



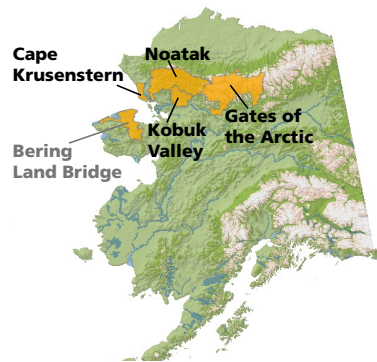
Bering Land Bridge N Pres. • Cape Krusenstern NM
Gates of the Arctic NP & Pres. • Kobuk Valley NP • Noatak N Pres.

December 2020

Dall's Sheep Resource Brief

Aerial view of ewes and lambs from a Super Cub during a Dall's sheep survey. NPS/Jared Hughey.

The Status of Dall's Sheep in the Arctic Network: Declining Populations



Map: Dall's sheep are being monitored in 4 Arctic Network parks: Gates of the Arctic National Park and Preserve, Noatak National Preserve, Kobuk Valley National Park and Cape Krusenstern National Monument.

There were an estimated 6,898 sheep (95% Credible Interval [CrI] 6,158-7,766 sheep) in 2015 in Gates of the Arctic National Park and Preserve (GAAR) and 740 sheep (95% CrI 620-899 sheep) in 2019 in the Western Arctic National Parklands (WEAR), which includes habitat in Noatak National Preserve (NOAT), Kobuk Valley National Park and Cape Krusenstern National Monument. These numbers indicated a 21% decline in GAAR since 2009, and a disturbing 74% decline in WEAR since 2011.

Annual surveys of subareas within GAAR and WEAR provide more detail about these declines. Populations were stable in the Itkillik subarea of GAAR from 2009 to 2012 (~1,600 sheep) but declined ~60% across 2013 and 2014. Populations have remained low but stable in the Itkillik subarea from 2015 to 2019 (~670 sheep). Sheep populations have been on a steep downward trend in the Western Baird subarea of WEAR, declining 73% from 2011 to 2019, when populations reached a remarkable low of 174 sheep (95% CrI 141-230).

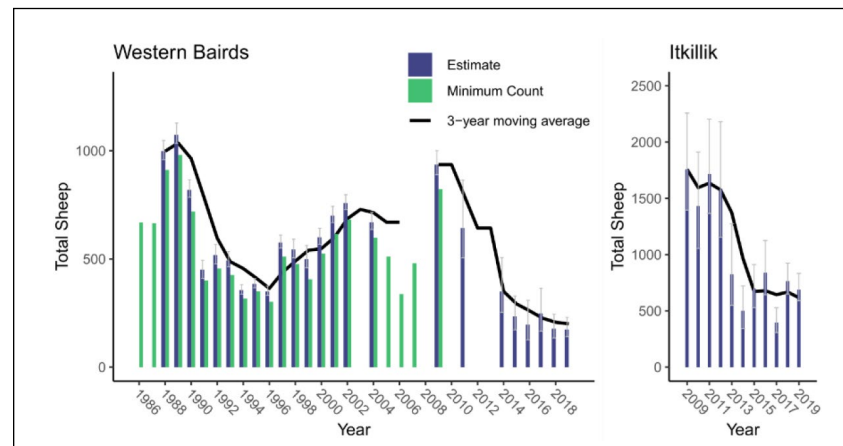
The number of lambs per 100 ewe-like sheep (which includes ewes, yearlings, and young rams), is often used as an indicator of reproductive success for Dall's sheep. The average ratio is ~30 lambs per 100 ewe-like sheep. Almost no lambs were observed in the Itkillik and W. Baird areas in 2013 and 2014. There was an average of 35 lambs per 100 ewe-like sheep in the Itkillik subarea (GAAR) and 33 lambs per ewe-like sheep in the W. Bairds (WEAR) from 2015-2019. Unfortunately, these higher than average reproductive rates have not translated into population growth. All hunts were closed by emergency order in WEAR in 2014 due to the population decline and have remained closed through 2020

How Does Climate Affect Dall's Sheep Populations?

Environmental conditions strongly affect Dall's sheep populations, especially in WEAR and GAAR, where sheep are living at the northern edge of their range. New studies show that [lamb survival is closely linked to timing of spring snow melt](#) and the [survival](#)

[of adult sheep is higher in mild winters with fewer freeze-thaw cycles.](#)

Graph: Results from aerial Dall's sheep surveys in the western Baird Mountains, WEAR, 1986-2019 and Itkillik subarea of ARC, 2009-2019. Estimates for WEAR are from sightability model analysis of minimum count data 1988-2009 (with 95% confidence intervals; Udevitz et al. 2006). All Itkillik estimates and western Baird estimates in 2011, and 2014-2019 are from distance sampling techniques (with 95% credible intervals; Schmidt and Rattenbury 2013). The western Baird subarea was partially surveyed in 1986, 1987 and 2005-2007. **Photo (far right):** GAAR Rams. NPS/Jared Hughey.



Why Dall's Sheep are Important

Dall's sheep are an alpine adapted species at their northernmost extent in the Brooks Range of Alaska. GAAR and NOAT encompass most of the available habitat in the central and western Brooks Range and were estimated in the 1980's to contain 13-15% of the world's Dall's sheep. Dall's sheep are an important subsistence species for local residents and highly valued where sport hunting is permitted in preserves. Dall's sheep are also one of the most visible large mammals for wildlife viewing in northern Alaska.

Widespread and dramatic declines in sheep numbers were observed in the early 1990s and again in 2013-2015, resulting in emergency closures for subsistence and sport hunting

in WEAR. Monitoring population trends is critical to conserving Dall's sheep and maintaining hunting opportunities. Moreover, information about sheep abundance, distribution, demographics and health can be highly indicative of changing environmental conditions over time.



A Dall's sheep ram. Courtesy of Jared Hughey.

What We Want To Know About Dall's sheep

- Long-term trends in sheep abundance and distribution.
- Long-term trends in sex and age composition of sheep populations.

How We Monitor Dall's Sheep

The Dall's sheep monitoring program in ARCEN is based on aerial distance sampling conducted at two scales: 1) park-wide sampling across GAAR and WEAR; and 2) more frequent sampling in key harvest management areas: the Itkillik and Anaktuvuk subareas in GAAR and the western Baird Mountains in WEAR. Estimates of total abundance and counts for different sex and age classes are produced

using Bayesian modeling. These efforts are in collaboration with the Central Alaska Network, which monitors Dall's sheep populations in Denali National Park and Preserve, Wrangell-St. Elias National Park and Preserve, and Yukon-Charley Rivers National Preserve. The park-wide aerial surveys are conducted every four years and every one or two years in the sub areas.



Map: Survey areas in the Arctic Network. Western Baird mountains are depicted in blue and cover areas in or near Cape Krusenstern National Monument, Noatak National Preserve, Kobuk Valley National Park, and Gates of the Arctic National Park and Preserve. Survey areas in most of Gates of the Arctic are shown in grey and cover much of the park. Smaller subareas within the survey areas are distinguished with hash mark patterns.

How Monitoring This Vital Sign Can Help Park Managers

- Detect changes in regional and local abundance of Dall's sheep
- Provide information about sheep demographics and health in areas where hunting is managed
- Improve our understanding of alpine environmental conditions and the effects of environmental change on local sheep populations

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<https://www.nps.gov/im/arcn/index.htm>