

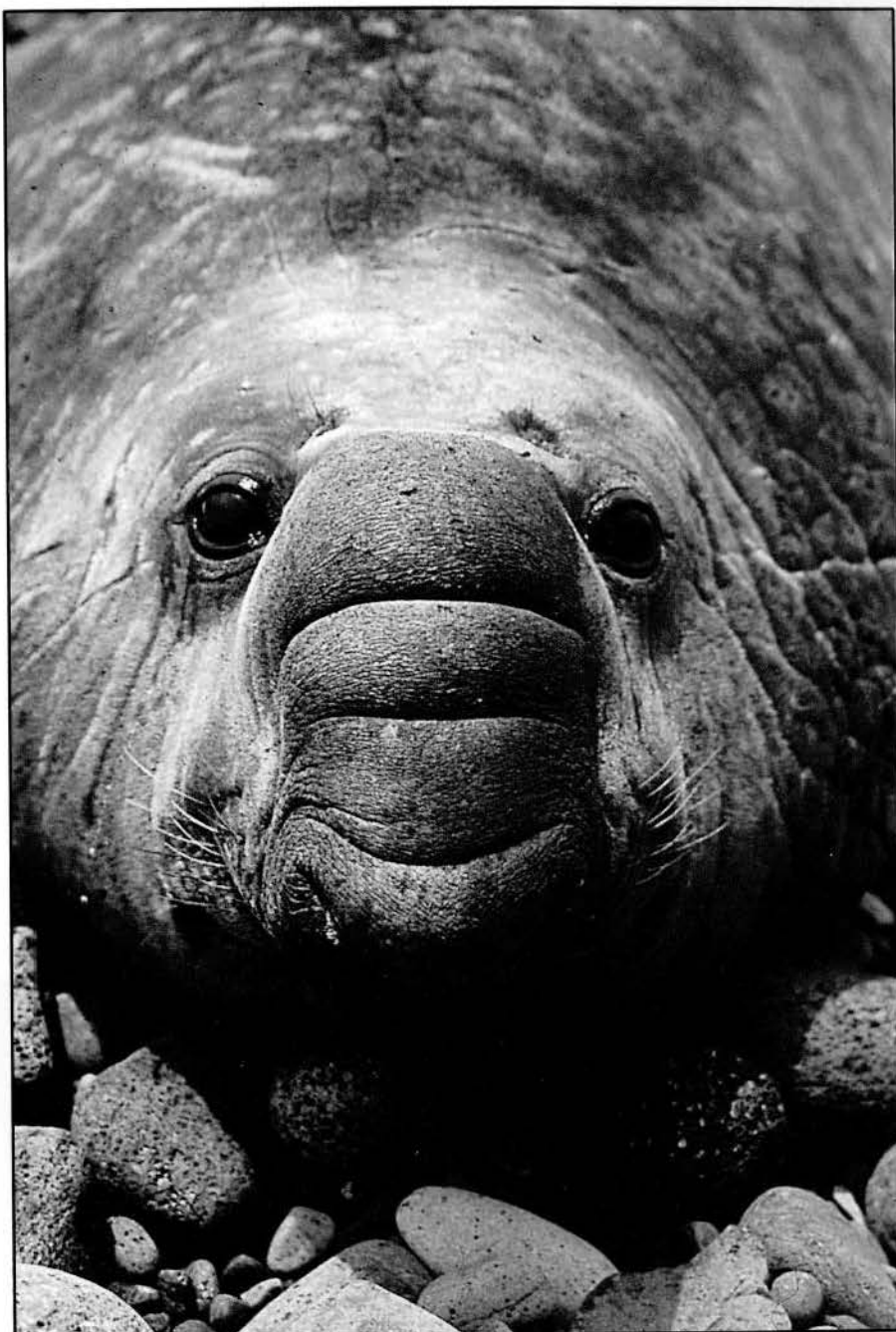
South African Research on Antarctic Seals

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The Mammal Research Institute (MRI) formally commenced seal research in the Antarctic region (*sensu lato*) in 1973 and focussed on the southern elephant seal, *Mirounga leonina*, and Subantarctic fur seal, *Arctocephalus tropicalis*, at Marion Island. These populations were found to be in a state of flux, *M. leonina* showing a marked decline while *A. tropicalis* was increasing exponentially (Condy 1978a & b). Baseline values established here became very important for subsequent research including other sub-populations on islands near the Antarctic Polar Front (APF) within the Indian Ocean sector (Kerguelen Province) of the Southern Ocean (Bester 1984). Antarctic fur seals, *A. gazella*, formerly only known from islands south of the APF, were establishing themselves (Condy 1978b) and a study into interspecific relationships confirmed inter-breeding (Kerley 1984).

International recognition came with the launching of studies on the population growth rate and social structure of elephant seal populations at Iles Kerguelen (1977/78, 1979/80 & 1984) in collaboration with Terres Australes et Antarctiques Francaises (TAAF). Highlighted during an international colloquium held in Pretoria (6 September 1983) to mark ten years of research on Antarctic and sub-Antarctic seals by the MRI, this collaboration (Bester & Jouventin 1984) was extended to the Australian Antarctic Division which solicited our participation in the 1985 ANARE to Heard Island. These studies unequivocally showed that the elephant seal population decline applied to all the sub-populations within the Kerguelen Province (Van Aarde 1984, Bester 1988), constituting an important signal of at least regional environmental change yet to be identified (Bester & Wilkinson 1993). Annual censuses (1973 to 1992) in conjunction with the mark/recapture programme of elephant seals provided a fine resolution in population trends and estimation of population parameters such



Southern elephant seal

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as mean age of first reproduction, fecundity rate, survivorship and net reproductive rate. This allowed preliminary estimates of the stage(s) at which the as yet unknown factor(s) operate on the declining Marion Island population (Bester & Wilkinson 1993). Since these operated at sea, a first attempt at tracking elephant seals pelagically using archival geosensing recorders showed that postparturient cows ($n = 3$) foraged within 1 100 – 1 400 km from the island (Bester & Wilkinson 1993), matching

recorded movements of tagged immatures (Bester 1989). Associated research investigated the influence of the elephant seals on the terrestrial ecology of the island, fidelity to birth/breeding sites, dispersal and dispersion, seasonal haul out cycles, and factors influencing their reproductive success (Condy 1979, Panagis 1984, Skinner & Van Aarde 1983, Wilkinson & Bester 1990a & b).

Accorded a lesser role in the overall research thrust on Marion Island, the population trends of fur seals here (Kerley

1984, Wilkinson & Bester 1990b), at Iles Kerguelen (Bester & Roux 1986), and on low latitude, cold temperate islands such as Amsterdam Island (with TAAF) (Hes & Roux 1983) and Gough Island (Bester 1990) confirmed continued population increases over their whole distributional range, showing different phases of population growth (Bester 1984).

Investigation of the distribution and abundance of pack ice seals off Western Dronning Maud Land, Antarctica, commenced in 1974 to provide baseline values for monitoring future possible changes. A major find was that the rare Ross seal, *Ommatophoca rossii*, occurred at consistently high densities despite differing pack ice conditions over four consecutive years (Condy 1977), and led to a preliminary study concerning the age structure, reproductive state and diet of this species (Skinner 1984, Skinner & Westlin-Van Aarde 1989). This is being followed by an in-depth study of their three-dimensional distribution in the residual pack ice zone during summer in collaboration with the University of Washington.

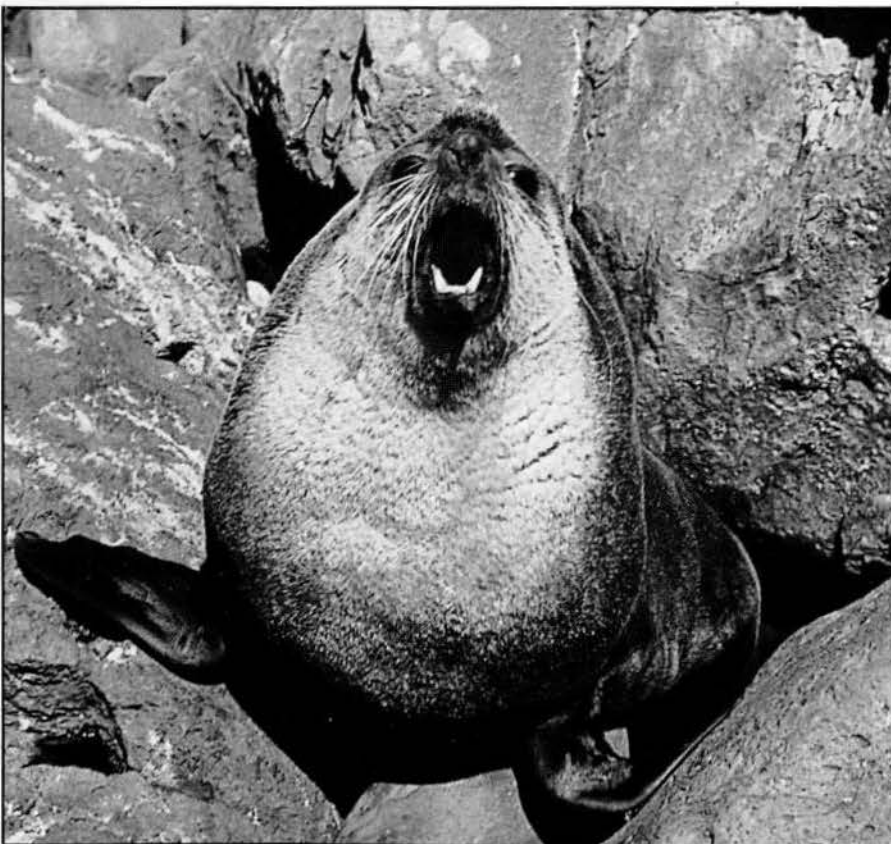
Future research will be directed at defining the forces responsible for change in the population parameters of these top predators. This would entail studies of the trophodynamics of the seals, the implications of this for growth and survival, the use of

growth rates and reproductive parameters as indicators of change in the ecosystem, and the dispersal and dispersion of seals in the region as a whole.

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Subantarctic fur seal

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