**THE CONSERVATION STATUS AND PRIORITIES FOR ALBATROSSES AND LARGE PETRELS**

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**ABSTRACT**

Seabirds are amongst the most globally-threatened of all groups of birds, and conservation issues specific to albatrosses (Diomedeidae) and large petrels (*Procellaria* spp. and giant petrels *Macronectes* spp.) led to drafting of the multi-lateral Agreement on the Conservation of Albatrosses and Petrels (ACAP). Here we review the taxonomy, breeding and foraging distributions, population status and trends, threats and priorities for the 29 species covered by ACAP. Nineteen (66%) are listed as threatened by IUCN, and 11 (38%) are declining. Most have extensive at-sea distributions, and the greatest threat is incidental mortality (bycatch) in industrial pelagic or demersal longline, trawl or artisanal fisheries, often in both national and international waters. Mitigation measures are available that reduce bycatch in most types of fisheries, but some management bodies are yet to make these mandatory, levels of implementation and monitoring of compliance are often inadequate, and there are insufficient observer programmes collecting robust data on bycatch rates. Intentional take, pollution (including plastic ingestion), and threats at colonies affect fewer species than bycatch; however, the impacts of disease (mainly avian cholera) and of predation by introduced species, including feral cats (*Felis catus*), rats (*Rattus* spp.) and house mice (*Mus musculus*), are severe for some breeding populations. Although major progress has been made in recent years in reducing bycatch rates and in controlling or eradicating pests at breeding sites, unless conservation efforts are intensified, the future prospects of many species of albatrosses and large petrels will remain bleak.

**Keywords**: anthropogenic impacts; conservation management; invasive species, non-target species, population trends; regional fisheries management organisations.

**INTRODUCTION**

According to the IUCN Red List criteria, which relate to population size, trends, and the extent and fragmentation of breeding distributions, seabirds are amongst the most threatened of all groups of birds ([Croxall et al. 2012](#_ENREF_39)). Albatrosses and petrels are long-lived, have high adult survival rates, delayed sexual maturity and low fecundity; all lay single-egg clutches, and nine species (all of which are albatrosses) breed biennially if successful in raising a chick ([Warham 1990](#_ENREF_169)). Given these extreme life-history attributes, changes in adult mortality have a much greater impact on population trajectories than variation in other demographic parameters, including breeding success, proportion of deferring breeders, juvenile survival and recruitment ([Arnold et al. 2006](#_ENREF_9); [Croxall and Rothery 1991](#_ENREF_42); [Moloney et al. 1994](#_ENREF_98); [Véran et al. 2007](#_ENREF_165)). All species have wide at-sea distribution during the breeding and nonbreeding seasons; these extensive foraging ranges overlap with, and so put them at potential risk from multiple fisheries in national and international waters ([Baker et al. 2007](#_ENREF_10); [Delord et al. 2010](#_ENREF_49); [Phillips et al. 2006](#_ENREF_117)).

Incidental mortality of seabirds in fisheries (hereafter “bycatch”), particularly of albatrosses and petrels, became a major conservation concern in the late 1980s ([Brothers 1991](#_ENREF_19); [Murray et al. 1993](#_ENREF_99); [Weimerskirch and Jouventin 1987](#_ENREF_175)). Initial evidence came from numerous recoveries in longline fisheries of wandering albatrosses (*Diomedea* *exulans*) ringed at South Georgia (Islas Georgias del Sur) ([Croxall and Prince 1990](#_ENREF_41)), and estimates of very high bycatch from the Japanese tuna fishery off Australia (Brothers 1991). Although based on very small samples, the inferred mortality coincided with declines in albatross populations in the sub-Antarctic, and so it was strongly suspected that fisheries bycatch was a critical factor ([Croxall and Prince 1990](#_ENREF_41); [Prince et al. 1994b](#_ENREF_123); [Weimerskirch and Jouventin 1987](#_ENREF_175)). High rates of seabird bycatch were subsequently confirmed in a wide range of longline fisheries ([Brothers et al. 1999b](#_ENREF_22); [Gales 1998](#_ENREF_67); [Tasker et al. 2000](#_ENREF_154)). Although attention focused initially on industrial longlining, bycatch by trawl and artisanal fleets have also been identified as major sources of mortality for many albatrosses and petrels ([Croxall et al. 2012](#_ENREF_39); [Favero et al. 2010](#_ENREF_60); [Maree et al. 2014](#_ENREF_92); [Sullivan et al. 2006b](#_ENREF_153)).

Solving a conservation problem as pervasive as bycatch for species as wide-ranging as albatrosses and large petrels requires concerted management actions that cover both national and international waters. This motivated the development of the Agreement on the Conservation of Albatrosses and Petrels (ACAP) as a daughter agreement of the Convention on Migratory Species (Bonn Convention), and its ratification in 2004 ([Cooper et al. 2006](#_ENREF_34)). Although bycatch remains the main threat to many species and hence the contributing factors and demographic consequences are principal foci in this review, albatrosses and petrels also face a range of other threats on land and at sea, including impacts of invasive species, degradation or loss of nesting habitat, disease, pollution and climate change (see below). Consequently, the Action Plan of ACAP addresses topics that include habitat conservation and restoration, management of human activities, research and monitoring, education and public awareness, collation of information and implementation (ACAP [2001](#_ENREF_1); [Cooper et al. 2006](#_ENREF_34)). The purpose of this paper is to review the taxonomy, breeding and at-sea distributions, population status and trends, and marine and terrestrial threats to the 22 albatrosses and seven large petrels (*Macronectes* and *Procellaria* spp.) listed under ACAP, and report recent progress in addressing those threats and the priority conservation actions for the future. In order to maintain taxonomic and geographic coherence, the review does not cover the two species of shearwater added to the ACAP list since 2009 (Balearic shearwater *Puffinus mauretanicus* and pink-footed shearwater *P. creatopus*). Unless indicated otherwise by a supporting citation, data in tables and figures reflect published and unpublished data submitted to the ACAP database, available at [www.acap.aq](http://www.acap.aq).

**TAXONOMY**

Although >80 albatross taxa have been formally described since the mid 1700s ([Robertson and Nunn 1998](#_ENREF_131)), many were based on specimens collected at sea from unknown breeding locations and later revealed to be age-related plumage morphs of previously-described species. Taxonomic confusion was compounded by a scarcity of information on breeding behaviour and distribution, strong natal philopatry which precluded recognition of genuine physiological or behavioural barriers to gene flow (because contact between individuals from disparate populations is rare), and unusually low levels of genetic divergence even between what appear to be very different species ([Nunn et al. 1996](#_ENREF_105); [Nunn and Stanley 1998](#_ENREF_106)). This reduces the power of genetic studies to delineate species boundaries ([Burg and Croxall 2001](#_ENREF_28), [2004](#_ENREF_29); [Double et al. 2003](#_ENREF_57)).

The taxonomic debate surrounding albatrosses was revisited when a new taxonomy was proposed by Robertson & Nunn (1998). This largely applied the Phylogenetic Species Concept and recognised 24 albatross species; however, some decisions were controversial ([Penhallurick 2012](#_ENREF_109); [Penhallurick and Wink 2004](#_ENREF_110); [Rheindt and Austin 2005](#_ENREF_127)). Although the recommendation to re-establish four genera (resurrecting *Phoebastria* and *Thalassarche*) has been universally accepted, there is no current consensus at the species level; subsequent taxonomic treatises, field guides and reviews recognised between 13 and 24 albatross species (e.g. [Brooke 2004](#_ENREF_18); [Chambers et al. 2009](#_ENREF_30); [Christidis and Boles 2008](#_ENREF_32); [Onley and Scofield 2007](#_ENREF_107); [Penhallurick and Wink 2004](#_ENREF_110); [Shirihai 2002](#_ENREF_143)). Acknowledging that taxonomic confusion could hamper conservation, ACAP established a Taxonomy Working Group with a remit to develop a defendable species list based upon peer-reviewed literature and a transparent decision-making process. This group largely follows guidelines in Helbig et al. ([2002](#_ENREF_76)) which apply a relaxed version of the General Lineage Species Concept, focusing on diagnostic characteristics and evidence for distinct evolutionary trajectories. After assessing the splits advocated by Robertson and Nunn ([1998](#_ENREF_131)), the conclusion was that two (Pacific albatross *Thalassarche bulleri platei* and Gibson’s albatross *Diomedea antipodensis gibsoni*) of the 24 terminal albatross taxa could not be justified as separate species based on available data. The recognition of 22 albatross species by ACAP was later endorsed by Birdlife International ([2015](#_ENREF_15)), the official IUCN Red List Authority.

Most regional or global taxonomic authorities now recognise 21 or 22 albatross species, depending on whether shy (*Thalassarche cauta*) and white-capped albatross (*T. steadi*) are considered – which they are by ACAP - to be separate species ([BirdLife International 2015](#_ENREF_15); [Gill and Donsker 2016](#_ENREF_69); [Tennyson 2010](#_ENREF_158)). The argument by a minority for a return to 13 or 14 albatross species is based largely around percentage sequence divergence ([Christidis and Boles 2008](#_ENREF_32); [Penhallurick and Wink 2004](#_ENREF_110)). Unsurprisingly, the sequence divergence between sister taxa in the 14-species taxonomy is greater than for the 22-species taxonomy; indeed, divergence is very low between many sister taxa in the latter (<1% cytochrome b, [Chambers et al. 2009](#_ENREF_30); [Nunn et al. 1996](#_ENREF_105); [Nunn and Stanley 1998](#_ENREF_106)). However, this alone should not preclude recognition at the species level because neutral mitochondrial markers are insensitive to rapid radiations ([Chambers et al. 2009](#_ENREF_30); [Rheindt and Austin 2005](#_ENREF_127)). Moreover, no one level of sequence divergence can define a species event; this is particular pertinent for albatrosses, as molecular evolution is highly variable within the Procellariiformes and larger species show slower rates ([Nunn and Stanley 1998](#_ENREF_106)).

The other taxonomic dispute concerns northern (*Macronectes halli*) and southern giant (*M. giganteus*) petrels, which are morphologically similar and show low sequence divergence ([Nunn and Stanley 1998](#_ENREF_106); [Penhallurick and Wink 2004](#_ENREF_110)). However, a rare white plumage phase only occurs in the southern giant petrel, and this species has a different bill tip colour and in areas of sympatry breeds about 6 weeks later than its congener ([Bourne and Warham 1966](#_ENREF_17); [Brown et al. 2015](#_ENREF_23)). Few now argue against separate species status ([but see Penhallurick and Wink 2004](#_ENREF_110)). Finally, spectacled petrel (*Procellaria conspicillata*) was at one time considered to be a subspecies of white-chinned petrel (*P. aequinoctialis*), but has since been accorded species status, reflecting vocal, plumage, structural and genetic differences ([Ryan 1998](#_ENREF_138); [Techow et al. 2009](#_ENREF_157)).

**GEOGRAPHIC DISTRIBUTION**

**Breeding Sites**

The global breeding distributions of the albatrosses and large petrels vary greatly in geographic extent. Breeding sites, as listed by ACAP, are usually an entire, distinct island or islet, or rarely, section of a large island (>3,000km2), and each species-site combination is included separately, i.e., two species breeding in the same area constitute two breeding sites. If the few sites with tiny populations (<10 breeding pairs) are excluded, five albatrosses (wandering, grey-headed *Thalassarche chrysostoma*, black-browed *T. melanophris*, sooty *Phoebetria fusca* and light-mantled *P. palpebrata* albatrosses), the two giant petrels, and two of the *Procellaria* petrels (white-chinned and grey petrels *P. cinerea*) have a circumpolar breeding distribution, with populations in every Southern Ocean basin; eight albatrosses (Antipodean *Diomedea antipodensis*, Buller’s *T. bulleri*, Campbell *T. impavida*, Chatham *T. eremita*, white-capped, northern royal *D. sanfordi*, southern royal *D. epomophora* and Salvin’s albatrosses *T. salvini*) and two *Procellaria* petrels (Westland *Procellaria westlandica* and black *P. parkinsoni* petrels) breed only around New Zealand; two albatrosses (Tristan *D. dabbenena* and Atlantic yellow-nosed albatrosses *T. chlororhynchos*), and spectacled petrel breed only on islands in the Atlantic Ocean; two albatrosses (Indian yellow-nosed *T. carteri* and Amsterdam albatrosses *D. amsterdamensis*) only in the Indian Ocean; three albatrosses (Laysan *Phoebastria immutabilis*, black-footed *P. nigripes* and short-tailed albatrosses *P. albatrus*) only in the North Pacific; shy albatross only in Tasmania, and; waved albatross *P. irrorata* only regularly in the Galápagos islands (Fig. 1). Seven albatross and three *Procellaria* petrel species are endemic to a single island or island group (Fig. 1). Almost all breeding colonies are on remote islands, ranging in size from tiny rocky islets to Grande Terre, Kerguelen Islands (6,675 km2) and the South Island, New Zealand.

The ACAP database includes virtually all the existing census data for the 29 species in this review, and allows the identification of internationally important breeding sites - single islands or, in a few cases, peninsulas or small island groups - that hold >1% of the global population (Appendix A). Using this definition, and bearing in mind the caveats that there are no census data for around 22% of breeding sites (particularly those of the burrow-nesting *Procellaria* petrels and light-mantled albatross), and some counts are of low reliability or more than a decade old, most albatrosses and larger petrels breed at relatively few sites; for 16 of the 29 species, there are only 1-3 sites with >1% of global numbers. Only for a minority of albatrosses (8 of 22 species) are there ≥5 breeding sites with >1% of the global population, and only for the five albatrosses and the two giant petrels that have circumpolar breeding distributions (see above) are there ≥9 sites that hold >1% of global numbers. No species breeds at ≥3 sites that each hold >10% of the global population. The restricted breeding distribution of many species increases their vulnerability to localised threats (see below), and is reflected in the assignment by IUCN of some albatrosses and *Procellaria* petrels to a threat category of Vulnerable even though the global populations are not thought to be decreasing (see below).

**At-sea distribution**

Albatrosses and large petrels are exceptionally wide-ranging, frequently travelling 100s to 1000s of km on a single foraging trip that can extend to a straight-line distance of >2000 km from the colony ([Peron et al. 2010b](#_ENREF_112); [Phillips et al. 2004](#_ENREF_119); [Weimerskirch et al. 1993](#_ENREF_177)). This reflects trip durations during incubation and chick-rearing that can be of 2-3 weeks, although it is more common for the adult to return and feed its chick after 2-4 days, especially during brood-guard ([Phillips et al. 2005a](#_ENREF_116); [Torres et al. 2013](#_ENREF_160)). As the degree of central-place foraging constraint varies with breeding phase, so too does the extent of at-sea distributions; this is sometimes associated with a change in habitat use from oceanic, distant shelf or shelf-slope regions in the pre-laying and incubation periods, to neritic waters much closer to the colony in brood-guard, and then a return to more distant waters for the remainder of chick-rearing ([Phillips et al. 2006](#_ENREF_117); [Wakefield et al. 2011](#_ENREF_166); [Weimerskirch et al. 1993](#_ENREF_177)). During chick-rearing, parents may adopt a dual foraging strategy, involving the alternation of long and short trips as they balance the demands of chick provisioning with self-maintenance ([Weimerskirch et al. 1994](#_ENREF_172)).

Almost all the albatross and large petrel species have been tracked at some stage while breeding, and many during the nonbreeding season (although only in recent years and many data are unpublished), whereas there are relatively few tracks from juveniles and immatures ([De Grissac et al. 2016](#_ENREF_47); [Dias et al. 2014](#_ENREF_52)). During the nonbreeding period, many species make a directed, long-distance migration to a productive upwelling, shelf or frontal system, sometimes in a different ocean basin, and return to the colony can involve a circumnavigation of the Antarctic continent ([Croxall et al. 2005](#_ENREF_43)). There are, however, numerous exceptions and contrasting strategies. Thus, Atlantic yellow-nosed albatrosses from Tristan da Cunha and Gough, and black-browed albatrosses from South Georgia migrate a few thousand km east across the south Atlantic Ocean to the Benguela Upwelling system, where they overlap with nonbreeding white-chinned petrels from colonies in the Indian Ocean, and some white-capped and shy albatrosses that have travelled much longer distances west from the Auckland Islands and Tasmania, respectively ([Peron et al. 2010b](#_ENREF_112); [Phillips et al. 2005b](#_ENREF_118)). In contrast, white-chinned petrels, also from South Georgia, migrate only to the Patagonian Shelf or the Humboldt Upwelling; in the former, they overlap with wintering black-browed albatrosses from the Falklands (Malvinas) and northern royal albatrosses from New Zealand, and in the latter with several species of albatrosses and large petrels from New Zealand, including Salvin’s, Buller’s, Chatham and Antipodean albatrosses, black and Westland petrels ([Landers et al. 2011](#_ENREF_86); [Nicholls et al. 2002](#_ENREF_103); [Phillips et al. 2006](#_ENREF_117); [Spear et al. 2003](#_ENREF_146); [Walker and Elliott 2006](#_ENREF_167)). Even within the same population, there is often extensive variation among individuals in movements and distribution ([Croxall et al. 2005](#_ENREF_43); [Phillips et al. 2006](#_ENREF_117); [Phillips et al. 2005b](#_ENREF_118)).

Albatrosses and large petrels display diverse habitat preferences, reflecting the broad range of oceanographic conditions in waters around their scattered colonies and the more distant regions used at others times of year. They can be specialists or generalists, reflected in the proportion of time spent utilising tropical, subtropical, sub-polar or polar, and continental shelf, island shelf, shelf-slope or oceanic waters at different times of year ([Peron et al. 2010b](#_ENREF_112); [Phillips et al. 2006](#_ENREF_117); [Phillips et al. 2005b](#_ENREF_118); [Walker and Elliott 2006](#_ENREF_167)). Several species exhibit pronounced sexual segregation, with females tending to feed at lower latitudes or further from colonies than males, attributed to competition between sexes or habitat specialisation, and related in some, but not all species, to sexual size dimorphism ([Bartle 1990](#_ENREF_13); [González-Solís et al. 2000](#_ENREF_72); [Weimerskirch et al. 1993](#_ENREF_177)). There can also be partial or complete spatial segregation between juveniles and adults ([Alderman et al. 2010](#_ENREF_2); [Gutowsky et al. 2014](#_ENREF_73); [Weimerskirch et al. 2014](#_ENREF_173)). Even in areas of spatial overlap, species usually differ in at-sea activity patterns (e.g. frequency of landings, flight and resting bout durations), reflecting the distribution of preferred prey or degree of nocturnality, among others ([Mackley et al. 2010](#_ENREF_91); [Phalan et al. 2007](#_ENREF_113); [Weimerskirch and Guionnet 2002](#_ENREF_174)). There are also large differences in diving capability; albatrosses and, given anatomical similarities, probably giant petrels, are much poorer divers than *Procellaria* petrels ([Hedd et al. 1997](#_ENREF_75); [Prince et al. 1994a](#_ENREF_122); [Rollinson et al. 2014](#_ENREF_136)). Intra- and inter-specific variation in distribution, habitat preferences, dive depth and other aspects of behaviour have major implications for the degree of overlap and hence risk of bycatch in different fisheries (see below).

**POPULATION STATUS AND TRENDS**

The 29 species of albatrosses and large petrels (*Macronectes* and *Procellaria*) included here collectively comprise almost 3 million pairs breeding at 571 sites, across multiple jurisdictions. Trends vary between sites and species, but globally, over the 2 decades from 1993 to 2013, about 38% of these species declined, 28% increased, 28% were stable, and the trend for 7% (2 species) was unknown. Nineteen species (66%) are considered to be threatened (Vulnerable, Endangered or Critically Endangered) by IUCN (Figure 2, Table 1). Three species qualify as Critically Endangered, all with very restricted breeding ranges. Two are declining: the Tristan albatross because of a combination of bycatch and predation of chicks by introduced house mice *Mus musculus* ([Wanless et al. 2009](#_ENREF_168)), and the waved albatross because of bycatch and intentional take for human consumption ([Anderson et al. 2008](#_ENREF_5)). The Amsterdam albatross is increasing as it recovers from degradation of its nesting habitat and impacts of longline fisheries ([Inchausti and Weimerskirch 2001](#_ENREF_77)), but remains in perilously low numbers (31 breeding pairs; Table 1). A further five albatross species are Endangered; grey-headed and Indian yellow-nosed albatrosses because of rapid population decline at South Georgia and Amsterdam Island, respectively; sooty albatross seems to be declining based on limited data; Atlantic yellow-nosed albatross appears to be stable, but with low confidence in the trend data, and; the current trend for northern royal albatrosses is uncertain.

Eleven species (seven albatrosses and four *Procellaria* petrels) are Vulnerable; in some cases, this reflects restricted breeding range and not a declining population (Figure 2, Table 1; www.iucn.org). Eight of these species breed within the jurisdiction of one country, seven in New Zealand. The populations of four species (Chatham, Campbell, and southern royal albatrosses, and Westland petrel) are considered stable. Wandering and Antipodean albatross and black petrel are in decline. Although the short-tailed albatross is recovering rapidly from near-extinction because of careful management, the population remains at <650 breeding pairs each year ([Finkelstein et al. 2010](#_ENREF_64)). By comparison, the white-chinned petrel is far more abundant (c.1 million breeding pairs) but the limited trend data suggest a steep decline of the largest population (South Georgia) from the 1980s to the later 1990s, as a result of incidental mortality in fisheries (Phillips et al. 2006). Eight species are Near Threatened, two of which are increasing, the black-browed and black-footed albatrosses (Figure 2, Table 1). Limited trend data are available for light-mantled albatross (probably stable), white-capped albatross (trend uncertain), and grey petrel and shy albatross (declining). Laysan and Buller’s albatrosses are stable. The two species of Least Concern are the northern and southern giant petrels, both of which are increasing.

There are no counts within the last decade for 64 breeding sites (of 12 albatross and four petrel species) that were known to hold >1% of the global population (Table 1), or for any site in 13 island groups (of 5 albatross and three petrel species) that together held >1% of the global population (Appendix B). In addition, the Prince Edward Islands potentially hold >1% of global numbers of grey petrels, but no estimate is available. Adult and juvenile survival rates, and breeding success are known from at least one site for all species except for adult survival (spectacled petrel), juvenile survival (Chatham, Salvin’s, southern royal, white-capped, light-mantled and short-tailed albatrosses, and northern giant and spectacled petrel), and breeding success (Chatham and Salvin’s albatrosses, and spectacled petrel), although in some cases, data have been collected but not published. Data gaps often reflect the logistical challenges of working at remote islands, and funding limitations given the large number of breeding sites in some jurisdictions.

**THREATS: BYCATCH IN FISHERIES**

**Scale, contributing factors and impacts**

Bycatch of seabirds in longline fisheries occurs when birds attack baited hooks and become hooked and drowned as the line sinks ([Brothers 1991](#_ENREF_19)). In trawl fisheries, birds foraging on discards or offal (hereafter “discards”) may be injured or killed on collision with net-monitoring and warp cables, dragged underwater and drowned when their wings become entangled around the warp, or become entangled in nets ([Sullivan et al. 2006a](#_ENREF_151); [Watkins et al. 2008](#_ENREF_170)). Incidental capture in gillnet fisheries is due mostly to entanglement while diving for prey ([Melvin et al. 1999](#_ENREF_96); [Waugh et al. 2011](#_ENREF_171)).

Bycatch is often unevenly distributed; biases can be towards males or females, adults or immatures, and depend on fishing area, gear type or season ([Bugoni et al. 2011](#_ENREF_24); [Delord et al. 2005](#_ENREF_50); [Gales et al. 1998](#_ENREF_68)). Variation in the sex and age classes most at risk are often due to differences in foraging distributions at each stage of the annual (breeding and nonbreeding) cycle, and hence the relative overlap with high-risk fisheries ([Alderman et al. 2011](#_ENREF_3); [Baker et al. 2007](#_ENREF_10); [Cuthbert et al. 2005](#_ENREF_44); [Delord et al. 2010](#_ENREF_49)). Bycatch rates of birds in different life-history stages have implications for demography and population trajectories, including time lags before detection and potential recovery ([Dillingham and Fletcher 2011](#_ENREF_56)).

Although the volume and reliability of bycatch information are still severely limited for many areas and fisheries, particularly artisanal and gillnet, there has been a general improvement in the last decade, with better sampling coverage ([Anderson et al. 2011](#_ENREF_6); [Richard and Abraham 2014](#_ENREF_128); [Žydelis et al. 2013](#_ENREF_180)). Regardless, the scale of bycatch is huge. An assessment for longline fisheries just in the Atlantic Ocean estimated c.48,500 seabirds were killed in 2003-2006 ([Klaer 2012](#_ENREF_85); [Tuck et al. 2011](#_ENREF_163)). In the most recent estimate at the global level, >160,000, and potentially >320,000 seabirds are killed annually in longline fisheries, a large portion of which were albatrosses and large petrels ([Anderson et al. 2011](#_ENREF_6)). Estimated annual global bycatch in gillnet fisheries is even higher, and although only a small proportion are procellariids, the impact on species such as the waved albatross may be severe ([Žydelis et al. 2013](#_ENREF_180)).

Many operational, environmental and ecological factors influence the nature and extent of seabird bycatch ([Gómez Laich et al. 2006](#_ENREF_71); [Klaer and Polacheck 1998](#_ENREF_84)). Albatrosses and larger petrels are particularly susceptible; they scavenge on food items near the sea surface, have a propensity to follow vessels, and possess large gapes so can ingest baited hooks ([Brothers et al. 2010](#_ENREF_20); [Brothers et al. 1999a](#_ENREF_21)). They also have a competitive advantage over smaller birds when attempting to access bait and discards ([Brothers 1991](#_ENREF_19); [Jimenez et al. 2011](#_ENREF_79)), although there are differences in feeding behaviour and vulnerability to capture among species of similar size ([Brothers et al. 2010](#_ENREF_20)). The *Procellaria* petrels are more proficient divers, as are shearwaters *Ardenna* species, and in multi-species feeding assemblages can seize baited hooks at depths below those accessible to larger species; by returning those to the surface, bycatch of albatrosses is increased ([Jimenez et al. 2012a](#_ENREF_80)). Bycatch in trawl fisheries is similarly influenced by species-specific differences in size and manoeuvrability; the large albatrosses are particularly susceptible to injury on warp cables ([Favero et al. 2010](#_ENREF_60); [Sullivan et al. 2006a](#_ENREF_151); [Sullivan et al. 2006b](#_ENREF_153); [Watkins et al. 2008](#_ENREF_170)).

Although bycatch is now recognised as the most pervasive threat for albatrosses and large petrels, there are populations (spectacled petrel, and white-chinned petrels at Marion Island) which are increasing following the removal of terrestrial threats, despite ongoing mortality in fishing gear ([Ryan et al. 2012](#_ENREF_140); [Ryan and Ronconi 2011](#_ENREF_142)). Although the nature of bycatch is fairly well understood, the link to population-level impacts has been harder to establish. However, a growing number of studies show negative relationships between fishing effort and adult survival or population trends ([Rolland et al. 2010](#_ENREF_135); [Tuck et al. 2011](#_ENREF_163); [Véran et al. 2007](#_ENREF_165)). Assessing conservation implications (including critical areas and periods) requires estimation of bycatch rate or risk for each species in different fisheries based on the spatio-temporal overlap between fishing effort and bird distributions, as well as data on size and trends of affected populations ([Small et al. 2013](#_ENREF_145); [Tuck 2011](#_ENREF_162); [Tuck et al. 2011](#_ENREF_163)). Analyses need to consider not only bycatch by multiple fleets across ocean basins ([Baker et al. 2007](#_ENREF_10)), including Illegal, Unreported and Unregulated fishing operations, but the impact relative to other threats ([Rivalan et al. 2010](#_ENREF_130); [Rolland et al. 2010](#_ENREF_135); [Wanless et al. 2009](#_ENREF_168)). It is not necessarily the most frequently-captured species that suffer the most severe population-level consequences ([Jimenez et al. 2012b](#_ENREF_81)). The Amsterdam albatross has a small but increasing global population, but models show that bycatch of only six individuals per year would eventually drive the species to extinction ([Rivalan et al. 2010](#_ENREF_130)). Impacts of bycatch can also vary regionally; the impact on wandering albatrosses is much higher for breeding populations in the Atlantic than Indian Ocean ([Poncet et al. 2006](#_ENREF_121); [Ryan et al. 2009](#_ENREF_141); [Tuck et al. 2011](#_ENREF_163)), whereas the reverse is true for white-chinned petrels ([Ryan et al. 2012](#_ENREF_140)). Finally, bycatch can be biased towards males or females, potentially reflecting differential access to bait mediated by sexual size dimorphism, or sex-specific differences in foraging distributions ([Bugoni et al. 2011](#_ENREF_24); [Nel et al. 2002a](#_ENREF_101)). This exacerbates the impact on breeding numbers by reducing effective population sizes and fecundity ([Mills and Ryan 2005](#_ENREF_97)).

**Progress in mitigating threats from fisheries**

A range of measures is available that can minimise bycatch, and improvements and novel approaches are still being researched. Although some approaches are widely-advocated, none is 100% effective in isolation. There is extensive variation in operational and gear characteristics among fisheries, and they may overlap with different assemblages of seabirds which vary in susceptibility to capture. Consequently, mitigation needs to be tailored carefully, and if introduced in combination with close monitoring of compliance has been very effective, for example in trawl, demersal or pelagic longline fisheries around South Georgia, New Zealand, South Africa and Hawaii ([Anderson et al. 2011](#_ENREF_6); [Bull 2007](#_ENREF_26), [2009](#_ENREF_27); [Croxall 2008](#_ENREF_38); [Løkkeborg 2011](#_ENREF_89); [Maree et al. 2014](#_ENREF_92)).

Mitigating seabird bycatch in pelagic longline is not as advanced as in demersal longline fisheries because of operational challenges to deploying bird-scaring lines, setting gear at night and attaching weighted swivels on branch-lines. Notwithstanding these difficulties, the efficacy of these approaches has been demonstrated through experimental studies, especially when used in combination, and without affecting target catch rates ([Bull 2009](#_ENREF_27); [Løkkeborg 2011](#_ENREF_89); [Melvin et al. 2014](#_ENREF_95); [Robertson et al. 2013](#_ENREF_132)). In addition, ‘safe-leads’ are available that reduce the risk of injuries to crew ([Sullivan et al. 2012](#_ENREF_152)), but there has been limited adoption by the pelagic longline industry (Baker pers. obs.). However, if appropriate mitigation is implemented, bycatch may be reduced significantly ([Anderson et al. 2011](#_ENREF_6); [Gilman et al. 2014](#_ENREF_70)). Bycatch can also decline because of shifts or reductions in fishing effort, or changes in operational procedures that were not targeted specifically at bycatch reduction ([Favero et al. 2013](#_ENREF_59); [Nel et al. 2002b](#_ENREF_102); [Robertson et al. 2014](#_ENREF_133); [Tuck et al. 2011](#_ENREF_163)). Best-practice bycatch mitigation has been adopted relatively recently by most tuna Regional Fisheries Management Organisations (tRFMOs), but reductions in mortality can only be confirmed if there are vast improvements in observer coverage and data collection standards (see below).

Seabird mortalities associated with trawl fisheries are generally limited to the period when discarding is taking place ([Favero et al. 2010](#_ENREF_60); [Maree et al. 2014](#_ENREF_92); [Pierre et al. 2012](#_ENREF_120); [Sullivan et al. 2006b](#_ENREF_153)). Therefore, avoiding release of discards while the warp cables are in the water would eliminate bycatch in most trawl fisheries. Complete retention of discards may not be operationally achievable, but management during shooting and hauling, and releasing batched waste at other times can reduce the attendance of seabirds, thereby mitigating associated risk ([Pierre et al. 2012](#_ENREF_120)). The combination of improved discard management and the use of bird-scaring lines has reduced trawl bycatch significantly ([Maree et al. 2014](#_ENREF_92); [Melvin et al. 2011](#_ENREF_94); [Pierre et al. 2012](#_ENREF_120); [Sullivan et al. 2006b](#_ENREF_153)). Efforts to address bycatch in gillnet fisheries are far less advanced, with very little concerted action to-date ([Žydelis et al. 2013](#_ENREF_180)). Consequently, there is no current best-practice and an urgent need for further research.

ACAP routinely reviews bycatch mitigation measures and provides advice appropriate to each gear type. This advice needs to be complemented by increased awareness, education and training for operators, and appropriate regulations by management authorities. The Food and Agricultural Organization of the United Nations (FAO) has developed technical guidelines on reducing incidental catch of seabirds in capture fisheries that encourage adoption of National Plans of Action (NPOA-Seabirds) ([FAO 2008](#_ENREF_58)). To date, 14 states and other entities have formally adopted NPOA-Seabirds or their broad equivalent. In addition, BirdLife International and ACAP has jointly developed a series of fact sheets, available in several languages, which provide detailed information on each of the main mitigation measures, including technical specifications and implementation guidelines (<http://www.acap.aq/en/resources/bycatch-mitigation/mitigation-fact-sheets>). BirdLife International’s Albatross Task Force has also achieved considerable success in building capacity on board vessels to refine mitigation measures ([Croxall et al. 2012](#_ENREF_39)).

**THREATS: INTENTIONAL TAKE OR KILLING AT SEA**

Historically, albatrosses and petrels were deliberately caught at sea for human consumption, or shot from vessels for sport or scientific purposes (Robertson and Gales 1998). More recently, intentional killing of seabirds to reduce the depredation of live bait in hook-and-line fisheries has been recorded off Brazil ([Bugoni et al. 2008](#_ENREF_25)). Both incidental and intentional catches in Peruvian artisanal longline and gillnet fisheries are thought to have contributed to reduced adult survival, changes in sex ratios and population declines of waved albatrosses in the late 1990s and early 2000s ([Alfaro Shigueto et al. 2016](#_ENREF_4); [Anderson et al. 2008](#_ENREF_5)). Washing-up of broken wings provides circumstantial evidence for intentional take, although this may relate to the processing for food of bycaught birds, rather than active targeting. There is also circumstantial evidence from floating carcasses for intentional capture of black-browed albatrosses for food by squid-fishing vessels on the southern Patagonian Shelf ([Reid et al. 2006](#_ENREF_126)). It is extremely difficult to quantify intentional take and its impact on populations, because the practise is likely to cease as soon as independent observers are on board. The factors underlying intentional take are different to those associated with bycatch, and require alternative solutions, including a greater focus on socio-economic and cultural issues ([Alfaro Shigueto et al. 2016](#_ENREF_4)). Although it represents a less pervasive threat to albatrosses and petrels than bycatch, efforts need to be directed towards a better understanding of the contributing factors to allow effective conservation interventions.

**THREATS: POLLUTION, DEBRIS AND DISCARDED FISHING GEAR**

As albatrosses and large petrels are long-lived top predators, they are potentially at high risk from bioaccumulation of marine pollutants through food chains. This applies even to species that feed in remote areas, as pollutants dispersed by long-range atmospheric transport continue to cycle in food webs for many years ([Cossa et al. 2011](#_ENREF_35); [Nriagu and Pacyna 1988](#_ENREF_104); [Riget et al. 2010](#_ENREF_129)). In addition, global emissions of mercury are predicted to increase, and although levels of some legacy (cf. emerging) persistent organic pollutants (POPs) are declining, there remains a high risk from new and emerging organic contaminants ([Riget et al. 2010](#_ENREF_129); [Streets et al. 2009](#_ENREF_150)).

Concentrations of mercury, cadmium, arsenic and POPs in the tissues of albatrosses and petrels are related to trophic level, and also influenced by the degree of background contamination in foraging areas, and type of prey, including the proportion of squid, which have high cadmium levels in their digestive glands, and of mesopelagic taxa, which tend to have higher mercury burdens ([Anderson et al. 2009](#_ENREF_7); [Anderson et al. 2010](#_ENREF_8); [Becker et al. 2002](#_ENREF_14); [Harwani et al. 2011](#_ENREF_74); [Stewart et al. 1999](#_ENREF_148)). There is evidence for increases in several pollutants, including mercury and organochlorines in the tissues of albatrosses in both the Northern and Southern hemispheres ([Becker et al. 2002](#_ENREF_14); [Finkelstein et al. 2006](#_ENREF_61)). In black-footed albatrosses, these were associated with an alteration of immune function ([Finkelstein et al. 2007](#_ENREF_62)), and the levels of PCBs and DDE were considered sufficient to increase the risk of eggshell thinning and reduce egg viability ([Ludwig et al. 1998](#_ENREF_90)).

Mercury levels in adults and chicks of some species of albatrosses and large petrels can be well above the threshold associated with toxic impacts in terrestrial birds, yet cause no obvious deleterious effects ([Blevin et al. 2013](#_ENREF_16)). This relates to the abilities to excrete mercury into feathers during moult, and into eggs by females, and in some species to demethylate mercury to its less toxic inorganic form (which can be sequestered in internal tissues); consequently, although mercury may increase in albatrosses from hatching to recruitment, the concentration then declines to a lower, stable level once adults have established a consistent moult pattern, and hence does not correlate with age in breeding adults ([Tavares et al. 2013](#_ENREF_155)). Similarly, the toxicity of cadmium may be reduced by binding onto protein (metallothionein), and there is no evidence that cadmium concentrations increase with age to harmful levels ([Stewart and Furness 1998](#_ENREF_147)). By comparison, lead poisoning had an obvious deleterious effect on up to 5% of Laysan albatross chicks on Midway Atoll; however, this is an exceptional situation as the lead did not originate from prey but from ingestion of the paint used on old buildings in nesting areas ([Finkelstein et al. 2003](#_ENREF_63)).

No published study suggests other than minor effects of oil spills on albatrosses or large petrels. Plastics have been found in their stomach contents, often mistaken for floating prey and ingested accidently, including when scavenging behind fishing vessels, or, in the North Pacific Ocean, ingested incidentally along with adhering egg masses from flying fish ([Cherel and Klages 1998](#_ENREF_31); [Fry et al. 1987](#_ENREF_66); [James and Stahl 2000](#_ENREF_78)). Although in theory this may suppress appetite and partially or completely block the gut, there is little evidence for serious problems except possibly at the Hawaiian islands, where Laysan albatross chicks with high volumes of plastic in their proventriculus were significantly lighter at fledging ([Sievert and Sileo 1993](#_ENREF_144)). Plastics may become contaminated by toxic substances during manufacture, and floating plastic pellets in the marine environment adsorb toxic chemicals, including POPs ([Colabuono et al. 2010](#_ENREF_33); [Mato et al. 2001](#_ENREF_93)). Plastic ingestion therefore increases the likelihood of contamination, particularly for chicks that tend to accumulate plastic particles in the gut until fledging. Albatrosses and large petrels are also at risk of ingesting discarded fishing gear, including hooks and line in offal, although the amount ingested shows substantial regional variation ([Nel and Nel 1999](#_ENREF_100); [Phillips et al. 2010](#_ENREF_115); [Ryan et al. 2016](#_ENREF_139)). A recent analysis of a 16-year dataset revealed that the amount of gear associated with wandering albatrosses was an order of magnitude higher than in other albatrosses and giant petrels, with a recent peak reflecting the adoption of a new longline system that resulted in greater discarding of hooks ([Phillips et al. 2010](#_ENREF_115)). Despite the complete digestion of many hooks by chicks, fledging success remained high; however, whether toxic effects could be manifested after independence was unknown.

**THREATS: ALIEN SPECIES AT BREEDING SITES**

**Impacts of alien species**

Invasive alien species have had a destructive effect on wildlife worldwide, particularly birds and other fauna on islands which have not evolved effective natural defences against mammalian ground predators ([Courchamp et al. 2003](#_ENREF_36)). The most widespread alien species with the greatest impacts on seabirds tend to be predators, but invasive herbivores and plants can cause habitat deterioration, and introduced pathogens and insect vectors can become serious problems for animal health ([Courchamp et al. 2003](#_ENREF_36); [Frenot et al. 2005](#_ENREF_65)). Of the mammalian predators, the most common threats to albatrosses and large petrels at breeding sites are feral cats *Felis catus,* brown rats *Rattus norvegicus* and black rats *Rattus rattus* (Table 2).

The impacts of invasive alien mammals are highly variable. There is evidence for predation of adult Laysan albatrosses by Polynesian rats *R. exulans*, several albatross and *Procellaria* petrel species by cats, royal albatross and Westland petrel chicks by stoats *Mustela erminea*, white-capped and light-mantled albatross, and Westland and black petrel chicks by feral pigs *Sus scrofa*, and adult and young Westland and black petrels by dogs *Canus lupus familiaris* ([Croxall 1991](#_ENREF_37); [Croxall et al. 1984](#_ENREF_40); [Kepler 1967](#_ENREF_83); [Ratz et al. 1999](#_ENREF_124); [Taylor 2000](#_ENREF_156)). Recent studies where the house mouse is the only introduced mammal have demonstrated predation on various albatross and petrel species at Marion and Gough islands ([Cuthbert et al. 2013](#_ENREF_45); [Davies et al. 2016](#_ENREF_46); [Dilley et al. 2015](#_ENREF_53); [Dilley et al. 2013](#_ENREF_54); [Dilley et al. 2016](#_ENREF_55); [Wanless et al. 2009](#_ENREF_168)) Other introduced mammals that threaten ACAP species because of severe habitat degradation include pigs and reindeer *Rangifer tarandus* at a few sites (Table 2).

Population-level impacts of predation by alien species on albatrosses and large petrels are less common than might be anticipated. Although rat predation can cause widespread breeding failure in the burrow-nesting *Procellaria* petrels, no study has demonstrated a link between rat presence and population decline in the larger, surface-nesting albatrosses or giant petrels ([Jones et al. 2008](#_ENREF_82)). In contrast, predation of Tristan albatross chicks by house mice at Gough Island is so common that this species, which is currently in rapid decline, would be unable to recover even if birds ceased to be killed in fisheries ([Wanless et al. 2009](#_ENREF_168)). Although alien grazing mammals are present at several breeding sites of ACAP species, the associated habitat destruction appears only to have a substantial effect on distribution and, potentially, numbers of *Procellaria* petrels.

**Progress in managing alien species**

Given the major problems posed by alien species, there are ongoing management regimes aimed at local control of predators, including cats, mustelids or rats, at several breeding sites, including those of Westland petrel and royal albatrosses on the South Island of New Zealand, white-chinned petrels at Possession Island, and Laysan albatross in Hawai’i ([Taylor 2000](#_ENREF_156); [Young et al. 2013](#_ENREF_178)). The number of high profile campaigns to eradicate alien mammals from islands is increasing, including nine past or ongoing eradications at breeding sites of ACAP species since the first ACAP Meeting of the Parties in 2004 (Appendix E). These include the successful campaign (10 years from planning to completion, at a cost of $AUD 24 million) to eradicate European rabbits *Oryctolagus cuniculus*, black rats and house mice from Macquarie Island using a combination of rabbit calicivirus, aerial baiting, and hunting by a team with trained detector dogs. There has also been a three-phase campaign (baiting completed in March 2015) to eradicate brown rats and house mice from the 11,300 ha mainland of South Georgia, which if successful, would be by far the largest island ever cleared of rodents (Appendix E). It is important to recognise that these campaigns can result in substantial non-target mortality; >2500 birds died as a result of primary, secondary or tertiary ingestion of brodifacoum at Macquarie, including >760 northern and southern giant petrels, with substantial impacts on their local populations; however, non-target mortality was reduced by a range of mitigation measures, and it is anticipated that both populations will recover ([Parks and Wildlife Service 2014](#_ENREF_108)). Feasibility plans have also been produced for a number of other ACAP breeding sites, and in some cases planning is well advanced and eradications are scheduled for the next few years (Appendix E).

**THREATS: PATHOGENS**

The remoteness of their terrestrial breeding sites and their highly pelagic marine distributions likely shield albatrosses and large petrels from contact with pathogens in general. However, the associated immunological naivety may favour the rapid spread of pathogens should they be introduced to typically-dense breeding aggregations ([Descamps et al. 2012](#_ENREF_51)), particularly if ongoing environmental changes increases the probability of establishment. Information on hosts, pathogens and disease epidemiology in ACAP species is incomplete, sampling is patchy in terms of geographic and species coverage, and very limited during the nonbreeding season, and there is a paucity of data on overall health and the ecological impacts of diseases. Potential pathogens have been recorded in 18 (62%) of the 29 albatrosses and large petrels ([Uhart et al. 2014, Appendix](#_ENREF_164) C). Bacteria, viruses, protozoa, gastrointestinal parasites, ectoparasites and fungi were detected, respectively, in 7 (24%), 5 (17%), 4 (14%), 3 (10%), 13 (49%) and 1 species (3%). Seventeen different bacteria were recorded, most commonly avian cholera *Pasteurella multocida* (in four species) and *Salmonella* sp. (in two species). Only two viruses were isolated; pox viruses (in five species) and a new Phlebovirus (HIGV) in ticks from shy albatrosses. Recorded incidences reflect differences in research effort rather than environmental factors, with most studies focused on the black-browed albatross or southern giant petrel (16 and 15 papers, respectively).

The greatest risk appears to be from avian cholera, which is responsible for mortality events in several seabird species in Antarctica ([Leotta et al. 2001](#_ENREF_87); [Leotta et al. 2003](#_ENREF_88)), and at Amsterdam Island, where it causes recurrent reproductive failure in Indian yellow-nosed and sooty albatrosses, and could potentially spread to the small population of the endemic, critically endangered Amsterdam albatross ([Rolland et al. 2009](#_ENREF_134)). Amongst viruses, only poxviruses have been associated with disease or death, primarily in chicks or fledglings (five ACAP species, see Appendix C). Poxvirus outbreaks seem to be recurrent at some breeding sites, and sick birds often recover from the infection ([Young and VanderWerf 2008](#_ENREF_179)). Poxviruses and *P. multocida* are highly contagious and can be spread to remote locations by movements of animals, including scavenging birds, and human visitors. In terms of parasite infestations, only ticks and mites in black-browed and Laysan albatrosses, respectively, have been linked to disease or death ([Uhart et al. 2014](#_ENREF_164)). However, this could change if ameliorating climatic conditions enable the establishment of insect vectors at higher latitudes.

**THREATS: CLIMATE CHANGE**

An increasing number of studies in recent years have focused on potential impacts of climatic variation on seabirds, including ACAP species, demonstrating effects of annual changes in sea surface temperature (SST) and marine productivity, and of global cycles (El Niño Southern Oscillation, North Atlantic Oscillation), ([for reviews see Barbraud et al. 2011](#_ENREF_11); [Barbraud et al. 2012](#_ENREF_12); [Thomson et al. 2015](#_ENREF_159)). On land, warmer conditions can cause heat stress in chicks, and changes in rainfall and wind patterns can increase the risk of exposure. Higher SST, especially at foraging grounds, usually has negative effects on demographic parameters, especially breeding success, although the relationships can be non-linear. In contrast, black-browed albatrosses from Kerguelen benefited from increased SST, with evidence for contrasting responses to conditions in breeding *vs* non-breeding areas. Although juvenile survival can be reduced under warmer conditions, there is little evidence for a comparable effect on adult survival in albatrosses and petrels. Modelling suggests that responses to future climatic change will be species-specific, with few impacts predicted for northern species but steep declines for species in the Southern Ocean as a consequence of increased SST and decreased sea ice extent.

There have been shifts in distribution and breeding phenology of seabirds in response to climate change ([Peron et al. 2010a](#_ENREF_111); [Weimerskirch et al. 2012](#_ENREF_176)). For example, changes in winds pattern have modified the distribution of wandering albatrosses in the Indian Ocean, and resulted in improved body condition and breeding success. Other impacts of climate change that may be deleterious are changes to weather, including rainfall patterns, that could lead to increased surface erosion and loss of nesting habitat because of landslips ([Ryan 1993](#_ENREF_137)). Sea level rise is also likely to increase susceptibility of albatross colonies on low atoll islands in the Pacific Ocean to submersion during storm events ([Storlazzi et al. 2013](#_ENREF_149)). Warming conditions might also lead to a potential increase in risk of transmission of diseases because of greater nutritional or environmental stress in infected birds, and increasing abundance or the establishment of new vectors. Apart from the obvious global interest in minimizing climate change by reducing greenhouse gas emissions, direct impacts on land may be reduced by improving habitat management to reduce erosion, or establishment of new colonies at suitable sites by translocation or attracting recruits using decoys or tape playback ([Deguchi et al. 2014](#_ENREF_48)).

**THREAT PRIORITISATION**

ACAP has adopted standardised, objective systems for the assessment of threats to albatrosses and petrels, both at sea and on land (Appendix D). On land, the threats affecting the greatest number and proportion of breeding sites, and proportion of the global population of each species, relate to habitat destruction and predation by introduced mammals, although some other threats present at just a few sites are severe (Tables 2 and 3). The two species affected at the most breeding sites are grey petrel and white-chinned petrel, which are burrow nesting, mainly because of predation or habitat destruction by introduced mammals (Table 3). Management interventions that would remove threats were prioritised based on a score that combined vulnerability (reflecting global population size, proportion of global population and population trend at the site), threat magnitude, and likelihood of success (Table 4). The analysis was only of important global breeding sites (>1% of the global population), and scores for threats that applied to more than one species in the same area were summed. On this basis, by far the two highest priorities were on islands where there was a major threat to an endemic species or very large proportion of the global population; to eradicate house mice from Gough Island and to mitigate impacts of avian cholera at Ile Amsterdam. The scores for the other threats from alien species all differed from each other by ≤2, and were therefore in a large group considered to be Lower priority. Indicative costs are provided in Table 4 based on expert opinion, but were not used in the prioritisation process. The bulk of the costs are associated with planning and mobilisation, and hence economies of scale would be substantial if an eradication campaign targeted more than one species at the same island or island group. In most cases, there would also be value in removing introduced vertebrates from islands that were formerly occupied or stand a good chance of being colonised by species of conservation concern ([Rauzon 2007](#_ENREF_125); [Towns and Broome 2003](#_ENREF_161)).

ACAP has also developed a framework for the assessment and prioritisation of at-sea (fisheries) threats. Currently, a total of 87 fisheries-seabird population combinations is identified as being of high priority for conservation action. However, many of the fisheries affect multiple seabird species and populations, and the combined list of priorities includes 28 seabird populations and 27 fisheries (Appendix F).

**FUTURE CHALLENGES FOR ALBATROSS AND PETREL CONSERVATION**

Despite considerable improvements in recent decades in knowledge of ecology, distribution, population sizes and demography of albatrosses and large petrels, many gaps remain. These gaps include information on population size, trends and threats at major breeding sites, and on at-sea distributions and levels of interaction with fisheries of immature birds, and of adults during the nonbreeding season. Although conservation management has been better targeted in recent years, these species still face a wide range of often very serious threats in marine and terrestrial environments. To address the most pervasive threat - bycatch - will require wider and more effective implementation and, in some cases, further development of best-practice mitigation measures in national (particularly gillnet, trawl and artisanal) and international fisheries (particularly pelagic longline), and much better information on bycatch rates and levels of compliance. More research is required on the effects of introduced vertebrates on burrow-nesting petrels and other less easily-observed species. Although there have been successful, high-profile eradications of alien species from islands in recent years, and further campaigns are planned or warranted, there remains a need for better representation of the underlying science in the peer-reviewed literature in order to improve methodologies, reduce risk of failure, and minimise the poisoning of non-target species ([Phillips 2010](#_ENREF_114)). Other threats that require more research to better understand current effects and predict future impacts include those from oceanographic and other changes in the wider ecosystem (requiring more data on diet, distribution and demography), infectious diseases (including the establishment of systematic monitoring to determine baseline occurrence of pathogenic organisms) and pollutants. Allocating more resources to research and to advocating for improved management and monitoring of fisheries and other threats may provide the only means of securing a positive future for albatrosses and large petrels.

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**Table 1.** Summary of status, trends, number of breeding sites and recent population estimate for albatrosses and large petrels (*Macronectes* and *Procellaria* spp.).

| **Species** | **No. sites1** | **Single country endemic** | **Breeding Freq.2** | **Annual breeding pairs** | **Latest census year by site** | **Current trend 1993-20133** | **Trend confidence** | **IUCN status (20154)** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Amsterdam albatross | 1 | France | B | 31 | 2013 | ↑ | High | CR |
| Tristan albatross | 1 | UK | B | 1,650 | 2014 | ↓ | High | CR |
| Waved albatross | 3 | Ecuador | A | 9,615 | 2001-2013 | ↓ | Low | CR |
| Atlantic yellow-nosed albatross | 6 | UK | A | 33,650 | 1974-2011 | ↔ | Low | EN |
| Grey-headed albatross | 29 |  | B | 98,084 | 1982-2015 | ↓ | Medium | EN |
| Indian yellow-nosed albatross | 6 |  | A | 39,319 | 1984-2009 | ↓ | Medium | EN |
| Northern royal albatross | 5 | NZ | B | 5,782 | 1995-2013 | ? | - | EN |
| Sooty albatross | 15 |  | B | 12,103 | 1974-2014 | ↓ | Very Low | EN |
| Antipodean albatross | 6 | NZ | B | 7,029 | 1995-2013 | ↓ | Medium | VU |
| Black petrel | 2 | NZ | A | 1,577 | 1998-2014 | ↓ | Medium | VU |
| Campbell albatross | 2 | NZ | A | 21,648 | 2012 | ↔ | Low | VU |
| Chatham albatross | 1 | NZ | A | 5,245 | 2011 | ↔ | Medium | VU |
| Salvin’s albatross | 12 | NZ | A | 41,111 | 1986-2013 | ↓ | Low | VU |
| Short-tailed albatross | 2 |  | A | 661 | 2002-2014 | ↑ | High | VU |
| Southern royal albatross | 4 | NZ | B | 7,924 | 1989-2014 | ↔ | Medium | VU |
| Spectacled petrel | 1 | UK | A | 14,400 | 2010 | ↑ | High | VU |
| Wandering albatross | 35 |  | B | 8,359 | 1981-2015 | ↓ | High | VU |
| Westland petrel | 1 | NZ | A | 2,827 | 2011 | ↔ | Low | VU |
| White-chinned petrel | 74 |  | A | 1,160,152 | 1984-2013 | ↓ | Very Low | VU |
| Black-browed albatross | 65 |  | A | 691,046 | 1982-2015 | ↑ | High | NT |
| Black-footed albatross | 15 |  | A | 66,376 | 1995-2014 | ↑ | High | NT |
| Buller’s albatross | 10 | NZ | A | 30,069 | 1971-2014 | ↔ | Low | NT |
| Grey petrel | 17 |  | A | 75,610 | 1981-2012 | ↓ | Very Low | NT |
| Laysan albatross | 17 |  | A | 610,496 | 1982-2014 | ↔ | High | NT |
| Light-mantled albatross | 71 |  | B | 12,082 | 1954-2014 | ↔ | Very Low | NT |
| Shy albatross | 3 | Australia | A | 14,353 | 2015 | ↓ | Low | NT |
| White-capped albatross | 5 | NZ | ? | 100,525 | 1995-2013 | ? | - | NT |
| Northern giant petrel | 50 |  | A | 10,594 | 1973-2014 | ↑ | Medium | LC |
| Southern giant petrel | 119 |  | A | 47,516 | 1958-2015 | ↑ | Medium | LC |

1 ***Site:*** *usually an entire, distinct island or islet, or rarely, section of a large island (>3,000km2).*  *Each species-site combination is considered separately, i.e., two species breeding in the same area constitute two breeding sites ACAP database. <data.acap.aq>. 14 July 2015.*

2 ***Breeding Frequency:*** *A = Annual, B = Biennial*

3 ***Trend:*** *↑ increasing, ↓declining, ↔ stable, ? unknown*

4 ***IUCN Status:*** *CR = Critically Endangered, EN = Endangered, VU = Vulnerable, NT = Near Threatened, LC = Least Concern.* <[www.iucnredlist.org](http://www.iucnredlist.org)>.

**Table 2.** Number of breeding sites of albatrosses and large petrels (*Macronectes* and *Procellaria* spp.) that are affected by different levels of threat.

| **Nature of Threat** | **Threat subcategory** | **Threat Species** | **Number of breeding sites1 affected** | | |
| --- | --- | --- | --- | --- | --- |
| **Threat level2:** | | |
| **Low** | **High** | **All** |
| Natural disaster | Sea-level rise | - | - | 12 | **12** |
| Contamination | Toxins - man made | - | 1 | - | **1** |
| Habitat loss or destruction | Habitat destruction by alien species | Reindeer | 4 | - | **4** |
| Increased competition with native species | Australasian gannet | - | 1 | **1** |
| Vegetation encroachment |  | 2 | - | **2** |
| Human disturbance | Military action |  | - | 2 | **2** |
| Recreation/tourism |  | - | 1 | **1** |
| Pathogen | Pathogen | Avian pox virus | 1 | - | **1** |
| Avian cholera | 1 | 1 | **2** |
| Predation by alien species | Predation by alien species | Dog | - | 1 | **1** |
| Cat | 11 | 2 | **13** |
| Pig | 4 | - | **4** |
| House mouse | 2 | 1 | **3** |
| Brown rat | 6 | - | **6** |
| Black rat | 9 | - | **9** |
| **All** |  |  | **41** | **21** | **62** |

*1* ***Breeding site:*** *usually an entire, distinct island or islet, or rarely, section of a large island (>3,000km2). Each species-site combination is considered separately, i.e., two species breeding in the same area constitute two breeding sites. ACAP database. <data.acap.aq>. 14 July 2015.*

2See Appendix D for threat criteria.

**Table 3.** Percentage of breeding sites and global population of each species of albatross and large petrel (*Macronectes* and *Procellaria* spp.) that are affected by terrestrial threats. Species without listed threats are excluded. See Appendix D for threat criteria.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Species** | **No. of sites** | **% of breeding sites1** | | | | | | | | **% of global population** | | | | | | | |
| **Natural disaster** | **Contamination** | **Human disturbance** | **Pathogen** | **Predation by alien species** | **Habitat loss or destruction by alien species** | **All threats** | **Natural disaster** | | **Contamination** | **Human disturbance** | **Pathogen** | **Predation by alien species** | **Habitat loss or destruction by alien species** | **All threats** |
| Antipodean albatross | 6 | 0 | 0 | 0 | 0 | 17 | 0 | **17** | 0 | | 0 | 0 | 0 | 1 | 0 | **1** |
| Tristan albatross | 1 | 0 | 0 | 0 | 0 | 100 | 0 | **100** | 0 | | 0 | 0 | 0 | 100 | 0 | **100** |
| Southern royal albatross | 4 | 0 | 0 | 0 | 0 | 25 | 0 | **25** | 0 | | 0 | 0 | 0 | <1 | 0 | **<1** |
| Wandering albatross | 35 | 0 | 0 | 0 | 0 | 6 | 0 | **6** | 0 | | 0 | 0 | 0 | 29 | 0 | **29** |
| Short-tailed albatross | 2 | 50 | 0 | 0 | 0 | 0 | 0 | **50** | 92 | | 0 | 0 | 0 | 0 | 0 | **92** |
| Laysan albatross | 17 | 35 | 0 | 6 | 0 | 18 | 0 | **59** | 100 | | 0 | <1 | 0 | <1 | 0 | **100** |
| Black-footed albatross | 15 | 47 | 7 | 7 | 0 | 7 | 13 | **60** | 98 | | 34 | 0 | 0 | 0 | 38 | **98** |
| Sooty albatross | 15 | 0 | 0 | 0 | 7 | 7 | 0 | **14** | 0 | | 0 | 0 | 3 | 12 | 0 | **15** |
| Indian yellow-nosed  Albatross | 6 | 0 | 0 | 0 | 17 | 0 | 0 | **17** | 0 | | 0 | 0 | 69 | 0 | 0 | **69** |
| Black-browed albatross | 65 | 2 | 0 | 0 | 0 | 0 | 0 | **2** | <1 | | 0 | 0 | 0 | 0 | 0 | **<1** |
| Shy albatross | 3 | 0 | 0 | 0 | 33 | 0 | 33 | **66** | 0 | | 0 | 0 | 67 | 0 | 2 | **69** |
| White-capped albatross | 5 | 0 | 0 | 0 | 0 | 20 | 0 | **20** | 0 | | 0 | 0 | 0 | 6 | 0 | **6** |
| White-chinned petrel | 74 | 0 | 0 | 0 | 0 | 19 | 3 | **19** | 0 | | 0 | 0 | 0 | 38 | <1 | **38** |
| Grey petrel | 17 | 0 | 0 | 0 | 0 | 24 | 12 | **24** | 0 | | 0 | 0 | 0 | 28 | 5 | **28** |
| Southern giant petrel | 119 | 1 | 0 | 0 | 0 | 0 | 0 | **1** | ? | | 0 | 0 | 0 | 0 | 0 | **?** |

*1* ***Breeding site:*** *usually an entire, distinct island or islet, or rarely, section of a large island (>3,000km2). Each species-site combination is considered separately, i.e., two species breeding in the same area constitute two breeding sites. ACAP database. <data.acap.aq>. 14 July 2015.*

**Table 4.** Prioritisation of management interventions to address threats on islands with albatrosses and large petrels (*Macronectes* and *Procellaria* spp.). The prioritisation was only of threats at sites that hold >1% of the global population.

| **Island** | **Threat** | **Priority1** | **Explanation** | **Indicative cost ($AUD)2** |
| --- | --- | --- | --- | --- |
| **Habitat loss or destruction/predation by alien species** | | | | |
| Gough Island | House mouse | High | Major threat to endemic species; medium feasibility of eradication | 5.5 million |
| Grande Terre, Kerguelen | Reindeer | Lower | High feasibility of eradication | 1-2 million |
| Feral cat | Lower | Medium feasibility of eradication | >10 million |
| Black rat | Lower | Medium feasibility of eradication | >25 million |
| Ile Saint Lanne Gramont, Kerguelen | Feral cat | Lower | High feasibility of eradication | 420K |
| Black rat | Lower | High feasibility of eradication | 140K |
| South Georgia (Islas Georgias del Sur) | Brown rat3 | Lower | Medium feasibility of eradication | 15 million |
| Auckland Island | Feral cat | Lower | Medium feasibility of eradication | 25 million |
| Domestic pig | Lower | Medium feasibility of eradication | 25 million |
| Marion Island | House mouse | Lower | Medium feasibility of eradication | 30 million |
| **Pathogen** | | | | |
| Ile Amsterdam | Avian cholera | High | Major threat to two species; low or unknown feasibility of eradication | Unknown |
| **Increased competition with native species** | | | | |
| Pedra Branca | Australasian gannet | Lower | Low or unknown feasibility of eradication | 100K |

1High priority reflects major threat to an endemic species or very large proportion of the global population.

2Economies of scale would reduce overall costs of operations in same island group.

3Aerial baiting completed (2015).

Fig. 1. Breeding locations of (a) albatrosses in equatorial and north Pacific Ocean, (b) albatrosses in the Southern Ocean, and (c) *Macronectes* and *Procellaria* petrels in the Southern Ocean.

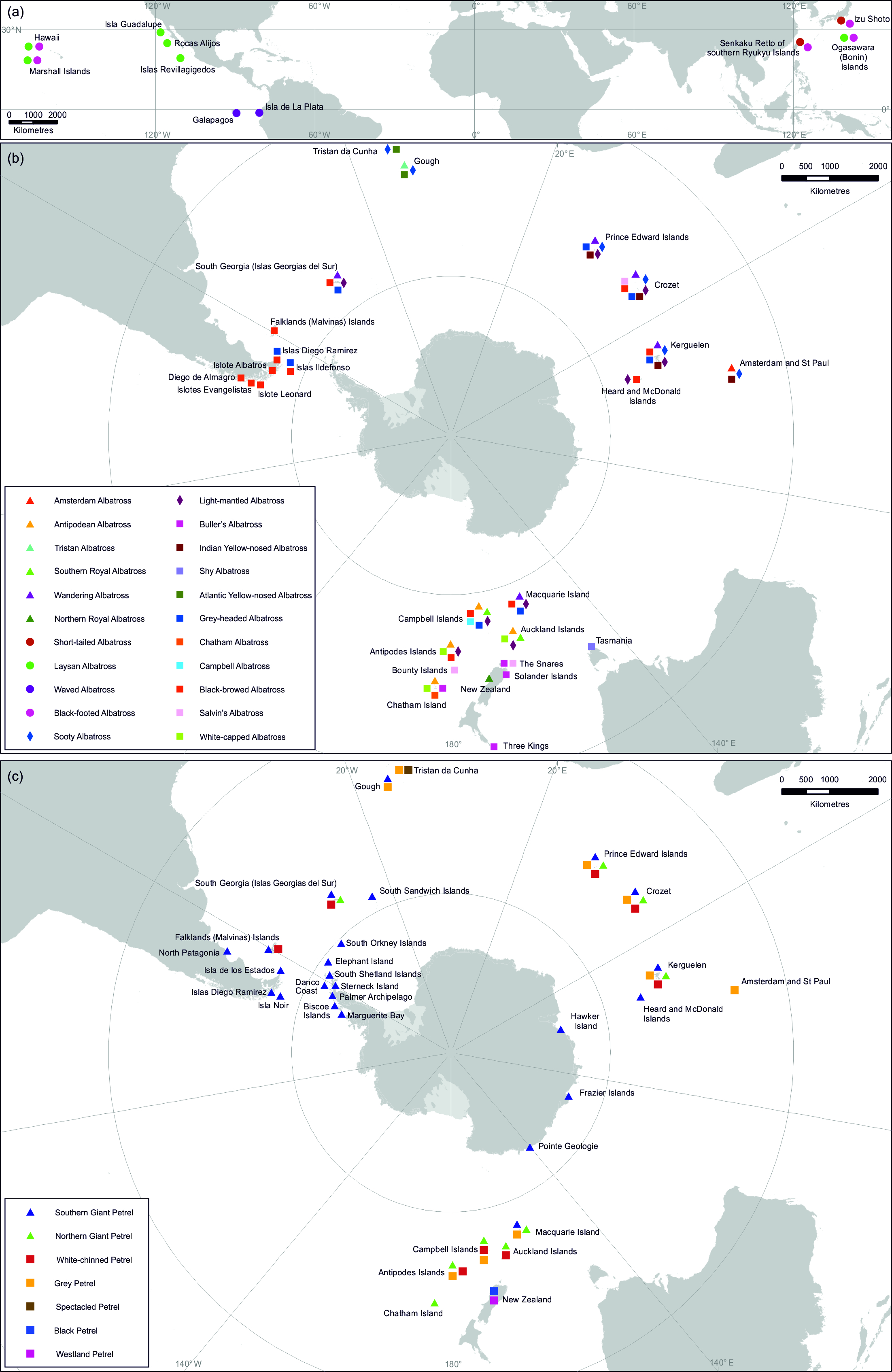
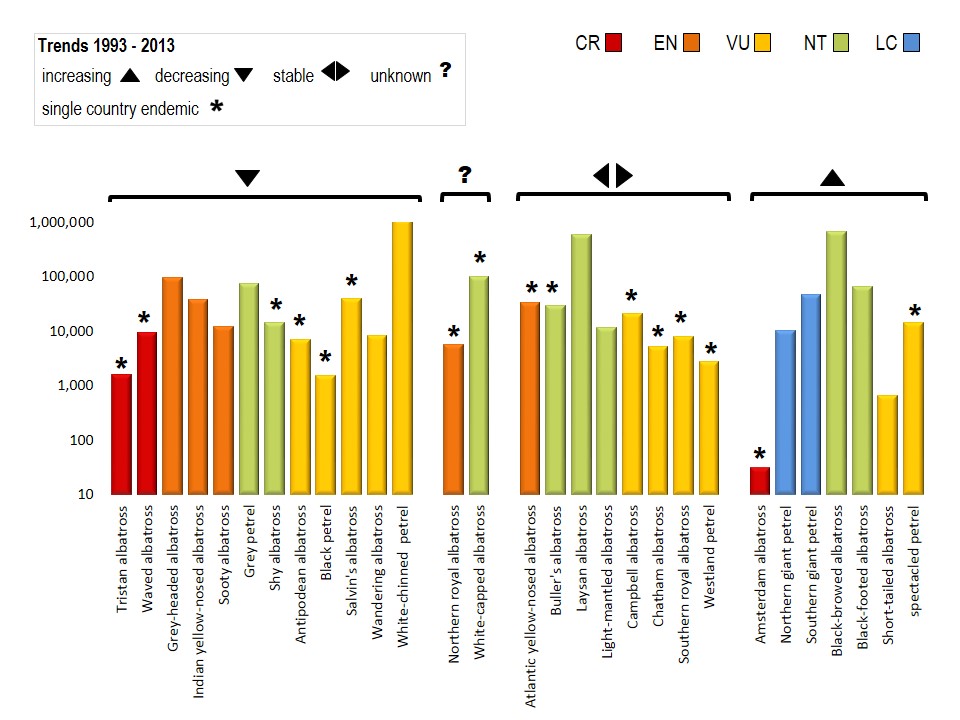


Fig. 2. Annual breeding population size, IUCN status and population trend (1993-2003) of albatrosses and large petrels (*Macronectes* and *Procellaria* spp.) IUCN Status: CR = Critically Endangered, EN = Endangered, VU = Vulnerable, NT = Near Threatened, LC = Least Concern. <[www.iucnredlist.org](http://www.iucnredlist.org)>.



**Appendix A: Supplementary Table 1.** Breeding sites of albatrosses and large petrels (*Macronectes* and *Procellaria* spp.) where the population is likely to exceed 1, 2, 5 and 10% of the global total for that species. The count date refers to the year in which the chicks fledge for species that breed over the austral summer. Note that some counts are old or of low accuracy.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Island group** | **Breeding site1** | **Species** | **Breeding pairs** | **Latest count date** | **1%** | **2%** | **5%** | **10%** |
| Amsterdam and St Paul | Falaise d'Entrecasteaux | Indian yellow-nosed albatross | 27,000 | 2006 | Y | Y | Y | Y |
| Amsterdam and St Paul | Ile Amsterdam | Sooty albatross | 394 | 2012 | Y | Y | N | N |
| Amsterdam and St Paul | Plateau des tourbieres | Amsterdam albatross | 31 | 2013 | Y | Y | Y | Y |
| Antipodes Islands | Antipodes Island | Antipodean albatross | 3,320 | 2013 | Y | Y | Y | Y |
| Antipodes Islands | Antipodes Island | Northern giant petrel | 233 | 2001 | Y | Y | N | N |
| Antipodes Islands | Antipodes Island | Light-mantled albatross | 250 | 1995 | Y | N | N | N |
| Antipodes Islands | Antipodes Island | White-chinned petrel | 58,725 | 2011 | Y | Y | Y | N |
| Antipodes Islands | Antipodes Island | Grey petrel | 48,960 | 2010 | Y | Y | Y | Y |
| Auckland Islands | Adams Island | Antipodean albatross | 3,277 | 2009 | Y | Y | Y | Y |
| Auckland Islands | Adams Island | Light-mantled albatross | 5,000 | 1973 | Y | Y | Y | Y |
| Auckland Islands | Auckland Island | Antipodean albatross | 72 | 1997 | Y | N | N | N |
| Auckland Islands | Auckland Island | White-capped albatross | 5,592 | 2013 | Y | Y | Y | N |
| Auckland Islands | Disappointment Island | Antipodean albatross | 352 | 1997 | Y | Y | Y | N |
| Auckland Islands | Disappointment Island | White-chinned petrel | 153,100 | 2015 | Y | Y | Y | Y |
| Auckland Islands | Disappointment Island | White-capped albatross | 94,727 | 2013 | Y | Y | Y | Y |
| Bounty Islands | Depot Island | Salvin’s albatross | 13,737 | 2013 | Y | Y | Y | Y |
| Bounty Islands | Funnel Island | Salvin’s albatross | 5,182 | 2013 | Y | Y | Y | Y |
| Bounty Islands | Molly Cap | Salvin’s albatross | 3,258 | 2013 | Y | Y | Y | N |
| Bounty Islands | Penguin Island | Salvin’s albatross | 1,044 | 2013 | Y | Y | N | N |
| Bounty Islands | Proclamation Island | Salvin’s albatross | 4,880 | 2013 | Y | Y | Y | Y |
| Bounty Islands | Ruatara Island | Salvin’s albatross | 5,012 | 2013 | Y | Y | Y | Y |
| Bounty Islands | Spider Island | Salvin’s albatross | 3,446 | 2013 | Y | Y | Y | N |
| Bounty Islands | Tunnel Island | Salvin’s albatross | 3,435 | 2013 | Y | Y | Y | N |
| Campbell Islands | Campbell Island | Southern royal albatross | 7,855 | 2008 | Y | Y | Y | Y |
| Campbell Islands | Campbell Island | Northern giant petrel | 234 | 1997 | Y | Y | N | N |
| Campbell Islands | Campbell Island | Light-mantled albatross | 1,600 | 1996 | Y | Y | Y | N |
| Campbell Islands | Campbell Island | Grey-headed albatross | 8,611 | 2012 | Y | Y | Y | N |
| Campbell Islands | Campbell Island | Campbell albatross | 21,648 | 2012 | Y | Y | Y | Y |
| Chatham Island | The Big Sister | Northern royal albatross | 1,893 | 2010 | Y | Y | Y | Y |
| Chatham Island | The Big Sister | Northern giant petrel | 336 | 1976 | Y | Y | N | N |
| Chatham Island | The Big Sister | Buller’s albatross | 1,500 | 1971 | Y | Y | Y | N |
| Chatham Island | The Forty-fours | Northern royal albatross | 2,692 | 2010 | Y | Y | Y | Y |
| Chatham Island | The Forty-fours | Northern giant petrel | 1,000 | 2005 | Y | Y | Y | N |
| Chatham Island | The Forty-fours | Buller’s albatross | 14,185 | 2010 | Y | Y | Y | Y |
| Chatham Island | The Little (Middle) Sister | Northern royal albatross | 1,159 | 2010 | Y | Y | Y | Y |
| Chatham Island | The Little (Middle) Sister | Buller’s albatross | 650 | 1996 | Y | Y | N | N |
| Chatham Island | The Pyramid | Chatham albatross | 5,245 | 2011 | Y | Y | Y | Y |
| Crozet | Ile aux Cochons | Wandering albatross | 1,060 | 1981 | Y | Y | Y | Y |
| Crozet | Ile aux Cochons | Southern giant petrel | 575 | 1982 | Y | N | N | N |
| Crozet | Ile aux Cochons | Northern giant petrel | 275 | 1976 | Y | Y | N | N |
| Crozet | Ile aux Cochons | Sooty albatross | 450 | 1976 | Y | Y | N | N |
| Crozet | Ile de la Possession | Wandering albatross | 371 | 2014 | Y | Y | N | N |
| Crozet | Ile de la Possession | Northern giant petrel | 474 | 2014 | Y | Y | N | N |
| Crozet | Ile de la Possession | Light-mantled albatross | 1,019 | 2014 | Y | Y | Y | N |
| Crozet | Ile de l'Est | Wandering albatross | 329 | 1982 | Y | Y | N | N |
| Crozet | Ile de l'Est | Northern giant petrel | 190 | 1981 | Y | N | N | N |
| Crozet | Ile de l'Est | Sooty albatross | 1300 | 1984 | Y | Y | Y | Y |
| Crozet | Ile de l'Est | Light-mantled albatross | 900 | 1984 | Y | Y | Y | N |
| Crozet | Ile de l'Est | White-chinned petrel | 33,145 | 2004 | Y | Y | N | N |
| Crozet | Ile de l'Est | Grey petrel | 5,500 | 1982 | Y | Y | Y | N |
| Crozet | Ile de l'Est | Grey-headed albatross | 3,750 | 1982 | Y | Y | N | N |
| Crozet | Ile des Apotres | Wandering albatross | 120 | 1982 | Y | N | N | N |
| Crozet | Ile des Apotres | Northern giant petrel | 150 | 1981 | Y | N | N | N |
| Crozet | Ile des Apotres | Indian yellow-nosed albatross | 1,230 | 1984 | Y | Y | N | N |
| Crozet | Ile des Pingouins | Northern giant petrel | 165 | 1981 | Y | N | N | N |
| Crozet | Ile des Pingouins | Sooty albatross | 250 | 1984 | Y | Y | N | N |
| Crozet | Ile des Pingouins | Indian yellow-nosed albatross | 5,800 | 1984 | Y | Y | Y | Y |
| Crozet | Ile des Pingouins | Grey-headed albatross | 2,000 | 1982 | Y | Y | N | N |
| Diego de Almagro | Isla Diego de Almagro | Black-browed albatross | 15,594 | 2002 | Y | Y | N | N |
| Elephant Island | Elephant Island | Southern giant petrel | 845 | 1972 | Y | N | N | N |
| Falkland (Malvinas) Islands | Barren Island | Southern giant petrel | 1504 | 2005 | Y | Y | N | N |
| Falkland (Malvinas) Islands | Beauchene Island | Black-browed albatross | 105,777 | 2011 | Y | Y | Y | Y |
| Falkland (Malvinas) Islands | Bird Island | Black-browed albatross | 15,719 | 2011 | Y | Y | N | N |
| Falkland (Malvinas) Islands | George | Southern giant petrel | 602 | 2005 | Y | N | N | N |
| Falkland (Malvinas) Islands | Golden Knob (Elephant Cays) | Southern giant petrel | 1,019 | 2005 | Y | Y | N | N |
| Falkland (Malvinas) Islands | Governor (Beaver) | Southern giant petrel | 723 | 2005 | Y | N | N | N |
| Falkland (Malvinas) Islands | Grand Jason | Southern giant petrel | 762 | 2005 | Y | N | N | N |
| Falkland (Malvinas) Islands | Grand Jason | Black-browed albatross | 89,489 | 2011 | Y | Y | Y | Y |
| Falkland (Malvinas) Islands | New Island | Black-browed albatross | 13,343 | 2011 | Y | N | N | N |
| Falkland (Malvinas) Islands | North Island | Black-browed albatross | 26,812 | 2011 | Y | Y | N | N |
| Falkland (Malvinas) Islands | Penn (Beaver) | Southern giant petrel | 1,543 | 2005 | Y | Y | N | N |
| Falkland (Malvinas) Islands | Sandy Cay (Elephant Cays) | Southern giant petrel | 10,936 | 2005 | Y | Y | Y | Y |
| Falkland (Malvinas) Islands | Saunders Island | Black-browed albatross | 16,722 | 2011 | Y | Y | N | N |
| Falkland (Malvinas) Islands | Steeple Jason | Southern giant petrel | 1,841 | 2012 | Y | Y | N | N |
| Falkland (Malvinas) Islands | Steeple Jason | Black-browed albatross | 183,135 | 2011 | Y | Y | Y | Y |
| Falkland (Malvinas) Islands | West Point Island | Black-browed albatross | 16,495 | 2011 | Y | Y | N | N |
| Galapagos | Isla Espanola | Waved albatross | 9,607 | 2001 | Y | Y | Y | Y |
| Gough | Gough Island | Tristan albatross | 1,650 | 2014 | Y | Y | Y | Y |
| Gough | Gough Island | Sooty albatross | 3,750 | 2011 | Y | Y | Y | Y |
| Gough | Gough Island | Grey petrel | 17,500 | 2001 | Y | Y | Y | Y |
| Gough | Gough Island | Atlantic yellow-nosed albatross | 5,300 | 2011 | Y | Y | Y | Y |
| Hawaiian Islands | French Frigate Shoals | Black-footed albatross | 4,944 | 2011 | Y | Y | Y | N |
| Hawaiian Islands | Kure Atoll | Laysan albatross | 24,366 | 2014 | Y | Y | N | N |
| Hawaiian Islands | Kure Atoll | Black-footed albatross | 2,854 | 2014 | Y | Y | N | N |
| Hawaiian Islands | Laysan Island | Laysan albatross | 134,835 | 2012 | Y | Y | Y | Y |
| Hawaiian Islands | Laysan Island | Black-footed albatross | 24,565 | 2012 | Y | Y | Y | Y |
| Hawaiian Islands | Lisianski Island | Laysan albatross | 26,500 | 1982 | Y | Y | N | N |
| Hawaiian Islands | Lisianski Island | Black-footed albatross | 2,126 | 2006 | Y | Y | N | N |
| Hawaiian Islands | Midway Atoll | Laysan albatross | 412,776 | 2014 | Y | Y | Y | Y |
| Hawaiian Islands | Midway Atoll | Black-footed albatross | 22,525 | 2014 | Y | Y | Y | Y |
| Hawaiian Islands | Pearl and Hermes Reef | Laysan albatross | 6,900 | 2003 | Y | N | N | N |
| Hawaiian Islands | Pearl and Hermes Reef | Black-footed albatross | 6,116 | 2003 | Y | Y | Y | N |
| Heard and McDonald Islands | Heard Island | Southern giant petrel | 3,500 | 2004 | Y | Y | Y | N |
| Heard and McDonald Islands | Heard Island | Light-mantled albatross | 350 | 1954 | Y | Y | N | N |
| Isla de los Estados | Isla Observatorio | Southern giant petrel | 500 | 2004 | Y | N | N | N |
| Isla Noir | Isla Noir | Southern giant petrel | 1,000 | 2005 | Y | Y | N | N |
| Islas Diego Ramirez | Isla Bartolome | Grey-headed albatross | 10,880 | 2003 | Y | Y | Y | Y |
| Islas Diego Ramirez | Isla Bartolome | Black-browed albatross | 43,928 | 2003 | Y | Y | Y | N |
| Islas Diego Ramirez | Isla Gonzalo | Grey-headed albatross | 4,413 | 2012 | Y | Y | N | N |
| Islas Diego Ramirez | Isla Gonzalo | Black-browed albatross | 8,706 | 2012 | Y | N | N | N |
| Islas Ildefonso | Isla Grande | Black-browed albatross | 32,640 | 2012 | Y | Y | N | N |
| Islas Ildefonso | Isla Norte | Black-browed albatross | 14,059 | 2013 | Y | Y | N | N |
| Islas Ildefonso | Isla Sur | Black-browed albatross | 6,912 | 2013 | Y | N | N | N |
| Izu Shoto | Torishima | Short-tailed albatross | 609 | 2014 | Y | Y | Y | Y |
| Izu Shoto | Torishima | Black-footed albatross | 2,060 | 2013 | Y | Y | N | N |
| Kerguelen | Baie Larose | Northern giant petrel | 125 | 1987 | Y | N | N | N |
| Kerguelen | Courbet Peninsula | Wandering albatross | 356 | 2014 | Y | Y | N | N |
| Kerguelen | Courbet Peninsula | Northern giant petrel | 750 | 1987 | Y | Y | Y | N |
| Kerguelen | Golfe du Morbihan | Northern giant petrel | 150 | 1987 | Y | N | N | N |
| Kerguelen | Golfe du Morbihan | Grey petrel | 3,400 | 2006 | Y | Y | N | N |
| Kerguelen | Iles Nuageuses | Grey-headed albatross | 7,860 | 1985 | Y | Y | Y | N |
| Kerguelen | Rallier du Baty Peninsula | Wandering albatross | 750 | 1987 | Y | Y | Y | N |
| Kerguelen | Rallier du Baty Peninsula | Northern giant petrel | 550 | 1987 | Y | Y | Y | N |
| Macquarie Island | Macquarie Island | Southern giant petrel | 1,834 | 2015 | Y | Y | N | N |
| Macquarie Island | Macquarie Island | Northern giant petrel | 1,487 | 2014 | Y | Y | Y | Y |
| Macquarie Island | Macquarie Island | Light-mantled albatross | 2,136 | 2014 | Y | Y | Y | Y |
| New Zealand | Great Barrier Island | Black petrel | 921 | 2014 | Y | Y | Y | Y |
| New Zealand | Little Barrier Island | Black petrel | 100 | 1998 | Y | Y | Y | N |
| New Zealand | Punakaiki | Westland petrel | 2,827 | 2011 | Y | Y | Y | Y |
| North Patagonia | Isla Gran Robredo | Southern giant petrel | 1,700 | 2005 | Y | Y | N | N |
| Ogasawara (Bonin) Islands | Nakodojima | Black-footed albatross | 967 | 2006 | Y | N | N | N |
| Palmer Archipelago | Anvers Island | Southern giant petrel | 582 | 1987- 2010 | Y | N | N | N |
| Prince Edward Islands | Marion Island | Wandering albatross | 2,050 | 2014 | Y | Y | Y | Y |
| Prince Edward Islands | Marion Island | Southern giant petrel | 1,583 | 2014 | Y | Y | N | N |
| Prince Edward Islands | Marion Island | Northern giant petrel | 443 | 2014 | Y | Y | N | N |
| Prince Edward Islands | Marion Island | Sooty albatross | 1,469 | 2014 | Y | Y | Y | Y |
| Prince Edward Islands | Marion Island | Light-mantled albatross | 316 | 2014 | Y | N | N | N |
| Prince Edward Islands | Marion Island | White-chinned petrel | 24,000 | 2009 | Y | Y | N | N |
| Prince Edward Islands | Marion Island | Grey-headed albatross | 8,807 | 2014 | Y | Y | Y | N |
| Prince Edward Islands | Prince Edward Island | Wandering albatross | 1,800 | 2009 | Y | Y | Y | Y |
| Prince Edward Islands | Prince Edward Island | Southern giant petrel | 723 | 2009 | Y | N | N | N |
| Prince Edward Islands | Prince Edward Island | Northern giant petrel | 180 | 1991 | Y | N | N | N |
| Prince Edward Islands | Prince Edward Island | Sooty albatross | 1,210 | 2009 | Y | Y | Y | N |
| Prince Edward Islands | Prince Edward Island | Indian yellow-nosed albatross | 5,234 | 2009 | Y | Y | Y | Y |
| Prince Edward Islands | Prince Edward Island | Grey-headed albatross | 1,506 | 2009 | Y | N | N | N |
| Senkaku Retto of southern Ryukyu Islands | Minami-kojima | Short-tailed albatross | 52 | 2002 | Y | Y | Y | N |
| Solander Islands | Great Solander Island | Buller’s albatross | 4,579 | 2002 | Y | Y | Y | Y |
| Solander Islands | Little Solander Island | Buller’s albatross | 305 | 2014 | Y | N | N | N |
| South Georgia (Islas Georgias del Sur) | Albatross Island | Wandering albatross | 144 | 2014 | Y | N | N | N |
| South Georgia (Islas Georgias del Sur) | Annenkov Island | Wandering albatross | 193 | 2004 | Y | Y | N | N |
| South Georgia (Islas Georgias del Sur) | Annenkov Island | Black-browed albatross | 9,398 | 2004 | Y | N | N | N |
| South Georgia (Islas Georgias del Sur) | Barff | Southern giant petrel | 543 | 1987 | Y | N | N | N |
| South Georgia (Islas Georgias del Sur) | Barff | White-chinned petrel | 119,594 | 2007 | Y | Y | Y | Y |
| South Georgia (Islas Georgias del Sur) | Bird Island | Wandering albatross | 859 | 2014 | Y | Y | Y | Y |
| South Georgia (Islas Georgias del Sur) | Bird Island | Southern giant petrel | 521 | 1996 | Y | N | N | N |
| South Georgia (Islas Georgias del Sur) | Bird Island | Northern giant petrel | 2,062 | 1996 | Y | Y | Y | Y |
| South Georgia (Islas Georgias del Sur) | Bird Island | Grey-headed albatross | 5,120 | 2004 | Y | Y | Y | N |
| South Georgia (Islas Georgias del Sur) | Bird Island | Black-browed albatross | 8,264 | 2004 | Y | N | N | N |
| South Georgia (Islas Georgias del Sur) | Cooper Island | Black-browed albatross | 10,606 | 2004 | Y | N | N | N |
| South Georgia (Islas Georgias del Sur) | Hall Island | Grey-headed albatross | 2,686 | 2004 | Y | Y | N | N |
| South Georgia (Islas Georgias del Sur) | Main Island | Grey-headed albatross | 5,177 | 2004 | Y | Y | Y | N |
| South Georgia (Islas Georgias del Sur) | Main Island | Black-browed albatross | 14,559 | 2004 | Y | Y | N | N |
| South Georgia (Islas Georgias del Sur) | Northwest | Wandering albatross | 114 | 2004 | Y | N | N | N |
| South Georgia (Islas Georgias del Sur) | Northwest | Southern giant petrel | 703 | 1987 | Y | N | N | N |
| South Georgia (Islas Georgias del Sur) | Northwest | Northern giant petrel | 516 | 1981 | Y | Y | N | N |
| South Georgia (Islas Georgias del Sur) | Northwest | White-chinned petrel | 146,545 | 2007 | Y | Y | Y | Y |
| South Georgia (Islas Georgias del Sur) | Nunez | Northern giant petrel | 324 | 1987 | Y | Y | N | N |
| South Georgia (Islas Georgias del Sur) | Nunez | White-chinned petrel | 193,838 | 2007 | Y | Y | Y | Y |
| South Georgia (Islas Georgias del Sur) | Paryadin Peninsula north | Grey-headed albatross | 6,721 | 2004 | Y | Y | Y | N |
| South Georgia (Islas Georgias del Sur) | Paryadin Peninsula south | Grey-headed albatross | 22,058 | 2004 | Y | Y | Y | Y |
| South Georgia (Islas Georgias del Sur) | Saddle Island | Northern giant petrel | 192 | 1987 | Y | N | N | N |
| South Georgia (Islas Georgias del Sur) | Salisbury | White-chinned petrel | 16,365 | 2007 | Y | N | N | N |
| South Georgia (Islas Georgias del Sur) | Sorn & Bernt coast | Grey-headed albatross | 1,625 | 2004 | Y | N | N | N |
| South Georgia (Islas Georgias del Sur) | South Coast | Southern giant petrel | 574 | 1987 | Y | N | N | N |
| South Georgia (Islas Georgias del Sur) | South Coast | Northern giant petrel | 165 | 1987 | Y | N | N | N |
| South Georgia (Islas Georgias del Sur) | Southeast | White-chinned petrel | 43,355 | 2007 | Y | Y | N | N |
| South Georgia (Islas Georgias del Sur) | Stromness and Cumberland | White-chinned petrel | 64,361 | 2007 | Y | Y | Y | N |
| South Georgia (Islas Georgias del Sur) | Trinity Island | Grey-headed albatross | 3,309 | 2004 | Y | Y | N | N |
| South Georgia (Islas Georgias del Sur) | Trinity Island | Black-browed albatross | 13,960 | 2004 | Y | Y | N | N |
| South Orkney Islands | Laurie Island | Southern giant petrel | 624 | 2006, 2011 | Y | N | N | N |
| South Orkney Islands | Powell Island | Southern giant petrel | 613 | 1983 | Y | N | N | N |
| South Orkney Islands | Signy Island | Southern giant petrel | 1,093 | 1985 | Y | Y | N | N |
| South Sandwich Islands | Candlemas Island | Southern giant petrel | 1,818 | 2011 | Y | Y | N | N |
| South Shetland Islands | King George Island | Southern giant petrel | 1,728 | 1967- 2014 | Y | Y | N | N |
| South Shetland Islands | Nelson Island | Southern giant petrel | 877 | 1985-2014 | Y | N | N | N |
| Tasmania | Albatross Island (Tasmania) | Shy albatross | 4,194 | 2015 | Y | Y | Y | Y |
| Tasmania | Pedra Branca | Shy albatross | 171 | 2015 | Y | Y | N | N |
| Tasmania | The Mewstone | Shy albatross | 9,988 | 2015 | Y | Y | Y | Y |
| The Snares | Broughton Island | Buller’s albatross | 518 | 1997 | Y | N | N | N |
| The Snares | North-East Island | Buller’s albatross | 8,047 | 2014 | Y | Y | Y | Y |
| The Snares | Toru Islet | Salvin’s albatross | 829 | 2011 | Y | Y | N | N |
| Tristan da Cunha | Inaccessible Island | Sooty albatross | 501 | 2000 | Y | Y | N | N |
| Tristan da Cunha | Inaccessible Island | Spectacled petrel | 14,400 | 2010 | Y | Y | Y | Y |
| Tristan da Cunha | Inaccessible Island | Atlantic yellow-nosed albatross | 1,100 | 1983 | Y | Y | N | N |
| Tristan da Cunha | Nightingale | Sooty albatross | 150 | 1974 | Y | N | N | N |
| Tristan da Cunha | Nightingale | Atlantic yellow-nosed albatross | 4,000 | 2007 | Y | Y | Y | Y |
| Tristan da Cunha | Tristan da Cunha | Sooty albatross | 2,500 | 1974 | Y | Y | Y | Y |
| Tristan da Cunha | Tristan da Cunha | Atlantic yellow-nosed albatross | 23,000 | 1974 | Y | Y | Y | Y |

*1* ***Breeding site:*** *usually an entire, distinct island or islet, or rarely, section of a large island (>3,000km2). Each species-site combination is considered separately, i.e., two species breeding in the same area constitute two breeding sites. ACAP database. <data.acap.aq>. 14 July 2015.*

**Appendix B: Supplementary Table 2.** Island groups holding >1% of the total global population of albatrosses and large petrels (*Macronectes* and *Procellaria* spp.) where the last estimate of breeding numbers for any site is >10 years old (prior to 2004). The date of the estimate refers to the year in which the chicks fledge for species that breed over the austral summer.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Species** | **Island group** | **Number of sites1** | **Annual breeding pairs** | **Most recent estimate** | **% known global population** |
| Indian yellow-nosed albatross | Crozet | 2 | 7,030 | 1984 | 18 |
| Light-mantled albatross | Antipodes | 4 | 253 | 1995 | 2 |
| Kerguelen | 3 | 3,000-5,000 | 1987 | 19-31 |
| Heard and McDonald | 2 | 350 | 1954 | 2 |
| Campbell | 8 | 1,658 | 1996 | 10 |
| Grey-headed albatross | Kerguelen | 2 | 7,905 | 1985 | 8 |
| Crozet | 4 | 5,940 | 1982 | 6 |
| Black-browed albatross | Diego de Almagro | 1 | 15,594 | 2002 | 2 |
| Short-tailed albatross | Senkaku Retto | 1 | 52 | 2002 | 8 |
| Grey petrel | Gough | 1 | 10,000-25,000 | 2001 | 13-33 |
| Northern giant petrel | Campbell | 3 | 234 | 1997 | 2 |
| Antipodes | 1 | 233 | 2001 | 2 |
| Southern giant petrel | Elephant | 2 | 870 | 1972 | 2 |

1 ***Site:*** *usually an entire, distinct island or islet, or rarely, section of a large island (>3,000km2).*  ACAP database. <data.acap.aq>. 14 July 2015.

**Appendix C: Supplementary Table 3.** Number of pathogens reported in albatrosses and large petrels (*Macronectes* and *Procellaria* spp.) by pathogen type and collection site. SA - subantarctic, A - Antarctic, O - other). Summarized from Uhart, M., Gallo, L. and Quintana, F. Progress on updated review of pathogens described in ACAP species. PaCSWG2, Doc 04. 2014. <http://www.acap.aq/en/working-groups/population-and-conservation-status-working-group/population-and-conservation-status-wg-meeting-2/pacswg2-meeting-documents>

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Species** | **Virus** | | | **Bacteria** | | | **Protozoa** | | | **Gastrointestinal**  **parasite** | | | **Ectoparasite** | | | **Fungi** | | |
| **O** | **A** | **SA** | **O** | **A** | **SA** | **O** | **A** | **SA** | **O** | **A** | **SA** | **O** | **A** | **SA** | **O** | **A** | **SA** |
| Black-browed albatross | 1 |  |  | 1 |  | 1 |  |  | 1 |  | 1 |  | 2 |  | 7 |  |  |  |
| Southern giant petrel |  | 1 |  |  | 9 |  |  | 1 |  |  | 3 |  |  | 2 | 6 |  |  |  |
| Laysan albatross | 1 |  |  | 4 |  |  |  |  |  |  |  |  | 2 |  |  |  |  |  |
| Shy albatross | 1 |  | 1 |  |  |  |  |  |  |  |  |  |  |  | 2 |  |  |  |
| Black petrel | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Grey-headed albatross |  |  |  | 2 |  |  |  |  | 1 |  |  |  |  |  | 5 | 1 |  |  |
| Indian yellow-nosed albatross |  |  |  |  |  | 2 |  |  |  |  |  |  |  |  |  |  |  |  |
| Amsterdam albatross |  |  |  |  |  | 1 |  |  |  |  |  |  |  |  |  |  |  |  |
| Sooty albatross |  |  |  |  |  | 1 |  |  |  |  |  |  |  |  |  |  |  |  |
| Wandering albatross |  |  |  |  |  |  |  |  | 1 |  |  |  |  |  | 13 |  |  |  |
| Short-tailed albatross |  |  |  |  |  |  |  |  |  | 2 |  |  |  |  |  |  |  |  |
| Black-footed albatross |  |  |  |  |  |  |  |  |  |  |  |  | 1 |  |  |  |  |  |
| Atlantic yellow-nosed albatross |  |  |  |  |  |  |  |  |  |  |  |  | 1 |  | 2 |  |  |  |
| Light-mantled albatross |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 4 |  |  |  |
| Waved albatross |  |  |  |  |  |  |  |  |  |  |  |  | 1 |  |  |  |  |  |
| Northern giant petrel |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 3 |  |  |  |
| White-chinned petrel |  |  |  |  |  |  |  |  |  |  |  |  |  | 1 | 5 |  |  |  |
| Grey petrel |  |  |  |  |  |  |  |  |  |  |  |  | 1 |  | 4 |  |  |  |

**Appendix D: ACAP Threat-scoring criteria.** Description of threat-scoring criteria.

Threats to each species at each breeding site are scored according to the Scope (proportion of population affected) and Severity (likely reduction of affected portion of the population within ten years), categorised as either Low (1-10%) or High (11-100%). This therefore excludes threats that are very unlikely to result in a population decline even if they cause a low level of breeding failure or occasional mortality of adults in a large population. The Scope and Severity were combined in a simple matrix to assess the overall threat magnitude, which reflects the lowest score for either factor (e.g. High Scope and Low Severity = Low overall threat). This assessment considered the anticipated impact over the next decade, assuming the continuation of current conditions and trends. To allow for threats such as alien species that caused a major historical decline but now have minimal impact on a much reduced local population (so would not qualify under the Scope criterion), a threat was also listed as Low magnitude if it substantially limited expansion in numbers or distribution at an occupied site even if the local population was stable or slightly increasing. Threats were only included if there was a current, documented impact that was expected to continue, i.e., a threat for which there is already effective management (e.g. intensive trapping effort directed at an alien predator) did not meet the criteria. Predation by native predators was not considered a threat unless there was anthropogenic perturbation in the system leading to increased pressure. Nor was the presence of a non-native species, disease or disease vector, or disturbance by tourists or researchers considered to be a threat unless there was evidence of a direct impact on the ACAP species.

**Appendix E: Supplementary Table 4.** Islands with breeding albatrosses and large petrels (*Macronectes* and *Procellaria* spp.) where introduced vertebrates are present, were eradicated in recent years, or an eradication is planned. N - species present, no eradication planned. “Year” – year of successful eradication. (“year”) – start year of planned eradication.

| **Island Group** | **Island** | **Cattle** | **Dog** | **Goat** | **Deer** | **Cat** | **European hare** | **House mouse** | **Stoat** | **Ferret** | **Small Indian mongoose** | **Rabbit** | **Sheep** | **Reindeer** | **Polynesian rat** | **Brown (Norwegian) rat** | **Black (ship) rat** | **Unspecified rats** | **Pig** | **cotton-tail rabbit** | **Brushtail possum** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Amsterdam and St Paul | Amsterdam | 2010 |  |  |  | N |  |  |  |  |  |  |  |  |  | N |  |  |  |  |  |
| Antipodes | Antipodes |  |  |  |  |  |  | (2015) |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Auckland | Auckland |  |  |  |  | N |  | N |  |  |  |  |  |  |  |  |  |  | N |  |  |
| Crozet | Ile aux Cochons |  |  |  |  | N |  |  |  |  |  | N |  |  |  |  |  |  |  |  |  |
| Crozet | Ile de la Possession |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | N |  |  |  |  |
| Crozet | Ile de l'Est |  |  |  |  |  |  |  |  |  |  | N |  |  |  |  |  |  |  |  |  |
| Falkland (Malvinas) | Barren |  |  |  |  |  |  |  |  |  |  |  | N |  |  |  |  |  |  |  |  |
| Falkland (Malvinas) | Bleaker |  |  |  |  | 2001 |  |  |  |  |  |  |  |  |  | Y |  |  |  |  |  |
| Falkland (Malvinas) | Burnt Islet | N |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Falkland (Malvinas) | Carcass | N |  |  |  |  |  |  |  |  |  |  | N |  |  |  |  |  |  |  |  |
| Falkland (Malvinas) | Dyke (Weddell) | N |  |  |  |  |  |  |  |  |  |  | N |  |  | N |  |  |  |  |  |
| Falkland (Malvinas) | East Falkland | N |  |  |  | N | N | N |  |  |  | N | N |  |  |  |  |  |  |  |  |
| Falkland (Malvinas) | George | N |  |  |  |  |  | N |  |  |  |  | N |  |  |  |  |  |  |  |  |
| Falkland (Malvinas) | Governor |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 2008 |  |  |  |  |  |
| Falkland (Malvinas) | Keppel |  |  |  |  | 2007 |  |  |  |  |  |  |  |  |  | N |  |  |  |  |  |
| Falkland (Malvinas) | Lively | N |  |  |  |  |  |  |  |  |  |  | N |  |  |  |  |  |  |  |  |
| Falkland (Malvinas) | New |  |  |  |  | N |  | N |  |  |  |  |  |  |  |  | N |  |  | N |  |
| Falkland (Malvinas) | Pebble | N |  |  |  | N |  |  |  |  |  | N | N |  |  | N |  |  |  |  |  |
| Falkland (Malvinas) | Penn |  |  |  |  |  |  |  |  |  |  |  |  |  |  | N |  |  |  |  |  |
| Falkland (Malvinas) | Saddle |  |  |  |  |  |  |  |  |  |  |  |  |  |  | (2011) |  |  |  |  |  |
| Falkland (Malvinas) | Saunders | N |  |  |  | N | N |  |  |  |  |  | N |  |  | N |  |  |  |  |  |
| Falkland (Malvinas) | Sea Lion | 2004 |  |  |  |  |  |  |  |  |  |  | 2009 |  |  |  |  |  |  |  |  |
| Falkland (Malvinas) | Speedwell | N |  |  |  |  |  |  |  |  |  |  | N |  |  |  |  |  |  |  |  |
| Falkland (Malvinas) | Steeple Jason |  |  |  |  |  |  | N |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Falkland (Malvinas) | Swan |  |  |  |  |  |  |  |  |  |  |  | N |  |  | N |  |  |  |  |  |
| Falkland (Malvinas) | West (Cape Orford) |  |  |  |  |  |  |  |  |  |  |  |  |  |  | N |  |  |  |  |  |
| Falkland (Malvinas) | West Falkland |  |  |  |  | N | N | N |  |  |  | N | N |  |  |  |  |  |  |  |  |
| Falkland (Malvinas) | West Point |  |  |  |  |  |  | N |  |  |  |  | N |  |  | N |  |  |  |  |  |
| Gough Island | Gough |  |  |  |  |  |  | N |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Hawaiian | Kaua’i |  | N |  |  | N |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Hawaiian | Kaula |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | N |  |  |  |  |
| Hawaiian | Lehua |  |  |  |  |  |  |  |  |  |  |  |  |  | N |  |  |  |  |  |  |
| Hawaiian | Midway Atoll |  |  |  |  |  |  | N |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Hawaiian | O‘ahu |  | N |  |  | N |  | N |  |  | N |  |  |  |  |  | N |  |  |  |  |
| Isla de La Plata | Isla de La Plata |  |  |  |  | 2009 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Isla de los Estados | Isla de los Estados |  |  | N | N |  |  |  |  |  |  |  |  |  |  | N |  |  |  |  |  |
| Isla de los Estados | Isla Observatorio |  |  |  |  |  |  |  |  |  |  | N |  |  |  | N | N |  |  |  |  |
| Isla Guadalupe | Isla Guadalupe |  | 2007 | 2010 |  | N |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Izu Shoto | Torishima |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | N |  |  |  |  |
| Kerguelen | Howe |  |  |  |  |  |  |  |  |  |  | N |  |  |  |  |  |  |  |  |  |
| Kerguelen | Kerguelen (Grande Terre) |  |  |  |  | N |  |  |  |  |  | N |  | N |  |  | N |  |  |  |  |
| Macquarie Island | Macquarie |  |  |  |  | 2002 |  | 2014 |  |  |  | 2014 |  |  |  |  | 2014 |  |  |  |  |
| New Zealand | Great Barrier |  | N |  |  | N |  |  |  |  |  |  |  |  | N |  | N |  | N |  |  |
| New Zealand | Little Barrier |  |  |  |  |  |  |  |  |  |  |  |  |  | 2004 |  |  |  |  |  |  |
| New Zealand | South | N | N | N |  | N |  |  | N | N |  |  |  |  |  | N |  |  |  |  | N |
| Ogasawara (Bonin) | Anejima |  |  |  |  |  |  |  |  |  |  |  |  |  |  | N |  |  |  |  |  |
| Ogasawara (Bonin) | Imotojima |  |  |  |  |  |  |  |  |  |  |  |  |  |  | N |  |  |  |  |  |
| Ogasawara (Bonin) | Magojima |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | N |  |  |  |
| Ogasawara (Bonin) | Mukojima |  |  | 2002 |  |  |  |  |  |  |  |  |  |  |  |  | (2010) |  |  |  |  |
| Ogasawara (Bonin) | Nakodojima |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | N |  |  |  |  |
| Prince Edward | Marion |  |  |  |  |  |  | N |  |  |  |  |  |  |  |  |  |  |  |  |  |
| South Georgia (Islas Georgias del Sur) | Harcourt |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 2011 |  |  |  |  |  |
| South Georgia (Islas Georgias del Sur) | South Georgia (Islas  Georgias del Sur) |  |  |  |  |  |  | (2011) |  |  |  |  |  | 2015 |  | (2011) |  |  |  |  |  |
| Tristan da Cunha | Inaccessible |  |  | N |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Tristan da Cunha | Tristan da Cunha | N |  |  |  |  |  | N |  |  |  |  | N |  |  |  | N |  |  |  |  |

**Appendix F: Supplementary Table 5. High priority fisheries for conservation management to safeguard globally-important populations of albatrosses and large petrels (*Macronectes* and *Procellaria* spp.).** This table only includes fisheries that have been reported on by ACAP Parties or Range States. LL = longline. WCPFC = Western and Central Pacific Fisheries Commission, CCSBT = Commission for the Conservation of Southern Bluefin Tuna, ICCAT = International Commission for the Conservation of Atlantic Tuna, SEAFO = Southeast Atlantic Fisheries Organisation, SPRFMO = South Pacific Regional Fishery Management Organisation, IOTC = Indian Ocean Tuna Commission, IATTC = Inter-American Tropical Tuna Commission.

| **Species (island group)** | **Fishery** |
| --- | --- |
| Antipodean albatross (Antipodes Islands) | WCPFC Pelagic LL |
| Antipodean albatross (Auckland Islands) | CCSBT Pelagic LL |
| Atlantic yellow-nosed albatross (Tristan da Cunha) | Brazil Pelagic LL |
| Brazil Pelagic LL (Itaipava) |
| ICCAT Pelagic LL |
| Namibia Demersal LL |
| Namibia Demersal trawl |
| Black-browed albatross (Antipodes Islands) | CCSBT Pelagic LL |
| WCPFC Pelagic LL |
| Black-browed albatross (Campbell Island) | CCSBT Pelagic LL |
| WCPFC Pelagic LL |
| Black-browed albatross (Iles Crozet) | CCSBT Pelagic LL |
| Black-browed albatross (South Georgia (Islas Georgias del Sur)) | ICCAT Pelagic LL |
| CCSBT Pelagic LL |
| Namibia Demersal LL |
| SEAFO Demersal trawl |
| Black petrel (Great and Little Barrier Islands) | CCSBT Pelagic LL |
| WCPFC Pelagic LL |
| Peru Pelagic LL |
| Australia Pelagic trawl |
| Peru Demersal LL |
| SPRFMO Demersal trawl |
| Campbell albatross (Campbell Island) | CCSBT Pelagic LL |
| WCPFC Pelagic LL |
| Grey-headed albatross (South Georgia (Islas Georgias del Sur)) | CCSBT Pelagic LL |
| ICCAT Pelagic LL |
| IOTC Pelagic LL |

|  |  |
| --- | --- |
| Grey petrel (All sites) | CCSBT Pelagic LL |
| ICCAT Pelagic LL |
| IOTC Pelagic LL |
| WCPFC Pelagic LL |
| Peru Pelagic LL |
| UK (OT) Pelagic LL |
| Indian yellow-nosed albatross (Amsterdam Island) | CCSBT Pelagic LL |
| IOTC Pelagic LL |
| Australia Demersal trawl |
| Indian yellow-nosed albatross (Crozet Island) | CCSBT Pelagic LL |
| IOTC Pelagic LL |
| Indian yellow-nosed albatross (Prince Edward Island) | IOTC Pelagic LL |
| Laysan albatross (Laysan) | IATTC Pelagic LL |
| WCPFC Pelagic LL |
| Northern giant petrel (Prince Edward Islands) | CCSBT Pelagic LL |
| IOTC Pelagic LL |
| Northern royal albatross (Chatham Islands) | Brazil Pelagic LL |
| Argentina Demersal trawl |
| CCSBT Pelagic LL |
| ICCAT Pelagic LL |
| WCPFC Pelagic LL |
| Shy albatross (Tasmania) | Australia Trawl |
| Australia Demersal LL |
| IOTC Pelagic LL |
| Namibia Demersal LL |
| Namibia Pelagic LL |
| Namibia Pelagic trawl |
| Sooty albatross (Iles Crozet) | CCSBT Pelagic LL |
| IOTC Pelagic LL |
| Sooty albatross (Prince Edward Islands) | CCSBT Pelagic LL |
| IOTC Pelagic LL |
| Southern giant petrel (Islas de los Estados & Observatorio) | Argentina Demersal trawl |
| Southern giant petrel (Prince Edward Islands) | CCSBT Pelagic LL |
| IOTC Pelagic LL |
| Tristan albatross (Gough Island) | Brazil Pelagic LL |
| Brazil Pelagic LL (Itaipava) |
| CCSBT Pelagic LL |
| ICCAT Pelagic LL |
| IOTC Pelagic LL |
| Angola Pelagic LL |
| Brazil Demersal LL |
| Namibia Demersal LL |
| Wandering albatross (Iles Kerguelen) | CCSBT Pelagic LL |
| IOTC Pelagic LL |
| Wandering albatross (South Georgia (Islas Georgias del Sur)) | Brazil Pelagic LL |
| CCSBT Pelagic LL |
| ICCAT Pelagic LL |
| Brazil Pelagic LL (Itaipava) |
| Argentina Demersal trawl |
| Brazil Demersal LL |
| Waved albatross (Islas Galapagos) | IATTC Pelagic LL |
| White-chinned petrel (South Georgia (Islas Georgias del Sur)) | Brazil Pelagic LL |
| Brazil Pelagic LL (Itaipava) |
| CCSBT Pelagic LL |
| ICCAT Pelagic LL |