its seabird conservation measures. Although GSGSSI is not a member of ICCAT, the UKOT is a member as is the UK (currently through the EU), and through support from FCO and Defra, have helped progress and support the adoption of seabird conservation measures by ICCAT. Outputs from the analysis of the overlap of South Georgia Black-browed Albatrosses and fishing effort outlined in Priority Action 4.1 will serve as a key input to this process.
- 4.5 Engage with those fleets that overlap most with Black-browed Albatrosses from South Georgia to improve their use of bycatch mitigation.** Information currently available indicates that suggests that the main threat comes from fisheries in the central and eastern South Atlantic. These include fisheries within the EEZs of South Africa, Namibia and potentially Angola, and importantly extensive pelagic longline fisheries operating in international waters, in areas regulated by ICCAT and CCSBT. The overlap analysis outlined in Priority Action 4.1 will help clarify and update the identification of key fleets, areas and seasons associated with high bycatch risk. Investigate the best mechanisms and opportunities for direct engagement with key fleets, such as the work being progressed by the seabird bycatch component of the FAO Common Oceans Tuna project (Activity 4.11).

Associated Activities

- 4.6 Continue to manage national fisheries to reduce or eliminate seabird bycatch.**

- 4.6.1 Continue to manage all SGSSI fisheries in a risk-averse manner, to the highest international standards, in line with and where appropriate exceeding all CCAMLR requirements, especially in relation to seabird bycatch mitigation.
- 4.6.2 Ensure that the seabird bycatch reporting requirements of ACAP are met (new protocols are currently being developed). Determine the most efficient method of obtaining the relevant data from CCAMLR (where all SGSSI bycatch and observer data are held) for ACAP reporting purposes.
- 4.6.3 Encourage and support as appropriate the continued implementation by BAS of monitoring programmes at Bird Island recording the incidence of fishing hooks and other marine debris associated with nests of Black-browed Albatrosses and other seabirds. Items should be fully described and documented in the standard CCAMLR form (available at <https://www.ccamlr.org/en/node/75831>), and ideally archived or photographed for later analysis of provenance.
- 4.7 Encourage and support further tracking studies and spatio-temporal overlap analyses of South Georgia Black-browed Albatrosses and fishing effort that identifies more accurately and at a higher resolution, fleets and vessels that are contributing to the bycatch of birds. Priority Action 4.1 is the first step in this process. The actions listed below represent further step-wise improvements in the resolution of data and outputs that will help identify more accurately the fleets and vessels responsible for bycatch of South Georgia Black-browed Albatrosses and thus help inform more targeted engagement with these fleets.
 - 4.7.1a Conduct fine-scale analyses of overlap of Black-browed Albatrosses with fisheries using new GPS data combined with Automatic Identification System (AIS) data to determine overlap with specific vessels in real time. Given the expense, and because breeding adults show less overlap with fisheries, this would be restricted to deploying satellite-linked GPS devices on non-breeding Black-browed Albatrosses (and, if funds are available, juveniles and older pre-breeders) during the non-breeding season.
 - 4.7.1b The comparison of GPS and AIS data could be usefully expanded to include analysis of satellite imagery to identify overlap (at an intermediate scale) with IUU vessels that have turned off their AIS. This latter component would add significant costs to the work.
 - 4.7.1c Finally, cameras could be deployed in conjunction with GPS loggers to record interactions with vessels, and potentially to identify legal and IUU vessels. Challenges include finding suitable attachment methods and a device/battery size that optimises recording duration.
- 4.8 In order to strengthen the ACAP RFMO engagement strategy, investigate mechanisms to progress seabird conservation objectives more formally within ICCAT and CCSBT through the EU, as appropriate; the EU is a member of both of these RFMOs. Although the SEAFO convention area is important for Black-browed Albatrosses, the fishing effort managed by SEAFO is currently very small (only two active vessels in the 2014-15 season). Consequently, SEAFO is considered a much lower priority than ICCAT and CCSBT.

- 4.9 Seek to work with ACAP Parties that are EU members, as appropriate, to encourage and support the effective implementation of the European Commission (2012) Action Plan for Reducing Incidental Catches of Seabirds in Fishing Gears, which applies both to fishing vessels fishing in the EU, and EU flagged vessels fishing elsewhere.
- 4.10 Work with fishing companies that operate in SGSSI and CCAMLR waters to ensure that successful mitigation of seabird bycatch by their vessels in these waters is complemented by the same measures when these vessels operate in other areas where there are risks of seabird bycatch.
- 4.11 Investigate opportunities to support and help facilitate the seabird bycatch component of the FAO Common Oceans Tuna project being led by BirdLife South Africa.
- 4.12 Establish a simple template to collate observations of oil-contaminated birds, both in colonies and at sea (currently done by BAS at Bird Island). Disseminate these forms to researchers working in colonies, scientific fisheries observers and tourist expedition leaders, and request that they use them to record any relevant observations and return them to GSGSSI for later analysis. Ensure that the collated information is submitted routinely to relevant organisations and authorities, including CCAMLR, ACAP and the Falkland Islands Government.

Component 5: Understanding the potential impacts of climate change on the ecology and population dynamics of South Georgia Black-browed Albatrosses

An increasing number of studies have been conducted to investigate the potential impacts of climate change on Southern Ocean seabirds, including albatrosses. Climate variables can affect seabirds directly, or indirectly, through changes in foraging or breeding habitat, which in turn affect foraging strategies, distribution and phenology. Climate change may also impact seabirds by affecting the transmission of diseases and the distribution of fish species and consequently fisheries effort.

Using long-term data from Bird Island, BAS are currently investigating the respective roles of climate and fisheries variables in driving the decline in numbers of Black-browed Albatrosses (and Wandering and Grey-headed Albatrosses) at South Georgia, and other demographic parameters. Preliminary results of these analyses indicate that few if any of the changes in demographic traits over the last 30 years could be attributed to changes in climatic variables.

Actions relating to the potential effects of climate change on Black-browed Albatrosses at South Georgia focus on progressing research and monitoring initiatives to detect and measure effects of climate change, and identifying information gaps and areas that require further investigation.

Associated Activities

- 5.1 Once completed, engage with and support BAS to use the results from their research project investigating the influence of climate and fisheries variables on Black-browed Albatross demography to synthesise information on the potential impacts of climate change, and identify strategies to fill information gaps and develop appropriate monitoring strategies to better understand and track these impacts. The continued collection of demographic and foraging ecology data will be crucial in this respect (see Activities 1.1 and 2.1).

Component 6: Raising awareness of the plight of Black-browed Albatrosses at South Georgia, and the actions that are required and being undertaken to improve their conservation status

Public support of Black-browed Albatross conservation will provide benefits for all of the actions that are conducted as part of this Plan. Dissemination of information and targeted outreach and awareness-raising initiatives are crucial to promote and support the objectives of this Plan. There are a number of opportunities to raise awareness and understanding of the plight of South Georgia's Black-browed Albatrosses and the actions that are required and are being taken to conserve them. It is important to recognise that there are a range of different target audiences, including policy makers, fishery managers, fishers, scientists, tourists and the general public, each of whom will often require different outreach approaches. The GSGSSI website includes sections dealing with the environment and wildlife that are regularly updated. Staff members of GSGSSI deliver annual presentations to the International Association of Antarctic Tour Operators (IAATO) on tourist management policies and activities, and also hold annual fisheries science meetings with industry representatives. These initiatives provide good opportunities for targeted engagement with the tourism and fisheries sectors, respectively.

Approximately 8,000 tourists visit South Georgia each year, and the wildlife and environment constitute an important component of the tourists' experience. Tourism activities contribute significantly to raising awareness and the profile of conservation issues on the island, including by encouraging those who have visited the island to act as advocates for the conservation of the island and its biodiversity. Given that a large proportion of the tourists to South Georgia have a strong interest in wildlife, there is also an opportunity to involve visitors more directly in conservation work through a citizen science approach. 'Citizen'-based contributions to mainstream scientific investigations are becoming increasingly useful and important, both in terms of enhancing data collection, and thus increasing the range and depth of data available for analysis and research, and also to engage the public more meaningfully in important conservation initiatives. One of the ways in which tourists could contribute usefully to the monitoring of Black-browed Albatrosses (and Grey-headed Albatrosses) is to take standardised photographs of a defined colony during the incubation period (November) and shortly before chicks fledge (early April). Counts of these photos will enable estimates to be derived annually of the number of birds attempting to breed, and their breeding success, which could be compared with and used to complement the estimates from Bird Island. Elsehul (within the Paryadin Peninsula North Breeding Location; Location No. 13 in Fig. 1 and Appendix 1), which

is regularly visited by cruise ships, and has colonies of both Black-browed and Grey-headed Albatrosses, would be an optimal site for such an initiative (see Action 1.3).

Although relatively large numbers of tourists visit South Georgia each year, the opportunity to experience albatrosses in their natural habitat is out of reach for most members of the public. Webcams and other interpretive tools can bring this experience into the homes and classrooms of a much larger target audience. Bird Island would be an optimal venue for such an initiative to link the imagery with the long-term studies of Black-browed Albatrosses being undertaken there, and make use of infrastructure that is already established.

Internationally, awareness of albatross and petrel conservation is promoted through a range of different media, including scientific and popular publications and via websites of key organisations, such as ACAP, BirdLife International and IAATO. The 'Latest News' section of the ACAP website, which features new stories most days, and the ACAP Facebook page, have proven to be popular and useful mechanisms to disseminate information regarding albatross and petrel conservation to the general public.

This Plan itself provides an opportunity for increasing awareness of issues affecting the conservation of Black-browed Albatrosses at South Georgia, and what is being done to address these. Indeed, to be fully effective, it is important that the objectives and actions contained in the plan are fully understood, and that progress or lack of progress in reaching the objectives is communicated, not only to those involved in progressing these actions, but to the wider ACAP community. This latter component is important because it provides an opportunity to discuss the implementation needs of the plan, many of which are reliant on international cooperation.

Associated Activities

- 6.1 Formally present this Conservation Action Plan for Black-browed Albatrosses to the next meeting of ACAP's Working Groups and Advisory Committee, scheduled to take place in New Zealand in September 2017. At each of the subsequent meetings, present formal feedback on progress achieved against the objectives and actions outlined in the Plan.
- 6.2 Make this Conservation Action Plan (and updates) available on the GSGSSI (and ACAP) websites, and circulate information about its existence.
- 6.3 Produce a summary document of the annual reviews of the plan (see Action 8.1) that can be used to disseminate updates and progress to a range of target audiences, including the annual IAATO and SGSSI fisheries science meetings.
- 6.4 Investigate and use opportunities to disseminate information and stories regarding Black-browed Albatross conservation at South Georgia. Drafting short news pieces for the Latest News section of the ACAP website provides one such opportunity. Other mechanisms include making available a summarised version of the South Georgia Conservation Action Plans at the South Georgia Post Office, and the South Georgia Museum.

- 6.5 GSGSSI staff with environmental and fisheries responsibilities will be encouraged to attend ACAP meetings to present and promote work being undertaken to conserve South Georgia Black-browed Albatrosses, to participate in wider discussions regarding albatross and petrel conservation, and remain informed of initiatives and opportunities relevant to the goal of this plan.
- 6.6 Ensure information relevant to albatross conservation is delivered to visitors and South Georgia Museum staff through Government Officer presentations.
- 6.7 Investigate the installation and management of a Webcam at one or more Black-browed Albatross colonies that can be linked to an interactive website for public awareness and school education.
- 6.8 Develop a stamp issue to promote albatross conservation with opportunities for links and collaboration with project partners.
- 6.9 Update list of actions with any additional recommendations relating to Black-browed Albatrosses arising from the SGSSI Outreach Strategy, scheduled for 2017.
- 6.10 Improve knowledge of the markets associated with fisheries that overlap with Black-browed Albatrosses from South Georgia, and investigate mechanisms to increase awareness amongst consumers of products from these fisheries of the importance of implementing effective seabird bycatch mitigation strategies.

Component 7: Participating in international conservation and fisheries fora to promote actions that will help support the conservation of Black-browed Albatrosses from South Georgia

Incidental mortality in external fisheries, for which GSGSSI does not have responsibility, is considered to be the main threat to the South Georgia Black-browed Albatross population. Consequently, the successful implementation of this Plan, and the conservation status of South Georgia Black-browed Albatrosses, is dependent on the involvement and contributions of other nations and organisations. This also requires GSGSSI and the UK government to participate actively in relevant international conservation and fishing fora in order to encourage and support actions required for the conservation of Black-browed Albatrosses from South Georgia. ACAP is the primary mechanism to achieve this objective, and a number of actions outlined in this Plan are of an international and cooperative nature.

Any intergovernmental collaboration between the UK (and GSGSSI) and other relevant countries should be based on the principle of shared interest and responsibility for albatross and petrel conservation. Such collaboration has many potential benefits. It will help all parties remain informed about the status of seabird bycatch mitigation policy and implementation in the different countries, understand the range of challenges, and thus ensure that the UK can optimally respond to priority issues and needs as they arise. A collaborative approach will facilitate the exchange of expertise and information and assist in the integration of seabird

bycatch data across jurisdictions. By establishing constructive working relationships with these other countries, the benefits could extend to matters of seabird bycatch on the High Seas of the South Atlantic, through fishing industry, joint venture and RFMO links.

Associated Activities

There are a number of activities throughout this Plan, especially under Component 4, that contribute towards meeting the objective of this component.

Component 8: Reviewing the Conservation Action Plan to evaluate accomplishments and update information on priority needs

The Plan should be reviewed annually to measure progress against the goal, aim, actions and associated activities. This will allow the Plan to be updated in response to review results, and for further refinement of actions and priorities, thus ensuring an adaptive management approach. In addition to formally reviewing the progress of the Plan, the annual review process will also be used for different parties to provide feedback on actions to which they have contributed. Ideally, the review process should take place prior to ACAP Advisory Committee meetings, allowing enough time to collate the necessary information so that it can be included as part of the national reporting process, and presented to the relevant ACAP Working Groups. Although progress against each of the actions should be assessed, assessing progress toward the desired goal for South Georgia Black-browed Albatrosses will be accomplished primarily by tracking population trends and demographic parameters.

There are a number of actions included in the implementation framework that are not, or will not be, implemented directly by GSGSSI, but by partner organisations. It is not the intention of GSGSSI to prescribe these actions to external agencies, but rather to recognize that they are a vital part of the conservation framework, and to help facilitate their implementation through engaging with and supporting as appropriate the external agencies in carrying them out. A small steering group will be established to help facilitate a co-ordinated, collaborative and proactive approach to the goal, priority actions and associated activities outlined in this Plan.

Associated Activities

- 8.1 Develop a standardized template for the annual review of the Plan, and conduct succinct annual reviews.
- 8.2 Establish a small steering group to discuss and co-ordinate the implementation of the Plan, and identify opportunities for collaboration that would help meet the objectives of the Plan.

Table 1. Summary of the **Priority Actions** identified in the Conservation Action Plan for Black-browed Albatrosses at South Georgia.

Lead & partner organisations:

BAS: British Antarctic Survey
Islands

BirdLife International and BirdLife South Africa

Defra: Department for Environment, Food & Rural Affairs

FIG: Falkland Islands Government

FCO: Foreign & Commonwealth Office (UK)

GSGSSI: Government of South Georgia & the South Sandwich

IAATO: International Association of Antarctic Tour Operators

JNCC: Joint Nature Conservation Committee

RSPB: Royal Society for the Protection of Birds

	Action	Timeframe	Lead and Partner organisations
Component 4: <i>Understanding marine-based threats to South Georgia Black-browed Albatrosses in order to implement and promote best practice management approaches within and outside SGSSI waters to address these.</i>			
4.1	Conduct detailed analysis of the overlap of Black-browed Albatrosses from South Georgia with fishing effort. Adopt a similar approach to that used for South Georgia Wandering Albatrosses and pelagic longline fisheries (Jiménez et al. 2015). This approach used a combination of GLS, PTT and GPS tracking data (accurate to c. 200km, c. 10km and c. 10m, respectively) and data on fishing effort at a resolution of 5 x 5 degree grid square (the best available for many fisheries). The outputs of this work have already been very helpful in identifying high-risk areas and fisheries for South Georgia Wandering Albatrosses, and would be similarly useful for Black-browed Albatrosses. Use existing PTT and GPS data from breeders, and GLS data from non-breeding Black-browed albatrosses to examine year-round overlap with all longline and trawl fisheries. The main aim of this analysis would be to get a much better understanding of the spatial and temporal (both seasonal and annual) overlap of birds with fishing fleets. This information will help identify more specifically those fleets that overlap with Black-browed Albatrosses from South Georgia, as well as the areas and seasons of highest bycatch risk, and thus inform a more focussed approach to engaging with these fleets to better understand and address bycatch impacts.	2016-2017	BAS, GSGSSI, BirdLife International
4.2	Report and disseminate results of any further overlap analyses to ACAP, BirdLife International and relevant RFMOs so that they can be used to conduct or update seabird-fisheries risk assessments, and help inform targeted engagement with fleets that overlap with South Georgia Black-browed Albatrosses.	As required	BAS, BirdLife International, GSGSSI, JNCC

	Action	Timeframe	Lead and Partner organisations
4.3	<p>Develop and implement collaborative strategies for mitigating fisheries bycatch, including via the provision of data, updates and outreach materials arising from activities in the Conservation Action Plans. Most of the nations identified as having fleets that overlap with Black-browed Albatrosses are ACAP Parties or in the case of Namibia are in the process of acceding to ACAP, and one of the main objectives of ACAP is to provide a focus for international cooperation and the exchange of information and expertise in relation to albatross and petrel conservation. However, some of the key fleets operating in the ICCAT and CCSBT convention areas are not currently ACAP Parties, and should be engaged through the ACAP RFMO strategy (see 4.4) and other means (see 4.5). Outputs from the analysis of the overlap between South Georgia Black-browed Albatrosses and fishing effort outlined in Priority Action 4.1 will serve as key inputs to this process.</p>	Ongoing	GSGSSI, FCO, Defra, JNCC, ACAP, BirdLife International
4.4	<p>Through the ACAP RFMO engagement strategy, strengthen the application of seabird bycatch mitigation measures within RFMOs and encourage better monitoring of compliance and effectiveness (see Annex 5 of the 2016 ACAP SBWG report AC9 Doc Rev 1 for detailed actions of the engagement strategy). ICCAT is of particular importance for South Georgia Black-browed Albatrosses, followed by CCSBT. In 2016, ICCAT will initiate a process to evaluate the effectiveness of its seabird conservation measures. Although GSGSSI is not a member of ICCAT, the UKOT is a member as is the UK (currently through the EU), and through support from FCO and Defra, have helped progress and support the adoption of seabird conservation measures by ICCAT. Outputs from the analysis of the overlap of South Georgia Black-browed Albatrosses and fishing effort outlined in Priority Action 4.1 will serve as key inputs to this process.</p>	Ongoing	GSGSSI, FCO, Defra, JNCC, ACAP, BirdLife International

	Action	Timeframe	Lead and Partner organisations
4.5	<p>Seek to engage directly with those fleets that overlap most with Black-browed Albatrosses from South Georgia to improve their use of by-catch mitigation.</p> <p>Information currently available indicates that suggests that the main threat comes from fisheries in the central and eastern South Atlantic. These include fisheries within the EEZs of South Africa, Namibia and potentially Angola, and importantly extensive pelagic longline fisheries operating in international waters, in areas regulated by ICCAT and CCSBT. The overlap analysis outlined in Priority Action 4.1 will help clarify and update the identification of key fleets, areas and seasons associated with high bycatch risk. Investigate the best mechanisms and opportunities for direct engagement with key fleets, such as the work being progressed by the seabird bycatch component of the FAO Common Oceans Tuna project (Action 4.11).</p>	Ongoing	GSGSSI, FCO, Defra, JNCC, ACAP, BirdLife International and BirdLife South Africa

Table 2. Summary of associated activities that contribute to the goal of this Conservation Action Plan. The table serves to prioritise activities, and facilitate the review of progress against each.

Activities already underway and/or with resources allocated by GSGSSI
Activities already being implemented by partner organisations
Activities that will be partly/wholly implemented/funded by GSGSSI with other partners collaborating/contributing as appropriate, but which have not yet been started
Activities that remain dependent on obtaining funds or capacity

	Activity	Importance	Timeframe	Lead & partner organisations
Component 1: <i>Long-term monitoring of Black-browed Albatross population dynamics at South Georgia.</i>				
1.1	Encourage and support as appropriate BAS to continue long-term demographic monitoring of Black-browed Albatross at Bird Island (at established study colonies).	High	Annual	BAS, GSGSSI
1.2	Encourage and support as appropriate the continuation of decadal counts by BAS of the number of Black-browed Albatrosses breeding at Bird Island (whole island).	High	Decadal	BAS, GSGSSI

	Activity	Importance	Timeframe	Lead & partner organisations
1.3	Develop and implement photo-survey monitoring of population trends and breeding success of Black-browed Albatrosses at two sites outside of Bird Island. Investigate the involvement of cruise-ship expedition staff and passengers at one site (Elsehul within the Paryadin Peninsula North Breeding Location; Location No. 13 in Fig. 1 and Appendix 1), and the use of FPV <i>Pharos SG</i> to conduct similar photo-survey monitoring at Cooper Island. In both cases, protocols will need to be developed, including defining the colonies, providing reference photos and GPS co-ordinates (both of the colonies and the vessels positions from which the photographs are to be taken – information which is available from the two previous photo-surveys in 2003/04 and 2014/15), and systems set up to curate the photographs and conduct counts. In order to monitor population trends, photos of incubating birds would need to be taken in November of each year. Repeat photos taken of the colony in early April can be used to calculate and monitor breeding success. Photo-counts of these colonies should be conducted annually, or as frequently as possible.	Medium	Annual (preferable) or every 2-5 years	GSGSSI, IAATO, SGS, BAS (for use of correction factors)
1.4	Conduct a census of Black-browed Albatrosses breeding at South Georgia once every 10 years, using the same methodology and timing as previous surveys, and data from Bird Island to develop correction factors. The level of coverage should as a minimum be based on the same sites surveyed in 2014/15, which represents approximately 30% of the South Georgia population.	High	Every 10 years. Next census 2024/25	GSGSSI, BAS
1.5	Ensure that all population status and trend data are routinely incorporated into the GSGSSI GIS and database, and submitted to ACAP.	High	Annual	GSGSSI, BAS, JNCC
1.6	Formally submit and present the paper on the 2014/15 survey of Wandering, Black-browed and Grey-headed Albatrosses at South Georgia (Poncet et al. submitted) to the next meeting of ACAP's Population and Conservation Status Working Group, scheduled to take place in September 2017 in New Zealand.	Medium	2017	GSGSSI

	Activity	Importance	Timeframe	Lead & partner organisations
Component 2: Long-term monitoring of the foraging ecology and diet of Black-browed Albatrosses at South Georgia				
2.1	Evaluate at-sea distribution data for South Georgia Black-browed Albatrosses with respect to gaps and limitations in sample size, and likely overlap with high risk fisheries, and on this basis identify priority age and life-cycle phases for which further tracking data are required. Systematically update and fill data gaps in a prioritized manner. See Action 4.7 for further details	High	Ongoing	BAS
2.2	Consider tracking non-breeding Black-browed Albatrosses from Cooper Island to investigate if their distribution differs from birds tracked at Bird Island, and thus determine if the non-breeding distribution shows some variation across the archipelago. Satellite-linked GPS devices would need to be used if there was a single visit, whereas use of GLS loggers would require multiple visits in successive years.	Medium	2016-2018	BAS, GSGSSI
2.3	Ensure all tracking data are routinely submitted to the Global Procellariiform Tracking Database so that they can be used in future seabird-fisheries risk assessments	High	Ongoing	BAS
2.4	Encourage and support as appropriate the continued implementation of the BAS long-term diet monitoring programme of Black-browed Albatrosses at Bird Island using existing methods (Phillips 2006).	Medium	Ongoing	BAS
2.5	Investigate methods to collect dietary information outside of the chick-rearing period, and from non-breeding birds.	Low	2016-2018	BAS
Component 3: Monitoring and management of potential land-based threats to Black-browed Albatrosses breeding at South Georgia.				
3.1	Continue to support and manage responsible tourism activities at South Georgia	Medium	Ongoing	GSGSSI, IAATO
3.2	Ensure that the South Georgia biosecurity protocols described within the Biosecurity Handbook (2016) are properly implemented, regularly reviewed, and improved where possible.	Medium	Ongoing	GSGSSI
3.3	Implement all biosecurity activities listed under Objective 6 of the Biodiversity Action Plan for South Georgia and the South Sandwich Islands	Medium	Refer to Biodiversity Action Plan	GSGSSI

	Activity	Importance	Timeframe	Lead & partner organisations
3.4	Determine baseline levels of pathogens and disease in Black-browed Albatrosses at South Georgia, and subject to the findings of this investigation develop and implement a long-term disease surveillance and response programme (see also 3.5)..The sampling strategy should ideally include both Bird Island (visited by humans since the 1960s), and a colony that has experienced very little human visitation (e.g. Cape North, Paryadin Peninsula South). ACAP is in the process of developing guidelines for sampling that should be used to inform protocols at South Georgia	Medium	2016-2018	GSGSSI, BAS (A potential PhD student has submitted a project proposal to investigate this issue at Bird Island)
3.5	Develop and implement a contingency that sets out rapid response remedial actions that should be implemented in the event of a disease outbreak and is based on best practice principles. The Unusual Animal Mortality Response Plan developed by the Australian Antarctic Division to provide guidance on what to do if sick or dead animals are discovered in unusually high numbers or with signs that suggest disease, could serve as the basis for a dedicated plan for South Georgia.	Medium	2016-2018	GSGSSI
3.6	Ensure that the Black-browed Albatross breeding locations are included in the SGSSI Protected Areas planning process, and that these sites are optimally incorporated into the Protected Area Framework that is developed.	Low	2016-2020	GSGSSI
Component 4: <i>Understanding marine-based threats to South Georgia Black-browed Albatrosses, and implementing and promoting best practice management approaches within and outside SGSSI waters to address these.</i>				
4.1-4.5	See Priority Actions in Table 1.			
4.6	Continue to manage national fisheries to reduce or eliminate seabird bycatch			
4.6.1	Continue to manage all SGSSI fisheries in a risk-averse manner, to the highest international standards, in line with and where appropriate exceeding all CCAMLR requirements, especially in relation to seabird bycatch mitigation.	High	Ongoing (annual review)	GSGSSI
4.6.2	Ensure that the seabird bycatch reporting requirements of ACAP are met (new protocols are currently being developed). Determine the most efficient method of obtaining the relevant data from CCAMLR (where all SGSSI bycatch and observer data are held) for ACAP reporting purposes	High	Ongoing (annual review)	GSGSSI, JNCC

	Activity	Importance	Timeframe	Lead & partner organisations
4.6.3	Encourage and support as appropriate the continued implementation by BAS of monitoring programmes at Bird Island recording the incidence of fishing hooks and other marine debris associated with nests of Black-browed Albatrosses and other seabirds. Items should be fully described and documented in the standard CCAMLR form (available at https://www.ccamlr.org/en/node/75831), and ideally archived or photographed for later analysis of provenance.	Medium	Ongoing, annual reporting to CCAMLR	GSGSSI, BAS
4.7	Encourage and support further tracking studies and spatio-temporal overlap analyses of South Georgia Black-browed Albatrosses and fishing effort that identifies more accurately and at a higher resolution, fleets and vessels that are contributing to the bycatch of birds. Priority Action 4.1 is the first step in this process. The actions listed below represent further step-wise improvements in the resolution of data and outputs that will help identify more accurately the fleets and vessels responsible for bycatch of South Georgia Black-browed Albatrosses and thus help inform more targeted engagement with these fleets.			
4.7.1a	Conduct fine-scale analyses of overlap of Black-browed Albatrosses with fisheries using new GPS data combined with Automatic Identification System (AIS) data to determine overlap with specific vessels in real time. Given the expense, and because breeding adults show less overlap with fisheries, this would be restricted to deploying satellite-linked GPS devices on non-breeding Black-browed Albatrosses (and, if funds are available, juveniles and older pre-breeders) during the non-breeding season.	Medium	2016-2019	BAS, GSGSSI, BirdLife International
4.7.1b	The comparison of GPS and AIS data could be usefully expanded to include analysis of satellite imagery to identify overlap (at an intermediate scale) with IUU vessels that have turned off their AIS. This latter component would add significant costs to the work.	Medium	2016-2019	BAS, GSGSSI, BirdLife International
4.7.1c	Deploy cameras in conjunction with GPS loggers to record interactions with vessels, and potentially to identify legal and IUU vessels. Challenges include finding suitable attachment methods and a device/battery size that optimises recording duration.	Low	2016-2020	BAS, GSGSSI, BirdLife International

	Activity	Importance	Timeframe	Lead & partner organisations
4.8	In order to strengthen the ACAP RFMO engagement strategy, investigate mechanisms to progress seabird conservation objectives more formally within ICCAT and CCSBT through the EU, as appropriate; the EU is a member of both of these RFMOs. Although the SEAFO convention area is important for Black-browed Albatrosses, the fishing effort managed by SEAFO is currently very small (only two active vessels in the 2014-15 season). Consequently, SEAFO is considered a much lower priority than ICCAT and CCSBT.	Medium	Ongoing	GSGSSI, FCO, Defra, JNCC, ACAP
4.9	Seek to work with other ACAP Parties that are EU members, as appropriate, to encourage and support the effective implementation of the European Commission (2012) Action Plan for Reducing Incidental Catches of Seabirds in Fishing Gears, which applies both to fishing vessels fishing in the EU, and EU flagged vessels fishing elsewhere.	Medium	Ongoing	GSGSSI, FCO, Defra, JNCC
4.10	Work with fishing companies that operate in GSSI and CCAMLR waters to ensure that successful mitigation of seabird bycatch by their vessels in these waters is complemented by the same measures when these and other vessels operate in other areas where there are risks of seabird bycatch.	Medium	Ongoing	GSGSSI, FCO, Defra
4.11	Investigate opportunities to support and help facilitate the seabird bycatch component of the FAO Common Oceans Tuna project being led by BirdLife South Africa.	High	2016-2018	GSGSSI, BirdLife South Africa, BirdLife International
4.12	Establish a simple template to collate observations of oil-contaminated birds, both in colonies and at sea (currently done by BAS at Bird Island). Disseminate these forms to researchers working in colonies, scientific fisheries observers and tourist expedition leaders, and request that they use them to record any relevant observations and return them to GSGSSI for later analysis. Ensure that the collated information is submitted routinely to relevant organisations and authorities, including CCAMLR, ACAP and the Falkland Islands Government.	Low	As required	GSGSSI, BAS, CCAMLR

	Activity	Importance	Timeframe	Lead & partner organisations
Component 5: <i>Understanding the potential impacts of climate change on the ecology and population dynamics of South Georgia Black-browed Albatrosses.</i>				
5.1	Once completed, engage with and support BAS to use the results from their research project investigating the influence of climate and fisheries variables on Black-browed Albatross demography to synthesise information on the potential impacts of climate change, and identify strategies to fill information gaps and develop appropriate monitoring strategies to better understand and track these impacts. The continued collection of demographic and foraging ecology data will be crucial in this respect (see Activities 1.1 and 2.1).	Medium	2016-2020	BAS, GSGSSI
Component 6: <i>Raising awareness of the plight of Black-browed Albatrosses at South Georgia, and the actions that are required and being undertaken to improve their conservation status.</i>				
6.1	Present this Conservation Action Plan for Black-browed Albatrosses to the next meeting of ACAP's Working Groups and Advisory Committee, scheduled to take place in New Zealand in September 2017. At each of the subsequent meetings, present formal feedback on progress achieved against the objectives and actions outlined in the Plan.	High	2017	GSGSSI, JNCC
6.2	Make this Conservation Action Plan (and updates) available on the GSGSSI (and ACAP) websites, and circulate information about its existence.	High	2016 and ongoing	GSGSSI
6.3	Produce a summary document of the annual reviews of the plan (see Action 8.1) that can be used to disseminate updates and progress to a range of target audiences, including the annual IAATO and SGSSI fisheries science meetings.	High	2017 and ongoing	GSGSSI, JNCC
6.4	Investigate and use opportunities to disseminate information and stories regarding Black-browed Albatross conservation at South Georgia. Drafting short news pieces for the Latest News section of the ACAP website, and indeed making information available on other websites, provides one such opportunity. Other mechanisms include making available a summarised version of the South Georgia Conservation Action Plans at the South Georgia Post Office, and the South Georgia Museum.	Medium	Ongoing	GSGSSI, JNCC

	Activity	Importance	Timeframe	Lead & partner organisations
6.5	GSGSSI staff with environmental and fisheries responsibilities will be encouraged to attend ACAP meetings to present and promote work being undertaken to conserve South Georgia Black-browed Albatrosses, to participate in wider discussions regarding albatross and petrel conservation, and remain informed of initiatives and opportunities relevant to the goal of this plan.	Medium	As required	GSGSSI, JNCC
6.6	Ensure information relevant to albatross conservation is delivered to visitors and South Georgia Museum staff through Government Officer presentations	Medium	Ongoing	GSGSSI
6.7	Investigate the installation and management of a Webcam at one or more Black-browed Albatross colonies that can be linked to an interactive website for public awareness and school education.	Medium	2016 and ongoing	GSGSSI, BAS, RSPB, FIG (to involve schools in the Falkland Islands)
6.8	Develop a stamp issue to promote albatross conservation with opportunities for links and collaboration with project partners.	Medium	2016-2017	GSGSSI
6.9	Update list of actions with any additional recommendations relating to Wandering Albatrosses arising from the SGSSI Outreach Strategy, scheduled for 2017.	Low	2016-2017	GSGSSI
6.10	Improve knowledge of the markets associated with fisheries that overlap with Black-browed Albatrosses from South Georgia, and investigate mechanisms to increase awareness amongst consumers of products from these fisheries of the importance of implementing effective seabird bycatch mitigation strategies.	Medium	2016-2020	GSGSSI, FCO
Component 7: Participating in international conservation and fisheries fora to promote actions that will help support the conservation of Black-browed Albatrosses from South Georgia.				
Component 8: Reviewing the Conservation Action Plan to evaluate accomplishments and update information on priority needs.				
8.1	Develop a standardized template for the annual review of the Plan, and conduct succinct annual reviews.	High	Annually	GSGSSI
8.2	Establish a small steering group to discuss and co-ordinate the implementation of the Plan, and identify opportunities for collaboration that would help meet the objectives of the Plan	High	2016-2017, then ongoing	GSGSSI and partner organisations

ACKNOWLEDGEMENTS

We are grateful to the Foreign and Commonwealth Office, British Antarctic Survey, Joint Nature Conservation Committee, South Georgia Surveys and the Royal Society for the Protection of Birds for their helpful assistance in developing this Conservation Action Plan.

REFERENCES

- Agreement on the Conservation of Albatrosses (2010) ACAP Species assessment: Black-browed Albatross *Thalassarche melanophris*. Downloaded from <http://www.acap.aq> on 10 September 2009
- Agreement on the Conservation of Albatrosses (2011) Report of the Sixth Meeting of the Advisory Committee. Guayaquil, Ecuador, 29 August-2 September 2011.
- Alvito PM, Rosa R, Phillips RA, Cherel Y, Ceia F, Guerreiro M, Seco J, Baeta A, Vieira RP, Xavier JC (2015) Cephalopods in the diet of nonbreeding Black-browed and Grey-headed Albatrosses from South Georgia. *Polar Biology* 38: 631-641
- Anderson OR, Small CJ, Croxall JP, Dunn EK, Sullivan BJ, Yates O, Black AD (2011) Global seabird bycatch in longline fisheries. *Endangered Species Research* 14: 91-106
- Arnold JM, Brault S, Croxall JP (2006) Albatross population in peril: a population trajectory for Black-browed Albatrosses at South Georgia. *Ecological Applications* 16: 419-432
- Barbraud C, Rolland V, Jenouvrier S, Nevoux M, Delord K, Weimerskirch H (2012) Effects of climate change and fisheries bycatch on Southern Ocean seabirds: a review. *Marine Ecology Progress Series* 454: 285-307
- BirdLife International (2004) Tracking ocean wanderers: the global distribution of albatrosses and petrels. Results from the Global Procellariiform Tracking Workshop, 1-5 September 2003, Gordon's Bay, South Africa. BirdLife International, Cambridge, UK
- BirdLife International (2016) Species factsheet: *Thalassarche melanophris*. Downloaded from <http://www.birdlife.org> on 06/02/2016
- BirdLife International Marine Programme (2016) Albatross Task Force. 10 years of conservation action.
- Brothers N (1991) Albatross mortality and associated bait loss in the Japanese longline fishery in the Southern Ocean. *Biological Conservation* 55: 255-268
- Bugoni L, Mancini PL, Monteiro DS, Nascimento L, Neves TS (2008) Seabird bycatch in the Brazilian pelagic longline fishery and a review of capture rates in the southwestern Atlantic Ocean. *Endangered Species Research* 5: 137-147

- Croxall J (2008) The role of science and advocacy in the conservation of Southern Ocean albatrosses at sea. *Bird Conservation International* 18: 1-17
- Croxall JP, Rothery P, Pickering SPC, Prince P (1990) Reproductive performance, recruitment and survival of wandering albatrosses *Diomedea exulans* at Bird Island, South Georgia. *Journal of Animal Ecology* 59: 775-796.
- Croxall JP, Prince PA, Rothery P, Wood AG (1998) Population changes in albatrosses at South Georgia. In: Robertson G, Gales R (eds) *Albatross biology and conservation*. Surrey Beatty & Sons, Chipping Norton, pp 69-83
- Favero M, Blanco G, García G, Copello S, Seco Pon JP, Frere E, Quintana F, Yorio P, Rabuffetti F, Cañete G, Gandini M (2010) Seabird mortality associated with ice trawlers in the Patagonian shelf: effect of discards on the occurrence of interactions with fishing gear. *Animal Conservation* 14, 131–139.
- Favero M, Blanco G, Copello S, Seco Pon JP, Patterlini C, Mariano-Jelicich R, García G, Berón MP (2013) Seabird bycatch in the Argentine demersal longline fishery, 2001-2010. *Endangered Species Research* 19: 187-199
- Government of South Georgia & the South Sandwich Islands (2016) *Biodiversity Action Plan for South Georgia & the South Sandwich Islands 2016-2020*. Government House, Stanley, Falkland Islands
- Government of South Georgia and the South Sandwich Islands (2013) *South Georgia and the South Sandwich Islands Marine Protected Area Management Plan. Version 2.0*. Government House, Stanley, Falkland Islands
- Jiménez S, Abreu M, Pons M, Ortiz M, Domingo A (2010) Assessing the impact of the pelagic longline fishery on albatrosses and petrels in the southwest Atlantic. *Aquatic Living Resources* 23: 49-64
- Jiménez S, Domingo A, Abreu M, Brazeiro A (2012) Risk assessment and relative impact of Uruguayan pelagic longliners on seabirds. *Aquatic Living Resources* 25: 281-295
- Jiménez S, Domingo A, Brazeiro A, Defeo O, Wood AG, Froy H, Xavier JC, Phillips RA (2015) Sex-related variation in the vulnerability of Wandering Albatrosses to pelagic longline fleets. *Animal Conservation*: doi 10.1111/acv.12245
- Klaer NL (2012) Estimates of total seabird bycatch by Atlantic pelagic longline fisheries from 2003 to 2006. *Marine Fisheries Review* 74: 14-20
- Leotta G, Cerda R, Coria N, Montalti D (2001) Preliminary studies on some avian diseases in Antarctic birds. *Polish Polar Research* 22: 227-231
- Leotta GA, Rivas M, Chinen I, Vigo GB, Moredo FA, Coria N, Wolcott MJ (2003) Avian cholera in a Southern Giant Petrel (*Macronectes giganteus*) from Antarctica. *Journal of Wildlife Diseases* 39: 732-735
- Maree BA, Wanless RM, Fairweather TP, Sullivan BJ, Yates O (2014) Significant reductions in mortality of threatened birds in a South African trawl fishery. *Animal Conservation* 17: 520-529

- McInnes JC, Raymond B, Phillips RA, Jarman SN, Lea M-A, Alderman R (2016) A review of methods used to analyse albatross diets - assessing priorities across their range. *ICES Journal of Marine Science* doi 10.1093/icesjms/fsw105
- Otley HM, Reid TA, Pompert J (2007) Trends in seabird and Patagonian toothfish *Dissostichus eleginoides* longliner interactions in Falkland Island waters, 2002/03 and 2003/04. *Marine Ornithology* 35: 47-55
- Pasteur L, Walton DWH. 2006. South Georgia: Plan for Progress. Managing the Environment. 2006-2010. British Antarctic Survey: Cambridge, UK
- Petersen SL, Honig MB, Ryan PG, Underhill LG (2009) Seabird bycatch in the pelagic longline fishery off southern Africa. *African Journal of Marine Science* 31: 191-204
- Petersen SL, Phillips RA, Ryan PG, Underhill LG (2008) Albatross overlap with fisheries in the Benguela Upwelling System: implications for conservation and management. *Endangered Species Research* 5: 117-127
- Phillips RA (2006) Efficacy and effects of diet sampling of albatross chicks. *Emu* 106: 305-308
- Phillips RA, Silk JRD, Croxall JP, Afanasyev V, Bennett VJ (2005) Summer distribution and migration of nonbreeding albatrosses: individual consistencies and implications for conservation. *Ecology* 86: 2386-2396
- Phillips RA, Gales R, Baker GB, Double MC, Favero M, Quintana F, Tasker ML, Weimerskirch H, Uhart M, Wolfaardt A (2016) The conservation status and priorities for albatrosses and large petrels. *Biological Conservation* 201: 169-183
- Phillips RA, Ridley C, Reid K, Pugh PJA, Tuck GN, Harrison N (2010) Ingestion of fishing gear and entanglements of seabirds: Monitoring and implications for management. *Biological Conservation* 143: 501-512
- Phillips RA, Silk JRD, Phalan B, Catry P, Croxall JP (2004) Seasonal sexual segregation in two *Thalassarche* albatross species: competitive exclusion, reproductive role specialization or foraging niche divergence? *Proceedings of the Royal Society of London - Series B: Biological Sciences* 1545: 1283-1291
- Phillips RA, Wood AG, Croxall JP (2011) Priority population assessment – Black-browed Albatross at South Georgia (Islas Georgias del Sur). Annex 9 in the Report of the Breeding Sites Working Group and Status and Trends Working Group - Joint BSWG4/STWG6. AC6 Doc 11. Guayaquil, Ecuador, 29 August - 2 September 2011
- Poncet S, Robertson G, Phillips RA, Lawton K, Phalan B, Trathan PN, Croxall JP (2006) Status and distribution of Wandering, Black-browed and Grey-headed albatrosses breeding at South Georgia. *Polar Biology* 29: 772-781
- Poncet S, Wolfaardt AC, Black A, Browning S, Lawton K, Lee J, Passfield K, Strange G, Phillips RA (in press) Recent trends in numbers of wandering, black-browed and grey-headed albatrosses breeding at South Georgia. *Polar Biology*

- Premier Oil Exploration & Production Limited (2015) 2015 Falkland Islands Exploration Campaign Post-Consultation Environmental Impact Statement. Document No: FK-BU-PMO-EV-REP-0003
- Prince, P.A. 1980. The food and feeding ecology of grey-headed albatross *Diomedea chrysostoma* and black-browed albatross *Diomedea melanophrys*. Ibis 122: 476-488
- Prince PA, Rothery P, Croxall JP, Wood AG (1994) Population dynamics of Black-browed and Grey-headed albatrosses *Diomedea melanophrys* and *D. chrysostoma* at Bird Island, South Georgia. Ibis 136: 50-71
- Prince PA, Croxall JP, Trathan PN, Wood AG (1998) The pelagic distribution of South Georgia albatrosses and their relationships with fisheries. In: Robertson G, Gales R (eds) Albatross biology and conservation. Surrey Beatty & Sons, Chipping Norton, pp 137-163
- Reid, K., Croxall, J.P., and Prince, P.A. 1996. The fish diet of black-browed albatross *Diomedea melanophrys* and grey-headed albatross *D. chrysostoma* at South Georgia. Polar Biology 16: 469-477.
- Robertson G, Moreno C, Arata JA, Candy SG, Lawton K, Valencia J, Wienecke B, Kirkwood R, Taylor P, Suazo C (2014) Black-browed albatross numbers in Chile increase in response to reduced mortality in fisheries. Biological Conservation 169: 319-333
- Robertson G, Wienecke B, Suazo CG, Lawton K, Arata JA, Moreno C (2016) Continued increase in the number of black-browed albatrosses (*Thalassarche melanophrys*) at Diego Ramírez, Chile. Polar Biology doi 10.1007/s00300-016-2028-5
- Rodhouse, P.G. and Prince, P.A. 1993. Cephalopod prey of the black-browed albatross *Diomedea melanophrys* at South-Georgia. Polar Biology 13: 373-376.
- Rolland V, Barbraud C, Weimerskirch H (2008) Combined effects of fisheries and climate on a migratory long-lived marine predator. Journal of Applied Ecology 45: 4-13
- Rolland V, Barbraud C, Weimerskirch H (2009a) Assessing the impact of fisheries, climate and disease on the dynamics of the Indian Yellow-nosed Albatross. Biological Conservation 142: 1084-1095
- Rolland V, Nevoux M, Barbraud C, Weimerskirch H (2009b) Respective impact of climate and fisheries on the growth of an albatross population. Ecological Applications 19: 1336-1346
- Rolland V, Weimerskirch H, Barbraud C (2010) Relative influence of fisheries and climate on the demography of four albatross species. Global Change Biology 16: 1910-1922
- Rollinson DP, Wanless RM, Ryan PG (in prep.) Patterns and trends in seabird bycatch by the pelagic longline fishery off South Africa

- Ryan PG, Keith DG, Kroese M (2002) Seabird bycatch by tuna longline fisheries off southern Africa, 1998–2000. *South African Journal of Marine Science* 24: 103-110
- SC-CAMLR (1996) Scientific Committee for the Conservation of Antarctic Marine Living Resources. Report of the 15th meeting of the Scientific Committee. CCAMLR, Hobart.
- SC-CAMLR (1997) Scientific Committee for the Conservation of Antarctic Marine Living Resources. Report of the 16th meeting of the Scientific Committee. CCAMLR, Hobart.
- SC-CAMLR (1998) Scientific Committee for the Conservation of Antarctic Marine Living Resources. Report of the 17th meeting of the Scientific Committee. CCAMLR, Hobart.
- SC-CAMLR (1999) Scientific Committee for the Conservation of Antarctic Marine Living Resources. Report of the 18th meeting of the Scientific Committee. CCAMLR, Hobart.
- SC-CAMLR (2000) Scientific Committee for the Conservation of Antarctic Marine Living Resources. Report of the 19th meeting of the Scientific Committee. CCAMLR, Hobart.
- SC-CAMLR (2001) Scientific Committee for the Conservation of Antarctic Marine Living Resources. Report of the 20th meeting of the Scientific Committee. CCAMLR, Hobart.
- SC-CAMLR (2002) Scientific Committee for the Conservation of Antarctic Marine Living Resources. Report of the 21st meeting of the Scientific Committee. CCAMLR, Hobart.
- SC-CAMLR (2003) Scientific Committee for the Conservation of Antarctic Marine Living Resources. Report of the 22nd meeting of the Scientific Committee. CCAMLR, Hobart.
- SC-CAMLR (2004) Scientific Committee for the Conservation of Antarctic Marine Living Resources. Report of the 23rd meeting of the Scientific Committee. CCAMLR, Hobart.
- SC-CAMLR (2005) Scientific Committee for the Conservation of Antarctic Marine Living Resources. Report of the 24th meeting of the Scientific Committee. CCAMLR, Hobart.
- SC-CAMLR (2006) Scientific Committee for the Conservation of Antarctic Marine Living Resources. Report of the 25th meeting of the Scientific Committee. CCAMLR, Hobart.
- Sullivan BJ, Reid TA, Bugoni L (2006) Seabird mortality on factory trawlers in the Falkland Islands and beyond. *Biological Conservation* 131: 495-504
- Tancell C, Sutherland WJ, Phillips RA (2016) Marine spatial planning for the conservation of albatrosses and large petrels breeding at South Georgia. *Biological Conservation* 198: 165-176

- Thompson KR, Riddy MD (1995) Utilization of offal and discards from "finfish" trawlers around the Falkland Islands by the Black-browed Albatross *Diomedea melanophris*. *Ibis* 137: 198-206
- Tickell WLN, Pinder R (1975) Breeding biology of the Black-browed Albatross *Diomedea melanophris* and Grey-headed Albatross *D. chrysostoma* at Bird Island, South Georgia. *Ibis* 117: 433-451
- Tuck GN, Phillips RA, Small C, Thompson RB, Klaer NL, Taylor F, Wanless RM, Arrizabalaga H (2011) An assessment of seabird-fishery interactions in the Atlantic Ocean. *ICES Journal of Marine Science* 68: 1628-1637
- Varty N, Sullivan B, Black A (2008) FAO International Plan of Action-Seabirds: An assessment for fisheries operating in South Georgia and South Sandwich Islands. BirdLife International Global Seabird Programme. Royal Society for the Protection of Birds, The Lodge, Sandy, Bedfordshire, UK
- Watkins BP, Petersen SL, Ryan PG (2008) Interactions between seabirds and deep-water hake trawl gear: an assessment of impacts in South African waters. *Animal Conservation* 11: 247-254
- Waugh SM, Baker GB, Gales R, and Croxall JP (2008) CCAMLR process of risk assessment to minimise the effects of longline fishing mortality on seabirds. *Marine Policy* 32: 442-454
- Weimerskirch H (2004) Diseases threaten Southern Ocean albatrosses. *Polar Biology* 27: 374-379
- Wolfaardt A (2012) An assessment of the population trends and conservation status of black-browed albatrosses in the Falkland Islands. Joint Nature Conservation Committee (JNCC)
- Wolfaardt AC, Christie D (2010). South Georgia and the South Sandwich Islands Implementation Plan for the Agreement on the Conservation of Albatrosses and Petrels (ACAP). Government of South Georgia and the South Sandwich Islands, Stanley, Falkland Islands
- Xavier JC, Croxall JP, Trathan PN, Wood AG (2003) Feeding strategies and diets of breeding grey-headed and wandering albatrosses at South Georgia. *Marine Biology* 143: 221-232
- Yeh YM, Huang HW, Dietrich KS, Melvin E (2013) Estimates of seabird incidental catch by pelagic longline fisheries in the South Atlantic Ocean. *Animal Conservation* 16: 141-152

Appendix 1: Black-browed Albatross breeding sites at South Georgia (see map in Fig. 1)

Location (Fig. 1)	No.	Location Name
1		Main Island, Willis Island
2		Trinity Island, Willis Island
4		Bird Island
5		Sorn & Bernt Coast
6		Cape North
7		Welcome Islets
8		Sheathbill Bay
9		Sitka Bay
10		Cape Buller
11		Cape Wilson
12		Cape Crewe
13		Paryadin Peninsula North
15		Paryadin Peninsula South
16		Klutschak Point
17		Cape Nunez
18		Annenkov Island
19		Green Island
20		Rumbolds Point
21		Cooper Island
22		Clerke Rocks

Note that the **Location Numbers** are consistent with the numbers that have been used in previous counts and publications (e.g. Poncet et al. 2006; in press) of Black-browed and Grey-headed Albatrosses at South Georgia. The missing numbers (3, 14) refer to locations at which Grey-headed Albatrosses breed, but not Black-browed Albatrosses.