

# Polar Bear Predatory Behaviour toward Molting Barnacle Geese and Nesting Glaucous Gulls on Spitsbergen

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**ABSTRACT.** A polar bear (*Ursus maritimus*) was observed stalking and chasing a flock of adult flightless barnacle geese (*Branta leucopsis*) in a coastal bay in Hornsund, southwest Spitsbergen. Before chasing the geese, the polar bear appeared to make use of the cover provided by a rocky pier in order to swim close to them. Immediately after that unsuccessful attempt, the bear plundered a glaucous gull (*Larus hyperboreus*) nest situated on coastal rock and captured three nestlings. These observations are the first documented instances of a polar bear hunting for barnacle goose and glaucous gull and provide additional evidence of the use of terrestrial prey by polar bears during the season of minimal ice extent.

**Key words:** polar bear, *Ursus maritimus*, barnacle goose, *Branta leucopsis*, glaucous gull, *Larus hyperboreus*, predation, Hornsund, SW Spitsbergen

**RÉSUMÉ.** Un ours polaire (*Ursus maritimus*) a été observé en train de traquer et de pourchasser une bande de bernaches nonnettes (*Branta leucopsis*) coureuses adultes dans une baie côtière de Hornsund, dans le sud-ouest de Spitsbergen. Avant d'avoir chassé les bernaches, l'ours polaire semblait s'être servi d'un quai rocaillieux pour se cacher et nager près des bernaches. Immédiatement après cette tentative échouée, l'ours a pillé un nid de goélands bourgmestres (*Larus hyperboreus*) situé sur un rocher côtier et a capturé trois oisillons. Ces observations, les premiers exemples de bernaches nonnettes et de goélands bourgmestres pourchassés par un ours polaire, fournissent d'autres preuves selon lesquelles les ours polaires ont des proies terrestres pendant la saison de l'étendue minimale de glace.

**Mots clés :** ours polaire, *Ursus maritimus*, bernache nonnette, *Branta leucopsis*, goéland bourgmestre, *Larus hyperboreus*, prédation, Hornsund, sud-ouest de Spitsbergen

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## INTRODUCTION

Polar bears (*Ursus maritimus*) are marine predators of the Arctic sea ice. They feed primarily on ringed seal (*Phoca hispida*), bearded seal (*Erignathus barbatus*), and harp seal (*Phoca groenlandica*), and less commonly on beluga whale (*Delphinapterus leucas*), narwhal (*Monodon monoceros*), and walrus (*Odobenus rosmarus*) (Lønø, 1970; Stirling and Archibald, 1977; Smith, 1980; Lowry et al., 1987; Smith and Sjare, 1990; Rugh and Shelden, 1993; Stirling and Øritsland, 1995). In many Arctic regions, summer ice melt is known to limit the access of polar bears to seals (Stirling et al., 1999), forcing the bears to fast during summer and early autumn (Watts and Hansen, 1987) for periods of up to several months. However, the bears do feed opportunistically on alternative foods. Polar bears have been observed to hunt large terrestrial mammals such as caribou (*Rangifer tarandus*) (Derocher et al., 2000; Brook and Richardson, 2002) and muskox (*Ovibos moschatus*) (Ovsyanikov, 1996). Moreover, polar bears are both scavengers, feeding on carrion and anthropogenic organic waste, and occasionally cannibalistic (especially adult males), attacking cubs and younger or weaker bears,

mainly subadults (Lønø, 1970; Derocher et al., 2000; Dyck and Daley, 2002).

Polar bears have also been observed to prey on eggs, nestlings, and adults of colonial nesting seabirds and waterfowl, including Brunnich's guillemot (*Uria lomvia*) (Donaldson et al., 1995), little auk (*Alle alle*) (Stempniewicz, 1993), snow goose (*Anser caerulescens*) (Abraham et al., 1977), Canada goose (*Branta canadensis*) (Smith and Hill, 1996), and pale-bellied brent goose (*Branta bernicla hrota*) (Madsen et al., 1989), as well as on terrestrial species such as willow ptarmigan (*Lagopus lagopus*) (Miller and Woolridge, 1983). In addition, polar bears have been observed to consume vegetation, both marine (e.g., *Laminaria*) and terrestrial (e.g., grass, berries, *Cochlearia*) (Russell, 1975; Derocher et al., 1993; own observations). However, the significance of waterfowl and vegetation components in their diet is considered minor (Knudsen, 1978; Lunn and Stirling, 1985; Ramsay and Hobson, 1991; Ramsay et al., 1991; Hobson and Stirling, 1997).

This paper describes observations made of a polar bear stalking and chasing flightless adult barnacle geese (*Branta leucopsis*) at sea, and plundering the nest of a glaucous gull

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FIG. 1. Polar bear localizing barnacle geese resting on the inshore islet after approaching them from the opposite side of the flat rocky pier, at Gnållberget, Hornsund, Spitsbergen, on 23 July 2005. Photo by L. Iliszko.

(*Larus hyperboreus*) in Hornsund, SW Spitsbergen. The observations were made opportunistically, during a seabird study project.

#### DESCRIPTION OF OBSERVATION

On 23 July 2005, I observed an adult male polar bear along the seacoast at Gnållberget, Hornsund, southwest Spitsbergen (77°00' N, 15°28' E). The weather was calm, warm (> 10°C) and sunny, with very good visibility. The polar bear was observed for approximately 1.5 hours (starting at 0930 local time) as it explored the beach and rested in a hollow dugout in the gravel.

At 1100, the bear noticed a flock of 65 flightless adult barnacle geese resting on a flat rock 50 m from shore. It then moved slowly toward the sea, entered the water, and swam, with only the top of its head protruding above the water surface. The bear appeared to be stalking the birds, using the flat, rocky pier as cover to avoid detection. When it arrived at the islet on the side opposite the geese, it stopped and raised its head to look for the birds (Fig. 1). At that moment, the geese noticed the bear, then entered the water and swam away in a close group toward the open sea. The bear immediately rushed after the geese. During most of the chase, it was about 4 to 5 m behind them (Fig. 2), and a couple of times, the bear speeded up, attempting to reduce this distance. The geese responded with wing flapping and running across the water surface to maintain their distance from the bear. At one point, a rapid charge from the bear separated two geese from the flock. The bear immediately followed them, but they rejoined the flock. After swimming for several hundred meters toward the open sea, the flock turned back to the shore, making a loop, and then repeated this maneuver. In the shallow water close to the beach, the bear made a sudden but unsuccessful rush on the flock (Fig. 3). In total, the pursuit lasted for 30 minutes, but the bear did not manage to capture any geese.

The polar bear continued to swim along the shoreline and soon encountered a small, rocky island inhabited by a pair of breeding glaucous gulls with three-week-old young. The bear

climbed the rock, causing the chicks to abandon the nest for the water. The bear then entered the water and caught and consumed all three chicks. Following this event, the bear swam away toward the Treskellen peninsula, 10 km away, where it plundered a hut later the same day.

#### DISCUSSION

The likelihood that a polar bear can capture a healthy, adult barnacle goose at sea is presumably low. The observed attempt of hunting could have been successful if there had been young birds in the group chased. Adult geese periodically become flightless when they are molting their primary feathers. During this time, as well as during the rest of the chick-guarding period, they keep close to a water body (tundra ponds, lakes, or sea), to which they can escape immediately when in danger. Such behaviour is particularly efficient against predation by the arctic fox (*Alopex lagopus*), which avoids swimming, but only flightless adult birds may find it effective against polar bear predation. Goslings swim much slower and have less endurance than adults. On a few occasions, I observed tourists kayaking along the shoreline and scaring away barnacle geese. Each time, the goslings could not keep up with the escaping adults for more than a few minutes, and then lagged behind. Given the swimming speed of the polar bear that I observed and the duration of its pursuit, goslings would have a high likelihood of capture by polar bears. A polar bear chasing a flock of geese in the water for a long enough time has the potential to capture a large proportion of the goslings.

In contrast to the Polish Polar Station area, where bears are actively hazed and driven away by station personnel, at Gnållberget (10 km away) they are generally left undisturbed. Most of the 70 pairs of barnacle geese near the Polish Polar Station had two or three young. At Gnållberget the situation was similar during the area survey at the beginning of July. However, in the second half of the month, only 80 adult geese and no goslings were observed.



FIG. 2. Polar bear chasing a flock of flightless barnacle geese at sea, in Gnållberget, Hornsund, Spitsbergen, on 23 July 2005. Photo by L. Iliszko.

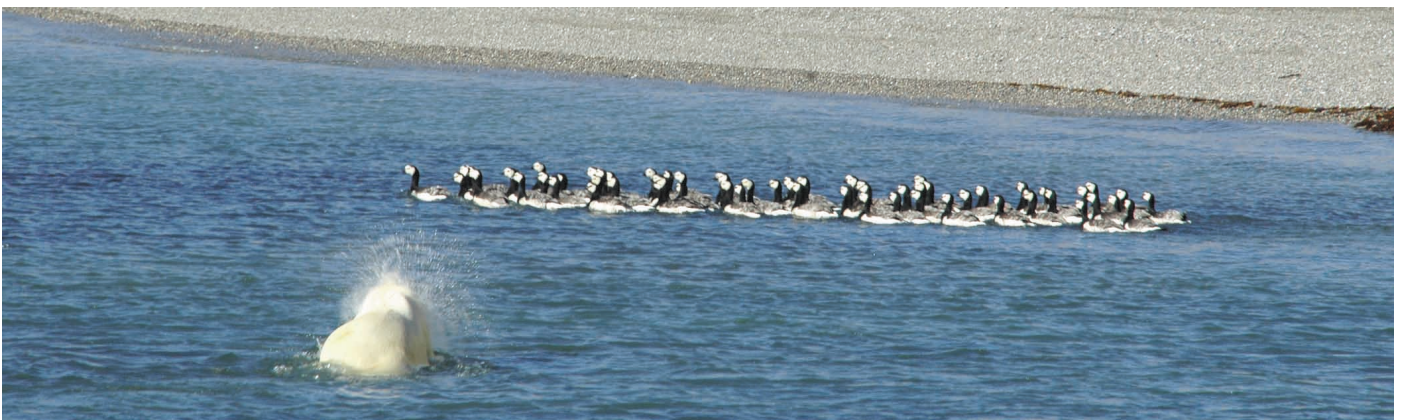


FIG. 3. Polar bear charging in the shallow water, at Gnållberget, Hornsund, Spitsbergen, on 23 July 2005. Photo by L. Iliszko.

This suggests that most goslings at Gnållberget may have been lost to predation by polar bears.

The energetic cost to polar bears of taking terrestrial prey can be high, for example, in the case of hunting caribou, which are highly vigilant and well adapted to run at high speeds for a long distance (Brook and Richardson, 2002). This cost is especially high when food items are small and provide little energy. Lunn and Stirling (1985) predicted that because of the high cost of running, a bear chasing snow geese on tundra would not receive a net gain in energy unless it caught a goose within 12 seconds. A spectacular example was polar bear predation of a little auk colony (Stempniewicz, 1993). A bear had to overturn boulders weighing several hundred kilograms to get access to one nest, capturing at most one adult and one nestling bird with a combined weight of 0.25 kg.

Hunting success of any active predator, including the polar bear stalking seals and other prey able to escape, depends largely on minimizing the distance separating the predator and prey just before an attack. The ability to get close to prey during stalking is influenced by hiding opportunities (ice, rocks, vegetation, etc.) and by wind direction (Stirling, 1974, 1988; Stirling and Archibald, 1977). In this observation, the polar bear appeared to be using the rocks protruding from the shallow water to move as close as possible to the resting geese

before being detected. As no wind was recorded that day, wind direction couldn't have had any importance when the bear chose the stalking route. Polar bears are well adapted to hunt for pinnipeds, which at least in some situations use smell to detect predators (Lønø, 1970). It would be interesting to know whether bears take wind direction into account even when stalking seabirds, which generally lack a sense of smell.

In Svalbard, glaucous gulls nest in two types of habitats. The first one is mainland mountain slopes, where gulls often form colonies, and their individual territories are limited to the nest vicinity and do not cover feeding area. Nests are accessible to arctic foxes, but gulls use efficient social colony defense. However, breeding in high density involves cannibalistic practices (eggs, nestlings). This type of breeding makes it possible to maintain high local gull population numbers. The second type of habitat used by glaucous gulls for nesting is inshore rocks separated by some water from the coast. In the latter case, gulls have large individual territories that contain their feeding areas and are safe from arctic foxes (Stempniewicz, 1995; L. Stempniewicz, unpubl. data). However, these nests appear completely vulnerable to bears. Polar bears can both climb the several-meter-high rocks and swim very well, and therefore they have no trouble collecting gull nestlings that abandon their nests for the water.



Polar bears visit Hornsund regularly throughout the year, and their numbers recorded in the summer periods have increased markedly during the last decades (Polish Polar Station, unpubl. data). The bears are present in the area during the breeding periods for glaucous gulls and barnacle geese, when defenseless eggs and chicks are available. Bears generally explore the coastal area, and especially the neighborhood of the Polar Station and the huts dispersed around the fjord, in search of any organic waste, as well as stranded carrion. They also penetrate lower parts of the little auk and Brunnich's guillemot colonies and take accessible eggs, nestlings, and adult birds. Barnacle geese and glaucous gulls are common birds in the Hornsund area, especially in the vicinity of large seabird colonies, where locally abundant food includes eggs, chicks, and adult seabirds, as well as vegetation (Stempniewicz, 2006). As polar bears, barnacle geese, and glaucous gulls occur together in this area for five to six months each year, interactions between them can occur frequently.

As a result of climate warming in the Arctic, the summer fast-ice range is receding northward (Dickson et al., 2000; Hurrell, 2002; Stenseth et al., 2002), which may force an increasing number of polar bears ashore earlier in summer and for a longer time. These bears are in a poorer nutritional state because seals are inaccessible (Stirling et al., 1999). Poor condition may increase the pressure that polar bears exert on alternative terrestrial food sources, such as organic waste left by people and large colonies of seabirds and waterfowl. Hunting for birds may concern only individual polar bears and is more likely to occur in southern parts of the Arctic, where summer sea-ice conditions are poorer. However, the regular exploitation of the little auk colony by polar bears observed on Franz Josef Land (Stempniewicz, 1993) contradicts this statement. Even a few land-locked, nutritionally stressed polar bears may potentially have a huge impact on recruitment in local populations of birds breeding in colonies.

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