Case Study:
Western Arctic Caribou Herd; One of the Largest Herds on Earth
Their Range, Distribution and Human Impacts
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Range and Ecosystem:

The Western Arctic caribou herd (WAH) is a barren ground caribou herd that ranges throughout northwestern Alaska. This vast herd ranges over a 140,000 square-miles or (363,000 km^2) area bounded by the Arctic Ocean, the lower Yukon River and the trans-Alaska pipeline. About 40 communities and 13,000 people are located within the range of the herd. For the people of these communities the herd is a vital link to cultural traditions, as well as a food staple for many families. The WAH moves seasonally over this large area, which has important implications to the ecology of the region and subsistence patterns throughout the region from harvest to nutrient cycling.

In the spring, pregnant female caribou lead the migration to calving grounds located north of the Brooks Range and its foothills west of the trans-Alaska pipeline. For a short time during early summer, WAH caribou form huge aggregations. The aggregation takes place in areas with winds that help keep the insects at bay. In the summer, the diet for these caribou includes grasses, sedges, and shrubs. Calves continue to grow on their mother's rich milk as well as from diverse and abundant vegetation. The calves begin walking just hours after birth and quickly learn to follow their mothers during the herd's migration. Although precocious after birth, newborn calves still face many challenges. The survival rate of WAH calves through their first year varies annually and has ranged from roughly 23-68%. Sources of calf mortality include sickness, predators, accidents and becoming separated from their mother.

Fall migration begins when temperatures cool and day length begins to decrease. Studies indicate that both temperature and day length play an important role in the timing of both fall and spring migration. Bulls compete fiercely with one another for females during mid-October. The mating season for caribou is brief and the 'rut' for this herd is over by the end of October. Most of the herd migrates in the fall across the Noatak and Kobuk Rivers to wintering grounds that include the upper Kobuk and Koyukuk drainages, the Nulato Hills, and the eastern half of the Seward Peninsula. In most years some WAH caribou do not migrate and winter on the North Slope between Point Lay and Anaktuvuk Pass. The herd winters in the mountains, on ridge tops or on the tundra where the landscape has shallow snow depths allowing the caribou to dig down, using their hooves like shovels to find lichen to eat. Winter can be difficult for caribou, especially if freeze thaw cycles cause heavy crusts or ice to form on the ground, which makes digging difficult. Fortunately, caribou are resilient creatures, well adapted to life in the north. Their hooves allow for efficient digging in the snow, yet enable them to traverse steep, mountainous terrain or cross soft, swampy tundra; their fur consists of hollow hair that effectively retains body heat. Barren ground caribou also have sleek, compact bodies and small ears that reduce surface area and thus minimize heat loss.

Unique Characteristics:

The WAH is the largest caribou herd in Alaska and one of the largest in the world. This herd peaked around 2003 when it reached 490,000 caribou. The most recent count in 2016, numbered this herd at approximately 201,000 caribou. Due to its tremendous size, the ecological importance of the WAH to Northwest Alaska is incalculable. Although they are important prey for wolves and bears, these caribou directly and indirectly impact the entire food web through nutrient cycling affecting organisms from bacteria to moose. Caribou have the ability to survive under harsh conditions, travel long miles, inhabit an array of ecosystems from the coast to the mountains, and tolerate extremely cold temperatures as well as hot, insect infested environments.

Cultural and Social Significance:

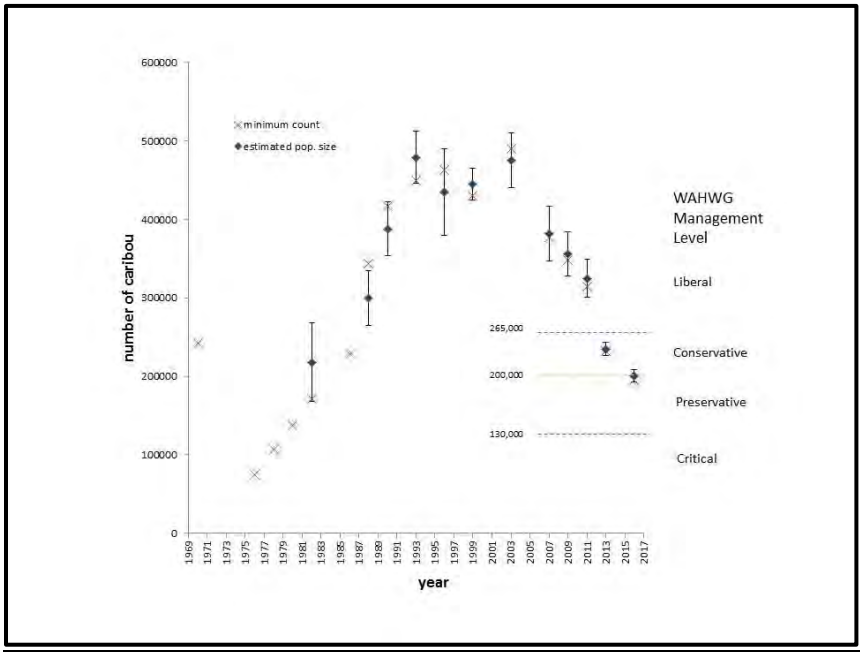
A variety of people hunt caribou throughout Northwest Alaska. The Inupaiq have relied on this herd for centuries to provide food, clothing, tools and shelter. Subsistence harvest patterns are primarily affected by seasonal movements and availability of caribou and also by traveling conditions for hunting. For example, Point Hope and North Slope villages harvest WAH caribou mainly during July and August, while the WAH is on its summer range. In contrast, on winter ranges, Shaktoolik and Unalakleet hunters primarily take WAH caribou during September through March. Harvest levels for villages along the Noatak and Kobuk Rivers are typically high during fall and spring migration periods and also when caribou winter near those communities. Even so, caribou harvests all but cease during periods of freeze-up and breakup, when travel by boat or snow machine is difficult. Unlike many subsistence activities that are seasonally specific, subsistence hunting of caribou occurs whenever caribou are available and accessible.

People's reliance on the WAH has changed in relation to caribou availability. During times of abundance, people were able to survive quite well on the meat, hide, bones, and sinew of the caribou. During times of shortage, people relied more heavily on other game and fish, and had to travel much further to find caribou. When caribou became scarce, many communities were almost wiped out from exposure and starvation. Currently, caribou are still one of the main protein sources for people living in the range of the herd. In addition to their importance as a source of food, WAH caribou are also an important link between the indigenous peoples' past and present.

Historical and Current Status:

Caribou abundance in Northwest Alaska has varied substantially over the past 150 years. Although biologists have only been able to estimate caribou populations during the last 40 years, we know from historical records of early explorers that caribou almost disappeared from large portions of this area by the mid-19th century. Biologists first counted the WAH in 1970, which numbered about 242,000 caribou. The herd declined rapidly from 1970 to 1976 to approximately 75,000 caribou. From 1976 through 1990 this herd grew about 13% annually to reach a population size of 416,000 caribou. From 1990 to 2003 the herd grew only 1-3% annually and peaked around 490,000 caribou. Since 2003 the WAH has declined and, as of 2016 numbered about 201,000 caribou.

Caribou Population Estimates and WAH management population alerts levels



Management and Study:

The foundation for management of the WAH depends largely on photocensus estimates of herd size. These censuses are conducted every 2-3 years unless there is a significant change in population. Currently ADFG is conducting an annual photo census to monitor the recent decline in population. Additionally, composition surveys are conducted annually during the June calving period to determine how many calves are born and to delineate the calving area. Spring composition surveys are conducted the following spring to monitor calf survival through their first year of life. Fall sex and age composition surveys are conducted biennially to monitor proportions of bulls, cows and calves in the herd. Adult mortality is estimated annually. Distribution and movements of this herd are monitored through conventional and satellite telemetry. All of these activities are based on radio telemetry data. For the past thirty years, the Alaska Department of Fish and Game biologists have gone to a world famous caribou crossing location called Onion Portage on the Kobuk River to radio collar caribou. Since the early 1990s federal agency staff and students from schools within the range of the WAH, have accompanied department biologists to learn about caribou. As caribou swim the river, a boat drives alongside a chosen group, where agency staff and students catch and hold an adult caribou and attach a radio collar. Besides deploying collars, the Department gathers information regarding calf weights, body condition, and collects blood samples to detect antibodies that indicate exposure to disease. If the chosen caribou is a female with a calf, a second boat captures the calf to weigh it, assess sex and body condition and then release it near its mother. A third boat ensures those caribou not being handled swim to the south side of the river to continue their migration. Using boats to capture caribou is quick and efficient, safer for caribou, uses no immobilization drugs, and is more widely accepted than aerial capture techniques used on other wildlife collaring projects. In-depth health assessments are conducted every 2-3 years to monitor the overall health of the animals.

The WAH traverses such a large area and impacts a variety of user groups, it is important for the future of the herd that all user groups have a voice in the management of the herd. The Western Arctic caribou herd Working Group (WG) was established in 1997 as a way to give valuable input on the management of the herd. The WG includes subsistence users, other Alaska hunters, reindeer herders, hunting guides, transporters, conservationists, biologists, and natural resource managers. The group meets each December, with additional subcommittee meetings throughout the year. During meetings, biologists report on the current health and population status, range conditions, and other biological factors affecting the herd. Invited speakers present information on topics that may impact the herd, such as climate, transportation, and land use. Elders share knowledge passed down for generations. The group identifies concerns, requests information and advocates for actions that will conserve and benefit the herd, including habitat studies or protections from the impacts of development.

The WAH is one of the last great herds of animals on Earth. Conservation of this herd and its habitats are critical in maintaining the traditional practices of northern people as well as for the health and productivity of the habitat in which they roam.

Current and Future Concerns:

The future of the Western Arctic caribou herd depends largely on the land and the people who make decisions regarding large scale resource development within the herd's range. Caribou are facing many changes. Climate change brings melting permafrost, expanding shrubs, decreasing lichen, increasing wildfires and changes in temperature. Oil, gas and mineral developments may bring roads, pipelines, powers lines, construction and possible spills and contamination. The warming climate is also opening the Arctic to an even greater expansion of resource exploration and development. Changes impacting the caribou also impact the people who value and use them .

Definition of terms

Aggregation- The gathering of a specific species at a particular time.

Alaska Board of Game- The Board of Game consists of seven members serving three-year terms. Members are appointed by the governor and confirmed by the legislature. The Board of Game's main role is to conserve and develop Alaska's wildlife resources by setting policy and direction for the management of the state's wildlife resources. The board is charged with making allocative decisions, and the Alaska Department of Fish and Game is responsible for management based on those decisions.

Composition survey- This survey basically describes the herd, calves vs adults, males vs females. This description varies depending on the pre-established need for information.

Distribution- How wildlife is spread out over a specific area.

Mortality- Death. This is a key factor in understanding any natural population from humans to caribou. For a population to be stable, mortality rates must equal productivity (reproductive) rates.

Movement- The geographic and elevation scale that an individual caribou utilizes over the landscape. This study measured this in square kilometers (geographic) and vertical meters (elevation).

Nutrient Cycle- The movement and exchange of organic and inorganic matter back into the production of living matter. The process is regulated by food web pathways that decompose matter into mineral nutrients.

Photo census- Annual count of caribou using images taken from the air.

Range- The distance an animal travels or wanders over a wide area.

Satellite Telemetry- Used on wildlife that will be studied over a period of time and travel such as caribou. Satellite collars are affixed to the caribou and researchers can monitor movements of that individual over time, without having to recapture it. Signals uploaded to the satellite give a specific location (GPS) of that individual or group of individuals.