

Den Collapse Kills Female Polar Bear and Two Newborn Cubs

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ABSTRACT. A female polar bear (*Ursus maritimus*) and two newborn cubs were found dead at their den site on the Yukon coast. The site investigation and necropsy indicated that den collapse was the cause of death.

Key words: polar bear, *Ursus maritimus*, den collapse, mortality, Yukon coast

RÉSUMÉ. Une femelle ours polaire (*Ursus maritimus*) et ses deux oursons nouveau-nés ont été trouvés morts dans leur tanière sur la côte du Yukon. L'enquête sur le site et l'autopsie ont indiqué que la mort avait été causée par l'effondrement de la tanière.

Mots clés: ours polaire, *Ursus maritimus*, effondrement de la tanière, mortalité, côte du Yukon

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While travelling along the coastline of the Northwest Territories (N.W.T.) and Yukon (Fig. 1) on 18 June 1989, co-author D. Irish saw the head of a dead polar bear sticking out of the snow. The snow was excavated at the site, revealing that the bear was an adult female with two cubs (Fig. 2). One cub was lying beside and the other underneath the female. All three bears were re-covered with snow and left at the site until a more detailed site investigation could be conducted.

A site investigation was conducted three days later, on 21 June 1989. The den was centred in a triangular-shaped snow

bank (30 m long and 15 m wide), in the middle of a small, steep-sloped drainage (Fig. 2). The snow level where the bears were lying was approximately 5 m lower than the ridge tops on either side of the drainage. It is quite possible that the snow line was level with the ridge tops before spring melt, as the drainage was still mostly full of snow late in June. If this were the case, there would have been a great weight of snow over the roof of the den chamber.

The bears were flown to Aklavik, where they were measured (Table 1) and necropsied. The results of the necropsy suggest

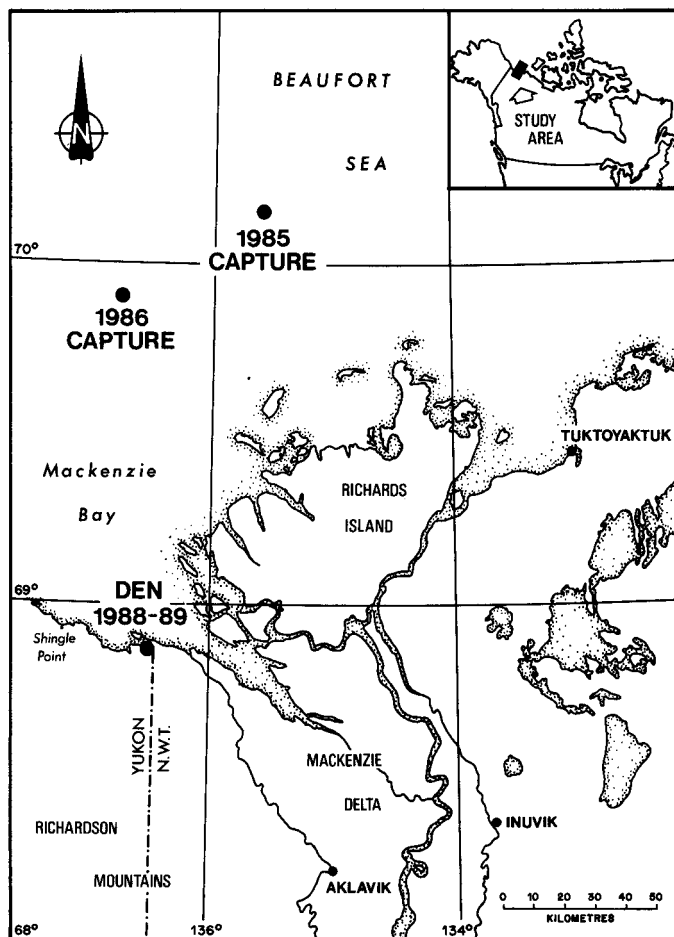


FIG. 1. Den location and capture sites for polar bear X9804.

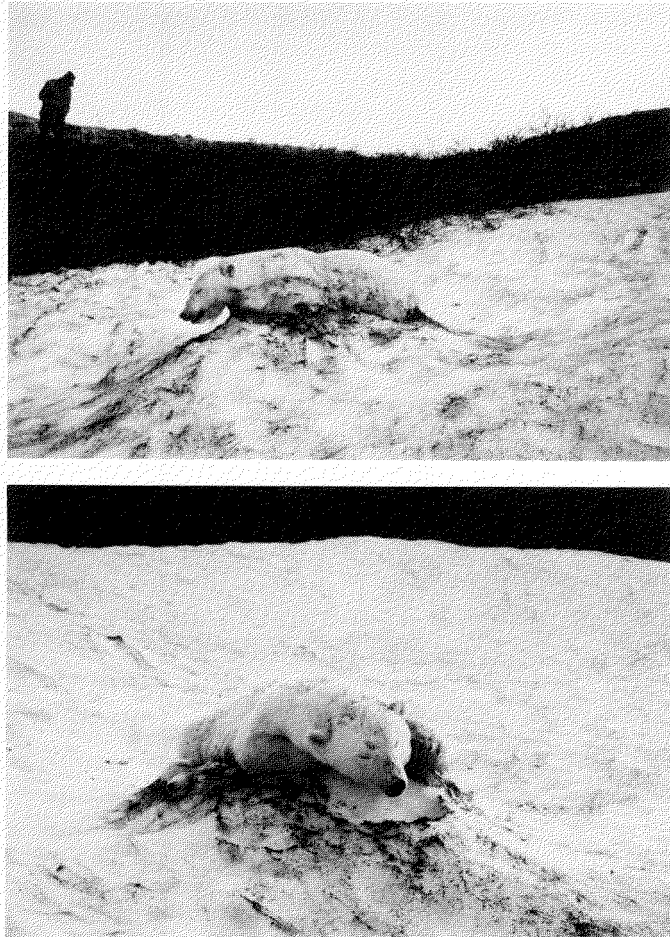


FIG. 2. Polar bear den site on Yukon coast.

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TABLE 1. Age and physical measurements of the polar bears killed when their den collapsed

Bear	Age	Length (mm)	Girth (mm)	Weight
Adult (female)	6 years	1900	1500	336 kg ¹
Cub (female)	3-4 weeks ²	371	245	2097 g
Cub (female)	3-4 weeks ²	371	227	1947 g

¹Estimated from girth measurement (Kolenosky *et al.* 1989).

²Estimated from weights given by Wortman and Larue (1973) and stage of development.

that the bears had been subjected to extensive trauma from above (Leighton, pers. comm. 1990; Wobeser, pers. comm. 1990). This was evidenced by excessive subcutaneous haemorrhaging in the abdominal and pelvic areas, lighter subcutaneous haemorrhaging on the lower back, and extensive internal haemorrhaging in the abdominal areas. The adult female did not have any broken bones. There were no signs of haemorrhaging on the front legs or upper body. The adult was in good condition, with a thick layer of subcutaneous fat. The cub beneath the female had a crushed skull and crushed front shoulder. The other cub did not have any broken bones. The hides were salvaged.

Based on the site investigation and necropsy, we concluded that the den must have collapsed sometime in late January. The cubs weighed 2 kg, were well furred, did not have their eyes open, and were estimated to be approximately 3-4 weeks old (Wortman and Larue, 1973). The adult female had been ear tagged (X9804) as a two-year-old in 1985 (Canadian Wildlife Service files, Edmonton) and captured as a three-year-old in 1986 (Amstrup, pers. comm. 1989) (Fig. 1). She was six years old at the time of her death. The two cubs were probably her first litter (Stirling *et al.*, 1988).

Den collapse may have been induced by the following climatic events. Warm temperatures (+2°C) on 17 December 1988 may have weakened the snow structure above the den chamber. On 12 January 1989 high winds (28 knots) would have caused heavy drifting on the coast. The area experienced a major snow storm during 26-28 January 1989. In Inuvik winds were 24-25 knots, with falling snow, and the weather on the coast would have been worse (Watts, pers. comm. 1990). The added weight of newly accumulated snow and the possible weaker snow structure over the den may have caused the collapse. In addition, if this was the female's first litter, she would have been inexperienced in selecting, digging,

and maintaining a proper den. Polar bears have successfully denned along the north coast in the past (Stirling *et al.*, 1988).

Grizzly and black bear, as well as polar bear, mortality from den collapse is rare. Records of grizzly bear mortalities caused by den collapse were not found in a review of the literature. Alt and Beecham (1984) reported that flooding and den collapse caused mortalities among black bear cubs in northeastern Pennsylvania.

Although den collapse can and does occur, the impact of this type of natural mortality on bear populations is probably minimal. However, any human activity that might cause snow avalanching or snow compaction should be prohibited in polar bear denning areas from December to April. Seismic work and the movement of heavy equipment are two activities that could have an impact on denning polar bears.

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