

AUSTRALIAN ANTARCTIC TERRITORY



WELCH ISLAND

Welch Island was discovered on 14 February, 1931, by BANZARE under Sir Douglas Mawson. It was named after B. F. Welch, second engineer on the R. R. S. *Discovery*.

THE ADELIE PENGUINS AT BECHERVAISE, WELCH, VERNER AND PETERSEN ISLANDS HOLME BAY, MAC.ROBERTSON LAND

In excess of 22,000 pairs of Adélie penguins breed annually on rocky islands within a 10 km radius of Mawson station. Of these approximately 16,000 pairs breed on Welch Island, distributed among multiple sub-colonies on the north-western corner of the island. A smaller 2,000 breeding-pair colony is found on the north-eastern tip of Béchervaise Island and is the site of a long-term monitoring study being carried out by scientists at the AAD.

Adélie penguins spend each winter at sea foraging within the pack ice zone and return to their breeding colonies in October to mate, incubate their eggs and rear their offspring through the summer months. Chicks fledge during late February and March during which time adult birds carry out their moult before departing to sea for the winter months.

The foraging range of breeding Adélie penguins is restricted in summer by the need for the birds to return regularly to their nests to carry out incubation duties and then to feed their offspring. Adult birds travel up to 350 km from their colonies to feed during their multi-day trips in the incubation period. Once the chicks have hatched foraging trips are further limited by requirements for the provision of regular meals for the growing young, and birds must find sufficient food for themselves and their offspring within a radius of approximately 120 km of their colonies.

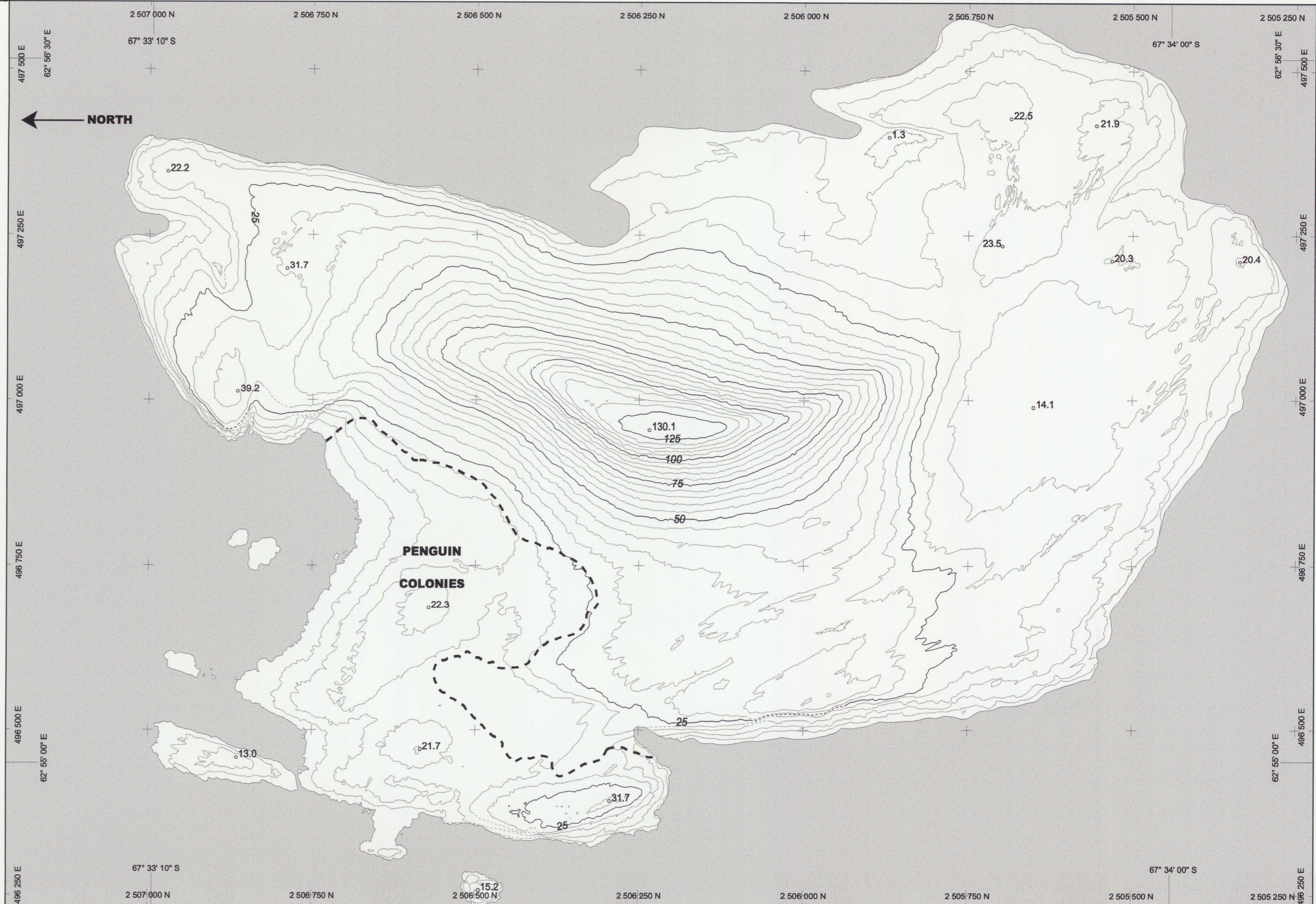
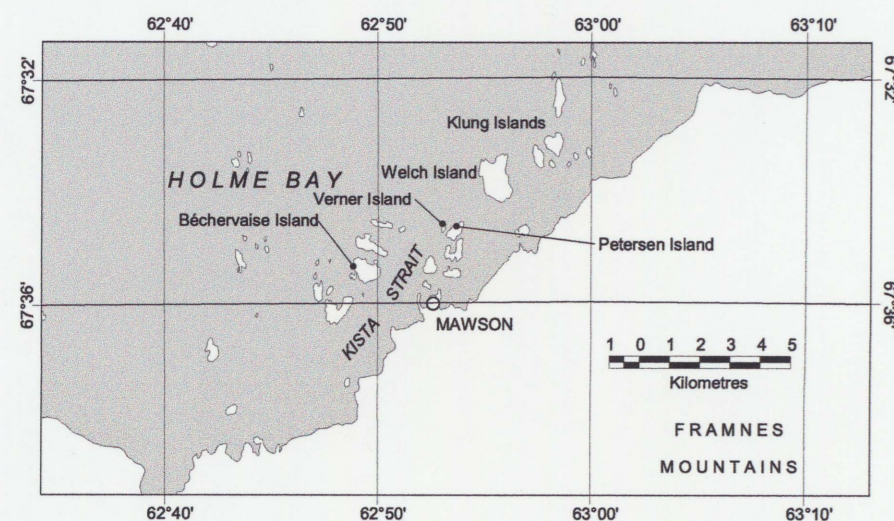
High levels of breeding success are dependent on abundant food resources during the breeding season, particularly Antarctic krill, *Euphausia superba*. When prey are scarce penguins tend to forage further afield and take longer to complete each foraging trip. They will forage to meet their own energy requirements but their chicks will die of starvation if food supplies are not sufficient to enable the adults to return to the colony at regular intervals.

Study of the relationships between aspects of Adélie penguin foraging ecology and breeding success are important to further our understanding of Antarctic predator-prey relationships within an ecosystem context. Monitoring programmes are presently in place to determine the importance of krill in the diet of predator species such as Adélie penguins to better manage the future of krill fisheries in the Southern Ocean and to prevent over-exploitation of such resources.

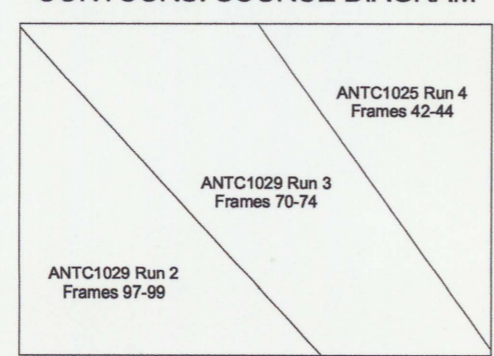
The Adélie penguin colony at Béchervaise Island has been the site of such a long-term monitoring programme since the summer of 1990-91. This programme which utilises an automated weighing and recording system to log birds in and out of the colony is intended to continue indefinitely as part of the Convention for the Conservation of Marine Living Resources (CCAMLR) Ecosystem Monitoring Program (CEMP). The programme aims to monitor certain biological variables of selected species of penguins and seals with the objective of detecting changes in the marine ecosystem and attributing such changes to natural or man made (harvesting) causes.

Studies undertaken at Béchervaise Island have facilitated the understanding of a number of factors affecting breeding success. Adélie penguin diet composition has been shown to vary greatly between seasons, and those years in which krill is abundant in the diet tend to be associated with highest breeding success. It has become obvious that ample food supplies during the early stages of chick rearing are of vital importance to the survival and growth of offspring. Variations in foraging behaviour and dietary preference between males and females and the relationship of these variations to the availabilities of both local and shelf-edge prey species have become apparent. Body condition of parent birds appears likely to be a driving force in the allocation of foraging effort between provisioning of chicks and self-maintenance. Foraging trip duration (particularly in combination with meal mass) has recently been identified as a sensitive indicator of colony productivity in terms of chick growth and survival.

Breeding success is often low in years in which the fast-ice persists longer than usual. The penguins seem to have trouble finding krill in such seasons, such as in 1994-95 when all the chicks starved to death. Why persistence of fast ice should affect the ability of the penguins to find food when they are foraging well north of the fast-ice region is unclear. However, it is possible that the same oceanographic process that affects the availability of krill in the Mawson region may also influence the timing of fast-ice breakout. Additional sea-based studies integrated with the penguin monitoring programme are underway to increase our understanding of the relationships between predators and their prey, krill stocks and recruitment, winter and summer ice extent, and oceanographic changes.

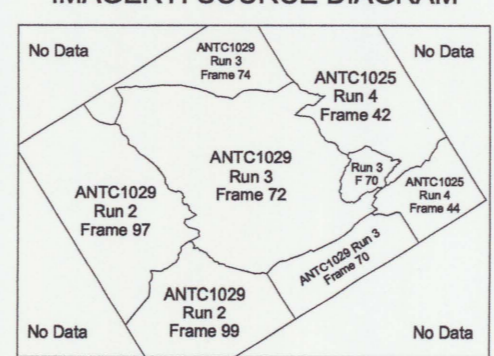


CONTOURS: SOURCE DIAGRAM

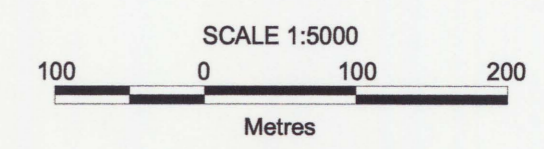


This diagram shows the film identifiers, run and frame numbers of the ANARE aerial photography from which lakes, rock edges and spot height elevations shown on this map have been derived.

IMAGERY: SOURCE DIAGRAM



This diagram shows the film identifiers, run and frame numbers of the ANARE aerial photography which constitute the imagery shown on this map. The image is a mosaic of several aerial photographs each of which has been scanned and digitally processed to form an orthophoto. The aerial photography was acquired from a Zeiss UMK 1318 metric camera. The film format is 120mm by 166mm.



For further information contact:
Australian Antarctic Division
Channel Highway
Kingston
Tasmania 7050
Telephone: (03) 6232 3209
Facsimile: (03) 6232 3288
Internet: <http://www.antdiv.gov.au>
Email: mapping@antdiv.gov.au
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LEGEND

Index contour
Approx. index contour
Intermediate contour
Approx. intermediate contour
Depression contour
Boundary of penguin colony	- - - -
Spot height elevation	o 5.6