



Management Plan

For Antarctic Specially Protected Area No. 160 FRAZIER ISLANDS, WINDMILL ISLANDS, WILKES LAND, EAST ANTARCTICA

Introduction

The Frazier Islands comprise three islands located approximately 18 km offshore from Australia's Casey station, in East Antarctica (see Map A). The islands support the largest of only four known breeding populations of southern giant petrels (*Macronectes giganteus*) on continental Antarctica and were designated as an Antarctic Specially Protected Area under Measure 2 (2003) for the sanctuary of the birds. The management plan for the Area was revised under Measure 13 (2008) and Measure 14 (2013).

Following first visitation of the islands in 1956, the southern giant petrel colonies at the Frazier Islands were visited intermittently on various occasions from late November to late March. Due to limited access, Nelly Island was visited most frequently. Occupied nests were counted in December in the period from 1989-2001, across all three islands.

Apart from visits for seabird observations, the Frazier Islands have been visited very infrequently. On average, a visit for seabird observations occurred every two years from the late 1950s until the mid-1980s, when a formal management strategy was implemented within the Australian Antarctic Program to minimise human disturbance to breeding colonies of southern giant petrels in the vicinity of Australia's Antarctic stations (see Appendix 1).

From 1989 to 2001, the Frazier Islands were visited five to six times to count occupied nests. However, the visits varied in time from December to March, making the comparison of results difficult.

From 2011 to 2014, four automated cameras were installed at Nelly Island to gain insights into the phenology of the breeding cycle of southern giant petrels. The obtained results show that southern giant petrels are present for most of the year and are seen at known nest sites in early July. Pair formation commences in August, followed by a pre-laying period of about 83 days. The laying period lasts from 23-31 October, and chicks start to hatch in late December. Chicks are guarded until mid- to late January and fledge in late March to early April.

1. Description of Values to be Protected

The Area is primarily designated to protect the breeding population of southern giant petrels, which is the largest known in the continental Antarctic.

In 2008, the world breeding population of southern giant petrels was estimated at 54,000 pairs. More recent analysis of trend data for the global population over the past three generations (64 years) gives a best case estimate of a 17% increase and a worst-case scenario of a 7.2% decline; declines consequently do not approach the threshold for classification as *Vulnerable* on the IUCN Red List of Threatened Species and the species has been down-listed from *Near Threatened* to *Least Concern* (BirdLife International, 2012).

The southern giant petrel is listed in Annex 1 of the Agreement on the Conservation of Albatrosses and Petrels (ACAP), a multilateral agreement that seeks to conserve albatrosses and petrels by coordinating international activity to mitigate known threats to their populations, and in Appendix II of the Convention on the Conservation of Migratory Species of Wild Animals.

In East Antarctica, southern giant petrels are uncommon. The species is at the southern limit of its distribution range. The most recent estimate of the total population at the Frazier Islands was 237 breeding pairs in 2011. Colonies are found on all three of the islands in the group (Nelly, Dewart and Charlton Islands), the largest occurs on Dewart Island. In 2011, automatic cameras were temporarily installed on Nelly Island to establish the breeding chronology and success of the southern giant petrels (Map B), and were removed in 2014.



The Frazier Islands are one of only four known breeding localities of southern giant petrels around the coastline of continental Antarctica and are the only known site in nearly 3000 km of coastline between Davis station and Dumont d'Urville station. The other three continental breeding colonies are located near the Australian stations of Mawson (Giganteus Island, Rookery Islands, ASPA 102) and Davis (Hawker Island, ASPA 167), and near the French Dumont d'Urville station (Pointe-Géologie Archipelago, ASPA 120). The southern giant petrels on the Antarctic continent comprise less than 1% of the global breeding population. The current population for continental Antarctica is estimated at approximately 300 pairs, with 2-4 pairs on Giganteus Island (2007), approximately 45 pairs on Hawker Island (2010), 8-9 pairs at Pointe Géologie archipelago (2005) and 237 pairs on the Frazier Islands (2011). However, incidental observations at the coast near Mawson station indicate there may be additional colonies that have not yet been discovered.

The Area also supports breeding colonies of Adélie penguin (*Pygoscelis adeliae*) (and several other species of flying birds).

2. Aims and Objectives

Management of the Area aims to:

- minimise human disturbance to the breeding colonies of southern giant petrels to assist further the protection of the population in the wild;
- allow scientific research in the Area provided it is for compelling reasons which cannot be served elsewhere and which will not jeopardise the natural ecological system in that Area;
- preserve the Frazier Islands as a reference area for future comparative studies with other breeding populations of southern giant petrels;
- prevent or minimise the introduction to the Area of alien plants, animals and microbes to the Area; and
- minimise the possibility of the introduction of pathogens which may cause disease in fauna populations within the Area.

3. Management Activities

The following management activities shall be undertaken to protect the values of the Area:

- a copy of this Management Plan made available at Casey station;
- markers, signs and structures erected within the Area for scientific or management purposes, and secured, maintained in good condition and removed when no longer required;
- abandoned equipment or materials removed to the maximum extent possible provided it does not adversely impact on the values of the Area;
- visitation of the Area as necessary (outside the mid-April to mid-September breeding season of southern giant where practicable, and no less than once every five years where practicable) to assess whether the Area continues to serve the purposes for which it is designated and to ensure that management activities are adequate; and
- review of the Management Plan at least every five years with updating as required.

4. Period of Designation

This area is designated for an indefinite period

5. Maps

- **Map A:** Antarctic Specially Protected Areas, Windmill Islands, East Antarctica.
- **Map B:** Antarctic Specially Protected Area No. 160 Frazier Islands – Topography and Bird Distribution.
- **Map specifications:** Projection: UTM Zone 49
Horizontal Datum: WGS84



6. Description of the Area

6(i) Geographical co-ordinates, boundary markers and natural features

General description

The Frazier Islands are located at latitude 66°14'S, longitude 110°10'E (Map A). The three islands (Nelly, Dewart and Charlton) lie in the eastern part of Vincennes Bay, approximately 18 km to the west north-west of Casey station. Nelly Island is the largest of the three islands (approximately 0.35 km² in area) and was named for the presence of several colonies of southern giant petrels or "Nellies". The Area comprises the entire terrestrial area of the three islands, with the seaward boundary at the low water mark (Map B). The total area of the Antarctic Specially Protected Area is approximately 0.6 km². There are no boundary markers.

Environmental Domains Analysis

The Frazier Islands are not classified in accordance with the Environmental Domains Analysis for Antarctica (Resolution 3 (2008)).

Antarctic Conservation Biogeographic Regions

The Frazier Islands are located within Biogeographic Region 7 *East Antarctica* (Resolution 6 (2012)).

Important Bird Areas in Antarctica

The Frazier Islands do not represent an *Important Bird Area* (Resolution 5 (2015)).

Southern Giant Petrels

The breeding season for southern giant petrels at the Frazier Islands usually commences in late October to mid-November, and extends through to April. Yearlings and adults can be present as early as July. Banded chicks from the Frazier Islands dispersed throughout the Southern Hemisphere and have previously been recovered in New Zealand, South America, Easter Island, and South Africa within nine months of departure.

In the mid-1980s, a management strategy was implemented by the Australian Antarctic Program for all three southern giant petrels breeding localities in the vicinity of Australia's stations, to minimise human disturbance. With the development of new technology (such as automated cameras), detailed information can now be obtained with little or no human presence during the breeding period.

In December 2011, 80 breeding pairs were observed on Nelly Island including two banded birds, 130 breeding pairs on Dewart Island, and 27 breeding pairs on Charlton Island. Four automatic cameras temporarily installed on Nelly Island from 2011 to 2014 assisted with establishing/understanding key breeding parameters.

Other birds

Nelly Island supports the largest and most varied avian community of the three islands; snow petrel (*Pagodroma nivea*), cape petrel (*Daption capense*), Antarctic petrel (*Thalassoica antarctica*), Wilson's storm-petrel (*Oceanites oceanicus*), southern fulmar (*Fulmarus glacialisoides*), and South Polar skua (*Catharacta maccormicki*) all breed on the island. South Polar skua nests have also been observed on Dewart Island.

In 1961/62, 100 Adélie penguin (*Pygoscelis adeliae*) nests were reported in one colony on Nelly Island. During the 1989/90 season, three colonies were recorded on the north-west ridge of Nelly Island with a total of 554 nests. This increase corresponds with those recorded for most other Adélie penguin populations in the Windmill Islands region during the period from 1959/60 to 1989/90. In the 2001/02 season, approximately 1000 Adélie penguin pairs were estimated to be breeding on Nelly Island. A brief inspection of the Adélie penguin colonies in 2005/06 suggested that the breeding population continues to increase.

Marine mammals

Recorded sightings of marine mammals at the Frazier Islands are scarce. In 1968, three Weddell seals (*Leptonychotes weddellii*) were observed on an ice floe located between Nelly and Dewart Islands. Orcas (killer whale: *Orcinus orca*) were also sighted offshore from the islands, including a large pod in late 2011. A few leopard seals (*Hydrurga leptonyx*) were sighted on sea ice near Nelly Island and a small number of Weddell seals were recorded on the sea ice near the Frazier Islands in the 2001/02 season (Appendix 2).

Climate

The climate at the Frazier Islands is characteristic of that experienced at the Windmill Islands and other Antarctic coastal locations in the region. At Casey station, located 18 km to the east south-east of the Frazier Islands group, mean temperatures are 0.3°C for the warmest month and -14.9°C for the coldest month. Precipitation is low and the high albedo of the exposed rock surfaces results in persistent ice-free areas that provide attractive nesting sites for the avifauna.



Geology and geography

The topography of the Frazier Islands is characterised by steep cliffs rising from the sea. The highest peak on Nelly Island is approximately 65 m. There is a broad 'U' shaped ice-filled valley on both Nelly and Dewart Islands.

The geology of the Frazier Islands is typical of the Windmill Islands group and is characterised by the layered schists and finely crenulated gneisses of the Windmill metamorphics. The geological character of the Frazier Islands developed as a result of two phases of metamorphism at 1400–1310 Ma and about 1200 Ma of pre-existing volcanics, greywacke and shale. On Nelly Island there are steep cliffs of biotite and gneiss. A red sandstone erratic occurs in the 'U' shaped valley on Nelly Island below the 30 m contour. Highly polished glacial striae in the gneisses provide evidence of recent glaciation and indicate the former direction of ice flow of 265° and 280° T. Surface sediments consist of fine gravelly sand located in bedrock depressions.

Vegetation

Vegetation recorded at Nelly Island comprises at least 11 species, including lichens *Buellia frigida*, *Usnea antarctica*, *Rhizoplaca melanophthalma*, *Candelariella flava*, a terrestrial alga *Prasiola crispa*, an indeterminate green crust that is thought to be a mixture of fungal hyphae and green alga *Desmococcus olivaceus*, and several species of snow algae including *Chlorococcum* sp., *Chloromonas polyptera*, *Chlorosarcina antarctica*, *Prasiococcus calcarius* (Appendix 2). There are no published records of terrestrial invertebrates on the Frazier Islands; however, no surveys have been undertaken.

6(ii) Access to the Area

Depending on sea ice conditions, access to the vicinity of the Frazier Islands can be gained by small boat, in accordance with section 7(ii) of this plan. Sea ice conditions are usually too unstable for over sea ice access by vehicles.

6(iii) Location of structures within and adjacent to the Area

There are no permanent structures within or adjacent to the Area and none are to be erected. Four automatic cameras were temporarily located in proximity to the southern giant petrel colony but were removed in 2014.

6(iv) Location of other protected areas in the vicinity

Other protected areas in the vicinity include (see Map A):

- ASPA No. 135, Northeast Bailey Peninsula (66°16'59.9"S, 110°31'59.9"E): located approximately 18 km to the east-south-east;
- ASPA No. 136, Clark Peninsula (66°15'S, 110°36'E): located approximately 15 km to the east-south-east; and
- ASPA No. 103, Ardery Island and Odbert Island (66°22'20"S, 110°29'10"E): located approximately 20 km to the south-east.

6(v) Special zones within the Area

There are no special zones within the Area.

7. Terms and Conditions for Entry Permits

7(i) General permit conditions

Entry to the Area is prohibited except in accordance with a permit issued by an appropriate national authority. Conditions for issuing a permit to enter the Area are that:

- the activities permitted give due consideration, via the environmental impact assessment process, to the continued protection of the values of the Area;
- the actions permitted are in accordance with this Management Plan and its objectives and provisions;
- permits shall be issued for a finite period;
- permits shall be carried when in the Area;
- permit holders shall notify the permitting authority of any activities or measures undertaken that were not authorised by the permit;
- a visit report must be supplied to the authority that approved the permit, as soon as practicable after the visit to the Area has been completed (but no later than six months after the visit has been completed); and
- all census and GPS data should be made available to the permitting authority and to the Party responsible for the development of the Management Plan.

Additional conditions for the Frazier Islands, consistent with this Management Plan's objectives and provisions, may be included by the permitting authority, including (but not limited to) the following:

- permits to enter the Area during the non-breeding period for southern giant petrels (from 1 May to 30 September) may be issued for compelling scientific research or essential management purposes; and
- permits to enter the Area during the breeding period for southern giant petrels (from 1 October to 30 April) may be issued for the purpose of conducting censuses.



7(ii) Access to, and movement within, or over the Area

- Vehicles are prohibited within the Area and all movement within the Area should be on foot.
- The only permitted access to the Frazier Islands is by watercraft. Boats used to visit the islands must be left at the shoreline and movement within the Area is by foot only. Only personnel who are required to carry out scientific/management work in the Area should leave the landing site.
- Any movement within the Area is to be consistent with the minimum approach distances to nesting birds specified in Appendix 3. Persons shall not approach closer than is necessary to obtain census data or biological data from any nesting southern giant petrels, and in no case closer than 20 m.
- To reduce disturbance to wildlife, noise levels including verbal communication are to be kept to a minimum. The use of motor-driven tools and any other activity likely to generate noise and thereby cause disturbance to nesting birds is prohibited within the Area during the breeding period for southern giant petrels (from 1 October to 30 April).
- Landing of aircraft in the Area is prohibited at any time.
- Sea-ice conditions are usually too unstable to permit aircraft landings, however permission to land a single-engined helicopter adjacent to the Area may be granted for essential scientific or management purposes when sea-ice conditions are suitable and only if it can be demonstrated that disturbance will be minimal, at a distance of no less than 930m from any breeding colony of bird or seal (emergencies exempted). Only personnel who are required to carry out work in the Area should leave the helicopter.
- Overflights of the islands during the breeding season are prohibited, except where essential for scientific or management purposes. Such overflights are to be at an altitude of no less than 930 m (3050 ft) for single-engine helicopters and fixed-wing aircraft, and no less than 1500 m (5000 ft) for twin-engine helicopters.
- Clothing (particularly all footwear) and field equipment shall be thoroughly cleaned before and after entering the Area.
- The operation of Remotely Piloted Aircraft Systems (RPAS) over the Area should be carried out, as a minimum requirement, in compliance with the 'Environmental Guidelines for Operation of Remotely Piloted Aircraft Systems (RPAS) in Antarctica (v 1.1) contained in Resolution 4 (2018).

7(iii) Activities which may be conducted within the Area

Activities which may be conducted within the Area include:

- compelling scientific research which cannot be undertaken elsewhere;
- sampling, but this should be the minimum required for the approved research programs;
- essential management activities, including monitoring, erection of signs, removal of structures/materials, and visits to assess the effectiveness of the Management Plan and management activities; and
- essential operational activities in support of scientific research or management within or beyond the Area.

Wherever practicable, censuses are to be conducted from outside the southern giant petrel colonies. In most cases, there are vantage points from where the nesting southern giant petrels may be counted. Access to the Area should be limited to the minimum amount of time and personnel reasonably required to undertake the census. Boat operators and other support personnel should remain at the landing site for safety reasons.

7(iv) Installation, modification, or removal of structures

Permanent structures and installations are prohibited within the Area. Temporary structures and installations may only be established in the Area for compelling scientific or essential management reasons and for a pre-established period, as specified in a permit.

Any temporary structure or installation established in the Area must be:

- first cleaned of organisms, propagules (e.g. seeds, eggs) and non-sterile soil;
- made of materials that do not impact on the surrounding environment, and can withstand Antarctic conditions;
- installed, maintained, modified and removed in a manner that minimises disturbance (and does not cause more damage than benefit) to the values of the Area;
- clearly identified by country, name of the principal agency/investigator, date of installation and date of expected removal;
- reported to the permitting authority if left *in situ* (GPS coordinates of long-term monitoring markers should be lodged with the Antarctic Data Directory System through the appropriate national authority); and
- removed when they are no longer required, or before the expiry of the permit, whichever is earlier.

7(v) Location of field camps

Camping is prohibited within the Area (except in an emergency).



7(vi) Restrictions on materials and organisms which may be brought into the Area

The following restrictions apply:

- No living animals, plant material, microorganisms or non-sterile soils shall be deliberately introduced into the Area. Appropriate precautions, such as the thorough cleaning of footwear and equipment, must be taken to prevent accidental introduction.
- No poultry products, including dried food containing egg powder, are to be taken into the Area.
- Chemicals may be introduced for scientific or management purposes specified in a permit, and shall be removed from the Area at or before the conclusion of the permitted activity.
- Permanent or semi-permanent fuel depots are not allowed. Fuel must not be stored in the Area unless it is required for essential purposes connected with the activity for which the permit has been granted. All such fuel must be stored in sealed and bunded containers removed from the Area at or before the conclusion of the permitted activity.
 - Boat refuelling is permitted at shoreline landing sites. A small amount of fuel is permitted for an emergency stove and must be handled in a way that minimises the risk of the accidental introduction of the fuel into the environment. Any chemical which may be introduced for compelling scientific purposes, as authorised in a permit, shall be removed from the Area, at or before the conclusion of the activity for which the permit was granted. The use of radionuclides or stable isotopes is prohibited.
- Any materials or supplies introduced for a stated period shall be removed at or before the conclusion of the stated period, and shall be stored and handled so that the risk of dispersal into the environment is minimised.

7(vii) Taking of, or harmful interference with, native flora and fauna

The taking of, or harmful interference with, native flora and fauna is prohibited except in accordance with a permit. Where the taking of, or harmful interference with, animals is involved, this action should be conducted in accordance with the *SCAR Code of Conduct for the Use of Animals for Scientific Purposes in Antarctica* as a minimum standard.

Disturbance of southern giant petrels should be avoided. Visitors should be alert to changes in wildlife behaviour, especially changes in posture or vocalisation. If birds are showing signs of wanting to leave the nest, all persons shall retreat immediately.

7(viii) The collection or removal of material not brought into the Area by the permit holder

Material of human origin likely to compromise the values of the Area, which was not brought into the Area by the permit holder or otherwise authorised, may be removed unless the impact of the removal is likely to be greater than leaving the material *in situ*. If such material is found, the appropriate national authority must be notified. Where possible, photographic documentation should be obtained and included in the site visit report.

7(ix) Disposal of waste

All wastes, including human wastes, shall be removed from the Area.

7(x) Measures that may be necessary to continue to meet the aims of the Management Plan

Permits may be granted to enter the Area to carry out the following measures, provided they do not adversely impact on the values of the Area:

- the collection of samples for analysis or review;
- the establishment or maintenance of scientific and/or logistical equipment, infrastructure and signposts; and
- other protective measures.

7(xi) Requirements for reports

The principal permit holder for each permit issued shall submit to the permitting authority a report describing the activities undertaken no later than six months after the visit has been completed. Such reports should include, as appropriate, the information identified in the Visit Report form contained in the *Guide to the Preparation of Management Plans for Antarctic Specially Protected Areas*. Parties should maintain a record of such activities and, in the Annual Exchange of Information, should provide summary descriptions of activities conducted by persons subject to their jurisdiction, which should be in sufficient detail to allow evaluation of the effectiveness of the Management Plan. Parties should, wherever possible, deposit originals or copies of such original reports in a publicly accessible archive to maintain a record of usage; to be used both in any review of the Management Plan and in organising the scientific use of the Area.

Additionally, visit reports should provide detailed information on census data, locations of any new colonies or nests not previously recorded, a brief summary of research findings, and copies of photographs taken of the Area.



8. Supporting Documentation

- Agreement on the Conservation of Albatrosses and Petrels. (2012). *ACAP Species assessment: Southern giant petrel *Macronectes giganteus**. <https://www.acap.aq>
- Australian Antarctic Division. (2014). *Environmental Code of Conduct for Australian Field Activities*
- Blight, D.F., & Oliver, R. L. (1982). Aspects of the geologic history of the Windmill Islands, Antarctica. In C. Craddock (Ed.), *Antarctic Geoscience* (pp. 445–454). University of Wisconsin Press, Madison.
- Cooper, J., Woehler, E.J., & Belbin, L. (2000). Selecting Antarctic Specially Protected Areas: Important Bird Areas can help. *Antarctic Science* 12, 129.
- Cowan, A.N. (1979). Giant petrels at Casey. *Australian Bird Watcher* 8, 66–67.
- Cowan, A.N. (1981). Size variation in the snow petrel. *Notornis* 28, 169–188.
- Creuwels, J. C. S., Stark, J. S., Woehler, E. J., Van Franeker, J. A., & Ribic, C. A. (2005). Monitoring of a southern giant petrel *Macronectes giganteus* population on the Frazier Islands, Wilkes Land, Antarctica. *Polar Biology* 28, 483–493.
- Croxall, J. P., Steele, W. K., McInnes, S. J., & Prince, P. A. (1995). Breeding distribution of the snow petrel *Pagodroma nivea*. *Marine Ornithology* 23, 69–99.
- Department of Climate Change, Energy, the Environment and Water. (2022). *Recovery Plan for Albatrosses and Giant Petrels (2022)*. Commonwealth of Australia. <https://www.dcceew.gov.au/sites/default/files/documents/national-recovery-plan-albatrosses-and-petrels-2022.pdf>
- Garnett, S. T., & Baker, G. B. (2020). *The Action Plan for Australian Birds 2020*. CSIRO Publishing, Clayton.
- Goodwin, I. D. (1993). Holocene deglaciation, sea-level change, and the emergence of the Windmill Islands, Budd Coast, Antarctica. *Quaternary Research* 40, 70–80.
- Ingham, S. E. (1959). Banding of giant petrels by the Australian National Antarctic Research Expeditions, 1955–58. *The Emu* 59, 189–200.
- Jouventin, P., & Weimerskirch, H. (1991). Changes in the population size and demography of southern seabirds: management implications. In C. M. Perrins, J. D. Lebreton, G. J. M. Hirons (Eds.), *Bird population studies: Relevance to conservation and management* (pp. 297–314). Oxford University Press, Oxford.
- Law, P. (1958). Australian coastal exploration in Antarctica. *The Geographical Journal* 124, 151–162.
- Mackinlay, S. J. (1997). *A Management Zoning System for Casey Station and the Windmill Islands, East Antarctica*. Project report for the MASc degree in Environmental Management, University of New South Wales.
- Melick, D. R., Hovenden, M. J., & Seppelt, R. D. (1994). Phytogeography of bryophyte and lichen vegetation in the Windmill Islands, Wilkes Land, Continental Antarctica. *Vegetation* 111, 71–87.
- Murray, M. D. (1972). Banding giant petrels on Frazier Islands, Antarctica. *The Australian Bird Bander* 10, 57–58.
- Murray M. D., & Luders D. J. (1990). Faunistic studies at the Windmill Islands, Wilkes Land, East Antarctica, 1959–80. *ANARE Research notes* 73, Australian Antarctic Division.
- Orton, M. N. (1963). A brief survey of the fauna of the Windmill Islands, Wilkes Land, Antarctica. *The Emu* 6, 14–22.
- Orton, M. N. (1963). Movements of young giant petrels bred in Antarctica. *The Emu* 63, 260.
- Otovic, S., Riley, M., Hay, I., McKinlay, J. O., van den Hoff, J., & Wienecke, B. (2018). The annual cycle of southern giant petrels *Macronectes giganteus* in East Antarctica. *Marine Ornithology* 46, 129–138.
- Patterson D. L., Woehler, E. J., Croxall, J. P., Cooper, J., Poncet, S., & Fraser, W. R. (2008). Breeding distribution and population status of the northern giant petrel *Macronectes halli* and the southern giant petrel *M. giganteus*. *Marine Ornithology* 36, 115–124.
- Paul, E., Stüwe, K., Teasdale, J., & Worley, B. (1995). Structural and metamorphic geology of the Windmill Islands, East Antarctica: field evidence for repeated tectonothermal activity. *Australian Journal of Earth Sciences* 42, 453–469.
- Robertson, R. (1961). Geology of the Windmill Islands, Antarctica. *IGY Bulletin* 43.
- van den Hoff, J. (2020). Environmental constraints on the breeding phenology of giant petrels *Macronectes* spp., with emphasis on southern giant petrels *M. giganteus*. *Marine Ornithology* 48, 33–40.
- van den Hoff, J. (2011). Recoveries of juvenile giant petrels in regions of ocean productivity: Potential implications for population change. *Ecosphere* 2, 1–13.
- van Franeker, J. A., Gavrilo, M., Mehlum, F., Veit, R. R., & Woehler E. J. (1999). Distribution and abundance of the Antarctic Petrel. *Waterbirds* 22, 14–28.
- Wienecke, B., Leaper, R., Hay, I., & van den Hoff, J. (2009). Retrofitting historical data in population studies: southern giant petrels in the Australian Antarctic Territory. *Endangered Species Research* 8, 157–164.
- Woehler, E. J. (1991). Status and conservation of the seabirds of Heard and the McDonald Islands. In J. P. Croxall (Ed.), *Seabird status and conservation: a supplement* (pp. 263–277). ICBP Technical Publication.



- Woehler, E. J. (2006). Status and conservation of the seabirds of Heard Island and the McDonald Islands. In K. Green, K. & E. J. Woehler (Eds.), *Heard Island, Southern Ocean Sentinel* (pp. 128-165). Surrey Beatty & Sons, Chipping Norton.
- Woehler, E. J. (1990). Status of southern giant petrels at Casey. *ANARE News* 61, 18.
- Woehler, E. J., Cooper, J., Croxall, J. P., Fraser, W. R., Kooyman, G. L., Miller, G. D., Nel, D. C., Patterson, D. L., Peter, H-U, Ribic, C. A., Salwicka, K., Trivelpiece, W. Z., & Weimerskirch, H. (2001). *A Statistical Assessment of the Status and Trends of Antarctic and Subantarctic Seabirds*. SCAR/CCAMLR/NSF.
- Woehler E. J., & Croxall J. P. (1997). The status and trends of Antarctic and subantarctic seabirds. *Marine Ornithology* 25, 43-66.
- Woehler, E. J., & Johnstone, G. W. (1991). Status and Conservation of the Seabirds of the Australian Antarctic Territory. In J. P. Croxall (Ed.), *Seabird status and conservation: a supplement* (pp.279-308). ICBP Technical Publication.
- Woehler, E. J., Martin, M. R., & Johnstone, G. W. (1990). The status of southern giant petrels *Macronectes giganteus* at the Frazier Islands, Wilkes Land, East Antarctica. *Corella* 14, 101- 106.
- Woehler, E. J., Riddle M. J. & Ribic C. A. (2003). Long-term population trends in southern giant petrels in East Antarctica. In A. H. L. Huiskes, W. W. C. Gieskes, J. Rozema, R. M. L. Schorno, S. M. van der Vies, & W. Wolff (Eds.), *Antarctic Biology in a global context* (pp. 290-295). Backhuys Publishers, Leiden.
- Woehler, E. J., Slip, D. J., Robertson, L. M., Fullagar, P. J., & Burton, H. R. (1991). The distribution, abundance and status of Adélie penguins *Pygoscelis adeliae* at the Windmill Islands, Wilkes Land, Antarctica. *Marine Ornithology* 19, 1-18.



Appendix 1: Southern giant petrel populations at the Frazier Islands, Antarctica

Note: To the extent possible, each observation below has been validated by a review of the primary data records. The comments indicate where variations from published literature were identified. Further consideration of each observation would be required before using and of these data in analyses.

Date	Nelly Island	Dewart Island	Charlton Island	Source	Comment
21 & 22 Jan 1956	250 N	not visited	not visited	Unpublished data: J Bunt 2008 pers. comm.; Law (1958)	Counted at four separate colonies on higher parts of Nelly Island. Notes say that most nests contained chicks. Many of these nests could be old nests.
24 & 25 Jan 1959	25 N	not visited	not visited	Unpublished data: Bird log Magga Dan–Wilkes & Oates Land Voyage (Jan–Mar 1959); Unpublished data: Biology report for Wilkes, (1959/60– 1960–61), R Penny.	It is not clear whether these observations are all chicks, but Penny comments that some of them were chicks.
15 Dec 1959	60 A	not visited	not visited	Unpublished data: Biology report for Wilkes, Appendix F (1961) M. Orton; Creuwels <i>et al.</i> (2005)	20 other birds were associated with nests.
12 Feb 1960	46 C	not visited	not visited	Unpublished data: Biology report for Wilkes, (1959/60– 1960–61), R Penny; Unpublished data: Biology report for Wilkes, Appendix F (1961) M. Orton.	Orton reports that there were 47 chicks on Nelly Island when according to Penny (1960) there were 46.
15 Dec 1960	not visited	60 N	not visited	Unpublished data: Biology report for Wilkes, Appendix F (1961) M. Orton; Woehler <i>et al.</i> (1990); Creuwels <i>et al.</i> (2005)	20 other birds were associated with nests. Woehler <i>et al.</i> (1990) and Creuwels <i>et al.</i> (2005) have both quoted directly from R. Penny's unpublished report.
22 Mar 1961	34 C	10 C	no data	Unpublished data: Biology report for Wilkes, Appendix F (1961) M. Orton; Unpublished data: Biology: giant petrel Wilkes report (1961); Creuwels <i>et al.</i> (2005)	All chicks observed on Nelly Island were banded. Only a subset of the chicks observed at Dewart Island were banded.
23 Nov 1962	11 eggs	not visited	not visited	Unpublished data: Davis and Mawson station biology log records (1962)	This count appears to have been a subset of the population only.
21 Jan 1964	10 C	not visited	not visited	Unpublished data: Wilkes station report, biology log records (1964), Murray	Birds were observed on the north-east ridge, with about 20 occupied nests in this area, and more on the lower area on the southern side of the ridge. There were many old and uninhabited nests.
7 Mar 1968	72	no data	not visited	Unpublished data: Bird Log Nella Dan (1967–8) Vol. 1; Shaughnessey (1971); Murray & Luders (1990)	This count is the total for all four colonies found on Nelly Island. There is a map of their location in the field notes.
20 & 21 Jan 1972	52 C	53 C	10–20 N (aerial survey only)	Murray (1972)	Land survey primarily for banding. 49 of 52 chicks seen were banded on Nelly Island. 51 of 53 chicks seen were banded on Dewart Island. Please note counts quoted in Murray & Luders (1990) are incorrect.
31 Jan 1974	27 BC	no data	no data	Unpublished data: Biology report for Casey (1974) Jones; Murray & Luders (1990); Woehler <i>et al.</i> (1990); Creuwels <i>et al.</i> (2005)	All peer-reviewed papers appear to have reported an incorrect count of a total of 76, however only 27 chicks were banded in this season.
13–17 Feb 1977	27 C	43 C	no data	Cowan (1979); Murray & Luders (1990); Woehler <i>et al.</i> (1990); Creuwels <i>et al.</i> (2005)	All peer-reviewed papers appear to have reported the wrong count. Cowan is the original reference, where data has gone straight to peer-reviewed publication.
25 Jan 1978	48 C	48 C	6 C	Cowan (1979); Murray & Luders (1990); Woehler <i>et al.</i> (1990); Creuwels <i>et al.</i> (2005)	
30 Jan & 2 Feb 1979	35 (method unknown)	46 (method unknown)	5 (method unknown)	Murray & Luders (1990); Woehler <i>et al.</i> (1990); Creuwels <i>et al.</i> (2005)	The earliest reference to this work is Murray & Luders (1990), but they did not do the original counts. For Nelly, Woehler <i>et al.</i> (1990) and Creuwels <i>et al.</i> (2005) further report the chick count as 37 and not 35 as reported in Murray & Luders (1990). Further work is required to know which figure reflects the correct count. K. de Jong's original data cannot be located.



Date	Nelly Island	Dewart Island	Charlton Island	Source	Comment
18 Jan 1980	43 C	10 (method unknown)	no data	Murray & Luders (1990); Woehler <i>et al.</i> (1990); Creuwels <i>et al.</i> (2005)	Original data not located. Creuwels <i>et al.</i> (2005) note that the census data from Dewart Island and Charlton Island are confused with banding data.
28 & 29 Nov 1983	63 AON	68 AON	9 AON	Unpublished data: Casey station report (1983); Woehler <i>et al.</i> (1990); Creuwels <i>et al.</i> (2005)	Woehler <i>et al.</i> (1990) conducted the survey.
25 & 26 Jan 1984	52 (method unknown)	not visited	not visited	Woehler <i>et al.</i> (1990); Creuwels <i>et al.</i> (2005)	Original data not located.
3 & 6 Mar 1985	64 C	69 C	no data	Woehler <i>et al.</i> (1990); Creuwels <i>et al.</i> (2005)	Original data not located.
14 Feb 1986	59	50	9	Woehler <i>et al.</i> (1990); Creuwels <i>et al.</i> (2005)	Census type cannot be attributed to any island. Original data not located.
23 Dec 1989	73 AON	106 AON	14 AON	Woehler <i>et al.</i> (1990); Creuwels <i>et al.</i> (2005)	Apparently occupied nests (AON) may contain a proportion of failed or non-breeding nest sites (Creuwels <i>et al.</i> 2005).
18 Feb 1996	11 C	not visited	not visited	Creuwels <i>et al.</i> (2005)	
23 Dec 1997	96 AON	104 AON	21 AON	Creuwels <i>et al.</i> (2005)	Apparently occupied nests (AON) may contain a proportion of failed or non-breeding nest sites (Creuwels <i>et al.</i> 2005).
26 Dec 1998	95 AON	103 AON	17 AON	Creuwels <i>et al.</i> (2005)	
14 Mar 1999	66 C	82 C	11 C	Creuwels <i>et al.</i> (2005)	
26 Dec 2001	93 AON	135 AON	20 AON	Creuwels <i>et al.</i> (2005)	
14 Dec 2005	100 ON	149 ON	25 ON	Unpublished data: E.J. Woehler	
12 & 13 Dec 2011	80 ON	130 ON	27 ON	Unpublished data: John van den Hoff	Four automatic cameras installed on Nelly Island

'A' = count of adults, 'AON' = apparently occupied nests, 'BC' = banded chicks, 'C' = count of chicks, 'N' = count of nests, 'ON' = occupied nests



Appendix 2: Biota recorded at the Frazier Islands

	Nelly Island	Dewart Island	Charlton Island
Seabirds			
Adélie penguin (<i>Pygoscelis adeliae</i>)	c.>1400 (2005)		
Antarctic petrel (<i>Thalassoica antarctica</i>)	P		
Cape petrel (<i>Daption capense</i>)	P	P (2001)	P (2001)
Snow petrel (<i>Pagodroma nivea</i>)	P	P	
Southern giant petrel (<i>Macronectes giganteus</i>)	100N (2005)	149N (2005)	25N (2005)
Wilson's storm petrel (<i>Oceanites oceanicus</i>)	P		
South Polar skua (<i>Catharacta maccormicki</i>)	1N (2005)	1N (2005)	
Southern fulmar (<i>Fulmarus glacialisoides</i>)	P	P	
Mammals			
Leopard seal (<i>Hydrurga leptonyx</i>)	X (2001)		
Weddell seal (<i>Leptonychotes weddellii</i>)	X (2001)		
Orca (killer whale: <i>Orcinus orca</i>)	Small pod observed close to island (2005)		
Lichens			
<i>Buellia frigida</i>	R		
<i>Usnea antarctica</i>	R		
<i>Rhizoplaca melanophthalma</i>	R		
<i>Candelariella flava</i>	R	R	
Moss			
<i>Bryum pseudotriquetrum</i>	R		
Algae			
Indeterminate green crust	F		
<i>Prasiola crispa</i>	F		
<i>Chlorococcum</i> sp.	F		
<i>Chloromonas polyptera</i>	F		
<i>Chlorosarcina antarctica</i>	R		
<i>Prasiococcus calcarius</i>	F		

Census data for breeding seabirds provided where available. 'P' indicates recorded breeding seabirds but no census data available, 2001 indicates observations in December 2001 visit, 2005 indicates observations from December 2005 visit. 'X' indicates recorded on or near the island, 'N' a count of nests, 'R' rare, and 'F' frequent. Data compiled from records held by the Australian Antarctic Data Centre, ANARE records 1968, Appendix 1, Melick *et al.* 1994, Seppelt, R. pers. comm., Ling, H. pers. comm., Woehler, E.J. pers. comm., and Woehler, E.J. and Olivier, F. unpublished data (December 2001), Woehler, E.J. unpublished data (December 2005).



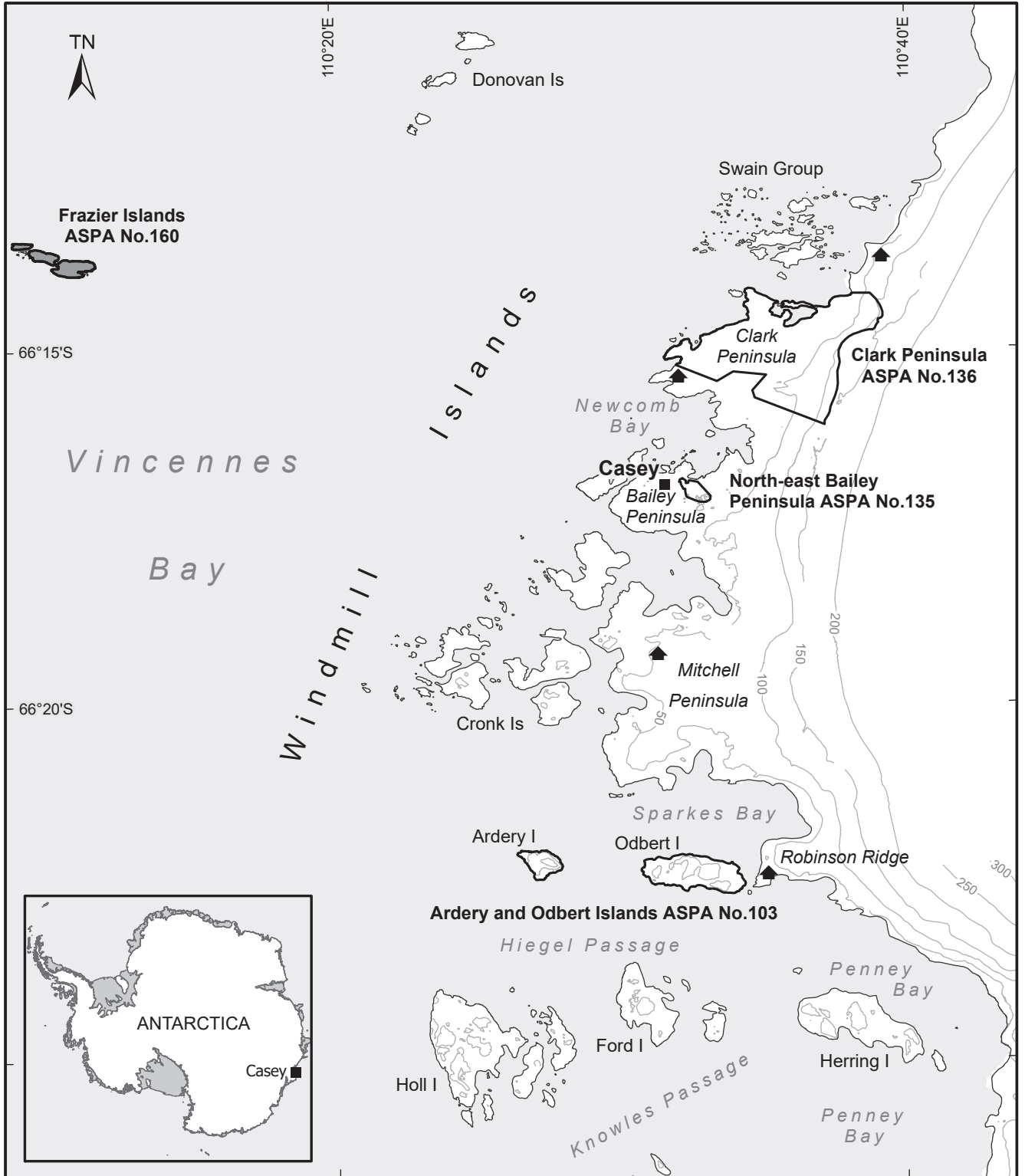
Appendix 3: Minimum wildlife approach distances

The minimum (closest) approach distances, as set out below, are to be maintained when approaching any wildlife on, or in the vicinity of the Frazier Islands unless a closer approach distance is authorised in a permit. These distances are a guide, and should an activity disturb wildlife, a greater distance is to be maintained.

Species	Approach distance (on foot)
Giant petrels	100 m
Other penguins in colonies Moulting penguins Seals with pups Seal pups on their own, Prions and petrels on nest, South polar skua on nest	30 m
Penguins on sea ice Non-breeding adult seals	5 m



Map A: Antarctic Specially Protected Areas, Windmill Islands, East Antarctica



- Station
- ▲ Refuge
- Coastline
- Contour (50 metre interval)
- ▭ ASPA boundary
- Frazier Islands ASPA No. 160



Horizontal Datum: WGS84
Projection: UTM Zone 49

Map available at: <https://data.aad.gov.au/aadc/mapcat/>
Produced by the Australian Antarctic Data Centre
February 2024, Map Catalogue No. 16150
© Commonwealth of Australia 2024





Map B: Antarctic Specially Protected Area No. 160, Frazier Islands Topography and Bird Distribution



- Coastline**
- Coastline
 - Contour (5m interval)
 - Cliff
 - Ice-free area
 - ASPA boundary
- Bird colonies**
- Adélie penguin
 - Antarctic petrel
 - Cape petrel
 - Snow petrel
 - South polar skua
 - Southern fulmar
 - Southern giant petrel
 - Wilson's storm petrel

0 50 100 200 300 400
Metres
Horizontal Datum: WGS84
Projection: UTM Zone 49

Map available at: <https://data.aad.gov.au/aadc/mapcat/>
Produced by the Australian Antarctic Data Centre
February 2024, Map Catalogue No. 16151
© Commonwealth of Australia 2024

