# Title of existing research project

The influence of foraging behaviour on long-term survival of newly weaned southern elephant seals

# Source of funding for existing project

Australian Antarctic Division, Institute for Marine and Antarctic Studies (University of Tasmania), Environmental Research Council, European Economic Community

# Details of existing research project

The movements, foraging areas and foraging behaviour of naïve (recently weaned) southern elephant seal pups during their first trip to sea were investigated. Satellite-linked data loggers that recorded locations and dive metrics were deployed on a total of 72 pups at Macquarie Island during their post-weaning fast in December 1995, 1996, 1999 and 2000 (Biuw et al. 2003). These pups were also permanently marked for future identification as part of a long-term demographic study, enabling the long-term survival of the animals to be related to their initial foraging trips. We know that first year survival of elephant seals is quite low (~70%) (McMahon et al. 2000, 2003, 2005), and that adults have high fidelity to their foraging sites (Bradshaw et al. 2004). These have profound implications for the persistence of the species. For example, if a preferred area is to become less favourable what is the capacity of individuals to find new foraging locations. The strategies used by seals in their first trip to sea are likely to heavily influence adult strategies, and this study was designed to test the hypotheses that: (i) the naïve seals disperse at random from the natal island and only find food by chance and (ii) some regions of the ocean offer better foraging (and therefore higher survival) than other regions. Together these will determine which areas are successful and become fixed in the adult population.

# Title of extended research project\*

How does the first foraging trip of naïve southern elephant seal pups influence their long-term survival?

# Details of extended research project

Southern elephant seals are one of the key marine predators in the sub-Antarctic and Antarctic region that play an important role in the structure and dynamics of the Southern Ocean ecosystem. This part of the project relies on the now available data on long-term survival of the tracked pups from the existing research project, which was not available at the time of the original tracking work, to answer the fundamental question of whether weaner use of foraging areas influences their long-term survival. Since the seals from the existing project were tagged when they were pups, researchers have subsequently been doing resights of marked animals every year at Macquarie Island. These resights provide important demographic and survival data which will be used to in this extended project. This extended project aims to investigate the relationship between the seals’ first foraging trips as pups (movement and dive behaviour) to their future survival ~ 20 years later. In essence, this research project is multi-pronged – we want to find out,

1. where did the seals go on their first foraging trip? (are there hotspots? Are they following ocean currents?)
2. did they get fat? (obtain body condition from drift dive analyses);
3. did they survive? (relate their movement and dive behaviour to 10+ year re-sight data).

Proposed deliverables:

1 (or more) high-impact peer-reviewed research paper

# Budget\*

Accommodation and subsistence in Hobart (where the research lab is). Rental costs are based on listings on realestate.com.au. Food costs are based on <https://www.utas.edu.au/international/the-tasmanian-experience/tasmania/cost-of-living>

Rent = 300AUD/week

Food = 80AUD/week

Total weekly cost = 380 AUD

Total monthly cost = 1520 AUD

Estimated project duration = 6 months = 1520\*6 = 9120 AUD

**Total budget requested = 9120 AUD = 5160 pounds**

Biuw, M., B. McConnell, C. J. A. Bradshaw, H. Burton, and M. Fedak. 2003. Blubber and buoyancy: monitoring the body condition of free-ranging seals using simple dive characteristics. Journal of Experimental Biology 206:3405–3423.

Bradshaw, C. J. A., M. A. Hindell, M. D. Sumner, and K. J. Michael. 2004. Loyalty pays: Potential life history consequences of fidelity to marine foraging regions by southern elephant seals. Animal Behaviour 68:1349–1360.

McMahon, C. R., M. N. Bester, H. R. Burton, M. A. Hindell, and C. J. A. Bradshaw. 2005. Population status, trends and a re-examination of the hypotheses explaining the recent declines of the southern elephant seal Mirounga leonina. Mammal Review 35:82–100.

McMahon, C. R., H. R. Burton, and M. N. Bester. 2000. Weaning mass and the future survival of juvenile southern elephant seals, Mirounga leonina, at Macquarie Island. Antarctic Science 12:149–153.

McMahon, C. R., H. R. Burton, and M. N. Bester. 2003. A demographic comparison of two southern elephant seal populations. Journal of Animal Ecology 72:61–74.