

Biological studies of seals in pack ice habitat

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From 25 October through 22 November 1978, leopard seals (*Hydrurga leptonyx*), crabeater seals (*Lobodon carcinophagus*), Weddell seals (*Leptonychotes weddelli*), and Ross seals (*Ommatophoca rossi*) were studied from abroad the *r/v Hero*. We conducted these studies in pack ice areas from King George Island south to Anvers Island, including Bransfield and Gerlache Straits and Bismarck, Dallmann, and Flandres bays, between latitude 61°–65°S and longitude 58°–65°W.

Our primary objectives were to estimate the number of each species, based on daily counts of all seals seen on ice floes; to locate female leopard seals with pups for behavioral observations and documentation of the approximate time of parturition; to collect female leopard and crabeater seals for preservation of reproductive tracts, stomach contents, toenails, and skeletal material; to document the underwater vocal repertoire of these pack ice seals; and to determine the patterns of leopard seal activity using radio telemetry.

Nineteen days of census in good pack ice habitat were conducted during this field period. Tallies were made from the ice house of the *r/v Hero* from approximately 0400 through 2200 hours each day. For each seal, we noted the species, sex, age, behavior, location, and size of floe on which it was located.

A total of four leopard seal pups were observed on ice floes between 7 and 13 November. Two near-term fetuses were collected, on 4 and 14 November. We were able to take weights and body measurements on three leopard seal pups and a second series of weights and measurements on two of the three pups. In addition, we collected a newborn Ross seal pup on 14 November. The unfrozen afterbirth indicated recent parturition. The only other documented observation of a Ross seal pup was made by Soviet scientists (Tikhomirov, 1975). In contrast, most crabeater pups observed during this period were newly weaned juveniles.

To investigate reproductive parameters, food habits, and age structure, our collection efforts were concentrated on female leopard and crabeater seals (See table 1). The entire reproductive tract (ovary, uterus, cervix, and part of the vagina) was collected to document reproductive histories. By correlating this information with age determinations based on toenails and teeth, it

will be possible to estimate age-specific reproductive success. In addition, we will determine the stage of estrus during this time of year. Stomach contents from captured leopard seals indicated that crabeater seal, penguin, fish, squid, and krill were all part of the leopard seal diet. In contrast, crabeater stomachs contained almost exclusively krill.

Underwater recordings of vocalizations were made to document the vocal repertoire of pack ice seals and investigate vocalization rates as a measure of diurnal activity patterns. Recordings of seal vocalizations were made with sonobuoys (model AN/SSQ-41B), which transmitted information to an onboard receiver, and with crystalline-timer controlled cassette recorders housed in Coleman coolers with R-130 hydrophones, which were left on ice floes overnight. Both recording systems performed well in the pack ice habitat.

We marked and recaptured leopard seals with two types of tags, plastic cattle ear tags and radio transmitters (table 1). Two sets of plastic tags were attached to the rear flippers of all seals handled and released. Adult female leopard seals with pups were restrained with a bag (Stirling, 1969), as were all the Weddell, Ross, and crabeater seals that were tagged and released. All other leopard seals were immobilized with Sernylan and Valium (Hofman, 1975). Initially, Sernylan dosages of 0.3 milligram per kilogram were used, with variable and unpredictable results. We found that lower dosages of Sernylan (0.1–0.15 milligram per kilogram) with 5 milligrams of Valium immobilized the seal sufficiently for a bag to provide satisfactory restraint for attaching radios. Four radio tags were successfully attached to leopard seals, and three of the four radio-tagged animals were relocated. These relocated animals seem to have been passively moving with the drift of the pack ice. We also tested various stomach-pumping techniques on both crabeater and leopard seals. The best results were obtained with a standard veterinary stomach pump, an evacuation bottle, and lubricated 1/2-inch surgical tubing. Stomach specimens of krill from crabeater seal stomachs were particularly easy to sample in this way.

Table 1. List of seals taken during Antarctic Peninsula study, 1978

Category	Species			
	Leopard	Crabeater	Weddell	Ross
Tagged & Released				
Adult males	4	8	1	0
Adult females	4*	2	18	2
Pup males	3	0	0	0
Pup females	1	0	0	0
Total	12	10	19	2
Collected				
Adult males	2	2	0	0
Adult females	16	5	0	0
Pup males	1**	0	0	1
Pup females	1**	0	0	0
Total	20	7	0	1
Grand Total	32	17	19	3

* = radio transmitters attached

** = collected in utero

Future investigations will concentrate on other segments of the reproductive cycle and behavior of leopard seals in order to improve our understanding of population dynamics.

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References

- Hofman, R. J. 1975. Distribution patterns and population structure of Antarctic seals. Ph.D. thesis, University of Minnesota.
- Stirling, I. 1966. A technique for handling live seals. *Journal of Mammology*, 47: 543-44.
- Tikhomirov, E. A. 1975. Biology of the ice forms of seals in the Pacific section of the Antarctic. *Rapp. P-v. Reun. Cons. int. Explor. Mer.*, 169: 409-12.