

Management Plan for Antarctic Specially Protected Area No. 136

CLARK PENINSULA, BUDD COAST, WILKES LAND, EAST ANTARCTICA

Introduction

Antarctic Specially Protected Area (ASPAs) No. 136 is located on Clark Peninsula, Wilkes Land at 66°15'S, 110°36'E (see Map A).

The Clark Peninsula was originally designated as Site of Special Scientific Interest (SSSI) No. 17 under Recommendation XIII-8 (1985). A revised management plan for SSSI 17 was adopted under Measure 1 (2000). The area was redesignated and renumbered as ASPA 136 under Decision 1 (2002). Revised ASPA management plans were adopted under Measure 1 (2006) and Measure 7 (2009).

ASPAs 136 is primarily designated to protect the Clark Peninsula's largely undisturbed terrestrial ecosystem. This ecosystem possesses one of the most extensive Antarctic flora communities outside of the Antarctic Peninsula and significant breeding populations of Adélie penguins (*Pygoscelis adeliae*) and south polar skuas (*Catharacta maccormicki*).

ASPAs 136 is approximately 9.4 km² and is located approximately 5km north-west of Casey station. Scientific research within the Area has focused on plant communities and long term population studies of Adélie penguin colonies. The protection of this flora and fauna within the Area allows for valuable comparison with similar plant communities and penguin colonies closer to Casey station which are subject to greater levels of human disturbance.

1. Description of values to be protected

ASPAs 136 is primarily designated to protect Clark Peninsula's largely undisturbed terrestrial ecosystem.

Clark Peninsula's ecosystem possesses one of the most extensive Antarctic flora communities outside of the Antarctic Peninsula. Its flora communities form a continuum of ecological variation along environmental gradients of soil moisture, soil chemistry and microclimate.

Clark Peninsula's ecosystem possesses intrinsic ecological value and scientific importance, particularly in the fields of botany, microbiology, soil science and glacial geomorphology. Ecosystem monitoring provides critical baseline data with which to analyse changes in Antarctic bryophyte, macrolichen and cryptogam communities. The cryptogam communities are also support studies into short-term microclimate fluctuations and long-term climate change in the region since deglaciation some 5000-8000 years ago.

Clark Peninsula possesses relatively undisturbed breeding populations of Adélie penguin (*Pygoscelis adeliae*) and South Polar skuas (*Catharacta maccormicki*). The significant populations of Adélie penguins at Whitney Point and Blakeney Point have been studied since 1959. These studies provide valuable comparative data for measuring human impacts upon the Adélie penguin colonies located near Casey Station. Breeding populations of Wilson's storm petrels (*Oceanites oceanicus*) and snow petrels (*Pagodroma nivea*) are present in most ice-free areas.

Clark Peninsula possesses intrinsic geological value. It provides a visible time sequence of the emergence of the Windmill Islands from the sea since the Holocene deglaciation.

The Area requires protection because of its ecological importance, its significant scientific value and the limited geographical extent of the plant communities. The Area is vulnerable to disturbance from trampling, scientific sampling, pollution and alien introductions, while being sufficiently distant from Casey station to

avoid immediate impacts and disturbances from activities undertaken there. It is because of the scientific and ecological values, and the usage of the Area for long term monitoring, that it should continue to be protected.

2. Aims and objectives

Management at the Clark Peninsula aims to:

- avoid degradation of, or substantial risk to, the values of the Area by minimising human disturbance;
- protect the ecosystem as a reference area for the purpose of comparative studies and to assess direct and indirect effects of Casey station;
- prevent the introduction of non-native species to the Area; and
- prevent 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:

- information about the Area (including its boundaries and the special restrictions that apply within it) and copies of the management plan shall be made available at: the abandoned Wilkes station; Wilkes Hilton refuge hut; Jack's Donga refuge hut; Casey station; and on ships that visit the region;
- signs shall be erected on the Area boundary to prevent inadvertent entry;
- markers, signs or structures erected within the Area for scientific or management purposes shall be secured and maintained in good condition and removed when no longer required;
- visits shall be made to the Area as necessary (where practicable, not less than once every five years) to assess whether the Area continues to serve the purposes for which it was designated and to ensure that management activities are adequate; and
- the management plan shall be reviewed at least every five years and updated as required.

4. Period of designation

Designated for an indefinite period.

5. Maps

- Map A: Antarctic Specially Protected Areas, Windmill Islands, East Antarctica
- Map B: Antarctic Specially Protected Area No. 136, Clark Peninsula, Windmill Islands, East Antarctica – Topography and distribution of birds
- Map C: Antarctic Specially Protected Area No. 136, Clark Peninsula, Windmill Islands, East Antarctica – Distribution of major vegetation types
- Map D: Antarctic Specially Protected Area No. 136, Clark Peninsula, Windmill Islands, East Antarctica – Geology

6. Description of the Area

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

General description

Clark Peninsula (66°15'S 110°36'E) is located on the northern coastline of Newcomb Bay at the eastern end of Vincennes Bay on Budd Coast, Wilkes Land (see Map A). It is an area of permanent ice, snow fields and rocky exposures. It is approximately 3.5 km wide and 4.5 km long.

The ASPA itself covers an area of 9.4 km² and comprises all of the land on Clark Peninsula north of the southern boundary line connecting the east side of Powell Cove at 66°15'15" S 110°31'59" E, through 66°15'29" S 110°33'26" E, 66°15'21" S 110°34'00" E, 66°15'24" S 110°35'09" E, 66°15'37" S 110°34'40" E, 66°15'43" S 110°34'45" E to a point to the east-south-east on the Løken Moraines at 66°16'06" S 110°37'11" E. The eastern boundary is the westernmost limit of the Løken Moraines as far north as a point east of Blakeney Point at 66°14'15" S 110°38'46" E and thence to the coastline at 66°14'15" S 110°38'06" E, returning along the coast to the point of origin. The boundary of the ASPA is indicated on Maps A, B, C and D.

Geology

Clark Peninsula possesses intrinsic geological value. It provides a visible time sequence of the emergence of the Windmill Islands from the coastal sea since the Holocene deglaciation. It is comprised of low lying, rounded, ice-free rocky outcrops. Its intervening valleys are filled with permanent snow, ice or glacial moraine and exfoliated debris. It rises eastward to the Løken Moraines where it reaches an approximate altitude of 130 metres above sea level.

Outcrops of metapelitic rock and leucocratic granite gneiss predominate. The metapelitic rock is generally foliated, migmatized and fine to medium grained. Mineralogy of the metapelitic rock includes biotite-sillimanite and biotite-sillimanite±cordierite. The sillimanite is strongly lineated in the foliation and the cordierite is generally pinnitized.

The early granite gneiss is white, medium grained and foliated. It comprises two felsic intermediate intrusions which predate and/or are synchronous with the deformation in the Windmill Islands. The larger intrusion, which occupies most of central Clark Peninsula, is a quartz, K-feldspar, biotite, white mica and opaque-bearing granitic augen gneiss. Small outcrops of mafics and metapsammite occur. The rock beds lie in a south-west to north-east orientation. The surface geology of Clark Peninsula is depicted at Map D.

Islands of the Windmill Islands group are located offshore from the ASPA. The Windmill Islands represent one of the easternmost outcrops of a Mesoproterozoic low-pressure granulite facies terrain that extends westward to the Bunger Hills and the Archaean complexes in Princess Elizabeth Land and eastward to Dumont D'Urville and Commonwealth Bay. The rocks of the Windmill Islands group comprise a series of migmatitic metapelites and metapsammites interlayered with mafic to ultramafic and felsic sequences with rare calc-silicates, large partial melt bodies (Windmill Island supacrustals), undeformed granite, charnockite, gabbro, pegmatite, aplites and late dolerite dykes.

Gravels and soils appear to be derived from marine sediments deposited in the Pleistocene. Subfossil penguin colonies are common at Whitney Point and Blakeney Point and along the central ridge. Around the abandoned penguin colonies the soils are pebbly and rich in organic matter derived from penguin guano. Small lakes, pools and melt streams are prevalent in summer. The distribution of lakes on Clark Peninsula is depicted at Map B.

Flora

Clark Peninsula's comparatively mild temperatures facilitated the development of a complex, diverse and stable vegetation cover. The ice-free rocky exposures support an extensive cover of lichen. Mosses predominate in lower lying areas. Factors responsible for the distribution of vegetation include wind exposure, the availability of water and the location of abandoned penguin colonies.

The broader Windmill Hills region possesses 4 species of bryophytes, 30 species of macrolichens, 44 species of cyanobacteria and 75 species of algae. Many of these taxa are known to inhabit Clark Peninsula. Well developed lichen communities of *Umbilicaria decussata*, *Pseudephebe minuscula*, *Usnea sphacelata* communities predominate in the northeast. Further inland *U. sphacelata* predominates and forms extensive carpets over the metamorphic rocks and gravel beds.

Bryophyte communities of *Bryum pseudotriquetrum*, *Schistidium antarctici* and *Ceratodon purpureus* predominate in moist, sheltered sites where they form closed stands up to 300mm in depth. The lichens

Xanthoria mawsonii, *Candelariella flava* and *Buellia frigidida* predominate around the Adélie penguin colonies of the north-western and western coasts. *Usnea. decussata* and *U. sphacelata* predominate around the abandoned penguin colonies of the southern coastal areas, and *U. decussata*, *P. minuscula*, *B. soledians* and *B. frigid* predominate in the centre of Clark Peninsula alongside smaller assemblages of *Pleopsidium chlorophanum*. Clark Peninsula's microflora includes algae (with *Botrydiopsis constricta* and *Chlorella conglomerata* predominating), bacteria, yeasts and filamentous fungi. Flora distributions on the Clark Peninsula are depicted at Map C.

Fauna

Adélie penguin (*Pygoscelis adeliae*) colonies are located on Whitney Point and Blakeney Point. In 2012-13 Whitney Point possessed approximately 11,000 occupied nests and Blakeney Point possessed approximately 4,000 occupied nests. The breeding populations of these two sites have increased since research commenced in 1959-60. The breeding population of Adélie penguins at nearby Shirley Island (located 3 km southwest of Casey station) has remained stable since 1968. Wilson's storm petrels (*Oceanites oceanicus*), South Polar skuas (*Catharacta maccormicki*) and Snow petrels (*Pagodroma nivea*) breed within the ASPA. Terrestrial invertebrate microfauna include protozoa, nematodes, mites, rotifers and tardigrades. The invertebrates are mainly confined to moss beds, lichen stands and moist soils. Fauna distributions on the Clark Peninsula are depicted on Map B.

Climate

Clark Peninsula and the Windmill Islands possess a dry, frigid Antarctic climate. Meteorological data collected at nearby Casey station indicates that the Clark Peninsula's mean temperature range is 0.3°C to -14.9°C. Temperature extremes of 9.2°C and -41°C have been recorded. Precipitation occurs as snow at approximately 195mm rainfall equivalent annually. Approximately 96 days of gale-force winds are experienced annually. These are predominantly easterly in direction and emanate from the polar icecap. Snow gathers in the lee of rocky exposures and in substratum depressions.

Environmental domains and Antarctic Conservation Biogeographic Regions

Based on the Environmental Domains Analysis for Antarctica (Resolution 3 (2008)), Clark Peninsula is located within Environment D *East Antarctic coastal geologic*. Based on the Antarctic Conservation Biogeographic Regions (Resolution 6 (2012)) the Frazier Islands are located within Biogeographic Region 7 *East Antarctica*.

6(ii) Access to the Area

The Area may be accessed from Casey station by over-snow vehicle or small boat in accordance with section 7(ii) of this management plan.

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

A dilapidated wood and canvas hide known as "the Wannigan" is located on the Lower Snow Slope (unofficial place name) on the western facing slope of Whitney Point. It was constructed in 1959 by R. L. Penney to facilitate behavioural studies of Adélie penguins.

The Area possesses several survey markers and several boundary markers delineate the Area's southern boundary.

Three automated camera facilities are located within the Area. Their purpose is to monitor long term variations in the breeding parameters of Adélie penguins. They form part of an ongoing automated camera network across east Antarctica. They are located at Whitney Point (66°15'5.70"S 110°31'50.10"E and 66° 15' 3.20"S 110°32'2.60"E) and Blakeney Point (66° 14'32.20"S 110°34'53.20"E).

Several structures are also located adjacent to the Area. At its closest point, the Area's boundary is located approximately:

- 3.5 km northeast of Casey station (66°17' S 110°31' E);
- 1.0 km north of the former Wilkes station and 0.2 km north of Wilkes Hilton refuge hut (66°15'25.6"S 110°31'32.2"E);
- 1.5 km southwest of Jack's Donga refuge hut (66°13.7'S 110°39.2'E).

6(iv) Location of other Protected Areas in the vicinity

Other protected areas within 50 km include (see Map A):

- Antarctic Specially Protected Area 135, Northeast Bailey Peninsula (66°17'S 110°33'E): located 2.5 km south-west of Clark Peninsula, across Newcomb Bay, adjacent to Australia's Casey station;
- Antarctic Specially Protected Area 103, Ardery Island (66°22'S, 110°27'E), and Odbert Island (66°22'S, 110°33'E) Budd Coast: located in Vincennes Bay, 13 km south of the former Wilkes station; and
- Antarctic Specially Protected Area 160, Frazier Islands (66°13'S 110°11'E): located approximately 16 km to the north-west in Vincennes Bay.

6(v) Special zones within the Area

A Transit Zone is located north-east of a line that runs north-west from the ASPA boundary at 110°38'34"E, 66°14'47"S to 110°36'54"E, 66°14'31"S (see Map B). Over-snow vehicles may pass through the Transit Zone to undertake scientific or management activities at the edge of the sea ice. To prevent disturbance to vegetation and relic penguin colonies, over-snow vehicles must only travel on ice or snow covered ground. Use of the Transit Zone may be subject to specific permit conditions.

7. Terms and conditions for entry permits

7(i) General permit conditions

Entry into 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 permit is issued only for compelling scientific reasons that cannot be served elsewhere, in particular for the scientific study of the avifauna and ecosystem of the Area, or for essential management purposes consistent with the objectives of this management plan, such as inspection, management or review;
- the actions permitted will not jeopardise the values of the Area or other permitted activities;
- the actions permitted are in accordance with this Management Plan;
- the permit, or an authorised copy, shall be carried within the Area;
- a visit report will be supplied to the authority that approved the permit, as soon as practicable after the visit to the ASPA has been completed, but no later than six months after the visit has occurred;
- permits shall be issued for a finite period;
- permit holders shall notify the appropriate authority of any activities or measures undertaken that were not authorised by the permit; and
- all census and GPS data shall be made available to the permitting authority and to the Parties responsible for the development of the management plan.

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

The Area should only be accessed via:

- Wilkes Hilton refuge hut in the south-west;
- Jack's Donga refuge hut in the north-east; or

- a descent of the western slope of Løken Moraines in the vicinity east of Stevenson Cove following a traverse from Casey station to Jack's Donga refuge hut.

The abandoned Wilkes station may be accessed from Casey station via a cane marked route to the south of the ASPA's southern boundary. On approaching the ASPA from Casey station, in the areas east and north-east of Noonan Cove, a section of the route is split providing two alternative routes (see Map B). The more southerly route should be used when ice conditions near Noonan Cove allow for safe access. When access via the more southerly route is not possible, the more northerly route should be used. As the Casey–Wilkes route is very close to the ASPA boundary, pedestrian and vehicular traffic should take care not to stray northward into the ASPA.

Wilkes Station may also be accessed via small boat from Casey station. A designated small boat landing site is located in Powell Cove at 110°31'29"E 66°15'22"S.

Access to the sea ice by over-snow vehicles is allowed within the Transit Zone that is located north-east of a line that runs north-west from the ASPA boundary at the Løken Moraines at 110°38'34"E 66°14'47"S to the coastline at 110°36'54"E 66°14'31"S. All vehicles must only travel on ice or snow covered ground to avoid disturbance to vegetation and relic penguin colonies.

Vehicles must not access the remainder of the ASPA except in emergencies. Access to the ASPA in all other circumstances should be made on foot. Pedestrian traffic in the ASPA should be kept to the minimum necessary to achieve the objectives of permitted activities. To prevent damage to sensitive soils, plant and algae communities and water quality, visitors must avoid walking on visible vegetation and moist ground.

Helicopters are not allowed to land within the ASPA, except in emergencies or for essential management activities. The operation of aircraft over the ASPA should be carried out in accordance with the Resolution 2 (2004) *Guidelines for the Operation of Aircraft Near Concentrations of Birds in Antarctica*.

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

The following activities may be conducted in the Area:

- compelling scientific research, which cannot be undertaken elsewhere and which will not jeopardise the avifauna or the ecosystem of the Area; and
- essential management activities, including monitoring.

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

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

Any temporary structure established in the Area must be:

- clearly identified by country, name of the principal agency, date of installation and date of expected removal;
- first cleaned of organisms, propagules (e.g. seeds, eggs) and non-sterile soil;
- made of materials that can withstand Antarctic conditions and pose minimal contamination risk to the Area; 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 not allowed within the Area. Field parties should camp at either the Wilkes Hilton refuge hut or at Jack's Donga refuge hut (see Map A).

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

The following restrictions apply:

- no living animals, plant materials, microorganisms or non-sterile soils are to be deliberately introduced into the Area. Precautions must be taken to prevent the accidental introduction of living animals, plant materials, microorganisms or non-sterile soils into the Area;
- no herbicides are to be taken into the Area unless needed to mitigate any non-natives species incursions. Such chemicals must only be used as a last resort and controlled by permit conditions. Any other chemicals (including radionuclides or stable isotopes which may be introduced for scientific or management purposes specified in a permit) will be removed from the Area at or before the conclusion of the activity for which the permit was granted;
- 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 removed from the Area at or before the conclusion of the permitted activity. Permanent or semi-permanent fuel depots are not permitted;
- all material introduced to the Area shall be for a stated time period only and if left unattended, labelled with a country identifier. All material introduced to the Area must be removed at or before the conclusion of that stated time period, and must be stored and handled in a manner that will minimise the risk of environment impacts;
- no poultry products, including dried food containing egg powder, are to be taken into the Area; and
- no depots of food or other supplies are to be left within the Area beyond the time period for which they are required.

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

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

7(viii) Collection or removal of materials not brought into the Area by the permit holder

Material may only be collected or removed from the Area as authorised under a permit and should be limited to the minimum necessary to meet scientific or management needs.

7(ix) Disposal of waste

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

7(x) Measures that may be necessary to ensure that the aims and objectives of the management plan can continue to be met

Permits may be granted to allow monitoring and Area management and inspection activities which may involve:

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

Any specific sites of long-term monitoring shall be appropriately marked and GPS coordinates obtained for lodgement with the Antarctic Data Directory System through the appropriate national authority.

Ornithological research shall be limited to activities that, where practicable, are non-invasive and non-disruptive to the breeding birds present within the Area. Invasive and/or disruptive research activities shall only be authorised if they will have no effect or only a temporary and transient effect on the population.

Visitors shall take special precautions against the introduction of non-native species into the Area; this includes the transfer of species from other locations in Antarctica, particularly other Antarctic Conservation Biogeographic Regions. Of particular concern are pathogenic, microbial or vegetation introductions sourced from soils, flora or fauna at other Antarctic sites (including research stations). To minimise the risk of introductions, before entering the Area all visitors shall thoroughly clean their footwear, sampling equipment, markers etc.

7(xi) Requirements for reports

Parties shall ensure that the principal permit holder for each permit issued submits, to the appropriate national authority, a report on activities undertaken.

Such reports shall 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 shall maintain a record of such activities.

In the Annual Exchange of Information, Parties shall provide summary descriptions of activities conducted by persons subject to their jurisdiction, in sufficient detail to allow an evaluation of the effectiveness of the management plan.

Parties shall, wherever possible, deposit original reports or copies of such in a publicly accessible archive to maintain a record of usage for the benefit of a review of the management plan and the organisation of science in the Area.

A copy of the report shall be forwarded to the Party responsible for the development of the management plan.

Additionally, visit reports shall 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 in the Area.

8. Supporting documentation

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

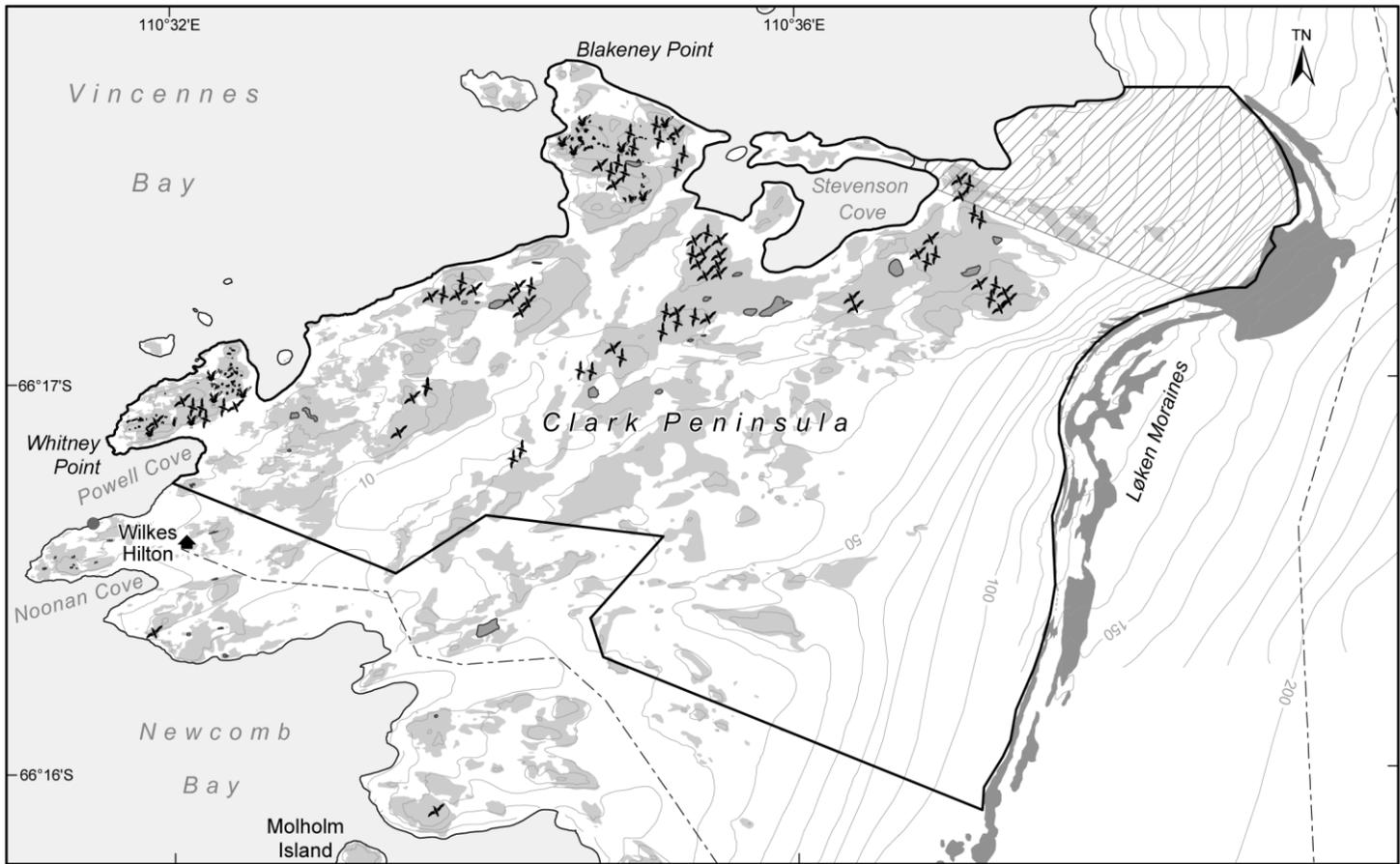


- Station ▲ Refuge
- Contour (50 metre interval)
- ASPA boundary
- Clark Peninsula ASPA No. 136

0 2 4 6 Km
 Horizontal Datum: WGS84
 Projection: UTM Zone 49

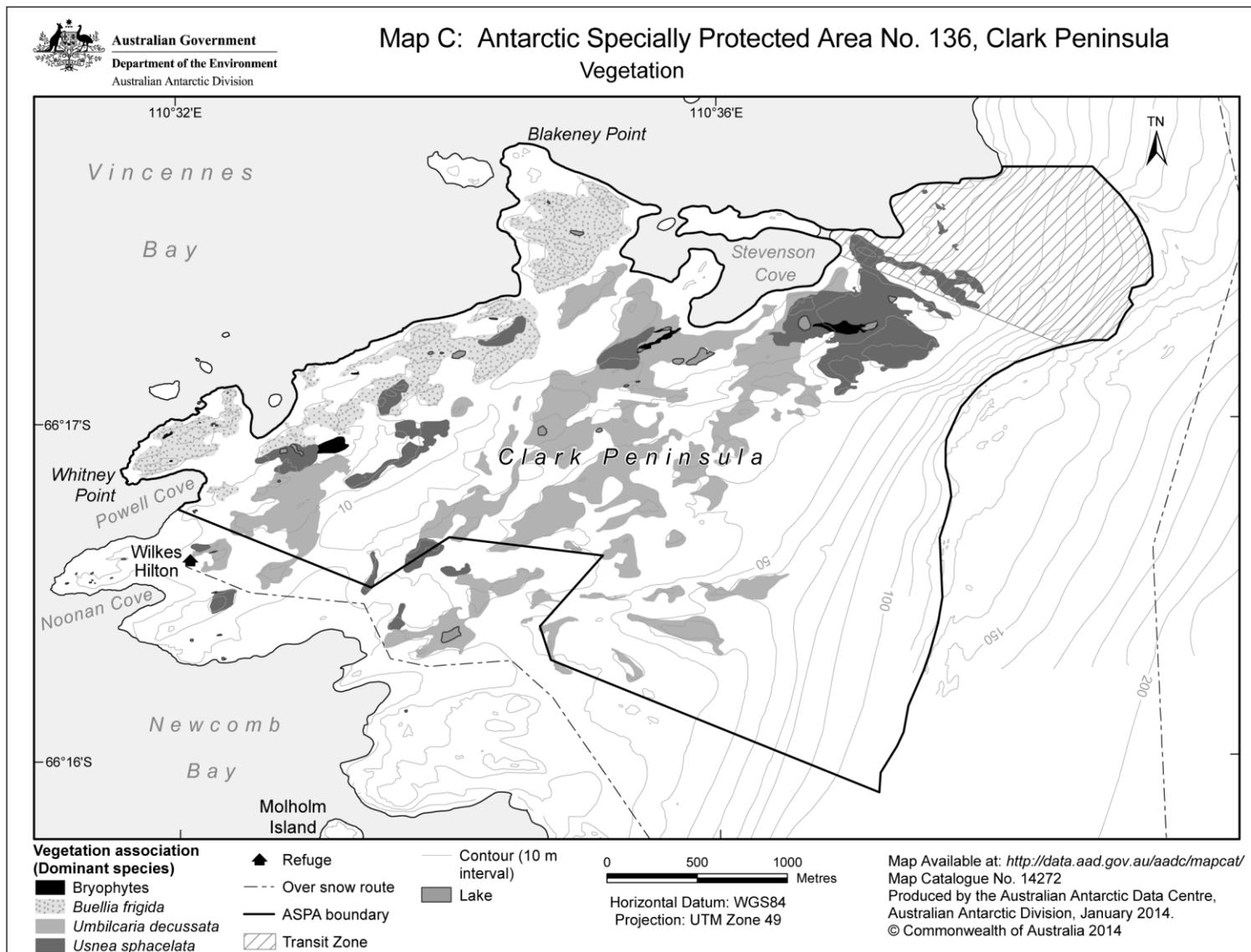
Map Available at: <http://data.aad.gov.au/aadc/mapcat/>
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Map B: Antarctic Specially Protected Area No. 136, Clark Peninsula
 Topography and Bird Distribution



- | | | | |
|---------------------|-------------------------|---------------------------|-------------------------|
| ▲ Refuge | ● Adélie penguin colony | — Contour (10 m interval) | 0 500 1000 Metres |
| ● Boat landing site | Nesting site | ■ Lake | Horizontal Datum: WGS84 |
| --- Over snow route | ✕ Snow petrel | ■ Moraine | Projection: UTM Zone 49 |
| — ASPA boundary | ✕ South polar skua | ■ Ice-free area | |
| ▨ Transit Zone | † Wilsons storm petrel | | |

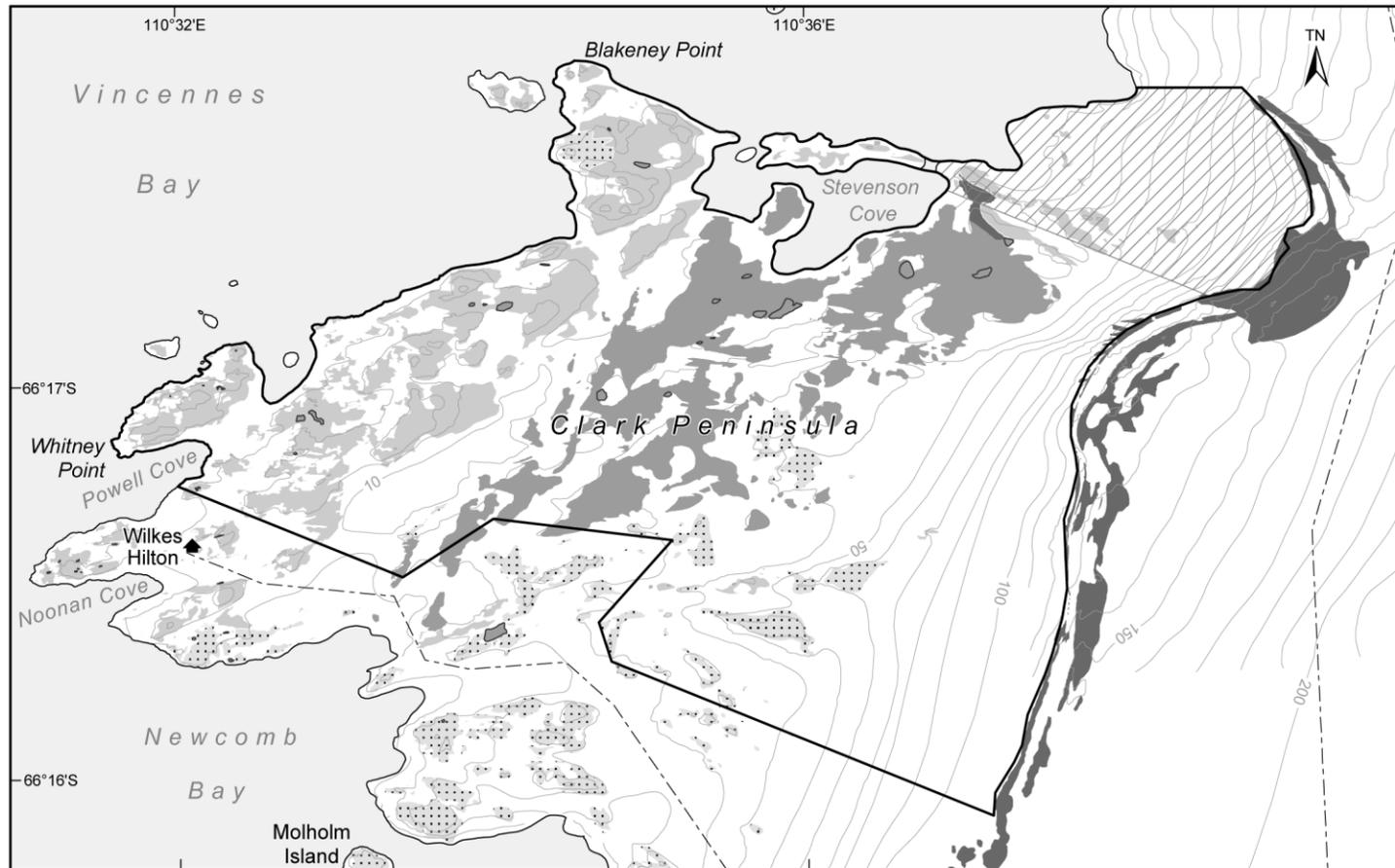
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Map D: Antarctic Specially Protected Area No. 136, Clark Peninsula Geology



Lithology	▲ Refuge	— Contour (10 m interval)	0 500 1000 Metres
■ Early granite gneiss	--- Over snow route	■ Lake	Horizontal Datum: WGS84
● Late granite gneiss	— ASPA boundary		Projection: UTM Zone 49
■ Moraine	▨ Transit Zone		
■ Pelitic and psammitic gneiss			

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