Light-mantled Albatross
Phoebetria palpebrata

Albatros fuligineux à dos clair
Albatros Tiznado

CRITICALY ENDANGERED | ENDANGERED | VULNERABLE | NEAR THREATENED | LEAST CONCERN | NOT LISTED

Sometimes referred to as
Light-mantled Sooty Albatross

Photo © Aleks Terauds

TAXONOMY

Order Procellariiformes
Family Diomedeidae
Genus *Phoebetria*
Species *P. palpebrata*

The genus *Phoebetria* was created by Reichenbach in 1853, but included only one species, *P. fuliginosa.* Although the Light-mantled Albatross was first collected in 1795 and the similar Sooty Albatross (*P. fusca)* in 1822, it was not until 1913 that Cushman Murphy revised the genus to include both *P. palpebrata* (from the Latin *palpebra*, meaning eyelid) and *P. fusca* [1]. More recent analyses of complete mitochondrial cytochrome-*b* gene sequences have confirmed the placement of both species within this genus [2].

CONSERVATION LISTINGS AND PLANS

International

- Agreement on the Conservation of Albatrosses and Petrels - Annex 1 [3]
- 2010 IUCN Red List of Threatened Species - Near Threatened (since 2000) [4]
- Convention on Migratory Species - Appendix II [5]

Australia

- *Environment Protection and Biodiversity Conservation Act* (*EPBC Act*) [6]
  - Migratory Species
  - Marine Species
- Threat Abatement Plan 2006 for the incidental catch (or bycatch) of seabirds during oceanic longline fishing operations [7]
- National Recovery Plan for Albatrosses and Giant Petrels 2001 [8]
- **South Australia:** *National Parks and Wildlife Act 1972* – Vulnerable (as *Diomedea palpebrata*) [9]
- **Tasmania:** *Threatened Species Protection Act 1995* - Vulnerable [10]
- **Victoria:** *Flora and Fauna Guarantee Act 1995* - Threatened [11]
- **Western Australia:** *Wildlife conservation Act 1950* - Wildlife Conservation (Specially Protected Fauna) Notice 2008 (2) – Fauna that is rare or is likely to become extinct [12]

Chile

- National Plan of Action for reducing by-catch of seabirds in longline fisheries (PAN-AM/CHILE) 2007 [13]

France

- *Ministerial Order of 14 August 1998 (Arrêté du 14 août 1998)* - Listed Protected Species *[14]*

New Zealand

- *New Zealand Wildlife Act 1953* [15]
- Action Plan for Seabird Conservation in New Zealand; Part A: Threatened Seabirds [16]
- New Zealand Threat Classification System List 2008 – Declining [17]

South Africa

- *Sea Birds and Seals Protection Act, 1973 (Act No. 46 of 1973)* [18]
- *Marine Living Resources Act (Act No. 18 of 1996): Policy on the Management of Seals, Seabirds and Shorebirds: 2007* [19]
- National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries 2008 [20]

South Georgia (Islas Georgias del Sur)

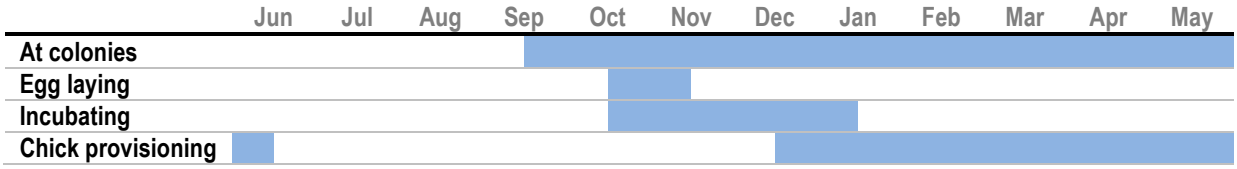
- *Falkland Island Dependencies Conservation Ordinance 1975* [21]
- FAO International Plan of Action-Seabirds: An assessment for fisheries operating in South Georgia and South Sandwich Islands [22]

BREEDING BIOLOGY

Phoebetria palpebrata nest solitarily or in small colonies, building pedestal nests along sheltered vegetated cliff edges. This species is considered a biennial breeder when successful, although unsuccessful breeders may breed the following year with an average 59% success rate [23].

Adults return to their breeding colonies in early October, except at Iles Crozet [24], Macquarie Island and Heard Island [8], where they generally return in mid-September. Eggs are laid in late October to early November. Egg laying is highly synchronous within each colony and completed within 10-12 days [25]. Eggs hatch late December to early January after an incubation period ranging from 67 days at Marion Island [24] to 70 days at South Georgia (Islas Georgias del Sur) [1]. Chicks are brooded for 19-21 days by both parents equally and fledge at around 139 days on South Georgia (Islas Georgias del Sur), 149 days on Macquarie Island and 157 days on Iles Crozet [26]. Young birds are philopatric, returning to their natal colony after 7-12 years [8].

Table 1. *Breeding cycle of* P. palpebrata



BREEDING STATES

Table 2. *Distribution of the global* P. palpebrata *population among Parties to the Agreement.*

	Australia	Disputed*	France	New Zealand	South Africa
Breeding pairs	8%	24.5%	31%	33.5%	3%

*A dispute exists between the Governments of Argentina and the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Islas Malvinas), South Georgia and the South Sandwich Islands (Islas Georgias del Sur y Islas Sandwich del Sur) and the surrounding maritime areas.

BREEDING SITES

Phoebetria palpebrata breed on Heard and Macquarie Islands (Australia), South Georgia (Islas Georgias del Sur), Prince Edward and Marion Islands (South Africa), Iles Kerguelen and Iles Crozet (France), and Auckland, Campbell and Antipodes Islands (New Zealand). Counts tend to be inaccurate at some sites, given difficulties in detecting nests in inaccessible terrain and scanning from a distance. In 1998, the global population was estimated to be about 21,600 breeding pairs on 14 islands or approximately 140,000 individual birds [27]. However, the only estimates considered to be of medium or high accuracy are for Ile de la Possession (Iles Crozet), Marion, Prince Edward and Macquarie Islands (Table 3).

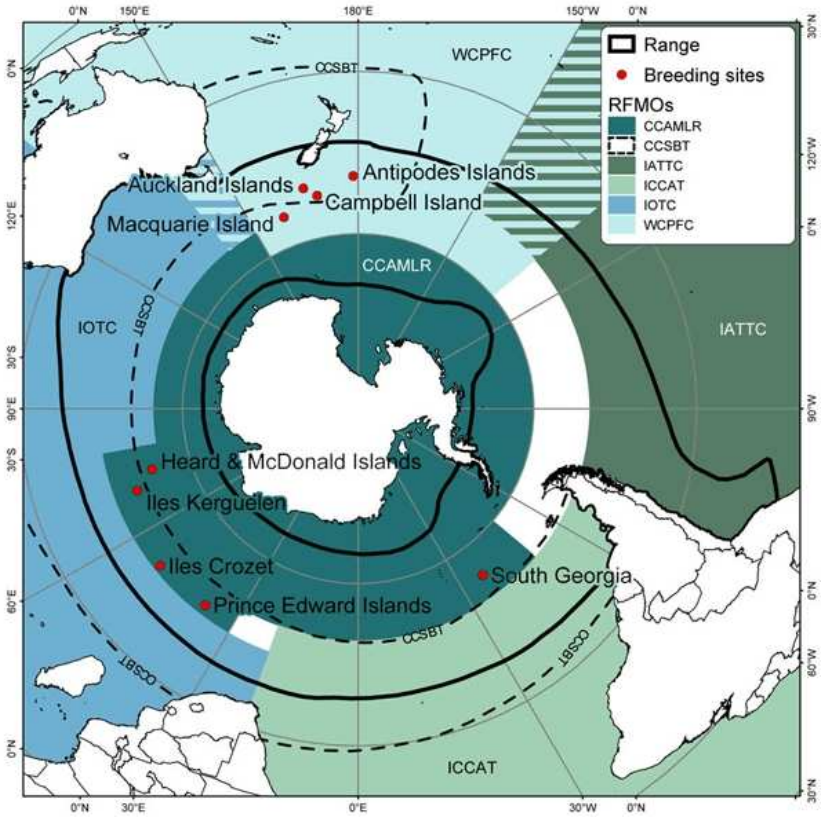


Figure 1. *The location of the breeding sites and approximate range of* P. palpebrata *with the boundaries of selected Regional Fisheries Management Organisations (RFMOs) also shown.*

CCAMLR - Commission for the Conservation of Antarctic Marine Living Resources
CCSBT - Convention for the Conservation of Southern Bluefin Tuna
IATTC - Inter-American Tropical Tuna Commission
ICCAT - International Commission for the Conservation of Atlantic Tunas
IOTC - Indian Ocean Tuna Commission
WCPFC - Western and Central Pacific Fisheries Commission

Table 3. *Monitoring methods and estimates of the population size (annual breeding pairs) for each breeding site. Table based on unpublished data (Tasmanian Department of Primary Industries and Water (DPIW) - Macquarie Island; Centre d'Etudes Biologiques de Chizé, Centre National De La Recherche Scientifique (CNRS) - Ile de la Possession; R.J.M. Crawford, Marine & Coastal Management, Department of Agriculture, Forestry and Fisheries (DAFF) and P.G. Ryan, University of Cape Town – Marion Island) and published references as indicated.*

Breeding site location	Jurisdiction	Years monitored	Monitoring method	Monitoring accuracy	Annual breeding pairs (last census)
Heard Island 53° 12'S, 73° 32'E	Australia	1954	A, B, C	Low	200-500 (1954) [28]
Total **% of all sites**					**200-500** ***c.* 1.7%**
Macquarie Island 54° 30'S, 158° 55'E	Australia	1994, 2005	B, C	Medium	1,281 (2005)
Total **% of all sites**					**1,281** ***c.* 6.3%**
South Georgia (Islas Georgias del Sur) 54° 00'S, 38° 36'E	Disputed*	1983	F	Low	5,000 (1983) [26]
Total **% of all sites**					**5,000** **24.5%**

Iles Crozet 46° 26'S, 51° 47'E					
Ile de la Possession	France	1980-2008	A	High	1,143 (2008)
Ile de l'Est		1983-1995	F	Low	> 900 (1984) [29]
Ile aux Cochons		1976	F	Low	50-100 (1976) [30]
Ile des Pingouins		1983	F	Low	30 (1984) [29]
Ile des Apôtres		1983	F	Low	150 (1984) [29]
Total					**2,273-2,323**
% of all sites					***c.* 11.2%**
Iles Kerguelen 49° 09'S, 69° 16'E	France	1985-1987	F	Unknown	3,000-5,000 (1987) [31]
Total					**3,000-5,000**
% of all sites					***c.* 19.6%**
Antipodes Islands 49° 75'S, 178° 80'E	New Zealand	1995	B	Low	250 (1995) [32]
Total					**250**
% of all sites					**1.2%**
Auckland Islands 51° 00'S, 166° 00'E	New Zealand	1972	A	Low	5,000 (1972) [33]
Total					**5,000**
% of all sites					**24.4%**
Campbell Islands 52° 50'S, 169° 00'E	New Zealand	1995	B	Low	1,600 (1995) [34]
Total					**1,600**
% of all sites					**7.8%**
Marion Island 46° 54'S, 37° 45'E	South Africa	1975-1977, 1989, 1998, 2002-2009	A	Medium	507 (2007)
Prince Edward Island 46° 38'S, 37° 57'E		2002, 2009	A	High	150 (2002) [35]
Total					**657**
% of all sites					**3.2%**
Total					***20,486 (19,261 - 22,611)***

* See Table 2 footnote

CONSERVATION LISTINGS AND PLANS FOR THE BREEDING SITES

International

Prince Edward Islands, Iles Crozet and Iles Kerguelen

- RAMSAR Convention List of Wetlands of International Importance (inscribed 2007 and 2008) [36]

Heard Island and McDonald Islands, New Zealand sub-Antarctic islands

- UNESCO World Heritage List (inscribed 1997 and 1998) [37]

Macquarie Island

- UNESCO World Heritage List (inscribed 1997) [37]
- UNESCO Biosphere Reserve - Man and the Biosphere Programme (inscribed 1977) [38]

Australia

Heard Island and McDonald Islands

- National Heritage List - listed 2007 (*EPBC Act 1999*) [6]
- Heard Islands and McDonald Islands Marine Reserve - declared 2002 (*EPBC Act 1999*) [6]

Macquarie Island

- Register of Critical Habitat - listed 2002 (*EPBC Act 1999*) [6]
- Register of the National Estate (until 2012) - listed 1977 (*Australian Heritage Commission Act 1975*) [39]
- National Heritage List - listed 2007 (*EPBC Act 1999*) [6]

Tasmania

Macquarie Island

- Nature Reserve – *Nature Conservation Act 2002 (Tasmania)* [40]
- Macquarie Island Nature Reserve and World Heritage Area Management Plan 2006 [41]
- Plan for the Eradication of Rabbits and Rodents on sub-Antarctic Macquarie Island 2007 [42]

France

Iles Crozet and Iles Kerguelen

- National Nature Reserve (*Réserve Naturelle Nationale*) - *Décret n° 2006-1211* [43]

French Southern Territories (Terres Australes et Antarctiques Françaises, TAAF)

Iles Crozet (some costal areas of Possession Island) ; Iles Kerguelen (Sourcils Noir, some islands and coastal parts of Golfe du Morbihan)

- Areas Reserved for technical and Scientific Research (*Zones Réservées à la Recherche Scientifique et Technique)* Arrêté n°14 du 30 juillet 1985 [44], now included in Natural Reserve Management Plan [43]

New Zealand

Auckland Islands, Campbell Islands, and Antipodes Islands

- National Nature Reserves - *New Zealand Reserves Act 1977* [45]
- Conservation Management Strategy. Subantarctic Islands 1998 -2008 [46]

South Africa

Prince Edward Islands

- Special Nature Reserve - *Environment Conservation Act (No. 73 of 1989),* declared 1995 [47]
- Prince Edward Islands Management Plan 1996 [48]

South Georgia (Islas Georgias del Sur)

- South Georgia: Plan for Progress. Managing the Environment 2006 - 2010 [49]
- South Georgia Environmental Management Plan [50]

Bird Island

- Specially Protected Area (SPA) South Georgia: Plan for Progress. Managing the Environment 2006-2010 [49]

POPULATION TRENDS

Little information is available to determine population trends for *P. palpebrata* (Table 4). Between 1980 and 2005, the breeding population on Ile de la Possession (Iles Crozet) increased by 1.1% per year or about 49% in total [51] (Figure 2). The population appeared stable between 1980 and 1999 before increasing at an annual rate of 6.8% from 1999 to 2005 [50]. However, interannual variation in numbers is high, such that a decrease of 1.7% per year between 1980 and 1995 was reported in an earlier study [52]. Although the number of breeding pairs along the coast of Marion Island showed a significant decrease from 1996 to 2002 [53], subsequent counts of the whole island suggest an increase of 3.2% per year between 1989 and 2007, with interannual variation also high at this site (Figure 3). The population on Macquarie Island appears to be stable. The at-sea abundance of this species in Prydz Bay of East Antarctica is reported to have decreased significantly since between 1980 and 1981 [54]. Reported declines at these and other locations were considered to be the result of mortality associated with fisheries [27], particularly during the non-breeding season [52].

Mean breeding success ranges from 15% on Bird Island, South Georgia (Islas Georgias del Sur) to 47.3% on Macquarie Island (Table 5). No data are available on juvenile survival and adult survival is known only for Ile de la Possession.

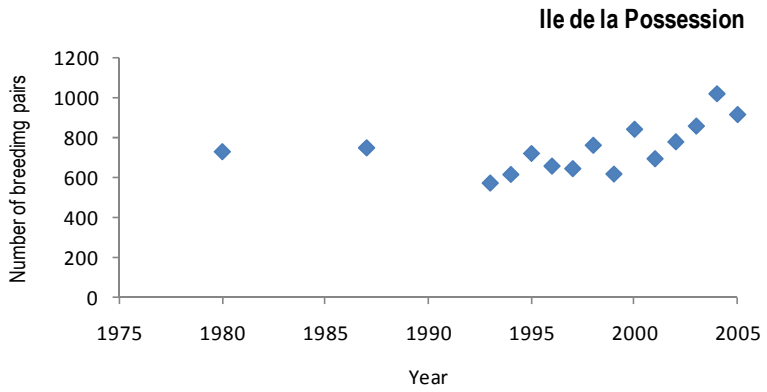


Figure 2. *Counts of nesting adults at Ile de la Possession. From Delord* et al. *2008* [51].

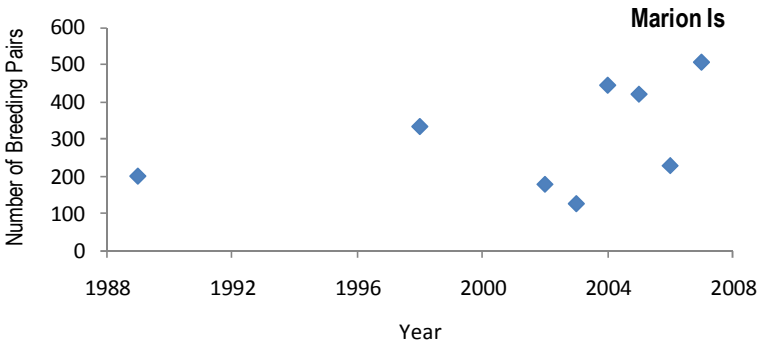


Figure 3. *Counts of nesting adults at Marion Island. Based on Crawford* et al. *2003* [53] *and unpublished data from R.J.M. Crawford, DAFF and P.G. Ryan, University of Cape Town. Data not to be used without dataholders' permission.*

Table 4. *Summary of population trend data for* P. palpebrata. *Table based on unpublished data provided by DPIW – Macquarie Island, R.J.M. Crawford, DAFF and P.G. Ryan, University of Cape Town - Marion Island, and published references as indicated.*

Breeding site	Current Monitoring	Trend Years	% average change per year (95% CI) [55]	Trend	% of population
Heard Island	No	-	-	Unknown	-
Macquarie Island	Yes	1994, 2005	-	Stable	100%
South Georgia (Islas Georgias del Sur)					
Bird Island	Yes	-	-	Unknown	-
Iles Crozet					
Ile de la Possession [51]	Yes	1980-2005	1.1 (0.5-1.7)	Increasing	70%
		1980-1999	1.0 (-)	Stable	70%
		1999-2005	6.8 (3.9-9.7)	Increasing	70%
Ile de l'Est	No	-	-	Unknown	-
Ile aux Cochons	No	-	-	Unknown	-
Ile des Pingouins	No	-	-	Unknown	-
Ile des Apôtres	No	-	-	Unknown	-
Iles Kerguelen	Yes	-	-	Unknown	-
Antipodes Islands	?	-	-	Unknown	-
Auckland Islands	?	-	-	Unknown	-
Campbell Islands	?	-	-	Unknown	-
Marion Island	Yes	1989, 1998-2007	3.2 (2.0-4.3)	Increasing	100%
Prince Edward Island	No	-	-	Unknown	-

Table 5. *Summary of demographic data for* P. palpebrata *breeding sites. Table based on unpublished data (DPIW - Macquarie Island; British Antarctic Survey (BAS) - South Georgia/Islas Georgias del Sur) and published references as indicated.*

Breeding site	Mean breeding success (±SD; study period)	Mean juvenile survival	Mean adult survival (study period)
Heard Island	No data	No data	No data
Macquarie Island	47.3% (±8.7%; 1995-2007)	No data	No data
South Georgia (Islas Georgias del Sur)			
Bird Island	15% (±8% SE; 2003-05)	No data	No data
Iles Crozet			
Ile de la Possession	40.9% (±3.8% SE 1981-2005) [51] 35.1% (±18.6%; 1967-95) [52]	No data	97.3% (1967-95) [52]
Ile de l'Est	No data	No data	No data
Ile aux Cochons	No data	No data	No data
Ile des Pingouins	No data	No data	No data
Ile des Apôtres	No data	No data	No data
Iles Kerguelen	No data	No data	No data
Antipodes Islands	No data	No data	No data
Auckland Islands	No data	No data	No data
Campbell Islands	No data	No data	No data
Marion Island	31% (1974-75) [24]	No data	No data
Prince Edward Island	No data	No data	No data

BREEDING SITES: THREATS

Threats at the breeding sites of *P. palpebrata* are relatively poorly known (Table 6). In the New Zealand colonies, many alien species have already been removed, including Norway rats *Rattus norvegicus* in 2003 from Campbell Island, feral cattle *Bos taurus*, European rabbits *Oryctolagus cuniculus* and house mice *Mus musculus* in 1993 from Enderby Island and feral goats *Capra aegagrus hircus* in 1995 from the main Auckland Island [16]. On Macquarie Island, extermination of feral domestic cats *Felis catus* was completed in 2000, and on Marion Island in 1991 [56].

Table 6. *Summary of known threats causing population level changes at the breeding sites of* P. palpebrata. *Table based on data submitted to the ACAP Breeding Sites Working Group in 2008.*

Breeding site	Human disturbance	Human take	Natural disaster	Parasite or pathogen	Habitat loss or degradation	Predation (alien species)	Contamination
Heard Island	no	no	Medium [a]	no	no	no	no
Macquarie Island	no	no	no	no	Low [b]	no	no
South Georgia (Islas Georgias del Sur)	no	no	no	no	no	no	no
Iles Crozet							
Ile de la Possession	no	no	no	no	no	no [c]	no
Ile de l'Est	no	no	no	no	no	no	no
Ile aux Cochons	no	no	no	no	no	no [c]	no
Ile des Pingouins	no	no	no	no	no	no	no
Ile des Apôtres	no	no	no	no	no	no	no
Iles Kerguelen	no	no	no	no	no	Low [d]	no
Antipodes Islands	no [e]	no	no [f]	no	no	no [g]	no
Auckland Islands	no [e]	no	no	no	no	no [g]	no
Campbell Islands	no [e]	no	no	no	no	no [g]	no
Marion Island	no	no	no	no	no	no	no
Prince Edward Island	no	no	no	no	no	no	no

[a] Recent large-scale volcanic activity (2003-2004 in particular) may have caused most birds to desert.

[b] The explosion in European rabbit *Oryctolagus cuniculus* numbers since 1999 has led to an extensive destruction of habitat and soil erosion at nesting sites. An eradication programme which also targets rodents (*Mus musculus* and *Rattus rattus*) commenced in 2010 [42] but had to be abandoned due to exceptionally poor weather. It will recommence in 2011.

[c] Cats and mice are present on Ile aux Cochons, rats (*Rattus rattus* and *R. norvegicus*) and house mice are found on Ile de la Possession, but there is no evidence of impact on *P. palpebrata* from any of these species at either site.

[d] Cats, rats (*R. rattus)* and mice occur on Iles Kerguelen, with cats having the biggest impact on the population.

[e] This species is prone to human disturbance, especially early in incubation. Desertion of nests and eggs was reported as a result of banding visits but population level effects are likely to be negligible [34].

[f] Fires represent a potential threat but nests are dispersed along the coastlines [16].

[g] House mice are present on the Antipodes but are not known to prey upon *P. palpebrata.* Feral pigs and cats may take limited numbers of eggs and chicks on Auckland Island but most nests are naturally well protected because of difficult accessibility. Norway rats were reported to have no effect on eggs and chicks on Campbell Island [16].

FORAGING ECOLOGY AND DIET

Phoebetria palpebrata employ a variety of feeding strategies including surface seizing, surface filtering and plunging [57]. Diving ability measured by depth gauges revealed a maximum depth of 12.4 m in pursuit of prey [58]. This species does not follow ships as often as do other albatross species [59]. Based on the advantages of dark plumage, it has been suggested that both *Phoebetria* species feed nocturnally [60]. Available activity data do indicate that *P. palpebrata* spend a greater proportion of darkness in flight than other southern hemisphere albatrosses, but without independent records of the timing of ingestion, it is difficult to determine the ecological implications [61].

Comprehensive dietary studies in *P. palpebrata* have been conducted at several colonies and highlight the importance of squid, fish, crustaceans and carrion. Analysis of beaks in casts from Marion Island identified 11 cephalopod species which indicated foraging south of the Atlantic Convergence [24]. Regurgitations from chicks on Marion Island showed that liquid is over half the dietary mass and that cephalopods were the most frequent item, followed by fish, crustaceans and seabirds. Scavenging behaviour was suggested based on identification of several squid taxa which are known to float after death [59, 60]. On South Georgia (Islas Georgias del Sur), chick regurgitations were comprised of mainly squid and krill with some fish [62]; similar results were reported from chick regurgitations from Iles Crozet [59, 63]. Regurgitations and pellets taken from adults and chicks at Macquarie Island indicated diets similar to those from Marion Island, and also revealed similar squid taxa as those taken by Heard Island birds [57]. Marine mammal and bird carrion is also an important component of the diet at some sites [59].

At Bird Island, South Georgia (Islas Georgias del Sur), trip durations are longer, and chick feeding frequency and growth rates are lower than in sympatric *Thalassarche* species, despite adults returning with food loads that are a greater proportion of body mass [61]. Data on chick provisioning regimes on Macquarie Island revealed a cyclical pattern of long and short trips; both of which were necessary to maintain body condition and successfully provision a chick [64]. A similar strategy was described in birds on Iles Crozet [65] but was not observed in those from Bird Island [66].

MARINE DISTRIBUTION

Phoebetria palpebrata have a circumpolar distribution over the Southern Ocean and exhibit the most southerly distribution of all the albatross species. Although common between 40°S and 60°S, they disperse as far south as pack ice and 77°S in the Ross Sea [25], yet have been reported to travel north with the Humboldt Current to 20°S [67]. Young birds tend to move further south than adults, often close to the Antarctic continent [25]. Based on satellite-tracking data, breeding birds from Macquarie Island forage in the surrounding shelf waters as well as into sub-Antarctic and Antarctic areas. Five satellite-tracked

incubating birds from Macquarie Island foraged south of the Antarctic Polar Front, an average of 1,500 km from their breeding sites [67]. Four breeding birds from South Georgia (Islas Georgias del Sur) followed a stereotypical flight path (38 trips) involving a clockwise route to and from high latitude waters along the southern Scotia Arc, on average travelling 3,800 km, to a maximum range of 920 km from the colony [61]. Breeding birds from Iles Crozet foraged in subantarctic waters during incubation and in Antarctic waters during chick-rearing (H. Weimerskirch, unpublished data). Systematic year-round observations around the Falkland Islands (Islas Malvinas) found the species to be uncommon, with most records between August and November and in waters deeper than 200 m east of the islands [68]. Satellite-tracked birds from Macquarie Island and Iles Crozet revealed that *P. palpebrata* tend to fly directly to Antarctic and sub-Antarctic foraging sites assisted by prevailing winds [65, 67]. [65, 67]. Immature birds from Iles Crozet and Kerguelen disperse throughout Indian Ocean in subtropical and subantarctic waters (H. Weimerskirch, unpublished data).

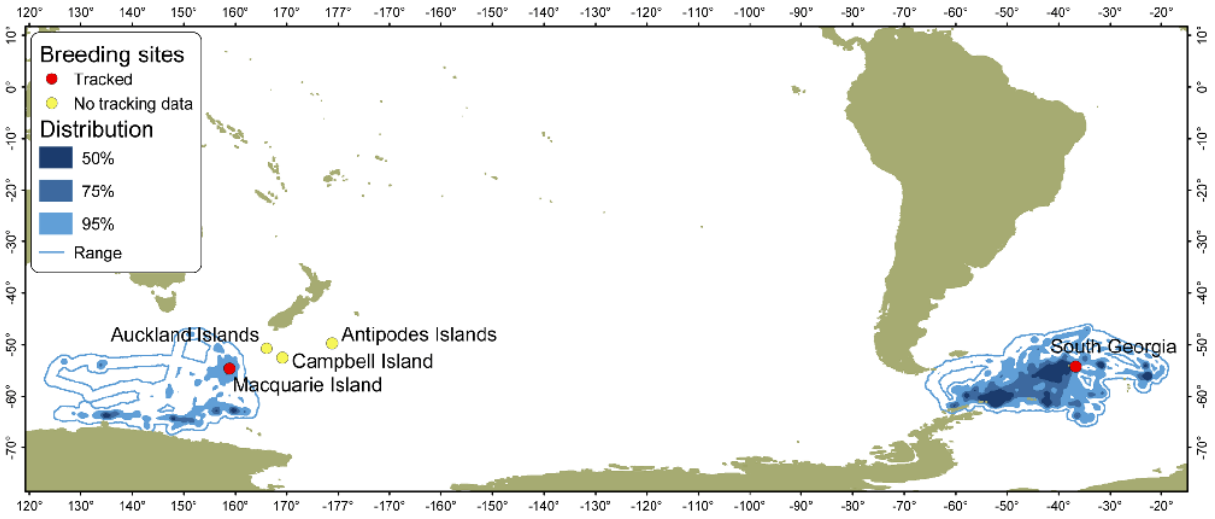


Figure 2. *Satellite-tracking data of breeding* P. palpebrata from Macquarie Island and South Georgia (Islas Georgias del Sur) (Number of tracks = 56). *Map based on data contributed to the BirdLife Global Procellariiform Tracking Database .*

Because of its circumpolar distribution, this species overlaps with all major southern hemisphere Regional Fisheries Management Organisations (Table 7, see also Figure 1), including SWIOFC (South-West Indian Ocean Fisheries Commission), SIOFA (Southern Indian Ocean Fisheries Agreement), SEAFO (South-East Atlantic Fisheries Organisation), and the yet to be established South Pacific Regional Fisheries Management Organisation (SPRFMO).

Table 7. *Summary of the known ACAP Range States, non-ACAP Exclusive Economic Zones and selected Regional Fisheries Management Organisations that overlap with the marine distribution of* P. palpebrata.

	Resident/ Breeding and feeding range	**Foraging range only**	**Few records - outside core foraging range**
Known ACAP Range States	Australia Disputed [1] France New Zealand South Africa	Argentina Chile	Brazil Peru
Exclusive Economic Zones of non-ACAP countries	-	-	Mauritius French Polynesia
Regional Fisheries Management Organisations [2]	WCPFC CCAMLR CCSBT	IATTC ICCAT IOTC SWIOFC SEAFO SIOFA SPRFMO	-

[1] See Table 2 footnote

[2] See Figure 1 and text for list of acronyms

MARINE THREATS

The primary threat to *P. palpebrata* is mortality associated with fisheries, specifically longlining [27, 69]. While less prone to following fishing vessels than most other albatrosses, their notable diving capabilities allow them greater access to baited hooks than most albatross species [27]. Breeding birds travel to Antarctic waters to feed [25]; however, these birds move northward during the non-breeding period and consequently come under threat as bycatch [27, 52]. *Phoebetria palpebrata* represented 6% of total seabird bycatch from tuna longliners 1988-1997 in the New Zealand EEZ, whereas "small numbers" were reported caught in the Australian EEZ [16]. An estimated 4,125 *P. palpebrata* were taken annually in the Southern Ocean by the Japanese longline industry based on the number of hooks set between 1981 and 1986 [70].

Little information exists on the potential effects of contaminants, oil spills or marine debris. No plastic fragments were found in the stomach contents of *P. palpebrata* from Marion Island [60] and no plastics or anthropogenic materials were observed in regurgitated pellets, in nest material or adjacent to study nests on Macquarie Island [71]. However, plastics were cited as present in stomach contents and pellets of this species in an earlier review, but extent and impact are unknown [59].

KEY GAPS IN SPECIES ASSESSMENT

Population dynamics for most populations remain unknown, particularly adult and fledgling survival rates, recruitment rates of juveniles into breeding colonies, natal philopatry and longevity. More information is needed on movements and dispersal of both adults and fledglings, particularly during the non-breeding period, as well as on the extent of overlap with fisheries and incidental mortality rates.

Photo © Aleks Terauds

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RECOMMENDED CITATION

Agreement on the Conservation of Albatrosses and Petrels. 2010. Species assessments: Light-mantled Albatross *Phoebetria palpebrata*. Downloaded from http://www.acap.aq on 5 October 2010.

GLOSSARY AND NOTES

(i) **Years**.

The "split-year" system is used. Any count (whether breeding pairs or fledglings) made in the austral summer (e.g. of 1993/94) is reported as the second half of this split year (i.e. 1994).

The only species which present potential problems in this respect are *Diomedea* albatrosses, which lay in December-January, but whose fledglings do not depart until the following October-December. In order to keep records of each breeding season together, breeding counts from e.g. December 1993-January 1994 and productivity counts (of chicks/fledglings) of October-December 1994 are reported as 1994.

If a range of years is presented, it should be assumed that the monitoring was continuous during that time. If the years of monitoring are discontinuous, the actual years in which monitoring occurred are indicated.

(ii) Methods Rating Matrix (based on NZ rating system)

METHOD

A Counts of nesting adults (Errors here are detection errors (the probability of not detecting a bird despite its being present during a survey), the "nest-failure error" (the probability of not counting a nesting bird because the nest had failed prior to the survey, or had not laid at the time of the survey) and sampling error).

B Counts of chicks (Errors here are detection error, sampling and nest-failure error. The latter is probably harder to estimate later in the breeding season than during the incubation period, due to the tendency for egg- and chick-failures to show high interannual variability compared with breeding frequency within a species).

C Counts of nest sites (Errors here are detection error, sampling error and "occupancy error" (probability of counting a site or burrow as active despite it's not being used for nesting by birds during the season).

D Aerial-photo (Errors here are detection errors, nest-failure error, occupancy error and sampling error (error associated with counting sites from photographs), and "visual obstruction bias" - the obstruction of nest sites from view, always underestimating numbers).

E Ship- or ground- based photo (Errors here are detection error, nest-failure error, occupancy error, sampling error and "visual obstruction bias" (the obstruction of nest sites from view from low-angle photos, always underestimating numbers)

F Unknown

G Count of eggs in subsample population

H Count of chicks in subsample population and extrapolation (chicks x breeding success - no count of eggs)

RELIABILITY

1 Census with errors estimated

2 Distance-sampling of representative portions of colonies/sites with errors estimated

3 Survey of quadrats or transects of representative portions of colonies/sites with errors estimated

4 Survey of quadrats or transects without representative sampling but with errors estimated

5 Survey of quadrats or transects without representative sampling nor errors estimated

6 Unknown

(iii) Population Survey Accuracy

High Within 10% of stated figure;

Medium Within 50% of stated figure;

Low Within 100% of stated figure (eg coarsely assessed via area of occupancy and assumed density)

Unknown

(iv) Population Trend

Trend analyses were run in TRIM software using the linear trend model with stepwise selection of change points (missing values removed) with serial correlation taken into account but not overdispersion.

(v) Productivity (Breeding Success)
Defined as proportion of eggs that survive to chicks at/near time of fledging unless indicated otherwise

(vi) Juvenile Survival
defined as:

1 Survival to first return/resight;
2 Survival to x age (x specified), or
3 Survival to recruitment into breeding population
4 Other
5 Unknown

(vii) Threats
A combination of scope (proportion of population) and severity (intensity) provide a level or magnitude of threat. Both scope and severity assess not only current threat impacts but also the anticipated threat impacts over the next decade or so, assuming the continuation of current conditions and trends.

		Scope (% population affected)			
		Very High (71-100%)	High (31-70%)	Medium (11-30%)	Low (1-10%)
Severity (likely % reduction of affected population within ten years)	Very High (71-100%)	**Very High**	**High**	**Medium**	**Low**
	High (31-70%)	**High**	**High**	**Medium**	**Low**
	Medium (11-30%)	**Medium**	**Medium**	**Medium**	**Low**
	Low (1-10%)	**Low**	**Low**	**Low**	**Low**

(viii) Maps
The satellite-tracking maps shown were created from platform terminal transmitter (PTT) and global-positioning system (GPS) loggers. The tracks were sampled at hourly intervals and then used to produce kernel density distributions, which have been simplified in the maps to show the 50%, 75% and 95% utilisation distributions (i.e. where the birds spend x% of their time). The full range (i.e. 100% utilisation distribution) is also shown. Note that the smoothing parameter used to create the kernel grids was 1 degree, so the full range will show the area within 1 degree of a track. In some cases the PTTs were duty-cycled: if the off cycle was more than 24 hours it was not assumed that the bird flew in a straight line between successive on cycles, resulting in isolated 'blobs' on the distribution maps. It is important to realise that these maps can only show where tracked birds were, and blank areas on the maps do not necessarily indicate an absence of the particular species".