Campbell Albatross
Thalassarche impavida

Albatros de Campbell
Albatros de l'île Campbell

CRITICALLY ENDANGERED | ENDANGERED | **VULNERABLE** | NEAR THREATENED | LEAST CONCERN | NOT LISTED

Sometimes referred to as
Campbell Island Mollymawk
Campbell Mollymawk

TAXONOMY

Order Procellariiformes
Family Diomedeidae
Genus *Thalassarche*
Species *T. impavida*

The generic classification of the Diomedeidae family was revised in the 1990s, based on cytochrome-*b* gene sequences, which resulted in the smaller albatrosses (sometimes also known as mollymawks) being split from the Wandering/Royal albatross clade (genus: *Diomedea*) [1]. The genus *Thalassarche* was resurrected for all Southern Ocean mollymawks, and this taxonomy has gained widespread acceptance [2]. The Campbell Albatross *Thalassarche impavida* (Mathews 1912) was long considered a sub-species of the Black-browed Albatross *T. melanophrys*. The species-pair was split based on genetic data by Robertson and Nunn (1998) [3]. *Thalassarche impavida* is now generally considered a monotypic species, including by ACAP [4].

CONSERVATION LISTINGS AND PLANS

International

- Agreement on the Conservation of Albatrosses and Petrels - Annex 1 [4]
- 2008 IUCN Red List of Threatened Species - Vulnerable (since 2000) [5]
- Convention on Migratory Species - Appendix II (as *Diomedea melanophris*) [6]

Australia

- *Environmental Protection and Biodiversity Conservation Act 1999 (EPBC ACT)* [7]
  - Vulnerable (as *Thalassarche melanophris impavida)*
  - Migratory
  - Marine
- Recovery Plan for Albatrosses and Petrels (2001) [8]
- Threat Abatement Plan 2006 for the incidental catch (or bycatch) of seabirds during oceanic longline fishing operations [9]

South Australia

- *National Parks and Wildlife Act 1972* – Vulnerable (as *Diomedea melanophris impavida*) [10]

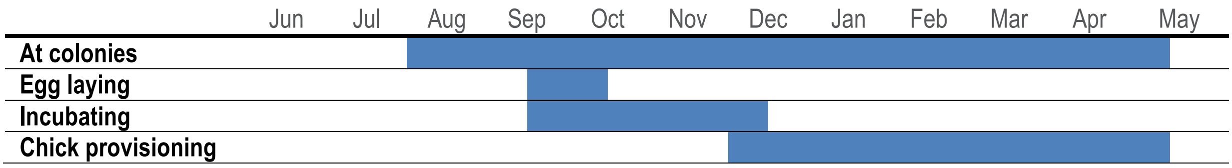
New Zealand

- *New Zealand Wildlife Act 1953* [11]
- Action Plan for Seabird Conservation in New Zealand; Part A: Threatened Seabirds [12]
- New Zealand Threat Classification System List 2008 – Naturally Uncommon [13]

BREEDING BIOLOGY

Thalassarche impavida breeds annually and is present in colonies from early August to May (Table 1). Eggs are laid from late September to early October, hatch mostly in early December and chicks fledge from mid April to early May [14, 15, 16] after 130 days on the nest (Moore and Moffat 1990 in [17]). Birds return to land at age five and the mean age of first breeding is 10 (range 6-13 years) [18].

Table 1. *Breeding cycle of* T. impavida.



BREEDING STATES

Table 2. *Distribution of the global* T. impavida *population among Parties to the Agreement.*

	New Zealand
Breeding pairs	100%

BREEDING SITES

Thalassarche impavida is endemic to Campbell Island (Table 2, Figure 1), nesting at the north of the island mostly in mixed colonies with the Grey-headed Albatross *T. chrysostoma* [16]. Approximately 21,000 pairs bred annually in 1996-1998 [16]. However, the total breeding population could number 23,300 pairs [16] (if at least 10% of birds defer breeding as estimated by Waugh *et al*. 1999 [18]).

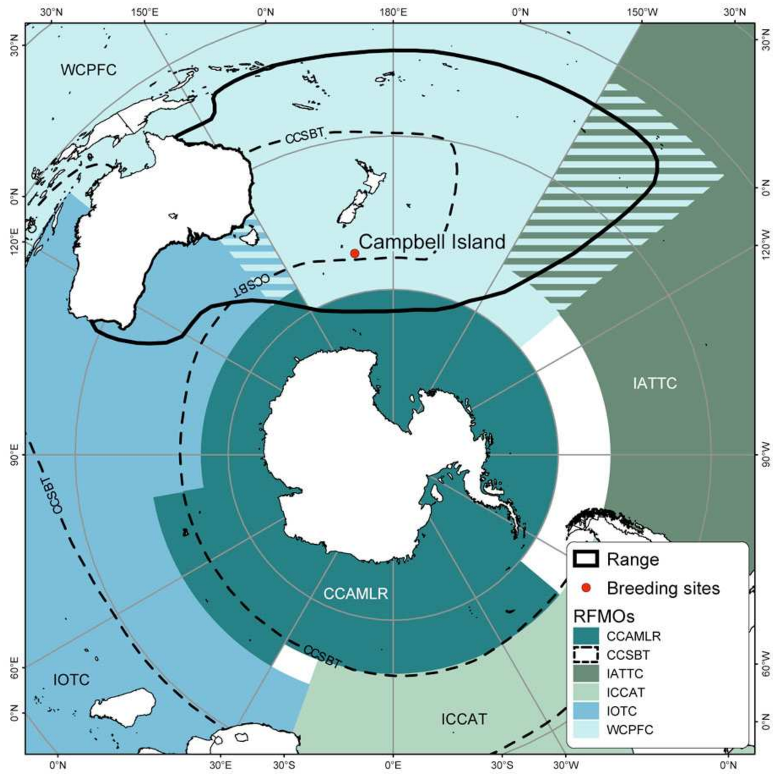


Figure 1. *Location of the breeding site and approximate range of* T. impavida with *the boundaries of selected Regional Fisheries Management Organisations (RFMOs) also shown.*

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) of T. impavida *for the single breeding site.*

Breeding site location	Jurisdiction	Years monitored	Monitoring method	Monitoring accuracy	Annual breeding pairs (last census)
Campbell Island 52° 33' S, 169° 09' E	New Zealand	1940s,1984, 1988, 1993-1998	A, E	High	21,000 (1998) [16]

CONSERVATION LISTINGS AND PLANS FOR THE BREEDING SITES

International

Campbell Island

- UNESCO World Heritage List (inscribed 1998) [19]

New Zealand

Campbell Island

- National Nature Reserve – *New Zealand Reserves Act 1977* [20]
- Conservation management strategy: subantarctic islands 1998-2008 [21]

POPULATION TRENDS

Thalassarche impavida experienced a period of steep decline in numbers during the 1970s and early 1980s, but the trend has since reversed (Table 4) [18]. Demographic models for the period 1985 – 1997 indicated that the overall population increased at 1.1% per annum, and reflected by an observed increase in numbers of 1.1% and 2.1% a year at two monitored colonies [18]. Counts of nests between 1996 and 1998 suggested no change in numbers of breeding pairs [16]. The trend over the subsequent decade is unknown.

Table 4. *Summary of population trend data for* T. impavida *at the single breeding site. Table based on Waugh* et al. *1999* [18].

Breeding site	Current monitoring	Trend years	% average change per year	Trend	% of population for which trend is calculated
Campbell Island	?	1943-1985	-2.6 [1]	Declining	*c.* 10%
		1967-1982	-5.9 [1]	Declining	*c.* 10%
		1967-1985	-1.5 [2]	Declining	*c.* 5%
		1976-1985	-5.5 [2]	Declining	*c.* 5%
		1985-1989	20.7 [1] & 1.7 [2]	Increasing	*c.* 10 & 5%
		1993-1997	2.1 [1] & 1.1 [2]	Increasing	*c.* 10 & 5%
		1985-1997	1.1	Increasing	100%

[1] Bull Rock North
[2] Bull Rock South

From the late 1980s to late 1990s, mean breeding success (66%) and adult survival (94.5%) were relatively high (Table 5) [18]. In contrast, survival to recruitment was low (19%) compared to other species [18]. Adult mortality was likely to be higher pre 1984, as indicated by the rate of population decline during the 1970s and early 1980s [18].

Table 5. *Demographic data for* T. impavida *at the single breeding site. Table based on Waugh* et al. *1999* [18].

Breeding site	Mean breeding success ±SD (Years)	Mean juvenile survival ±SD (Years)	Mean adult survival ±SD (Years)
Campbell Island	66 ±12 (1986-1998)	28.6 ± 0.9 [1] (1976-1990) 18.6 ± 3.8 [2] (1976-1988)	94.5 ± 0.7 (1985-1996)

[1] Survival to 5 yrs old
[2] Survival to first recapture

BREEDING SITES: THREATS

There are currently no known, confirmed land-based threats to *T. impavida* capable of causing population-level changes.

Table 6. *Summary of known threats at the breeding sites of* T. impavida.

Breeding site	Human disturbance	Human take	Natural disaster	Parasite or pathogen	Habitat loss or degradation	Predation (alien species)	Contamination
Campbell Island	No	No	No	No	No	No [a]	No

[a] Even prior to Campbell Island being declared free of Norway rats *Rattus norvegicus* in 2003, there was no evidence of predation on chicks or eggs of this species (Taylor 1986 in [12]).

FORAGING ECOLOGY AND DIET

Thalassarche impavida feed by surface-seizing and are probably capable of shallow dives to depths of up to 5 m recorded for the closely related *T. melanophrys* [22, 23]. The diet during chick rearing is dominated by juvenile southern blue whiting *Micromesistius australis* [24], a commercially exploited or bycaught species in New Zealand subantarctic waters. However, the small size class of specimens in stomach samples, and the high incidence of this species in the diet of *T. impavida* when no fishery operations were targeting *M. australis* at the foraging grounds, suggest that this prey species is mainly obtained naturally rather than as discards from trawl vessels [24]. Fish accounted for 93.6% of the diet by weight, followed by cephalopods, crustaceans and carrion (3.6, 0.5 and 2.3% respectively), as well as an even smaller proportion of gelatinous taxa [24]. When foraging at the Antarctic Polar Front and over oceanic waters however, cephalopods, especially *Martialia hyadesi*, was the main prey that were consumed [25].

MARINE DISTRIBUTION

Satellite-tracking studies indicated that birds provisioning chicks predominantly foraged over neritic waters during trips lasting less than four days, with some long trips of 8-21 days over oceanic waters [24, 26] (Figure 2). The foraging range during short trips extended 150-640 km from the breeding colony, mainly over subantarctic waters within the 1,000 m depth contour on the Campbell Plateau [24, 25]. Longer trips extended up to 2,000 km from the colony, ranging from subtropical to Antarctic waters, but mainly to the Polar Frontal Zone or to the east of the Campbell Plateau [25, 26]. This plasticity in foraging behaviour is in contrast to the exclusively neritic feeding trips observed in *T. melanophrys* at some sites [27, 28, 29], though not others [30, 31].

Little is known about the distribution of juveniles or adults outside the breeding season. Band recoveries over 30 years suggest that juvenile and non-breeding *T. impavida* are restricted to Australasian and western South Pacific waters [32]. Post fledging, juveniles appear to migrate north via waters off eastern New Zealand, disperse through the subtropics in winter, including along the eastern coast of Australia, and move back southward through the western Pacific Ocean and Tasman Sea during spring to summer [32]. Sub-adults appeared to be confined to 28°S - 43°S, but had a wide longitudinal range, between 115°E - 174°W in summer and 115°E - 146°W in winter [32]. During winter, adults were found widely dispersed around the Tasman sea and the south-western Pacific Ocean east of New Zealand, whereas in summer the distribution of both breeding and non-breeding birds was more restricted and southerly (32°S to 44°S) [32].

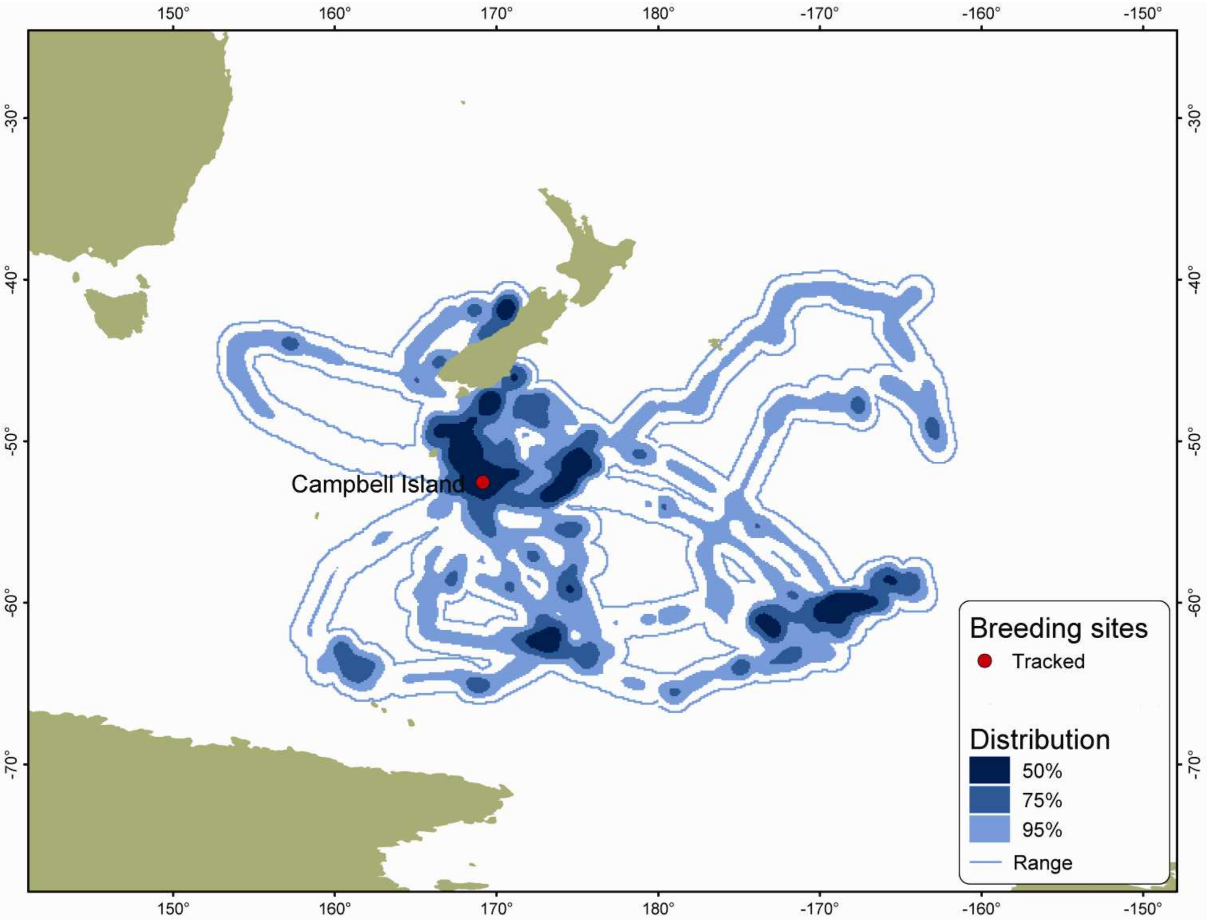


Figure 2. Satellite-tracking data of breeding adult T. impavida *from Campbell Island (N=10). Map based on data contributed to the BirdLife Global Procellariiform Tracking Database.*

Thalassarche impavida overlaps with five Regional Fisheries Management Organisations (Figure 1; Table 7), but principally the CCSBT and WCPFC. Negotiations are also currently underway to establish the South Pacific Regional Fisheries Management Organisation (SPRFMO) that would cover both pelagic and demersal fisheries in the region. New Zealand and Australia are the main Range States for *T. impavida.*

Table 7. *Summary of the known ACAP Range States, non-ACAP Exclusive Economic Zones and Regional Fisheries Management Organisations that overlap with the marine distribution of* T. impavida. *Full extent of foraging range is unknown, especially for non-breeding individuals.*

	Breeding and feeding range	Foraging range only	Few records - outside core foraging range
Known ACAP Range States	New Zealand	Australia	-
Non-ACAP Exclusive Economic Zones	-	Vanuatu Fiji Tonga Tahiti	Cook Islands French Polynesia Papua New Guinea Samoa Solomon Islands Tuvalu US Samoa
Regional Fisheries Management Organisations [1]	CCSBT WCPFC SPRFMO [2]	IOTC IATTC CCAMLR	-

[1] see Figure 1 and text for list of acronyms
[2] not yet in force

MARINE THREATS

Thalassarche impavida is vulnerable to being caught on longlines, principally in Australian and New Zealand waters [33]. Fisheries-related mortality is considered to be the main cause of the observed population declines prior to 1984, which coincided with the development of the tuna *Thunnus* sp. fishery in the Australasian region, especially in the New Zealand Exclusive Economic Zone (NZ EEZ) between 1971 and 1982 [18, 34]. Conversely, the observed and modelled increases in the population from 1985 to 1997 are thought to be due to a substantial decrease in the fishing effort during the same period [34], but *T. impavida* (mostly juveniles) still made up 80% of Black-browed type albatrosses and 39% of all albatross species caught by Japanese tuna longlines in the NZ EEZ between 1989 and 1992 [34]. Just over half of the Black-browed Albatrosses reported killed in the Japanese tuna longline fishery around Australia in 1988-1995 were *T. impavida*, with an estimated 1528 birds of both species killed annually [35]. More recently, 46 *T. impavida* were observed caught in New Zealand trawl and longline fisheries between 1998 and 2004, but observer coverage was less than 5% of total fishing effort [36]. Small numbers of *T. impavida* have also been reported captured by trawlers fishing for hoki, scampi and squid (DOC unpub. in [12]).

KEY GAPS IN SPECIES ASSESSMENT

The key conservation concern for *T. impavida* derives from fatal interactions with fisheries. More comprehensive data on the at-sea distribution of non-breeding and juvenile birds and their overlap with fishing operations as well as the continued monitoring of incidental mortality rates would improve our understanding of the extent of this threat. The last estimate of the population is now more than a decade old, and an up to date count of breeding pairs is needed to clarify the current population trend. Moore (2004) [16] recommends that as a minimum, ground counts of accessible colonies together with photographs of inaccessible areas should be conducted for three consecutive years every decade. Information on demographic parameters is also more than 10 years old and collection of new data is required. An intensive search in two consecutive years at 5-yearly intervals to recover banded birds was recommended by Taylor (2000) [12] to monitor changes in adult survival and chick-recruitment.

T. melanophrys (left) and *T. impavida* (right).

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RECOMMENDED CITATION

Agreement on the Conservation of Albatrosses and Petrels. 2009. Species assessments: Campbell Albatross *Thalassarche impavida.* Downloaded from http://www.acap.aq on 26 August 2009.

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
Where calculated, 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.