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Numbers of pinnipeds during 1994 in Admiralty Bay, King George Island, South Shetland Islands

ABSTRACT: The pinnipeds were counted on the western shore of Admiralty Bay during 1994. It was found that the numbers of one breeding species *Mirounga leonina* is stable, the remaining four species show a variable pattern of occurrence. However, there is no evidence to detect any trend since 1988.

Key words: Antarctica, pinnipeds, multiyear changes.

Introduction

Studies concerning numbers and distribution of pinnipeds in Admiralty Bay began in 1977. Year-round observations, taken once every ten days, were carried out from 1988 through 1992 along the western shore of the bay, from Point Thomas to Patelnia Point (Fig. 1) (Sierakowski 1991, Lesiński 1992, Rakusa-Suszczewski and Sierakowski 1995). No trends were found in pinnipeds numbers and distribution, only the seasonal fluctuations among which the Fur seal is showing two peaks of numbers. In 1994, a year-round census was once again kept and the results were added to the data base gathered between 1988 and 1992.

Methods

The pinnipeds of Admiralty Bay were censused in 10 day intervals from the beginning of February till the end of December of 1994. The numbers of Elephant seals, Fur seals and Weddell seals were counted along the western shore

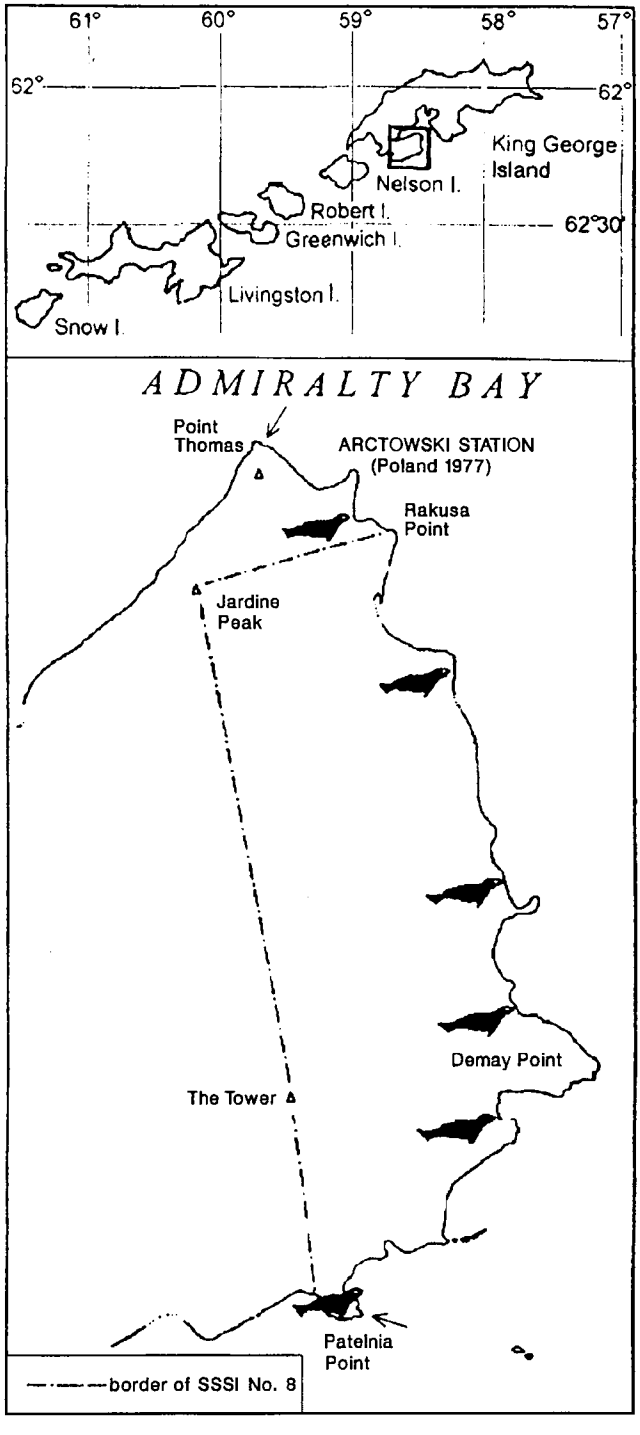

Fig. 1. Study area.

Table 1

Numbers of pinnipeds in Admiralty Bay at ten day intervals in 1994.

Month	Decade	*A.gazella*	*M.leonina*	*L.weddelli*	*L.carcinophagus*	*H.leptonyx*
February	1	566	538	10	0	0
	2	1124	462	14	0	0
	3	624	187	9	0	0
March	1	1048	218	10	1	0
	2	1147	280	12	0	0
	3	1100	330	9	0	0
April	1	543	324	4	0	0
	2	150	202	1	0	0
	3	20	144	1	1	0
May	1	12	171	1	0	0
	2	107	112	10	0	0
	3	9	117	3	0	0
June	1	12	39	3	0	0
	2	6	24	0	0	0
	3	8	77	6	0	0
July	1	236	49	3	0	0
	2	55	15	0	0	0
	3	2	0	0	0	0
August	1	2	1	7	0	0
	2	1	7	5	0	0
	3	0	4	11	0	0
September	1	26	2	9	0	0
	2	99	14	12	6	43
	3	103	22	8	0	67
October	1	26	46	0	0	6
	2	99	366	9	0	37
	3	103	374	5	86	63
November	1	26	384	3	23	47
	2	12	242	20	5	9
	3	3	282	11	1	0
December	1	0	427	12	1	0
	2	1	519	9	0	0
	3	0	582	15	0	0
	Σ	7270 n = 33 x = 220	6561 n = 33 x = 199	232 n = 33 x = 7	124 n = 33 x = 77	272 n = 33 x = 8

of Admiralty Bay. Crabeater seals and Leopard seals which occur most often on pack ice were censused by boat with the help of binoculars. The sex of all pinnipeds censused was left undetermined. In the period between 1988–1992 and for the year 1994, the number of each species of pinniped censused was

divided by the number of observations made to determine the average number of each species (Rakusa-Suszczewski and Sierakowski 1995).

In order to make statistical comparison of abundance of each species, the Kruskal-Wallis ANOVA was used. For those species whose average number per year varied significally, Spearman rank correlation was applied to test multiyear trends.

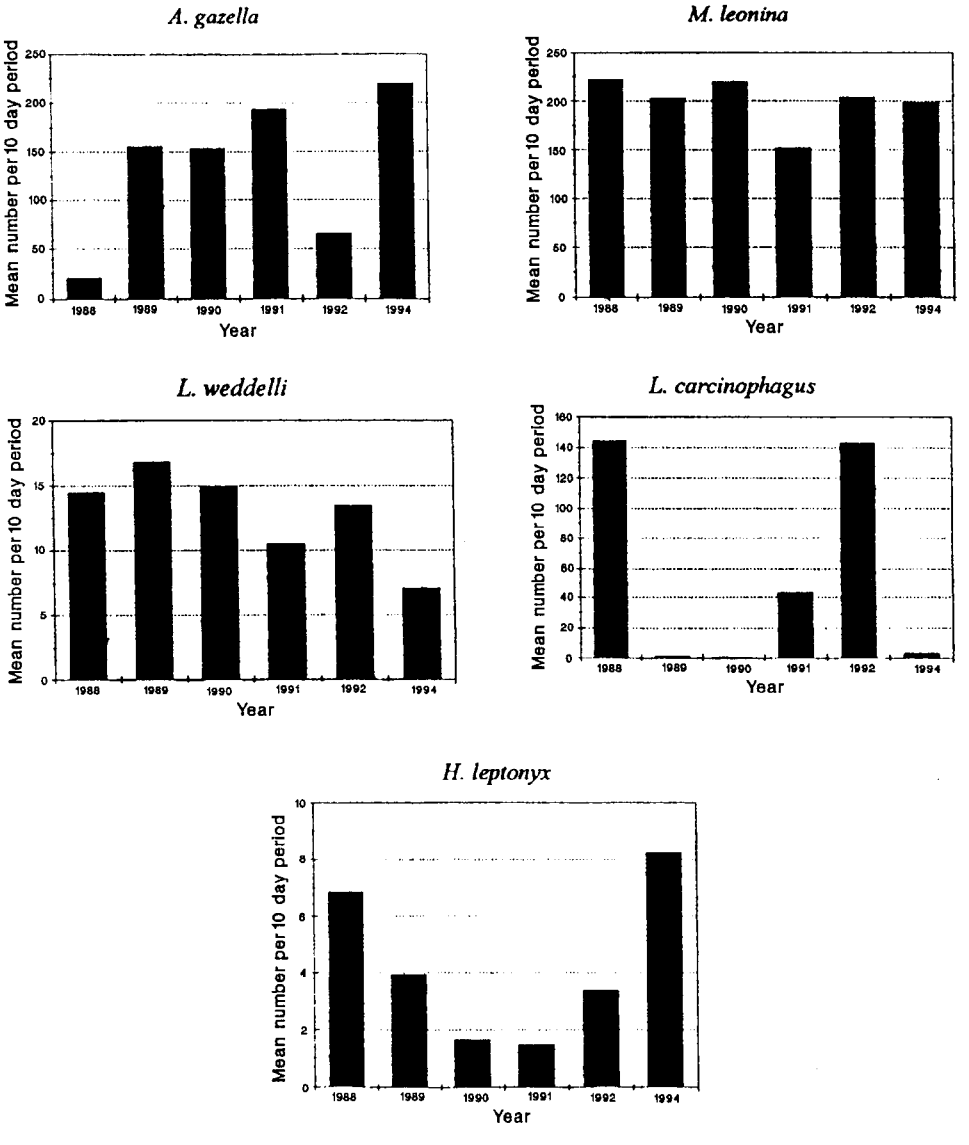

Fig. 2. Mean number of pinnipeds in Admiralty Bay at ten day intervals in different years (data for 1988–92 — from Rakusa-Suszczewski and Sierakowski 1995).

Results and discussion

In 1994 the occurrence of five species of pinnipeds was observed in the study area: Elephant seal (*Mirounga leonina* Linnaeus, 1758), Fur seal (*Arctocephalus gazella* Peters, 1875), Weddell seal (*Leptonychotes weddelli* Lesson, 1826), Crabeater seal (*Lobodon carcinophagus* Hombron *et* Jacquinot, 1842) and Leopard seal (*Hydrurga leptonyx* Blainville, 1820).

The number of pinnipeds was significantly different in particular periods during the 1994 (Table 1). Elephant seals occurred throughout the year, peaking in number during the breeding season from September to March, as in past years. Fur seals also occurred throughout the year but showed two peaks, March and again in July, what confirmed prior research at the region (Rakusa-Suszczewski and Sierakowski 1995). The data collected by Whitehouse and Veit (1994) suggest that the second peak of Fur seals occurrence is due to the freezing sea what forces out northwards the animals from the region of Antarctic Peninsula. The number of Weddell seals maintained at a low but constant level throughout the year. The two remaining species which are connected with pack ice, were observed only during the summer. Leopard seals occurred in September and October of 1994, in higher numbers than in the past years 1988–92. The Crabeater seals were observed in low numbers in August and October (Rakusa-Suszczewski and Sierakowski 1995).

The number of Elephant seals in 1988–92 and in 1994 remained at constant level. No significant differences were detected (K-W test = 6.584, p = 0.253). However, the average numbers of each of the other pinnipeds showed a statistically significant difference in certain years (Fig. 2): Fur seal (K-W test = 17.367, p = 0.01), Weddell seal (K-W test = 26.582, p 0.001), Crabeater seal (K-W test = 10.924, p = 0.05) and Leopard seal (K-W test = 16.000, p = 0.001). Though no multiyear trends were detected (Table 2).

Table 2

Results of the Spearman rank correlation analysis for the mean number of pinnipeds versus year.

Species	Coefficient	Significance level	Sample size
Arctocephalus gazella	+0.600	0.159	6
Leptonychotes weddelli	–0.700	0.085	6
Lobodon carcinophagus	–0.086	0.848	6
Hydrurga leptonyx	+0.314	0.482	6

The statistical analysis of the numbers of species of pinnipeds observed in Admiralty Bay during the period between 1988–1992 and in 1994 demonstrated, with the exception of the Elephant seal which average number has remained constant throughout this period, that there are no trends in multiyear changes, only distinct fluctuations in numbers from year to year.

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Streszczenie

Analiza statystyczna liczebności płetwonogich na zachodnim brzegu Zatoki Admiralicji i paku lodowym w okresie 1988–1992 i w 1994 roku nie wykazała żadnego trendu zmian wieloletnich oraz potwierdziła dużą stabilność liczebności słoni morskich (*Mirounga leonina*) oraz znaczne wahania pozostałych gatunków.