



# Rangifer tarandus

## Preserving the Pulse of the Arctic

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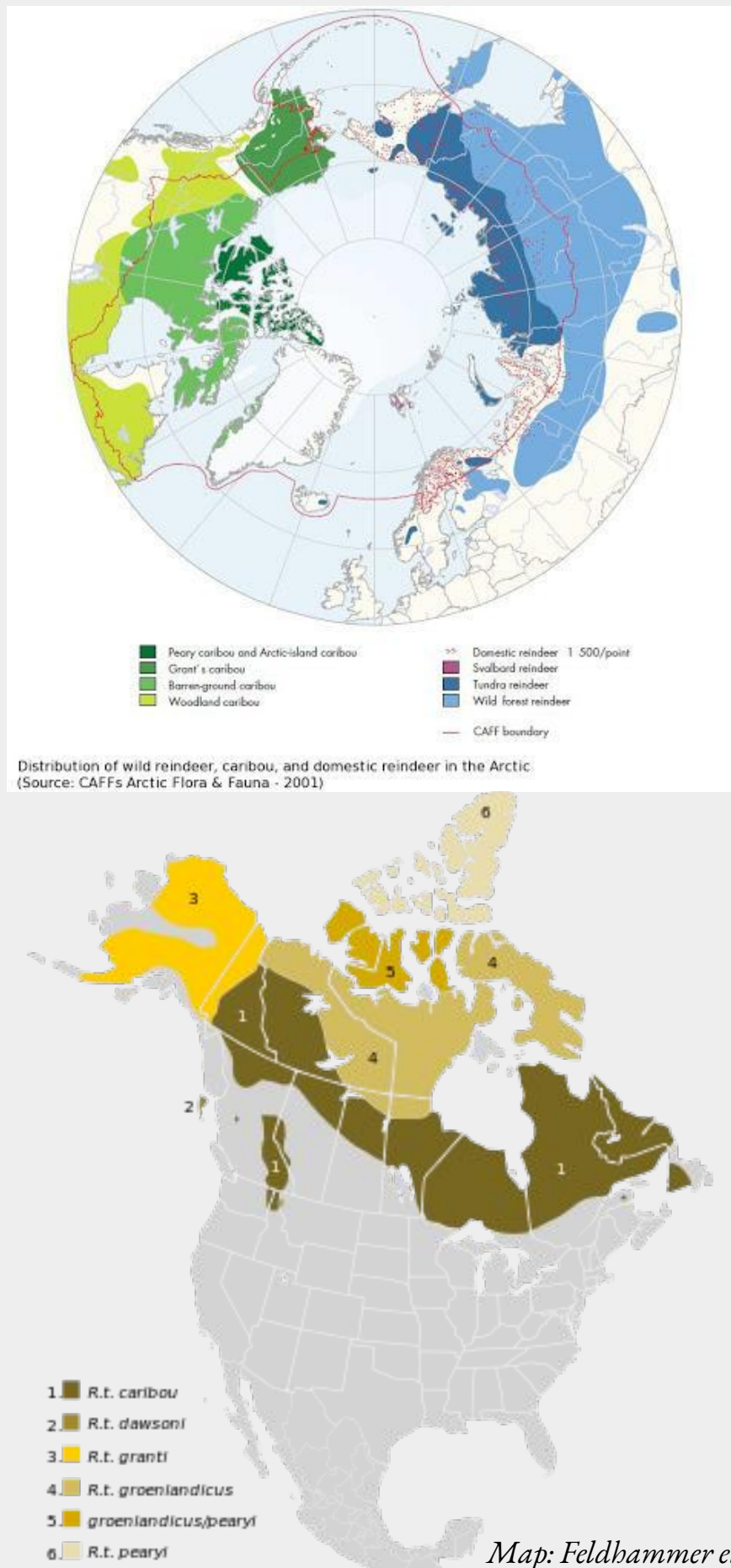
### FOUNDATIONS

#### Taxonomy

*Rangifer tarandus*, also known as caribou, is an even-hoofed mammal (order Artiodactyla) in the deer family, Cervidae.

#### Distribution and Habitat

- Caribou occupy a circumpolar distribution of the northern Holarctic. The species is native to Siberia, Scandinavia, and North America, extending as far south as the Selkirk Mountains of southeastern British Columbia.
- Rangifer tarandus* prefers boreal, tundra, taiga, mountainous and woodland regions, with variation in habitat preference based on the subspecies. In Alaska and the Canadian Arctic Archipelago, *Rangifer* inhabits spruce forests with lichen-moss understories alongside barren uplands, sedge meadows, sand dunes, tussock tundra, and montane lakes. *Rangifer tarandus caribou* occupying the far southern latitudes of the geographic range prefer cedar-hemlock communities in summer and fall, then migrate to old growth forests dominated by Engelmann's spruce come winter.



#### Diet

- Fall hyperphagia: Leading up to snowfall, *Rangifer* enters hyperphagia and takes on a generalist diet. More protein-rich species, such as *Salix* spp., forbs, graminoids, and mushrooms, are selected by caribou. Females at reproductive age particularly maximize their intake of a variety of plant species, knowing that demands for fetal growth add energetic costs to thermoregulation and locomotion.
- Reindeer lichen: When cold beats down on the Arctic, few plant sources are available to this herbivore. During the winter months, *Rangifer* consumes very little beyond carbohydrate-rich *Cladonia rangiferina*, relying on daily consumption of four to eleven pounds to sustain itself.

### SOCIALITY



Like numerous other Cervids, *Rangifer* evades predation through the formation of herds. Having a high degree of sociality and living amongst other members of the same species offers shared vigilance among the group members in addition to a more effective defense of resources. More specifically, *Rangifer* engages in social facilitation through herd behavior, as the instigation of collective behavior can strongly aid in predator evasion. Curiously, the mechanical "clicking" sound emanating from the tendons of adult caribou has been posited as a means to unify the herd.

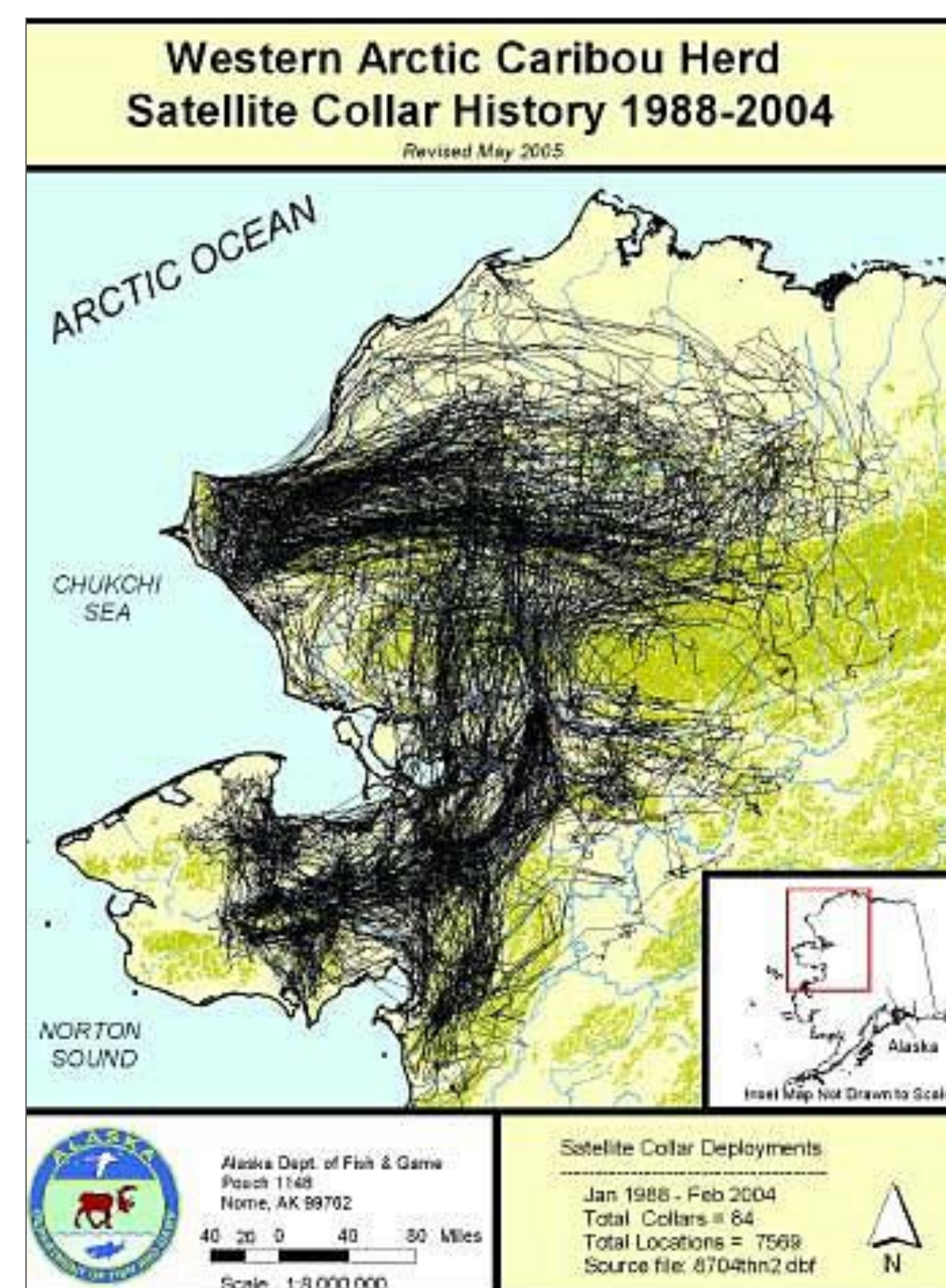
### MIGRATION

Seasonal variability in available forage and open surface water, as well as predation pressure while calving, creates an incentive for northern herds of *Rangifer* to travel up to 3000 miles while migrating between and within summer and winter ranges. Thus, migration is a primary source of numerous adaptations to form and behavior:

- An unguligrade foot posture creates a greater stride, and their **cannon bone** enhances the speed at which *Rangifer* can travel. Their anatomy has strengthened the ability of efficient migration, as *Rangifer* can run up to 80 kph.
- Each track is marked by a set of enlarged, separated "snowshoe" hooves, and the chemical composition of these hooves also provides stability while trekking across icy substrates. Their hooves are equally equipped, however, to function as **paddles** as they swim across marshes, lakes, and rivers during migration.
- Caribou are born **precocial**, meaning they are well-developed out of the womb. This is partially the result of migratory strategies, as quickly after the calving season, herds migrate to higher elevations to escape the summer insects.



Above: Caribou use their paddle-like hooves to aid in crossing marshes, lakes, and rivers while migrating. (Photo: Nick Jans)



Right: Movement patterns and migration routes of the Western Arctic Caribou Herd based on radio telemetry and satellite data. (Graphic: Peter Bente, Alaska Dept. of Fish & Game)

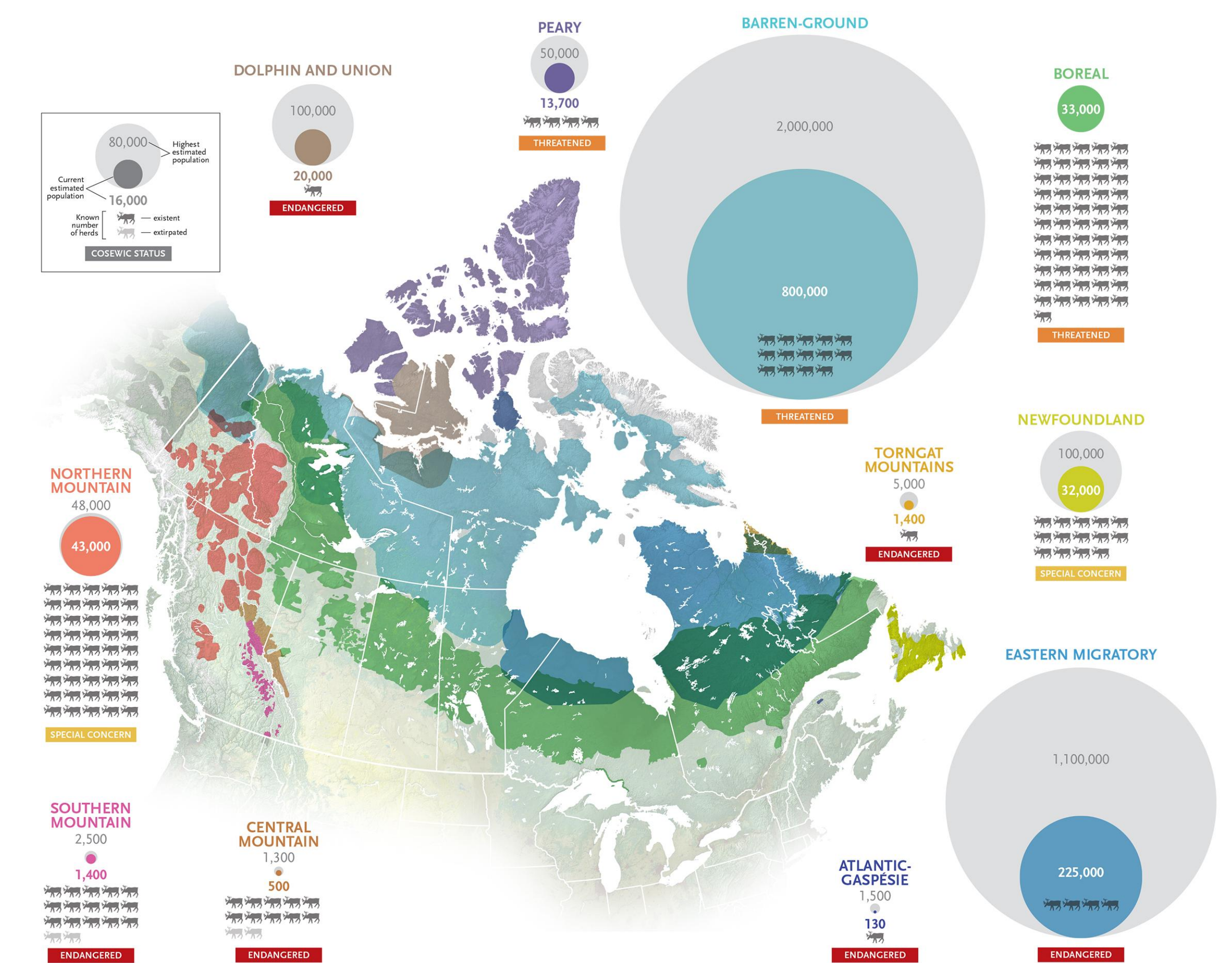
### MATING & CALVING

#### The Rut

When resources run dry, an alarm bell sounds through the ears of bull caribou. Extensive herds split into smaller harems, led by dominant males copulating with numerous females. *Rangifer* bulls establish a hierarchy through physical, direct competition, the ones with the greatest body sizes and antler sizes generally at the top. Bulls contest for cows by chasing and fighting subordinates, scent-marking, vocalizing, and thrashing their antlers through vegetation. Attention is placed on scent marking behaviors, including urine deposition, wallowing, ground scraping, and barking trees and shrubs.

#### Calving Season

When the calving season begins in early summer, caribou form aggregates that allow them to "swamp" predators, essentially overwhelming carnivores with overabundance. After a 229-day gestation period, cows give birth to a single calf. Communication between the mother and calf in establishing a bond and encouraging group behavior becomes absolutely critical in mitigating the calf's risk of predation. The Arctic environment during the birthing season is harsh. As a result, caribou calves are capable of increasing their metabolic rate five-fold above their baseline in the face of extreme cold and wind. They are also born with brown adipose tissue, a highly vascularized, mitochondria-rich fat that ultimately converts food into body heat. Quickly after parturition, calves develop an amalgam of thin and woolen hairs underlying a layer of thick, water-repelling guard hairs with air-filled cavities to trap air and reduce heat dissipation.



Graphic: Chris Brackley/Can Geo

### A SPECIES IN DECLINE

Across their Holarctic distribution, *Rangifer tarandus* is experiencing an unprecedented decline. In Canada's Southern Rocky Mountains, six of thirteen herds have been reduced to just 50 individuals. The contiguous United States said good-bye to its last remaining caribou in 2019.

#### Compounding Factors

Disease, predation, habitat loss, and a reduced access to forage each contribute to their decline. Bolstering them all are industrial development and anthropogenic climate change. A warming world affects foraging, allows for the spread of more parasites, and could cause heat stress in the Arctic-adapted animals, minimizing their disease resistance and tolerance of food shortages.



#### A Social Dilemma

Though federal protections over each subspecies do exist, difficulties abound in a natural resource-driven economy. Since at least the 1990s, there have been numerous efforts to delist the Southern Selkirk Mountain Caribou Population under the Endangered Species Act. These petitions have a common thread: they assert that the designated critical habitat "adds to the concerns of those who bear the burden of caribou-related restrictions."

### MODERN EFFORTS

Both Canada's Species at Risk Act and the United States' Endangered Species Act has resulted in expansive habitat deemed critical for the ongoing sustenance of North America's caribou. The Idaho Fish and Game Department is actively collaborating with Canadian agencies to develop a recovery plan for woodland caribou's return to the continental United States. As of now, successful recovery hinges on comprehensive and current research on subpopulation trends, size, structure, and distribution, as well as a more holistic understanding of causes of mortality. These efforts are acts of resilience, love, and optimism, and if the pulse of the Arctic is to beat on, we will need heaping doses of all three.

