

## WSA22-02 Executive Summary

<b>General Description</b>	<p>WSA22-02 requests that Dall sheep hunting on Federal public lands in Units 24A and 26B, west of the Sagavanirktok River be closed to all users for the 2022-23 and 2023-24 wildlife regulatory years. <i>Submitted by: Western Interior Alaska Subsistence Regional Advisory Council</i></p>
<b>Proposed Regulation</b>	<p><b>Unit 24-Sheep</b></p> <p><del>Unit 24A, except that portion within the Gates of the Arctic National Park - 1 ram by Federal registration permit only</del>      <del>Aug. 20-Sep. 30. No open season.</del></p> <p><b>Federal public lands are closed to the taking of sheep for the 2022-23 and 2023-24 regulatory years for all users.</b></p> <p><del>Units 24A and 24B (excluding Anaktuvuk Pass residents), that portion within the Gates of the Arctic National Park - 3 sheep, no more than one of which may be a ewe, by Federal registration permit only, with exception for residents of Alatna and Allakaket who will report by a National Park Service community harvest system</del>      <del>Aug. 1-Apr. 30.</del></p> <p><b>Unit 26-Sheep</b></p> <p><del>Unit 26B, that portion within the Dalton Highway Corridor Management Area, west of the Sagavanirktok River - 1 ram with 7/8 curl or larger horn by Federal registration permit only</del>      <del>Aug. 10-Sep. 20. No open season.</del></p> <p><b>Federal public lands are closed to the taking of sheep for the 2022-23 and 2023-24 regulatory years for all users.</b></p> <p><del>Unit 26A, remainder and 26B, remainder, including the Gates of the Arctic National Preserve and Unit 26B, east of the Sagavanirktok River - 1 ram with 7/8 curl or larger horn</del>      <del>Aug. 10-Sep. 20.</del></p> <p><del>Unit 26B, remainder, including Gates of the Arctic National Preserve</del>      <del>No open season.</del></p> <p><b>Federal public lands are closed to the taking of sheep for the 2022-23 and 2023-24 regulatory years for all users.</b></p>

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<p><b>OSM Conclusion</b></p>	<p><b>Support</b> Wildlife Special Action WSA22-02 <b>with modification</b> to simplify the regulatory language.</p> <p>See page 31 for modified regulations.</p>
<p><b>Western Interior Alaska Subsistence Regional Advisory Council Recommendation</b></p>	<p><b>Proponent of request</b></p>
<p><b>North Slope Subsistence Regional Advisory Council Recommendation</b></p>	<p><b>Support</b></p>
<p><b>Interagency Staff Committee Comments</b></p>	<p>The Interagency Staff Committee found the analysis to be a thorough and accurate evaluation of the proposal and that it provides sufficient basis for the Regional Advisory Council recommendation and the Federal Subsistence Board action on this proposal.</p> <p>Scale is crucial to evaluate Dall sheep population viability. When viewed across the entire Brooks Range, Dall sheep numbers appear to be stable. However, some local populations appear to be critically low. Specifically, there are serious concerns about the viability of the Dall sheep population along the Dalton Highway Corridor Management Area (DHCMA). Recent population estimates and minimum count surveys indicate substantial declines in legal rams, ewes and lambs in most survey areas along the DHCMA. Severe weather conditions, including extended winters and rain on snow events are thought to be a major factor in the population declines for sheep in Units 24A and 26B. Declines in the sheep population within the DHCMA are a concern for rural subsistence users that rely on local populations near where they live.</p> <p>ANILCA Section 816(b) allows for closure of Federal public lands to the harvest of fish and wildlife “for reasons of public safety, administration, or to assure the continued viability of a particular fish or wildlife population.” The Western Interior Subsistence Regional Advisory Council (the proponent for WSA22-02), is extremely concerned about the central Brooks Range sheep population along the DHCMA and is willing to forgo subsistence harvest of the species to aid in its recovery. Based on available biological information, and on the traditional ecological knowledge of Federally qualified subsistence users residing in the region, the proposed closure of Dall sheep hunting by all</p>

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	<p>users may be justified and approval of WSA22-02 could aid in the recovery of sheep populations within Units 24A and 26B. The North Slope Subsistence Regional Advisory Council also recommended closing sheep hunting to all users in Units 24A and 26B during their last regulatory meeting.</p> <p>Historically, most of the sheep harvest in the areas subject to this special action request has been by non-Federally qualified users. Since there are very few, if any, legal rams available for harvest in the area, closure of hunting by non-rural users could provide for conservation of healthy populations of sheep and to allow for continuation of subsistence uses of sheep. Closure to all users, as requested by WSA22-02, is likely to help ensure the continued viability of the Dall sheep populations in the DHCMA. Although sheep harvest by Federally qualified subsistence users is low, sheep numbers are low enough that any additional mortality from harvest may be unsustainable and could slow natural recovery of Dall's sheep in the area.</p>
<b>ADF&amp;G Comments</b>	<b>Oppose</b>
<b>Public Comments</b>	<b>7 Support, 9 Oppose, 1 Neutral</b>

**STAFF ANALYSIS**  
**TEMPORARY SPECIAL ACTION**  
**WSA 22-02**

**ISSUES**

WSA22-02, submitted by the Western Interior Subsistence Regional Advisory Council (Council), requests that Dall sheep hunting on Federal public lands in Units 24A and 26B, west of the Sagavanirktok River be closed to all users for the 2022-23 and 2023-24 wildlife regulatory years (**Figure 1**).

**DISCUSSION**

The Council is very concerned about the decreasing sheep populations along the Dalton Highway and believes traditional ecological knowledge on this subject has been ignored. Since 2012, unusual weather conditions including rain on snow events, late springs, and early deep snows have decimated these sheep populations, resulting in extremely low lamb recruitment, poor lamb production and loss of mature rams. Increased predation by wolves is also believed to have contributed to the population decline. Surveys conducted in 2021 by the Bureau of Land Management (BLM), the National Park Service (NPS) and Alaska Department of Fish and Game (ADF&G) showed lower numbers than from prior surveys.

The Council expresses frustration over the lack of biological data, particularly the failure to collect age composition data on rams. Currently, 6- and 7-year-old rams remain in the population, but there are very few 2–5-year-old rams currently in the population. The Council notes past studies have demonstrated detrimental effects of young rams breeding ewes in the absence of more mature, larger rams, including higher post-rut ram mortality and lower lamb production.

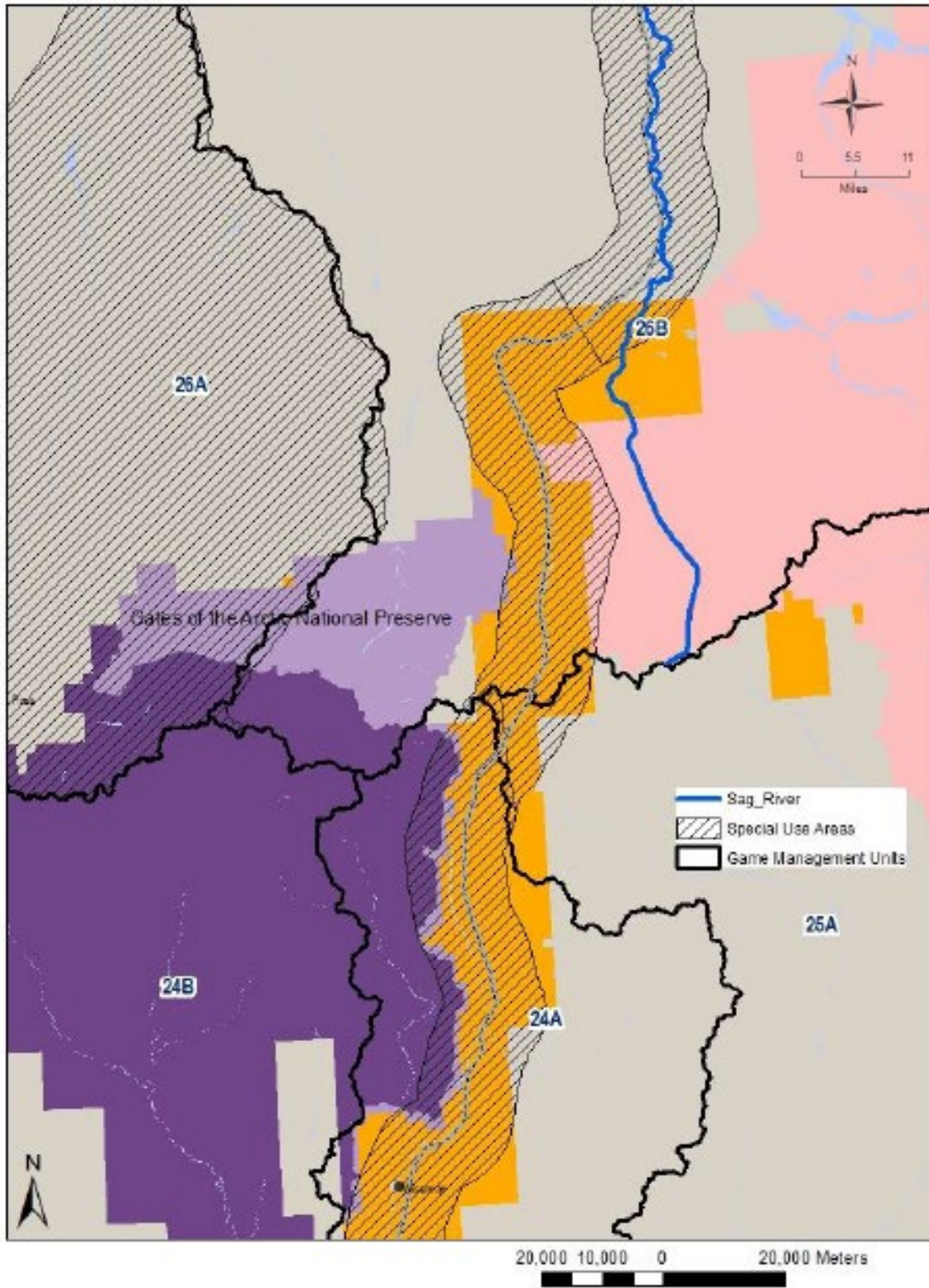
Current harvest management and harvest levels are other concerns. The Council further states that the full-curl management strategy only works with consistent ram recruitment, *not* when several cohorts are missing, as has happened to the Units 24A and 26B sheep populations. The Council argues that harvesting the remaining 6- and 7-year-old rams over the next two years, which is likely to occur under the current management regime, will exacerbate the recovery of these sheep populations since there are no 2–5-year-old rams to take their place and smaller, inexperienced rams will breed ewes in their absence.

The Council considers the Unit 24A and 26B sheep populations to be in a dire situation and these requested closures are critical to their recovery.

The applicable Federal regulations are found in 36 CFR 242.19(b) and 50 CFR 100.19(b) (Temporary Special Actions) and state that:

*. . . After adequate notice and public hearing, the Board may temporarily close or open public lands for the taking of fish and wildlife for subsistence uses, or modify the requirements for subsistence take, or close public lands for the taking of fish and wildlife for nonsubsistence uses, or restrict take for nonsubsistence uses.*





**Figure 1.** Map of proposed closure area in Unit 26B showing Federal public lands, submitted with the request.

## Existing Federal Regulation

### Unit 24–Sheep

*Unit 24A, except that portion within the Gates of the Arctic National Park - 1 ram by Federal registration permit only* Aug. 20-Sep. 30.

*Units 24A and 24B (excluding Anaktuvuk Pass residents), that portion within the Gates of the Arctic National Park - 3 sheep, no more than one of which may be a ewe, by Federal registration permit only, with exception for residents of Alatna and Allakaket who will report by a National Park Service community harvest system* Aug. 1-Apr. 30.

### Unit 26–Sheep

*Unit 26B, that portion within the Dalton Highway Corridor Management Area - 1 ram with 7/8 curl or larger horn by Federal registration permit only* Aug. 10-Sep. 20.

*Unit 26A, remainder and 26B, remainder, including the Gates of the Arctic National Preserve - 1 ram with 7/8 curl or larger horn* Aug. 10-Sep. 20.

## Proposed Federal Regulation

### Unit 24–Sheep

~~*Unit 24A, except that portion within the Gates of the Arctic National Park - 1 ram by Federal registration permit only*~~ ~~Aug. 20-Sep. 30.~~  
***No open season.***

***Federal public lands are closed to the taking of sheep for the 2022-23 and 2023-24 regulatory years for all users.***

~~*Units 24A and 24B (excluding Anaktuvuk Pass residents), that portion within the Gates of the Arctic National Park - 3 sheep, no more than one of which may be a ewe, by Federal registration permit only, with exception for residents of Alatna and Allakaket who will report by a National Park Service community harvest system*~~ Aug. 1-Apr. 30.

## Unit 26—Sheep

*Unit 26B, that portion within the Dalton Highway Corridor Management Area, west of the Sagavanirktok River - ~~1 ram with 7/8 curl or larger horn by Federal registration permit only~~* ~~Aug. 10-Sep. 20.~~  
**No open season.**

**Federal public lands are closed to the taking of sheep for the 2022-23 and 2023-24 regulatory years for all users.**

*Unit 26A, remainder ~~and 26B, remainder~~, including the Gates of the Arctic National Preserve ~~and Unit 26B, east of the Sagavanirktok River - 1 ram with 7/8 curl or larger horn~~* Aug. 10-Sep. 20.

**Unit 26B, remainder, including Gates of the Arctic National Preserve** **No open season.**

**Federal public lands are closed to the taking of sheep for the 2022-23 and 2023-24 regulatory years for all users.**

## Existing State Regulation

### Unit 24—Sheep

<i>24A within the Dalton Highway Corridor Management Area</i>	<i>Residents: One ram with full-curl horn or larger. Youth hunt only</i>	<i>HT</i>	<i>Aug 1-Aug 5</i>
	<i>Non-residents: One ram with full-curl horn or larger every four regulatory years. Youth hunt only</i>	<i>HT</i>	<i>Aug 1-Aug 5</i>
	<i>Residents: One ram with full-curl horn or larger</i>	<i>HT</i>	<i>Aug 10-Oct 5</i>
	<i>Non-residents: One ram with full-curl horn or larger every four regulatory years.</i>	<i>HT</i>	<i>Aug 10-Oct 5</i>
<i>24A remainder</i>	<i>Residents: One ram with full-curl horn or larger. Youth hunt only</i>	<i>HT</i>	<i>Aug 1-Aug 5</i>
	<i>Non-residents: One ram with full-curl horn or larger every four regulatory years. Youth hunt only</i>	<i>HT</i>	<i>Aug 1-Aug 5</i>
	<i>Residents: One ram with full-curl horn or larger</i>	<i>HT</i>	<i>Aug 10-Sep 20</i>
	<i>Non-residents: One ram with full-curl horn or larger every four regulatory years.</i>	<i>HT</i>	<i>Aug 10-Sep 20</i>

## Unit 26—Sheep

<i>26A &amp; 26B private lands within Gates of the Arctic National Park</i>	<i>Residents: Three sheep</i>	<i>HT</i>	<i>Aug 1-Apr 30</i>
	<i>Non-residents</i>	<i>HT</i>	<i>No open season</i>
<i>26B within the Dalton Highway Corridor Management Area</i>	<i>Residents: One ram with full-curl horn or larger. Youth hunt only</i>	<i>HT</i>	<i>Aug 1-Aug 5</i>
	<i>Non-residents: One ram with full-curl horn or larger every four regulatory years. Youth hunt only</i>	<i>HT</i>	<i>Aug 1-Aug 5</i>
	<i>Residents: One ram with full-curl horn or larger</i>	<i>HT</i>	<i>Aug 10-Oct 5</i>
	<i>Non-residents: One ram with full-curl horn or larger every four regulatory years.</i>	<i>HT</i>	<i>Aug 10-Oct 5</i>
<i>26A &amp; 26B remainder</i>	<i>Residents: One ram with full-curl horn or larger. Youth hunt only</i>	<i>HT</i>	<i>Aug 1-Aug 5</i>
	<i>Non-residents: One ram with full-curl horn or larger every four regulatory years. Youth hunt only</i>	<i>HT</i>	<i>Aug 1-Aug 5</i>
	<i>Residents: One ram with full-curl horn or larger</i>	<i>HT</i>	<i>Aug 10-Sep 20</i>
	<i>Non-residents: One ram with full-curl horn or larger every four regulatory years.</i>	<i>HT</i>	<i>Aug 10-Sep 20</i>

## Extent of Federal Public Lands

Unit 24A is comprised of 72% Federal public lands and consist of 58.7% BLM, 10.9% NPS and 2.4% U.S. Fish and Wildlife Service (USFWS) managed lands.

Unit 26B is comprised of 29% Federal public lands and consist of 22.8% USFWS, 3.6% BLM and 2.7% NPS managed lands.

## Customary and Traditional Use Determinations

Residents of Unit 24 residing north of the Arctic Circle, Allakaket, Alatna, Hughes and Huslia have a customary and traditional use determination for sheep in Unit 24.

Residents of Unit 26, Anaktuvuk Pass, Point Hope and Wiseman have a customary and traditional use determination for sheep in Unit 26B.

## Regulatory History

In 1992, the Federal Subsistence Board (Board) adopted Proposal 118 requiring a Federal registration permit for sheep hunting in the Dalton Highway Corridor Management Area (DHCMA) in Units 24 and

26B. This proposal set a harvest limit of one ram with 7/8-curl horn or larger and a season of Aug. 10–Sept. 20. Prior to Proposal 118 being adopted, there was no Federal permit requirements for sheep within the DHCMA.

In 1994, ADF&G submitted Proposal P94-85 to change the horn size of legal rams in Unit 26 outside of Gates of the Arctic National Park and Preserve (GAAR) from 7/8 to a full-curl ram. The Board did not adopt this proposal as it would have restricted Federally qualified subsistence users.

In 2004, the Board adopted Proposal WP04-57 with modification, which shifted the season for sheep in a portion of Unit 24 (that portion within the DHCMA except for GAAR) from Aug. 10–Sept. 20 to Aug. 20–Sept. 30. The shift of the season provided additional subsistence hunting opportunity after the end of the moose season, recognizing that there would be little to no increase in sheep harvested due to the limited number of qualified hunters, the 7/8-curl horn restriction and the reported harvest at that time.

In 2006, the Board adopted Proposal WP06-69, submitted by ADF&G, which requested that sheep regulations for Unit 24 be modified to reduce regulatory complexity. Unit 24 had recently been divided into subunits under State regulations and the proposal requested incorporating the new subunit descriptions into Federal regulations. The regulatory language established the current hunt area descriptor for the Federal hunt in Unit 24A to exclude that portion within GAAR.

In 2012, Wildlife Special Action WSA12-01 was submitted by the Council and requested Federally qualified subsistence users be allowed to harvest ½ curl horn or larger rams in Unit 24A for the 2012 season. This was approved by the Board based on a stable sheep population estimates within the DHCMA and in the adjacent areas of GAAR. Additionally, with low Federal harvest rates, there would be little impact on sheep population in the area.

In 2014, Wildlife Proposal WP14-30 submitted by the Council requested the harvest limit for sheep in Unit 24A, except that portion within the GAAR be changed from 1 ram with 7/8-curl horn or larger to 1 ram. This proposal was unanimously adopted to allow greater subsistence priority.

In the Western Brooks Range, the BOG adopted Proposal 203 in 2015, which closed all sheep seasons in Unit 23 and in Unit 26A, west of Howard Pass and the Etivluk River in response to the drastic sheep population declines in the area. Sheep seasons in Unit 23 have remained closed under State regulations. In 2016, the Board adopted Proposal WP16-53 with modification to establish may-be-announced sheep seasons in the Baird and DeLong Mountain hunt areas of Unit 23 and delegated authority to the WEAR superintendent to manage the hunt. A Federal season has never been announced as the Unit 23 and 26A sheep populations have not recovered.

In 2020, the Alaska Board of Game (BOG) adopted Proposal 84, extending the State sheep season from Aug. 10–Sept. 20 to Aug. 10–Oct. 5 within the DHCMA in Units 24A, 25A, and 26B. This was approved because of the low numbers of sheep harvested within the DHCMA, the belief that few hunters would or could access the area in late September/early October and a stable sheep population. It was the majority consensus that this would have little to no impact on the sheep population. One member of the BOG opposed this proposal because the Koyukuk River Advisory Committee was opposed to it.

## Dalton Highway Corridor Management Area

Under Federal regulations, “You may not use firearms, snowmobiles, licensed highway vehicles or motorized vehicles, except aircraft and boats, in the Dalton Highway Corridor Management Area, which consists of those portions of Units 20, 24, 25, and 26 extending 5 miles from each side of the Dalton Highway from the Yukon River to milepost 300 of the Dalton Highway, except as follows: Residents living within the Dalton Highway Corridor Management Area may use snowmobiles only for the subsistence taking of wildlife. You may use licensed highway vehicles only on designated roads within the Dalton Highway Corridor Management Area. The residents of Alatna, Allakaket, Anaktuvuk Pass, Bettles, Evansville, Stevens Village, and residents living within the Corridor may use firearms within the Corridor only for subsistence taking of wildlife.”

The DHCMA also occurs under State regulations but was modified for the 2022 regulatory year. At their 2021 Statewide Regulations meeting, the BOG adopted Proposal 172 as amended to remove the restrictions on transporting game and hunting equipment by motor vehicle within the DHCMA. These modifications were adopted because overlapping statutes and regulations were conflicting and resulted in unintended consequences such as homesteaders being unable to legally access their property by motor vehicle.

Under State regulations, the DHCMA consists of those portions of Units 20 and 24 - 26 extending five miles from each side of the Dalton Highway, including the drivable surface of the Dalton Highway, from the Yukon River to the Arctic Ocean, and including the Prudhoe Bay Closed Area; the area within the Prudhoe Bay Closed Area is closed to the taking of big game; the remainder of the DHCMA is closed to hunting; however, big game, small game, and fur animals may be taken in the area by bow and arrow only, and small game may be taken by falconry; and furbearers may be taken by trapping; any hunter traveling on the Dalton Highway must stop at any check station operated by the department within the DHCMA (ADF&G 2022a).

## **Current Events**

### WIRAC Letter to BLM

The Council sent a letter to the State Director of BLM Alaska in February of 2022, requesting an immediate cessation of all permitted hunting guides on BLM managed land within Guide Use Area 24-3 (which approximately corresponds with Unit 24A). Stating the same concerns as in their special action request, they feel that allowing non-resident hunting to occur on Federal managed lands while subsistence users are not meeting their needs only exacerbates the situation. The letter also expresses frustration that traditional and ecological knowledge (TEK) about the decline continues to be ignored. They also requested the BLM change the strategy of how they award permits to better protect the resource.

### Koyukuk River AC letter to BOG

The ADF&G Koyukuk River Advisory Committee (AC) submitted a letter of concern to the BOG at their March 2022 meeting in Fairbanks, requesting them to issue an emergency order to close or drastically reduce sheep harvest in Unit 24A for two regulatory years (**Appendix 1**). The letter points out a reputed flaw in the full-curl management strategy used by ADF&G. The letter indicates full-curl management is

based on having constant recruitment from all immature cohorts, which the AC states has not existed in this population for the last 10 years. This loss of complete age structure was caused by erratic weather events, which killed multiple cohorts starting in 2012. The AC felt they had to appeal to the BOG as they could not reach an understanding with ADF&G staff during their AC meeting in February 2022.

#### Public Hearing and Written Comments

The Office of Subsistence Management held a public hearing to solicit comments on WSA22-02 on April 28, 2022, from 4:00pm to 6:30pm by teleconference. Seventeen people testified and were almost evenly split between 7 Wiseman/Coldfoot residents in support of the request and a mix of 9 non-Federally qualified users, non-local hunters, guides and Alaska residents who were in opposition to the requested closure. One commenter was neutral on the request but stated managing this population for recovery would be difficult because they occur on Federal and State managed lands and there should be a comprehensive recovery plan initiated by all concerned parties.

Every local resident that commented was in support of this request and stated there has been a visible decline in the sheep population in the last 5 years. Most locals confirmed the unusual winter weather events this special action request attributed to the decline. Several local tour guides noted they have not seen sheep from the road for the last several years. All commenters noted how many of the locals rely on sheep for meat and/or tourism. One commenter noted that State of Alaska Wildlife Troopers are not allowed to seal sheep skulls anymore. Instead, successful harvesters must have them sealed by biologists so that accurate ages of harvested sheep can be determined. All testifiers supporting this proposal felt that ceasing all hunting for 2 years may allow the sheep population to recover enough individuals to allow for successful overall recovery in the future.

The most frequently given reason for opposition to the request was that while ADF&G data shows the sheep population is low, it is still healthy enough to have a harvestable surplus. ADF&G testified to this point specifically during the hearing while voicing their opposition to the proposed closure. ADF&G's full comment letter is included at the end of this analysis. Several who testified stated they agree that the population is low, but all sheep populations throughout Alaska are low. Most believed the full-curl management regime justifies harvest during periods of low population because none of the primary breeding population is removed, only rams past their prime. One caller stated there have been population declines in other units where hunting has remained open and population recovery was still achieved. Several callers asserted the DHCMA is the only non-draw archery harvest ticket hunt for Dall sheep available in Alaska; lands within the DHCMA are archery only; and bowhunters take a very small portion of sheep in these units. One commenter, representing Resident Hunters of Alaska, said the low sheep population should lead the BOG to close or limit the non-resident harvest to allow for the continuation of harvest by all Alaska residents. The general theme of opposition was a Federal public lands closure would not aid in population recovery and would only serve to hurt users of the resource.

#### North Slope Subsistence Regional Advisory Council

The North Slope Subsistence Regional Advisory Council (North Slope Council) acted on this request at their winter 2022 meeting held March 8-9. The North Slope Council felt the closure was justified due to

the population decline in Dall sheep in Units 24A and 26B. They recommended to support the closure and their full justification is included at the end of this analysis.

### **Biological Background**

Dall sheep are found throughout the Brooks Range wherever suitable habitat exists. In 1985, there was an estimated population of 30,000 sheep that had been stable over the previous 10 years (Heimer 1985). These were estimated to be 11,000 within the Arctic National Wildlife Refuge (ANWR), 3,000 between the western ANWR border and the Trans-Alaska Pipeline and 12,000 within GAAR. The eastern Brooks Range (which includes lands within and east of the DHCMA) accounted for 13,000 of those sheep. This area experienced a decline during the 1990s, when it is estimated approximately 40% of the population was lost. The most likely cause of this decline was severe weather, such as freeze-thaw and rain on snow events, along with increased predation. Dall sheep may experience greater sensitivity to external influences, such as temperature and weather, because they occur at higher elevations and latitudes than other ungulates (Van de Kerk et al. 2020). After this population decline, few standardized surveys were conducted in the eastern Brooks Range. Available survey data, harvest reports and hunter observations indicated the sheep population had stabilized at lower numbers since the 1990s decline (Caikoski 2011). Sheep surveys in the central Brooks Range (areas west of the DHCMA and within GAAR) were conducted mostly in GAAR and varied in size and type. The results of these surveys suggested a low sheep population from the 1970s through about 1982. Then from 1982-1984 the population increased and remained stable through 1987. The central Brooks Range population experienced a similar decline from 1987 to the mid-1990s (Caikoski 2018).

Recent weather events have affected the sheep population in the central and eastern Brooks Range, like the extended winter weather in the spring of 2013 and rain on snow events in both October 2018 and March 2019. The extended winter of 2013 caused the end of the continuous snow season to last 6-19 days longer than normal (Rattenbury et al. 2018). Snow stayed on the ground long enough in GAAR to overlap with peak lambing season, which generally occurs in mid-May. This event had a dramatic effect on sheep populations, with a 39% reduction in the sheep abundance within the Ikillik area (Rattenbury et al. 2018). While this was a decline in total population of sheep; rams, ewes and lambs, it dramatically lowered the lamb:ewe-like ratio. This decline is illustrated in data from ADF&G, BLM and NPS alike, and is discussed below.

ADF&G surveys one area of the central and eastern Brooks Range which is divided into two distinct survey units (1A/1B survey areas) and covers 800 mi<sup>2</sup> in eastern Unit 24A and western Unit 25A (**Figure 2**) (Caikoski 2018). These areas have been surveyed in July almost yearly since 2002. The purpose of these surveys is to obtain a minimum count of sheep as well as an index of sex and age composition and mid-summer lamb recruitment (Caikoski 2021). The minimum count survey results in an index to trend in abundance and composition over time in this geographic area (Caikoski 2018) and cannot be used to estimate total population numbers for the survey area or the Brooks Range sheep range. Surveys conducted on an infrequent basis make it difficult to establish short-term trends (Whitten 1997) and this is also true with the minimum count surveys conducted by ADF&G (Caikoski 2018). However, dramatic changes of abundance are likely detectable with this methodology, but with the limited survey data available, the magnitude and extent of declines cannot be quantified (Caikoski 2018).



ADF&G minimum count data appeared stable through 2012 with an average of 1,398 total sheep from 2002-2012 (**Figure 3**). Then in the 2014 count, coinciding with the severe winter of 2013/14, the total count dropped to 827 sheep, 541 of which were “ewe-like” and the lamb:ewe-like ratio dropped to 2:100. This cohort of lambs would be the 8-year-olds that would be legal rams to harvest in 2022. Later surveys conducted in 2018 and 2021 show losses of 31.8% and 66.4% total sheep, respectively. The ADF&G sheep count is currently at 469 total sheep based on their 2021 survey results.

Rams make up a smaller percentage of the overall population of Dall sheep. Since 2002, counts from ADF&G for the 1A/1B survey areas averaged 24.9% rams (**Figure 4**). Of all rams counted from 2002-2021, an average of 14.8% were legal for harvest (full-curl or larger), which is 3.2% of total sheep counted. The number of legal rams at the last count in 2021 was 12, which is 2.5% of the total 2021 sheep count (Caikoski 2021). Rams counted by ADF&G have been trending down since the surveys began in 2002.

Mid-summer lamb recruitment is an indicator of productivity and survival of sheep in the study area. Sheep classified as ewe-like include adult female sheep, yearlings of both sexes and some 2-year-old rams. The lamb:100 ewe-likes ratio has averaged 25.2 lambs:100 ewe-likes since 2002 (**Figure 5**). 2018 was a higher-than-average year for lambs with 36 lambs:100 ewe-likes, followed by a lower than average 22 lamb:100 ewe-likes in the latest survey in 2021 (Caikoski 2021). The 2018 and 2021 ratios should be considered in the context of an overall lower sheep population. So even though these ratios are consistent with previous years, total ewe-like and lamb numbers were both lower than previous surveys.

The BLM Central Yukon Field Office surveys BLM and State managed lands for Dall sheep in the Brooks Range along the DHCMA in Units 24A, 25A and 26B during July, including the State 1A/1B survey areas (**Figure 2**). These surveys are conducted in cooperation with the NPS Arctic Inventory and Monitoring Network, which surveys two areas along the DHCMA: 1) the southeast Gates of the Arctic (SE GAAR) and 2) Itkillik survey areas (**Figure 6**). The BLM and NPS fly aerial distance sampling transects and use a Bayesian model to produce population estimates (rather than just trends) (Rattenbury 2017). This enables a smaller portion of the study area to be surveyed and produces an estimate of sheep not seen from the number of sheep that were counted (sightability function) to produce the final estimate. This method includes a measure of precision, the credible interval or error range. An inherent weakness of sampling surveys is the estimate is only as good as the data used to derive it (Rattenbury 2017). Therefore, when fewer numbers of sheep are observed, the estimate has larger credible intervals, which indicates less certain estimates. Since these credible intervals are based on the total number of sightings from the survey, the results cannot be separated into smaller units. Therefore, Unit 26 data cannot be separated from Unit 24 data and still maintain the original accuracy achieved. Because of differing survey methodology, the ADF&G survey results are not directly comparable with the BLM/NPS survey results, but they still trend in concert with each other.

In the 1A/1B survey areas, the BLM estimated 293 total Dall sheep for 2021 (**Figure 7**), which is a 77% decrease from results of the survey conducted in 2015 (the last year when the BLM full survey area was surveyed in concurrence with the 1A/1B survey areas) (McMillan 2022, pers. comm.). This result is much lower than the estimate from the last survey conducted by the BLM of 1,103 in 2018. The number of full-

curl rams has substantially declined within the same timeframe, from 46 in 2014 and 45 in 2016 to estimates of 7, 1 and 5 full-curl rams in 2017, 2018 and 2021, respectively. The BLM full survey area encompasses the 1A/1B survey areas with more BLM managed lands along the DHCMA and includes some land in Unit 26B. The estimate in the full survey area was 3,241 sheep in 2015 and 1,229 sheep in 2021. This is an overall decrease of 62.1% (**Table 1**).

In the SE GAAR survey unit, the NPS estimated there were 2,525 total sheep (95% Bayesian Credible Intervals [BCI] of 2,334–2,776) in 2015 (**Figure 8**). The population estimate from the latest survey completed in 2021 dropped to 1,100 sheep total (BCI 922–1,405), which is a 56.4% decline (Deacy 2022, pers. comm.). The Itkillik survey area also declined from an estimated 1,577 total sheep in 2012 to an estimated 825 total sheep in 2013 because of severe winter weather and since then has remained at lower levels (**Figure 9**). The average population estimate from 2013- 2019 for the Itkillik survey area is 673 total sheep. The 2021 survey resulted in an estimate of 504 (BCI 416–626) total sheep. This is a decline of 25.1% since 2019.

Ram abundance in both BLM and NPS survey areas has declined in recent years. In the BLM full survey area, legal ram numbers dropped from an estimated 59 rams in 2015 to 12 rams (BCI 0–44) in 2021 (**Table 1**) (McMillan 2022, pers. comm.). In 2015 full-curl rams accounted for 1.82% of the total estimated sheep population in the BLM full survey area, by 2021 that proportion fell almost in half, to .98%. Full-curl rams in SE GAAR have declined by 65.7%, from 137 rams in 2015 to 47 rams in 2021. Smaller ram abundance in the SE GAAR survey area did not decline as much, but still showed a decrease of 52.5%, from 379 rams in 2015 to 180 rams in 2021 (**Figure 8**) (Deacy 2022, pers. comm.).

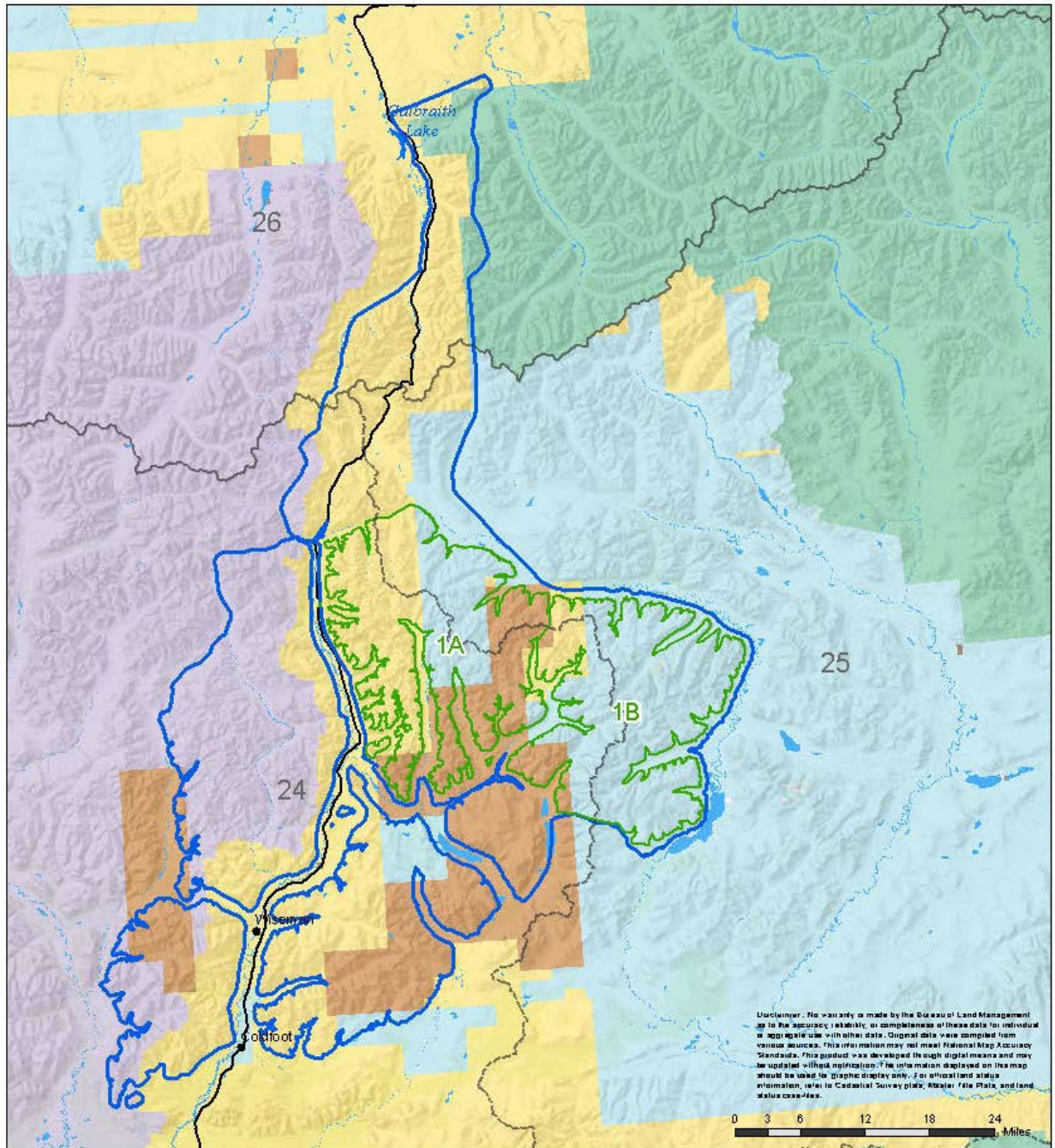
The overall abundance of full-curl rams in the central Brooks range has declined since 2009. All survey results from all agencies demonstrate a decline in full-curl ram numbers. A drastic decline is evident when 2021 results are compared to results for 2015 (**Table 2**). But even when 2021 results are compared to the average ram abundance per survey area since 2009 a decline is evident.

Mid-summer lamb:100 ewe-likes ratios have also declined in recent years (**Table 3**). Since 2015, in all survey areas but the Itkillik, this ratio has declined an average 42.7%. The BLM full survey area declined from 38:100 in 2015 to 19:100 in 2021. NPS survey results show a drop from 38:100 to 26:100 over the same period. The ratio in the Itkillik survey area increased slightly during this period from 28:100 to 30:100 (Deacy 2022, pers. comm.; McMillan 2022, pers. comm.).



# BLM Dall's Sheep Survey Units

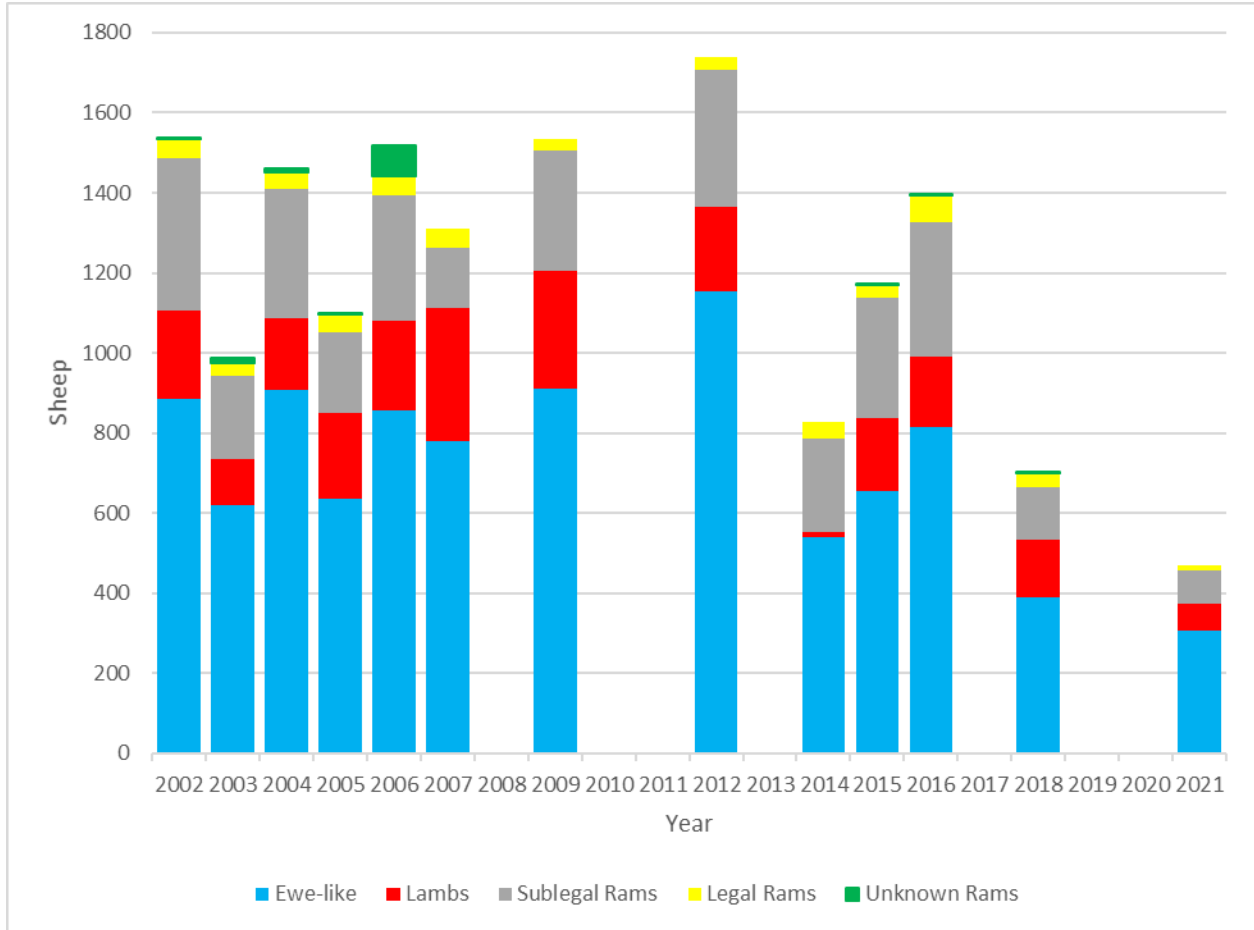
U.S. DEPARTMENT OF THE INTERIOR | BUREAU OF LAND MANAGEMENT | ALASKA



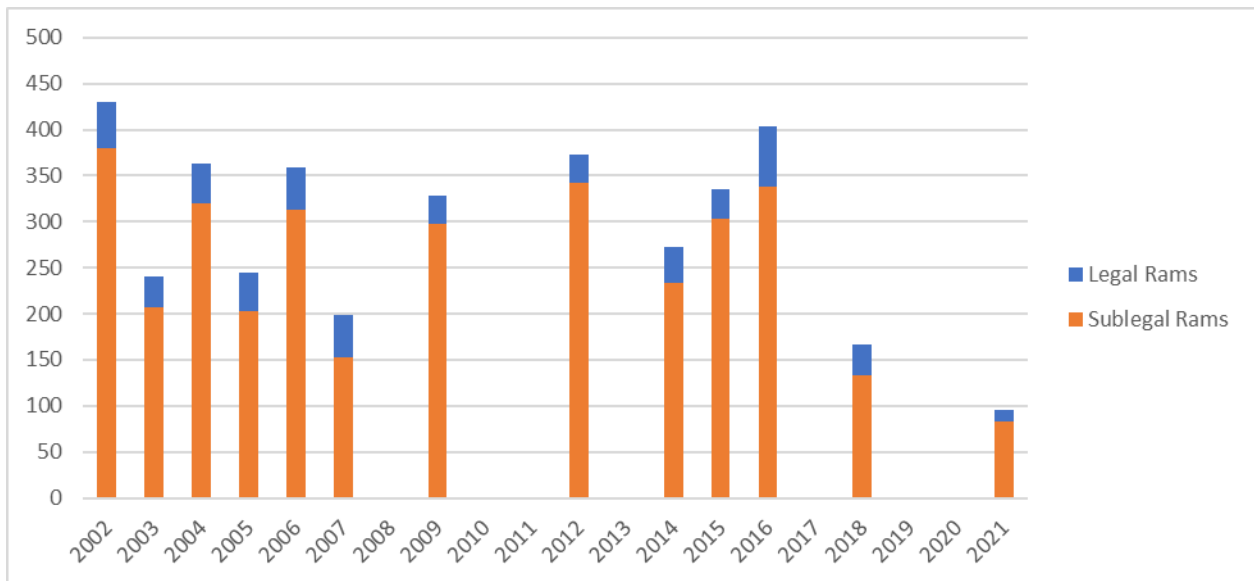
- Units 1A/1B
- BLM Full Survey Area
- Dalton Highway
- ADFG Game Management Units
- Administered Lands
  - Bureau of Land Management
  - Fish and Wildlife Service
- National Park Service
- State
- Native Allotment
- Native Lands
- Private
- Water



**Figure 2.** Eastern Unit 24A and western Unit 25A survey areas. ADF&G 1A/1B survey areas shown in green outline. BLM survey areas shown in blue outline (McMillan, 2022).

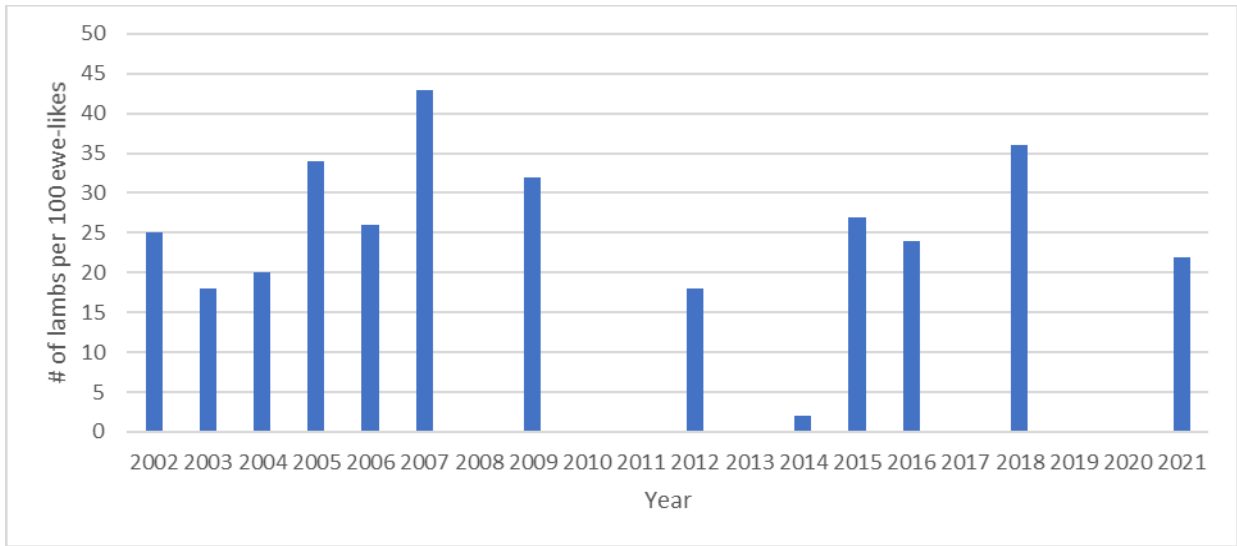


**Figure 3.** ADF&G minimum counts for 1A/1B survey areas. Ewe-like include adult female sheep, yearling sheep of both sexes and some 2-year-old rams. Legal rams include all full-curl and larger rams, sub-legal include all less than full-curl rams. (Caikoski, 2021).

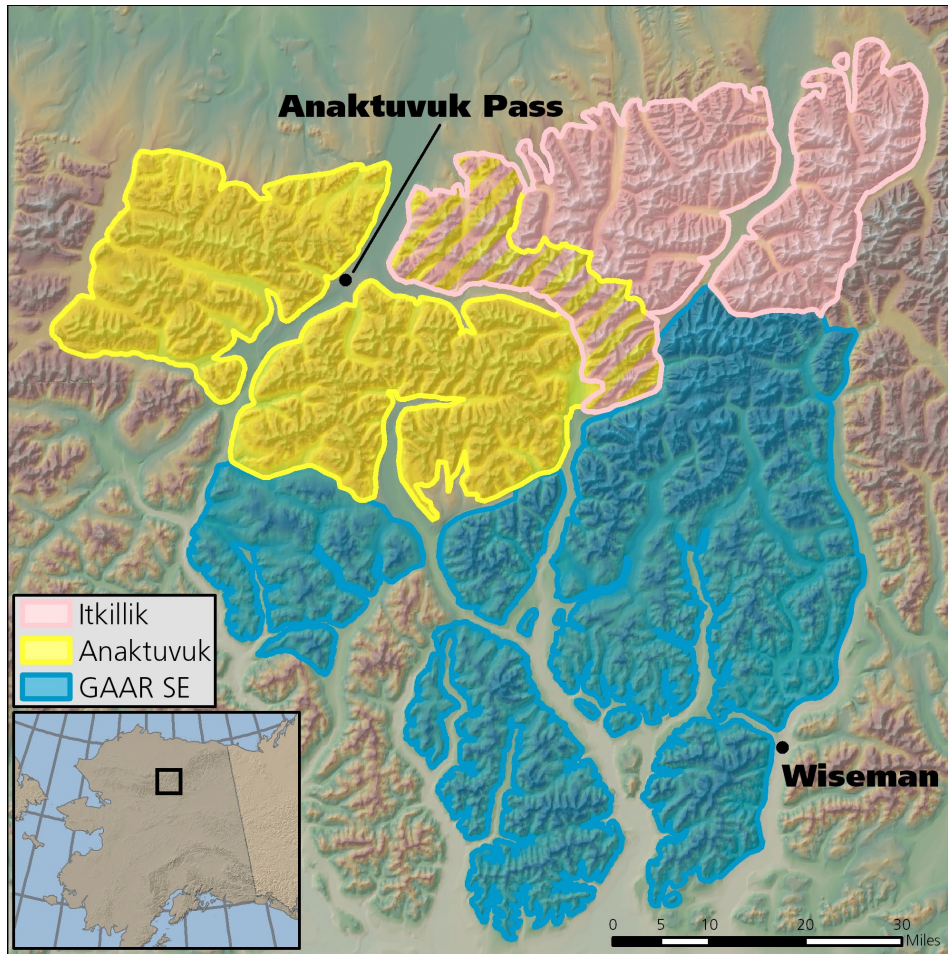


**Figure 4.** Minimum counts of sub-legal and legal rams in 1A/1B survey areas since 2002 (Caikoski 2021).

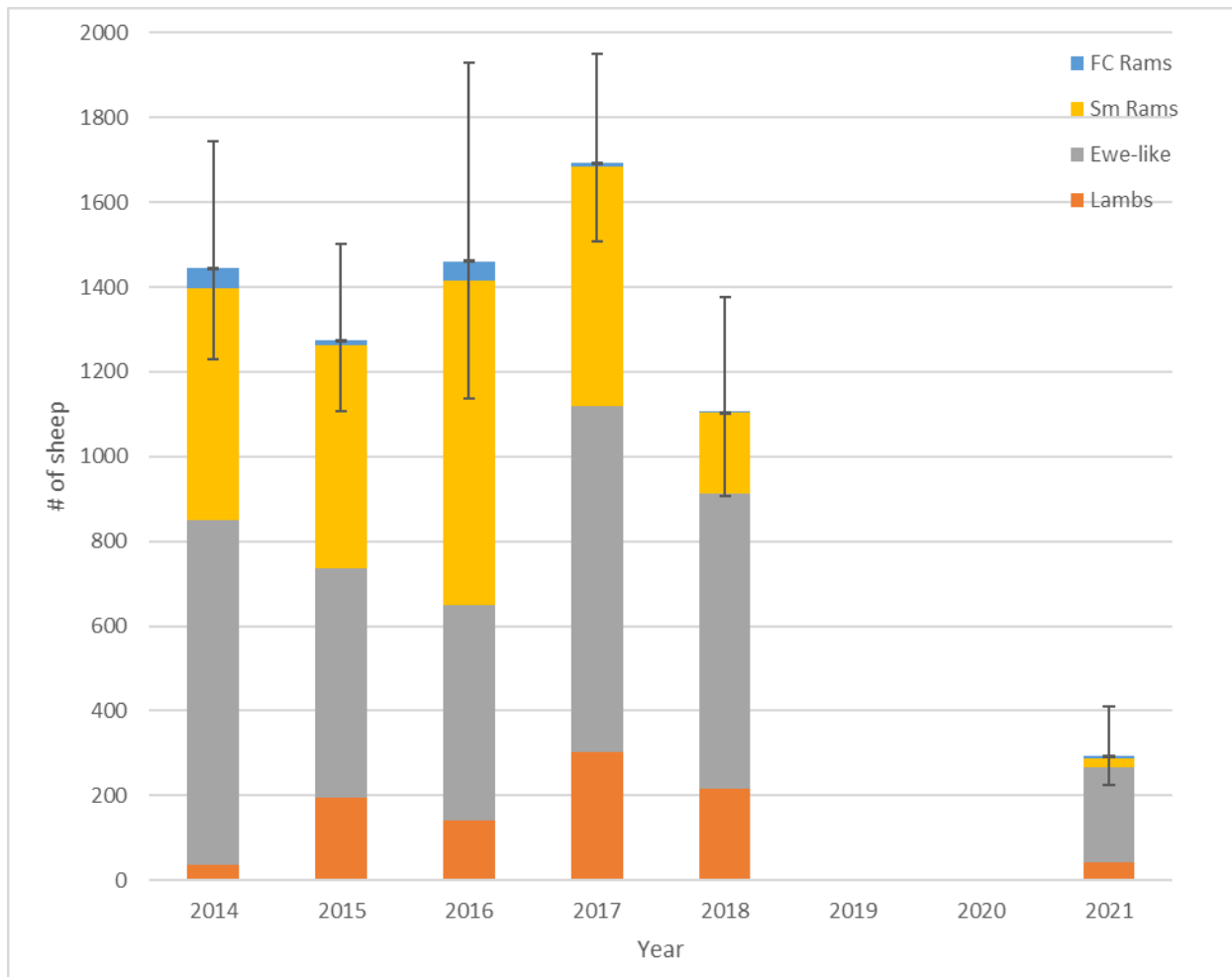




**Figure 5.** Ratios of lambs to 100 ewe-like sheep in 1A/1B survey areas since 2002 (Caikoski 2021).



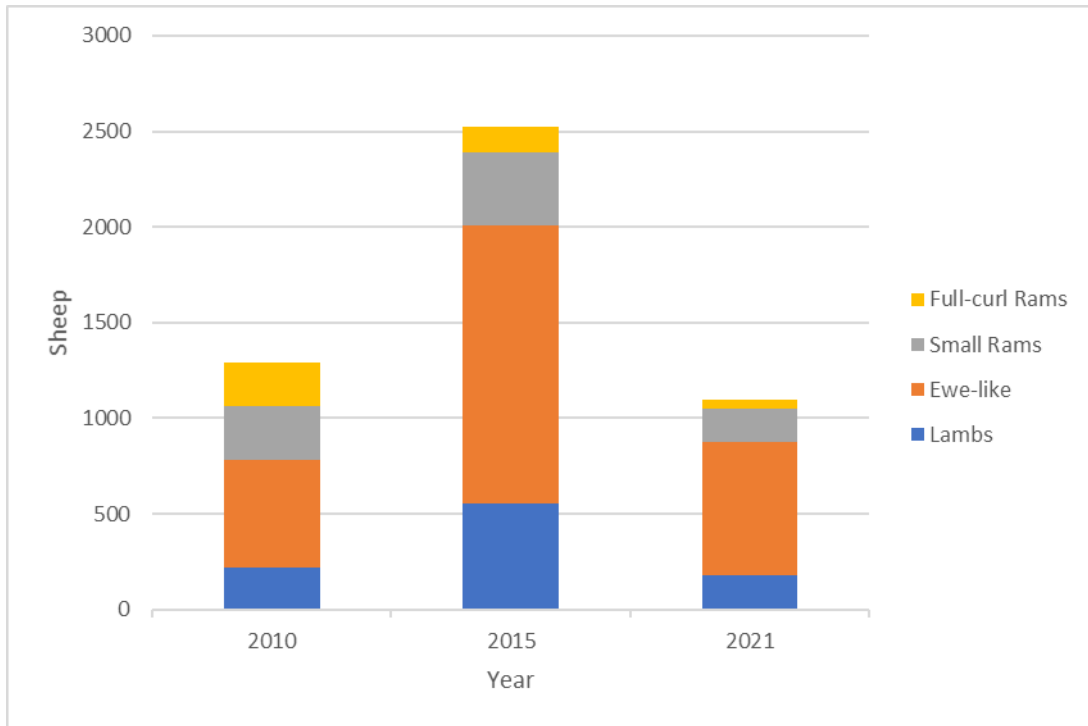
**Figure 6.** Gates of the Arctic Park and Preserve Dall sheep survey areas surveyed by the NPS (Deacy 2021). Only the GAAR SE and Itkillik survey areas are considered in this analysis. The Anaktuvuk survey area is outside the scope of this analysis.



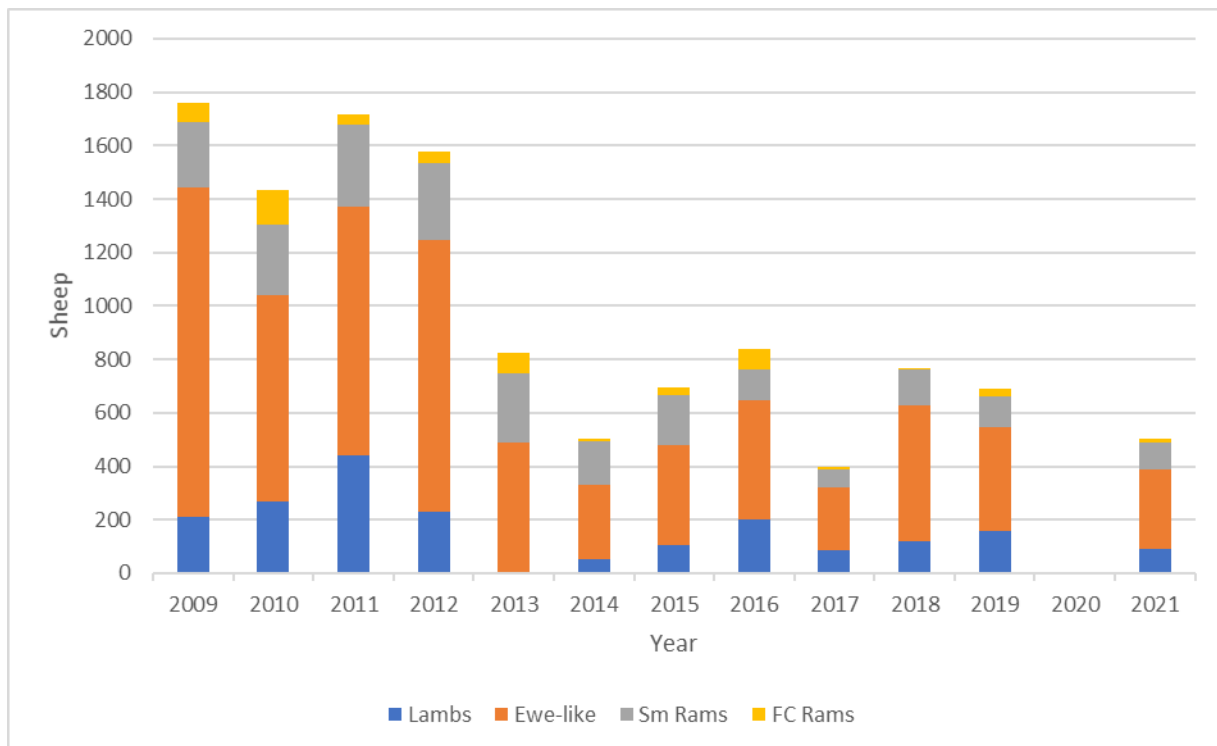
**Figure 7.** Population estimates from BLM in 1A/1B survey areas from 2014-2021 (McMillan 2022 pers. comm.).

**Table 1.** Population estimates from BLM surveys in full BLM survey area from 2015-2021 (McMillan 2022, pers. comm.). 95% credible interval range in parenthesis.

	BLM Full Survey Area	
	2015	2021
<b>Total Sheep</b>	3241 (2904-3701)	1229 (1088-1433)
<b>Adults</b>	2782 (2478-3185)	988 (879-1155)
<b>Legal Rams</b>	59 (45-101)	12 (0-44)
<b>Lambs</b>	459 (381-594)	242 (194-319)
<b>Lambs:Ewe-like</b>	0.38 (0.30-0.48)	0.26 (0.20-0.34)



**Figure 8.** NPS population estimates for SE GAAR survey area (Deacy 2022, pers. comm.).



**Figure 9.** NPS population estimates for Itkilik survey area (Deacy 2022, pers. comm.).

**Table 2.** Full-curl ram abundance for each survey unit 2009–2021 (Deacy 2022, pers. comm.; McMillan 2022, pers. comm.; Caikoski 2021). A dash indicates no data available.

Year	ADF&G 1A/1B	BLM 1A/1B	BLM Full	GAAR	Itkillik
2009	31	-	-	-	70
2010	-	-	-	228	128
2011	-	-	-	-	38
2012	30	-	-	-	43
2013	-	-	-	-	76
2014	40	46	-	-	6
2015	32	12	49	137	27
2016	66	45	-	-	80
2017	-	7	-	-	9
2018	34	1	-	-	5
2019	-	-	-	-	29
2020	-	-	-	-	-
2021	12	5	5	47	14
AVERAGE	35.0	19.3	27.0	137.3	43.8

**Table 3.** Lamb:100 ewe-likes ratios for BLM and NPS surveys from 2009–2021 (Deacy 2022, pers. comm.; McMillan 2022, pers. comm.). A dash indicates no data available.

Year	ADF&G 1A/1B	BLM 1A/1B	BLM Full	GAAR	Itkillik
2009	32	-	-	-	17
2010	-	-	-	39	35
2011	-	-	-	-	48
2012	18	-	-	-	23
2013	-	-	-	-	1
2014	2	-	-	-	20
2015	27	36	38	38	28
2016	24	28	-	-	46
2017	-	37	-	-	36
2018	36	31	-	-	24
2019	-	-	-	-	41
2020	-	-	-	-	-
2021	22	19	19	26	30



## Harvest History

The State manages sheep using a full-curl harvest strategy (ADF&G 2017). Full-curl harvest management is considered a conservative approach to managing Dall sheep populations. Once sheep are eight years old, their chance of surviving each additional year is much lower. Harvesting older, full-curl rams ( $\geq 8$  years old) allows younger rams in their prime to continue breeding (ADF&G 2017). Managers can also use the full-curl management strategy as an index for population trend, based on the premise that a decline in sheep harvest likely reflects a decline in the overall sheep population. (Caikoski 2018). The average age of rams harvested in the Brooks Range from 1981- 2013 was 9.1 years old for resident hunters and 9.4 years old for non-residents (ADF&G 2014).

It has been shown in heavily hunted sheep populations with  $\frac{3}{4}$ -curl horn restrictions (where every legal ram was removed each year) that ewes start being bred at an earlier age by younger rams. This led to lower reproductive frequency in ewes and possibly to compromised reproductive fitness of the ewe (Heimer and Watson 1986). When older  $\frac{3}{4}$  and full-curl rams are removed from the population, younger rams start breeding sooner than they typically would, usually before they reach physical maturity. This increased rutting activity leads to over exhaustion and depletes their energy stores, causing poor ram survival rates over winter (Heimer & Watson 1986). A more complete ram age structure leads to increased lamb production and ram survival, which in turn leads to population growth and more legal, full-curl rams available for harvest (Heimer and Watson 1990). A limited harvest of full-curl rams allows immature high-quality rams to reach their reproductive potential before attempting to breed (Coltman et al. 2001). However, the effectiveness of the full-curl management strategy relies upon a relatively undisturbed ram age structure and consistent ram recruitment (Heimer and Watson 1986). The negative effects of  $\frac{3}{4}$ -curl management (lower reproduction and higher young ram mortality) could occur under full-curl management if the ram cohorts that would normally be protected (between  $\frac{3}{4}$ - and full-curl) are few or absent due to catastrophic weather conditions that cause reproductive failure in prior years (Rattenbury et al. 2018). If all or most full-curl rams are harvested in an area with missing  $\frac{3}{4}$ - and  $\frac{7}{8}$ -curl cohorts, only younger rams will be present for breeding in the following year.

In Units 24A and 26B there are three Federal subsistence registration permit hunts (FS2404, FS2602, FS2411) as well as State general harvest ticket hunts. FS2404 occurs in Unit 24A, except for the portion within GAAR. This hunt occurs in the DHCMA and allows for a harvest of 1 ram. Permit FS2602 is within the DHCMA in Unit 26B and has a harvest limit of 1 ram with  $\frac{7}{8}$ -curl horn or larger. FS2411 is a rather new permit, being initiated in 2016 and occurs within GAAR in Units 24A and 24B. This permit only applies to a very small section of Unit 24A outside of the DHCMA and allows a harvest of up to 3 sheep, no more than one of which may be a ewe. This permit has only been issued to residents of Wiseman and Bettles since its inception. (Note: This permit excludes Anaktuvuk Pass residents who have a community hunt instead). State regulations allow general season hunting under a harvest ticket for all of Units 24A and 26B, with seasons from Aug 1 to Oct 5. Only full-curl or larger rams may be harvested under State regulations.

Permit FS2404 is the most used of the three Federal sheep permits for these units, with 281 being issued from 2001 to 2021 and an average harvest of 2 rams per year (**Figure 10**). FS2602 permits have been in use during the same time with a total of 227 being issued with 7 rams total being harvested since 2001

(**Figure 11**). FS2411 has been in use since 2016 and has been issued 55 times and has not had any successful harvest reported (**Figure 12**). Federal harvest has averaged 1 sheep per year from 2017-2021 for all three of these permit hunts (OSM 2022; Julianus 2022, pers. comm.). This is down from the overall average of 1.6 sheep harvested per year from 2001-2016 (**Figures 10, 11 & 12**).

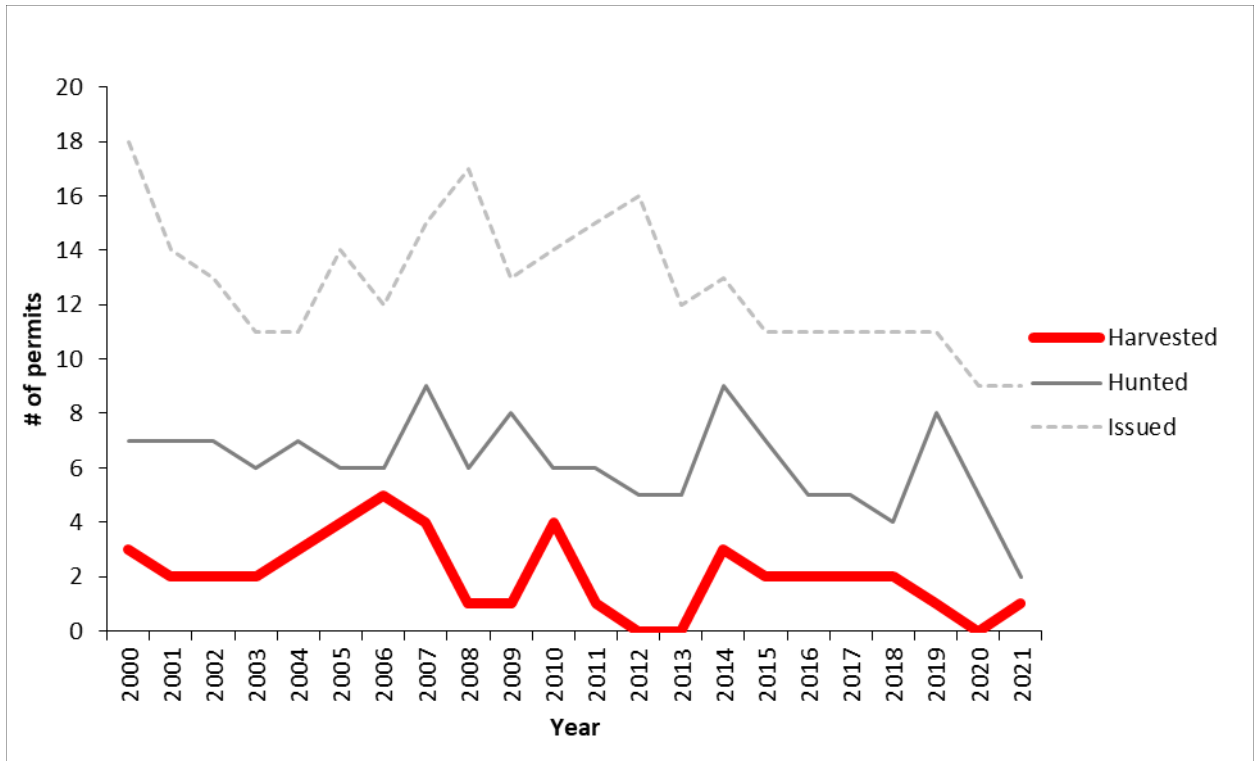
From 2002-2021, an average of 52.3 people reported hunting sheep under State regulations in Unit 24A with an average of 16.6 sheep reported harvested (**Figure 13**). Unit 26B reported an average 158.5 people hunting under State regulations with a reported average harvest of 47.5 sheep per year from 2002- 2014 (**Figure 14**). Then from 2015-2021, an average 65.5 people reported hunting by harvest ticket in Unit 26B with an average 18 sheep per year reported harvested (Stout 2022). This decrease in harvest ticket reports and harvest coincides with the population decline from the severe weather events in 2012/2013. Notably, these figures also represent hunt reports and harvest for all of Unit 26B, not just the proposed closure area. Additionally, these figures may be under-reported, as there is no penalty for failure to report hunting or harvest by harvest ticket. Harvest tickets also do not account for the fact that people may have hunted in either Unit 24A or 26B without harvesting a ram and then hunted and harvested a ram in another unit and reported that unit only.

Residents and non-residents have averaged 180 hunters in Units 24A and 26B from 2002- 2021 (**Table 4**). Non-resident harvest has averaged 42.8% of the total sheep harvest reported under State regulations during the same time period. While the total number of resident hunters and associated harvest has declined since 2013 along with sheep population estimates, non-resident hunter numbers have remained constant at an average of 35 per year for this time period. However, non-resident harvest is also trending down alongside the sheep population (Parrett 2022, pers. comm.).

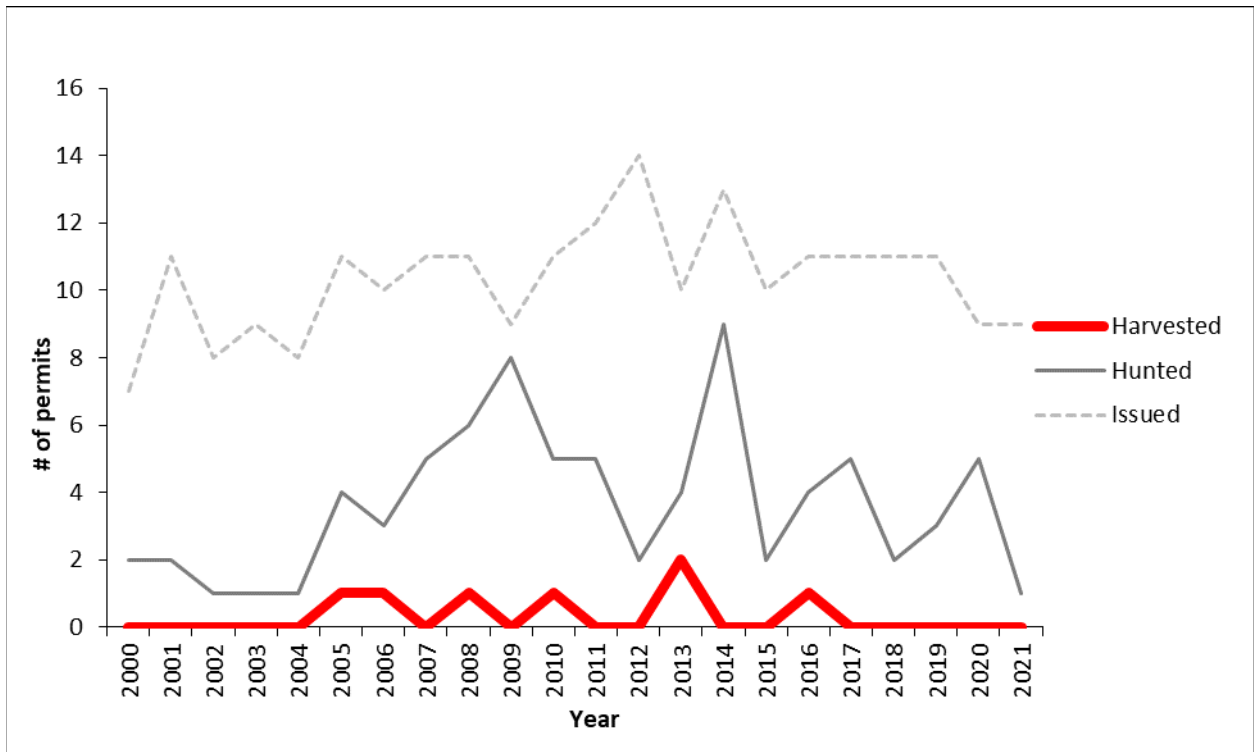
According to ADF&G harvest reports, an average of 1.7 sheep were reported as harvested by archery from 2000-2021 in Units 24A and 26B (**Table 4**). While reports do not capture with certainty where the sheep were harvested or by which method, 82% of successful bow hunters used a highway vehicle to access these units, suggesting about 80% of the archery harvest was within or near the DHCMA (1.4 sheep). Again, these harvest ticket reports do not reflect the number of unsuccessful hunters who hunted in these units but harvested and reported in a different unit or failed to mark weapon type on their harvest report.

A premise of the full-curl harvest strategy (that lower harvest is indicative of lower sheep populations) suggests sheep numbers are declining in these two units. Since 2000, the number of Federal permits issued, and sheep harvested has trended downward. While the number of hunters under State regulations in Unit 26B dropped considerably along with the sheep population decline in 2012, the number of State hunters in Unit 24A has increased slightly since 2016. But harvest has still trended downward in both units since 2000, albeit very slightly in Unit 24A (**Figures 14 & 15**).

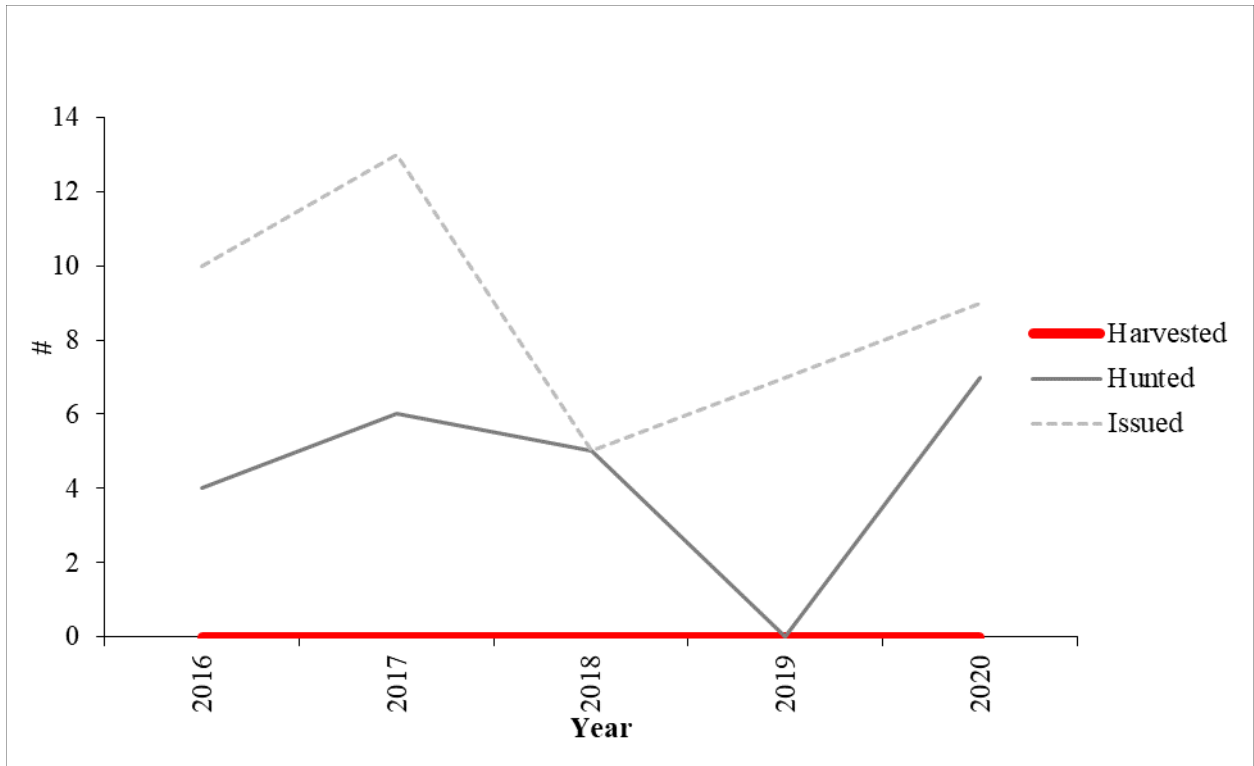
Comparing full-curl ram abundance over time (**Table 2**) with recent sheep harvest reports (**Figures 14 & 15**) suggests that the sheep population cannot withstand current harvest rates and hunting pressure, and that the harvestable surplus may be exceeded. From 2016-2021, sheep harvest in Units 24A and 26B averaged 15.8 sheep and 18.3 sheep, respectively (Stout 2022), while estimated 2021 ram abundance was 29% of historical averages (2009-2021) across all survey areas.



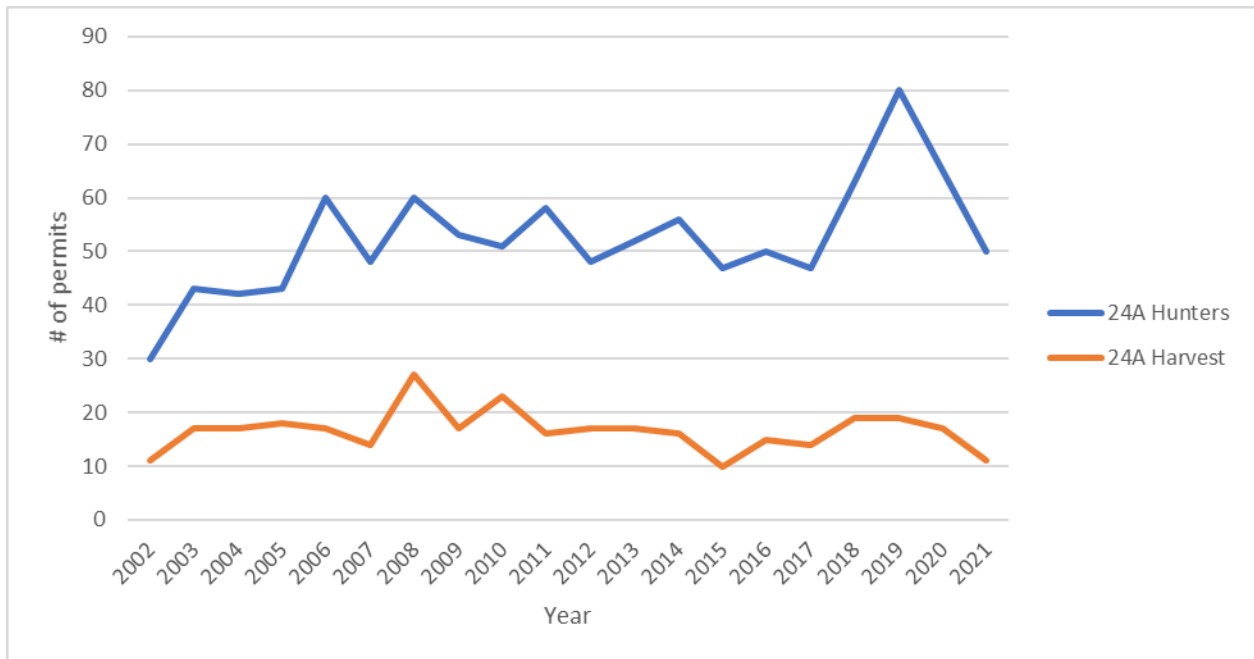
**Figure 10.** Reported harvest, hunter effort and success under Federal sheep permit FS2404 (OSM 2022; Julianus 2022, pers. comm.).



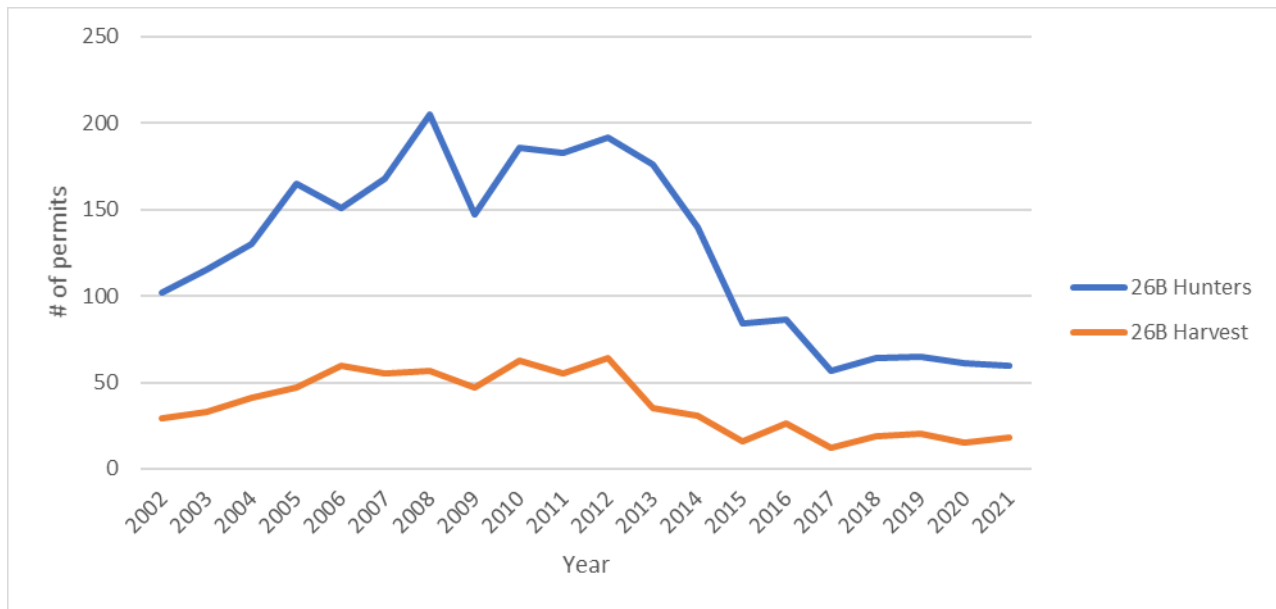
**Figure 11.** Reported harvest, hunter effort and success under Federal sheep permit FS2602 from 2000-2021 (OSM 2022; Julianus 2022, pers. comm.).



**Figure 12.** Reported harvest, hunter effort and success under Federal sheep permit FS2411 since inception in 2016 (OSM 2022; Julianus 2022, pers. comm.).



**Figure 13.** Number of hunters and sheep reported harvested on State harvest tickets in Unit 24A 2002-2021 (Stout 2022).



**Figure 14.** Number of hunters and sheep harvested reported on State harvest tickets in Unit 26B, 2002-2021 (Stout 2022).

**Table 4.** Number of resident and non-resident hunters and sheep harvest in Units 24A and 26B (Parrett 2022, pers. comm.).

Year	Resident Hunters	Resident Harvest	Non-Resident Hunters	Non-Resident Harvest	Total Hunters	Archery Harvest	Total Harvest
2002	98	18	33	21	131	0	39
2003	119	26	38	22	157	0	48
2004	130	30	39	26	169	2	56
2005	174	40	34	24	208	0	64
2006	169	29	37	18	206	0	47
2007	185	41	44	32	229	8	73
2008	220	55	43	25	263	5	80
2009	161	35	40	28	201	4	63
2010	197	61	42	25	239	7	86
2011	203	47	41	24	244	1	71
2012	200	57	40	24	240	4	81
2013	193	35	35	17	228	0	52
2014	160	28	35	19	195	0	47
2015	104	13	27	13	131	3	26
2016	107	22	31	19	138	1	41
2017	91	12	27	14	118	0	26
2018	106	21	25	17	131	0	38
2019	117	26	26	13	143	3	39
2020	98	13	28	19	126	0	32
2021	78	11	32	18	110	0	29

## Cultural Knowledge and Traditional Practices

Dall sheep are an important subsistence resource to residents of Allakaket, Alatna, Anaktuvuk Pass, Hughes, Huslia, Wiseman and Point Hope because of their value as a food source and their role in cultural traditions. The subsistence practices of the residents of Unit 24A and 26B reflect the cultural traditions of the Nunamiut Inupiat, Koyukon Athabascans, and Euro-American settlers. For some communities of the area, after caribou, sheep are one of the most valued subsistence resources in the Brooks Range. Residents of Anaktuvuk Pass, for example, depend greatly on their communal sheep hunts. In a 1978 NPS study of the residents of Anaktuvuk Pass and the Upper Koyukuk, Nelson et al., reported on the significance of the sheep harvest to community members and the traditional knowledge they rely upon to harvest sheep in the Brooks Range:

To the subsistence dependent resident who makes intensive use of the wild resources, the surrounding terrain is a complex maze of micro-environments each with characteristics and potentials that make it unique from all others. Each river is a special river with a set of physical properties that must be learned if one is to effectively exploit its resources. Each herd in a river is different...The vegetation and ledges of one mountain favor sheep populations while the neighboring mountain is relatively barren (Nelson et al. 1978:133–143).

Residents of Anaktuvuk Pass typically harvest more sheep than other communities in the region (ADF&G 2022; Hazell 2012: 130, 143, 154; Nelson 1978). Reports from multiple agencies and organizations indicate that residents of Anaktuvuk Pass hunt sheep locally and harvest an average of 21 sheep per year (Okada 2022, pers. comm.; Brown et al. 2016: 49; Hazell 2012: 139, 146, 154; Hutchinson-Scarborough et al. 2012: 673; Nelson 1978:54). In 2011, Anaktuvuk Pass residents reported harvesting as many as 75 sheep (Hazell 2012: 157). In comparison, other communities in the region typically report harvest fewer than ten sheep per year (**Table 5**). The harvest patterns of the affected communities indicate long-term dependence on sheep, highly local sheep harvest, and variability in the number of sheep harvested.

Dall sheep is an important subsistence resource to rural residents of Unit 24 and Unit 26 for multiple reasons. First, sheep are a valuable source of protein, particularly when other sources are less available. Subsistence harvesting is opportunistic and adaptive, and those living a subsistence way of life rely on having a diversity of options. At a 2015 Council meeting, a resident commented, “Yeah, old days there was not hardly any caribou, so our parents depended on sheep. There were a lot of sheep in this area...That’s what saved our hides” (041215AKAP4) (Hazell 2012: 415). This statement is supported by the trend in the reported number of sheep and other fish and wildlife harvested over time. When residents harvest less salmon and caribou, they rely more on sheep. For example, in 1973, the combined harvests of Alatna-Allakaket and Hughes included 518 caribou, 70 moose and 10 sheep (Marcotte and Haynes 1985: 105; Nelson et al. 1978:324). Then, in 1981–1982, the overall harvest of these communities was dominated by salmon (Marcotte and Haynes 1985: 95). Mammal harvests comprised only 15% of the total harvest for all three communities, which included 61 moose, five caribou and five sheep (Marcotte and Haynes 1985:95, 105). Decades later, in 2011, as the size of salmon runs began to decrease, the salmon harvest comprised of only 27% of the total harvest of fish and wildlife and residents of Alatna-Allakaket harvested more wildlife including 124 caribou, 21 moose and four sheep (Hutchinson-Scarborough, L., D. Andersen, M. Marchioni 2012: 121, 125). The data demonstrates the role of sheep in

the diet and food security of these communities: they depend on being able to harvest sheep and the number they harvest depends on availability of sheep and other subsistence resources.

A primary reason that sheep are an important subsistence resource for these communities is the cultural significance of traditional communal sheep hunting, a “rite of passage” (Hutchinson-Scarborough, L., D. Andersen, M. Marchioni 2012: 121). Pollock Simon, Sr., a resident of Allakaket and a member of the Council, spoke about the importance sheep hunting during a Council meeting in 2015. In response to a question on using household surveys to document sheep harvests, he said:

Yeah. A house-to-house survey would be ok, I guess. But I wanted to talk a little bit about the history of hunting in the mountains. Up by Alatna River, it’s about 150 miles, 200 miles by boat. And traditionally our people have hunted sheep up in the mountains for years. In the 1940s, 1950s my father and my grandfather, you know, before outboard motors they poled up the Alatna River and spent a couple of months hunting sheep. And, due to not much meat in Allakaket those days, there’s no moose and not much caribou. So, they have to hunt sheep in the summertime. They left—they’d go in July and come back in August, make raft and we don’t have to go up and hunt sheep these times now, but I have two sons that want to keep up the tradition of going up into the mountains and looking for sheep you know. The take of sheep is pretty low in Allakaket and Alatna and Hughes. Not every year does the boys go off to hunt (WIRAC 2015b: 195).

To Mr. Simon, Sr., the sheep hunt itself holds special meaning for his family and others in the area. He explained that it’s critical to maintain the tradition of sheep hunting, particularly because the frequency of the hunt varies depending on subsistence needs and the availability of other protein sources. Likewise, Marcotte and Haynes (1985) noted that the significance of the hunt cannot be measured by units of harvest effort. They stated, “...participation rates and absolute harvest quantities are not synonymous with the relative importance or value placed on a cultural activity” (1985:51). When harvested, sheep has special cultural meaning and significance. Sheep meat is a delicacy that is shared at celebrations (Brown et al. 2016: 400, 415–416; Hutchinson-Scarborough, L., D. Andersen, M. Marchioni 2012: 86, 102, 104; Marcotte and Haynes: 1985: 51, 54–55). Furthermore, the activity of the communal sheep hunt provides additional harvest opportunities. Marcotte and Haynes (1985) reported that during their study, a single communal sheep hunt yielded five sheep, four caribou and four black bears. These findings demonstrate that sheep have a cultural importance that extends beyond community harvest counts.

Because sheep are important, residents are concerned about their declining populations in the Brooks Range. This concern is not new; over the last 20 years, the Council and the North Slope Council have addressed issues such as sheep health and conservation in the Brooks Range (NSRAC 2022; 2021; 2020; 2017a; 2017b; 2015; 1994 and WIRAC 2022; 2021a&b; 2020; 2019a&b; 2017; 2016a&b; 2015a&b; 2014; 1994). Community members have also stated their concerns about sheep populations. In ADF&G Division of Subsistence Technical Paper No. 426, a resident of Anaktuvuk Pass described their observation of declining sheep populations, “The sheep numbers are going down within the past couple years...you just don’t see the daycares anymore—the ewes and the lambs hang out in big groups during the summer. You don’t see as much of those around anymore when you’re out in the country. You don’t see as many little babies running around” (041415AKPI) (Brown et al. 2016: 453).

In another study, residents commented that it was harder to find sheep and they had to travel more to find them which is expensive (Hazell 2012). Residents also described conflicts with non-local hunters. For example, one person said the noise from low flying “sport hunting planes” disturbs sheep and causes them to disperse, making it more difficult to harvest them (Hazell 2012: 177). With less sheep being observed, residents are more sensitive about the impacts that others have on sheep population sizes and behaviors.

Residents of Units 24 and 26 have been working to understand what is causing reductions in sheep abundance throughout the Brooks Range and to develop solutions to reverse these declines. Council members have discussed possible causes for reduced sheep numbers at many meetings over the past two decades (NSRAC 2022; 2021; 2020; 2017a; 2017b; 2015; 1994 and WIRAC 2022; 2021a&b; 2020; 2019a&b; 2017;2016a&b; 2015a&b; 2014; 1994). Council members consider extreme weather events, such as winters with heavy rain on snow events, as one of the main factors impacting sheep abundance. Other factors include increased hunting pressure because of Dalton Highway access, increased user conflict, and over-harvest of mature rams that play a primary role in maintaining healthy sheep numbers (NSRAC 2022; 2021; 2020; 2017a; 2017b; 2015; 1994 and WIRAC 2022; 2021a&b; 2020; 2019a&b; 2017;2016a&b; 2015a&b; 2014; 1994). In 2014, a resident of Anaktuvuk Pass described the number of non-local hunters harvesting sheep in the area, “We’ll see them come with stacks of big bull horns and sheep horns and sheep heads. But no meat. They don’t even bring any body meat” (041615AKP3) (Brown et al. 2016: 453). In Wiseman, residents discussed decreased abundance and growing competition from non-local hunters as limiting factors in their pursuit of sheep and caribou (Brown et al. 2016). They said this competition makes harvesting sheep difficult for them. Other concerns expressed were the risk of hunting amongst unskilled bow hunters from elsewhere, wounded sheep and caribou that are not harvested, dispatched or reported and insufficient harvest data needed to understand population dynamics (Kukkonen 2012: 376, 397–398). The Councils have discussed and attempted to address these issues for more than twenty years because of the importance of maintaining sheep populations as a subsistence resource.

**Table 5:** Dall sheep harvest in Unit 24A and 26B communities. Blank cell indicates no survey conducted, 0 indicates a survey was conducted and no harvest was reported (ADF&G 2022b; Koster and Holen 2015: 16-19).

Community	2014	2011	2002	2001	2000	1999	1998	1996	1994	1992	1984	1982
Alatna		0										
Allakaket		4										
Alatna/Al-lakaket											2*	6*
Anaktuvuk Pass	32	75	16	5	5	9	10	7	27	37		
Hughes	0											0
Huslia												
Point Hope	0								28**			
Wiseman		2										

\*In 1984 and 1982, ADF&G Division of Subsistence lumped the harvests of Alatna and Allakaket

\*\*Point Hope harvests may have occurred within or outside of Unit 23 (Koster and Holen 2015: 16).



## Other Alternatives Considered

In comments received from the NPS, biological staff felt that there is strong evidence to support a closure in Unit 24A and moderately strong evidence for the partial closure in Unit 26B. Sheep populations have declined in both units recently, but the decline has been more drastic in Unit 24A. Population estimates show all legal rams on the east side of the Dalton Highway in Unit 24A may possibly have been harvested during 2021, and the same may happen again in 2022. Whereas the Unit 26B sheep population experienced a decline from the winter of 2013/2014 but has been stable to slightly decreasing since that time. The population has not recovered even though there was above average lamb:ewe ratios in 2015 and in the most recent survey of 2021. Therefore, at this time the NPS considers a closure in Unit 24A only as warranted. But if population metrics in Unit 26B decline in the future, there would then be adequate reason to close it as well.

During the public hearing, a comment from a registered guide in the Itkillik River drainage coincided with the idea presented by the NPS. He stated he hasn't guided for sheep in the Itkillik area since 2015. But this last year he took two clients on sheep hunts there. His sentiment was the sheep population is recovering or stable enough to support harvest in that drainage, unlike in the rest of the requested area. He is not opposed to the closure in general, he is just opposed to it within the GAAR boundary within Unit 26B. He feels the population is strong enough to support continued hunting and that subsistence use in the area is low.

However, OSM did not further consider these alternatives because while NPS data shows the Itkillik survey area sheep population as being stable to slightly decreasing since 2013, only a portion of it is within Unit 26B. BLM data shows dramatic decreases in sheep abundance in the rest of the proposed closure area of Unit 26B. Actual sheep harvest in the Itkillik area is unknown, but the abundance of full-curl rams has declined considerably since 2016 (**Table 2**). In 2021, the Itkillik sheep population only had an estimated 14 full-curl rams. If this area is allowed to remain open while other portions of Unit 26B are closed to the harvest of sheep, it may concentrate sheep hunters in the Itkillik area. Even though the population has been stable from 2015-2021, the population is still less than half of pre-2013 levels (**Figure 9**).

Another alternative would be to close the same area to non-Federally qualified subsistence users only. Only 5.1% of total harvest from Units 24A and 26B is attributable to Federally qualified subsistence users from 2000–2021. From 2017–2021, Federally qualified subsistence users have harvested an average of one sheep per year. Since Federal harvest and hunter pressure is so low, their impact on the sheep population may be negligible. However, OSM did not further consider this alternative because the sheep population has declined so drastically, no harvestable surplus seems to be available, and any harvest or disturbance to the sheep population may hamper recovery. Additionally, all comments received from local subsistence users during the public hearing were in support of closing the season to all users, and both the Western Interior and North Slope Councils supported a full closure at their winter 2022 meetings.

## Effects of the Proposal

If this Special Action is approved, all Federal lands in Units 24A and 26B west of the Sagavanirktok River will be closed to the harvest of sheep to all users for the 2022–2023 and 2023–2024 regulatory years. This would decrease opportunity for Federally qualified subsistence users and for anyone hunting under State regulations as sheep would not be available for harvest on Federal public lands within these areas. Individuals hunting under State regulations could still hunt and harvest sheep on private and State lands within Units 24A and 26B. This could result in displacement and crowding of hunters onto these State-managed lands.

§816(b) of ANILCA permits closure of Federal public lands to the taking of wildlife by all users “to assure the continued viability of a particular fish or wildlife population.” Substantial conservation concerns, including drastic population declines and poor composition metrics (e.g., poor lamb recruitment, reduced full-curl ram abundance) threaten the viability of the Dall sheep population along the DHCMA. As found by Heimer and Watson (1986) and attested by local residents with traditional ecological knowledge, the absence of mature rams can have cascading, negative population-level effects, which, with cohorts currently missing, may occur if more mature rams are harvested. Additionally, current harvest rates appear unsustainable as legal ram numbers have decreased considerably (**Table 2**), while hunter effort and harvest in Unit 24A has not. Furthermore, lamb production in 2013 and 2014 was abysmal, and these are the eight- and nine-year-old rams, which would be available for harvest this season. For these reasons, no harvestable surplus seems available for these sheep populations.

Approval of WSA22-02 may aid in the recovery of these local sheep populations by increasing the survival of full-curl rams, which could have cascading, positive effects on the overall sheep population by increasing ewe fecundity, lamb production, and survival of younger rams. Approval could also decrease disturbance of these sheep by hunters, which could decrease energy expenditure, improve predator evasion, and improve physical fitness during the breeding season and into winter. While sheep will still be hunted on State-managed lands, the Board only has authority to close sheep hunting on Federal public lands.

Similar action has already occurred under State and Federal regulations for sheep hunting closures in the Brooks Range due to drastic sheep population declines and poor lamb production. In 2015 and 2016, the State and Federal sheep hunts in Unit 23 and portions of Unit 26A were closed due to serious conservation concerns.

## OSM CONCLUSION

Support Wildlife Special Action WSA22-02 **with modification** to simplify the regulatory language.

The modified regulation should read:

### Unit 24–Sheep

~~Unit 24A, except that portion within the Gates of the Arctic National Park - Aug. 20-Sep. 30.  
- 1 ram by Federal registration permit only~~ **No open season.**

**Federal public lands are closed to the taking of sheep for the 2022-23 and 2023-24 regulatory years for all users.**

~~Units 24A and 24B (excluding Anaktuvuk Pass residents), that portion within the Gates of the Arctic National Park - 3 sheep, no more than one of which may be a ewe, by Federal registration permit only, with exception for residents of Alatna and Allakaket who will report by a National Park Service community harvest system~~ **Aug. 1-Apr. 30.**

### Unit 26–Sheep

~~Unit 26B, that portion within the Dalton Highway Corridor Management Area, west of the Sagavanirktok River - 1 ram with 7/8 curl or larger horn by Federal registration permit only~~ **Aug. 10-Sep. 20.  
No open season.**

**Federal public lands are closed to the taking of sheep for the 2022-23 and 2023-24 regulatory years for all users.**

~~Unit 26A, remainder and 26B, remainder, including the Gates of the Arctic National Preserve and Unit 26B, east of the Sagavanirktok River - 1 ram with 7/8 curl or larger horn~~ **Aug. 10-Sep. 20.**

## Justification

Population viability concerns warrant closure to sheep hunting along the DHCMA by all users under §816(b) of ANILCA. Approving WSA22-02 may help the Dall sheep populations within Units 24A and 26B, west of the Sagavanirktok River to recover and rebuild a more complete age structure. After constant hunting pressure and severe winter weather, the population has dropped considerably. No harvestable surplus of mature rams appears to exist in this population as the few legal rams left are needed for effective breeding to maximize lamb production.

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## **SUBSISTENCE REGIONAL ADVISORY COUNCIL RECOMMENDATIONS**

### **North Slope Alaska Subsistence Regional Advisory Council**

**Support** WSA22-02. The NSRAC discussed this request at length with Jack Reakoff, Chair of the WIRAC and Will Deacy, wildlife biologist with NPS GAAR. The NSRAC believe, based on the local and traditional knowledge and biological data presented, that a closure to sheep hunting in Unit 24A and 26B, west of the Sagavanirktok River is warranted. This closure would not affect sheep harvest by the community of Anaktuvuk Pass in Units 26A and 24B and the NSRAC is otherwise willing to forgo subsistence harvest of sheep in Units 24A and 26B to aid population recovery. The NSRAC feels subsistence hunters are conservationists and will not hunt the declining sheep population. The NSRAC supports the neighboring WIRAC in their request to close all hunting in this area.

The NSRAC fully embraces the Dall sheep conservation concerns Mr. Reakoff read into the record at their winter 2022 meeting. They concur with observations on sheep decline due to climate change impacts such as rain on snow events in addition to the intensive hunting pressure NSRAC members have witnessed along the DHCMA. Traditional knowledge informs the importance of balance across all age classes and especially the mature males for effective breeding and maintaining a healthy population. The NSRAC believes there is a clear need for conservation measures to be enacted at this time through a closure to all hunting of Dall sheep in this area to allow for the population to recover.

### **INTERAGENCY STAFF COMMITTEE COMMENTS**

The Interagency Staff Committee found the staff analysis to be a thorough and accurate evaluation of the proposal and that it provides sufficient basis for the Regional Advisory Council recommendation and Federal Subsistence Board action on the proposal.

Scale is crucial to evaluate Dall sheep population viability. When viewed across the entire Brooks Range, Dall sheep numbers appear to be stable. However, some local populations appear to be critically low. Specifically, there are serious concerns about the viability of the Dall sheep population along the Dalton Highway Corridor Management Area (DHCMA). Recent population estimates and minimum count surveys indicate substantial declines in legal rams, ewes and lambs in most survey areas along the DHCMA. Severe weather conditions, including extended winters and rain on snow events are thought to be a major factor in the population declines for sheep in Units 24A and 26B. Declines in the sheep population within the DHCMA are a concern for rural subsistence users that rely on local populations near where they live.

ANILCA Section 816(b) allows for closure of Federal public lands to the harvest of fish and wildlife “for reasons of public safety, administration, or to assure the continued viability of a particular fish or wildlife population.” The Western Interior Subsistence Regional Advisory Council (the proponent for WSA22-02), is extremely concerned about the central Brooks Range sheep population along the DHCMA and is



willing to forgo subsistence harvest of the species to aid in its recovery. Based on available biological information, and on the traditional ecological knowledge of Federally qualified subsistence users residing in the region, the proposed closure of Dall sheep hunting by all users may be justified and approval of WSA22-02 could aid in the recovery of sheep populations within Units 24A and 26B. The North Slope Subsistence Regional Advisory Council also recommended closing sheep hunting to all users in Units 24A and 26B during their last regulatory meeting.

Historically, most of the sheep harvest in the areas subject to this special action request has been by non-Federally qualified users. Since there are very few, if any, legal rams available for harvest in the area, closure of hunting by non-rural users could provide for conservation of healthy populations of sheep and to allow for continuation of subsistence uses of sheep. Closure to all users, as requested by WSA22-02, is likely to help ensure the continued viability of the Dall sheep populations in the DHCMA. Although sheep harvest by Federally qualified subsistence users is low, sheep numbers are low enough that any additional mortality from harvest may be unsustainable and could slow natural recovery of Dall's sheep in the area.

# ALASKA DEPARTMENT OF FISH AND GAME COMMENTS



THE STATE  
of **ALASKA**  
GOVERNOR MICHAEL J. DUNLEAVY

## Department of Fish and Game

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## MEMORANDUM

TO: Anthony Christianson, Chair  
Federal Subsistence Board

DATE: April 28, 2022

PHONE: (907) 267-2190

FROM: Ben Mulligan <sup>BJM</sup>  
Deputy Commissioner

SUBJECT: Wildlife Special  
Action WSA22-02

The Alaska Department of Fish and Game (ADF&G) has reviewed Wildlife Special Action (WSA) 22-02 requesting the closure under the provisions of Title VIII of the Alaska National Interest Lands Conservation Act (ANILCA), of Dall's sheep harvest in Unit 24A and the portion of 26B west of the Sagavanirktok River. The proposed closure area includes National Park Service (NPS); Park and Preserve lands, National Wildlife Refuge lands (FWS), and Bureau of Land Management lands (BLM). This proposed closure primarily targets hunting opportunity for a specific group of hunters (walk-in/archery hunters), but it will not result in a sheep population response because most of the sheep population range is outside the proposed closure area. ADF&G agrees sheep abundance in the Central and Eastern Brooks Range has declined in recent years due to weather. However, as outlined below, the proposed closure will not facilitate a population recovery. Because the population continues to provide a sustainable harvestable surplus that exceeds the average annual harvest, ADF&G **OPPOSES** the proposed closure for any portion of this sheep population. The current population numbers do not meet the closure criteria found in ANILCA Section VIII.

Congress enacted ANILCA Title VIII to ensure the continued opportunity for subsistence uses by rural residents of Alaska. Congress also clarified in ANILCA Section 815(3) that Title VIII is not intended to restrict non-subsistence uses of fish and wildlife generally permitted on public lands (other than national parks and park monuments) unless necessary for the conservation of healthy populations of fish and wildlife and as necessary pursuant to Sections 804 and 816. We believe that the population of Dall sheep within the Central and Eastern Brooks Range is both healthy and viable in accordance with Title VIII provisions, and that the sheep in the proposed closure area of Units 24A and 26B west of the Sagavanirktok River are a component of that population.

Congress was very clear in ANILCA of its intent to preserve continued opportunities for subsistence uses by rural residents; however, Congress was also very clear that it intended ANILCA to strike an appropriate balance between "scenic, natural, cultural and environmental values" and "economic and social needs of the State of Alaska and its people." ANILCA Section 101(d). This intent has been confirmed in *Ninilchik Traditional Council v. U.S.*, 227 F.3d. 1186, 1192-93 (9<sup>th</sup> Cir. 2000) and in two recent court cases, one settled by the United States Supreme Court in *Sturgeon v. Frost*, 139 S. Ct. 1066 (2019) and another just recently in *Friends of Alaska National Wildlife Refuges v. Haaland*, 20-35721 (9<sup>th</sup> Cir. 2022).

In considering closures of substantial quantities of public lands managed by multiple different agencies with different management purposes, the Federal Subsistence Board (FSB), in addition to considering the substantial evidence requirement found in Section 805(c), needs to consider the purposes Congress had in establishing various land management designations. Congress established several national preserves, administered by the NPS, specifically to allow the continuation of all forms of hunting – sport, subsistence, and guided hunting, as well as trapping.<sup>1</sup> Preserve boundaries were carefully delineated *to meet the concerns of sport hunters*, provide some ecologically sound wildlife sanctuaries, and accommodate other Park System uses.<sup>2</sup> [emphasis added] BLM lands in the area proposed for closure serve as the true multiple use lands in the area and are managed on the basis of “multiple use and sustained yield”. As outlined in the Niniichik Traditional Council case referenced above, if in the course of this consideration, it becomes clear that the recommendation will cause a restriction of non-subsistence uses (i.e., hunting of Dall sheep under State regulations), we ask the Board to provide ADF&G with an explanation as to why they disagree with the information presented in this memo and that the restriction is necessary to serve a purpose listed in Section 815(c) and that less restrictive measures will not achieve this purpose.

### **Background**

The proposal rationale argues that weather is the primary cause of the decline of sheep in the area, but also claims harvest of mature rams and wounding loss contributed to the decline. High ram: ewe-like ratios from trend count surveys conducted within the proposed closure area do not support the claim of significant undocumented wounding loss. Additionally, 65% of rams are harvested at greater than 8 years of age, which refutes the claim of excessive mature ram harvest. The rationale of the proposed closure fails to demonstrate how a closure would mitigate the decline or facilitate growth, because wounding loss or an absence of mature rams are claims not supported by the harvest and survey data. For the mitigation to be effective, it must address the cause of the decline. For the Central and Eastern Brooks Range sheep population, the decline was not harvest related and harvest that does occur is likely mostly compensatory (Burnham and Anderson 1984). Therefore, the proposed closure will be ineffective at mitigating weather caused declines or promoting growth.

### **Full-Curl Ram, Harvest Management Strategy Allows Harvest Without Impacting Population Growth**

Dall’s sheep in this area are managed using the full-curl ram harvest management strategy. The full-curl strategy is a conservative strategy because it delays harvest of rams until they are among the older age classes. Because rams aged 8 years old or older have higher mortality rates than younger rams (Deevey 1947), we know that the full-curl strategy is a mostly compensatory harvest strategy. Advantageously, the full-curl strategy is deliberately conservative but simultaneously diminishes the need for annual survey counts and subsequent harvest rate assessments from annual population estimates. This is suited to the practical limitations of obtaining annual aerial survey data consistently in the Brooks Range. Additionally, we can demonstrate that harvest fluctuates proportional to the number of full curl rams in the population with the full-curl strategy, and harvest of each cohort is proportional to the recruitment of each respective cohort (Figure 1). Therefore, we have high confidence that harvest is dependent on cohort abundance. Furthermore, harvest data (Brooks Range, 1987-2021; n = 7,476) demonstrates that only 35% of legal rams harvested are harvested the first year they are legal (full-curl or 8 y.o.), whereas 65% of rams are harvested greater than 8 years of age. This gives us confidence that social structure tends to remain similar across a range of abundances with the full-curl management strategy.

Fundamental to the full-curl strategy is the concept that the older ram age classes that are targeted are also numerically few. Numerically few animals result in minimal harvest. Practically speaking, full curl

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<sup>1</sup> ANILCA Legislative History, Volume 35, page 307/581

<sup>2</sup>*Id.*, page 381/655

rams are also identifiable by hunters, therefore it is a useful observable metric for hunters to identify legal animals, which simultaneously coincides with the small demographic of the population. Because they are a numerically small demographic and because that particular age/sex demographic is known to have higher rates of mortality, it results in a mostly compensatory harvest that is numerically small and fluctuates in proportion to availability. Harvest data reinforces the assessment that few rams are harvested from small cohorts, proportionally more rams are harvested from relatively more abundant cohorts, and rams greater than 8 years old are present among both numerically strong and weak cohorts. The ADF&G uses a combination of cohort assignment from harvested rams and survey counts of lambs to monitor the strength of each cohort and harvest sustainability.

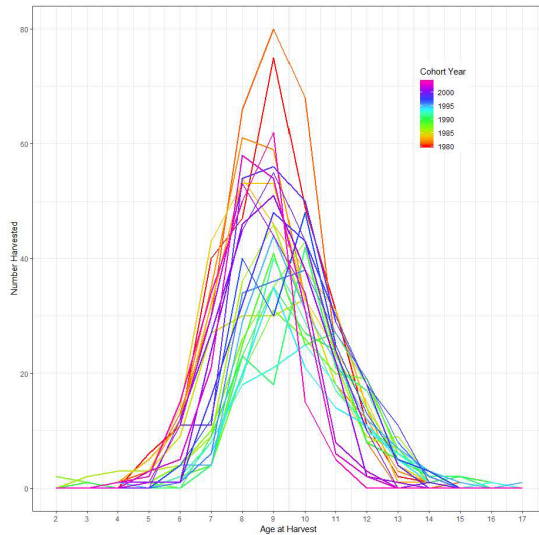


Figure 1. Cohort assessment of sheep harvested in the Brooks Range from 1987 through 2021. Cohort year is determined using harvested sheep ages and year of harvest. Numerically weak cohorts of the 1990s are lower than numerically strong cohorts of the 1980s and 2000s.

*The Area Affected is Small and is Already Restricted to Hunting Methods and Means*

The affected area of the proposed closure includes 3,282 mi<sup>2</sup> of federal lands, which constitutes 7.5% of the 43,506 mi<sup>2</sup> of sheep range in the Central and Eastern Brooks Range (Figure 2). Furthermore, 1,606 mi<sup>2</sup> of the proposed closure area is already highly restricted as an archery-only/non-motorized vehicle hunt or within the Gates of the Arctic National Park (GAAR). Therefore, the proposed regulation would primarily affect only 1,676 mi<sup>2</sup> of federal lands, or 3.9% of the Central and Eastern Brooks Range sheep range. The proposed regulation would be ineffective as management action at the landscape level. The area of implementation assessment is relevant, because hunters would easily redistribute themselves within the huntable sheep range. Including federally qualified users (FQU) in the closure, is not meaningful mitigation because the harvest from those two communities is very small (< 3 sheep annually) and because they can easily access and hunt sheep in the GAAR portion of 24B.



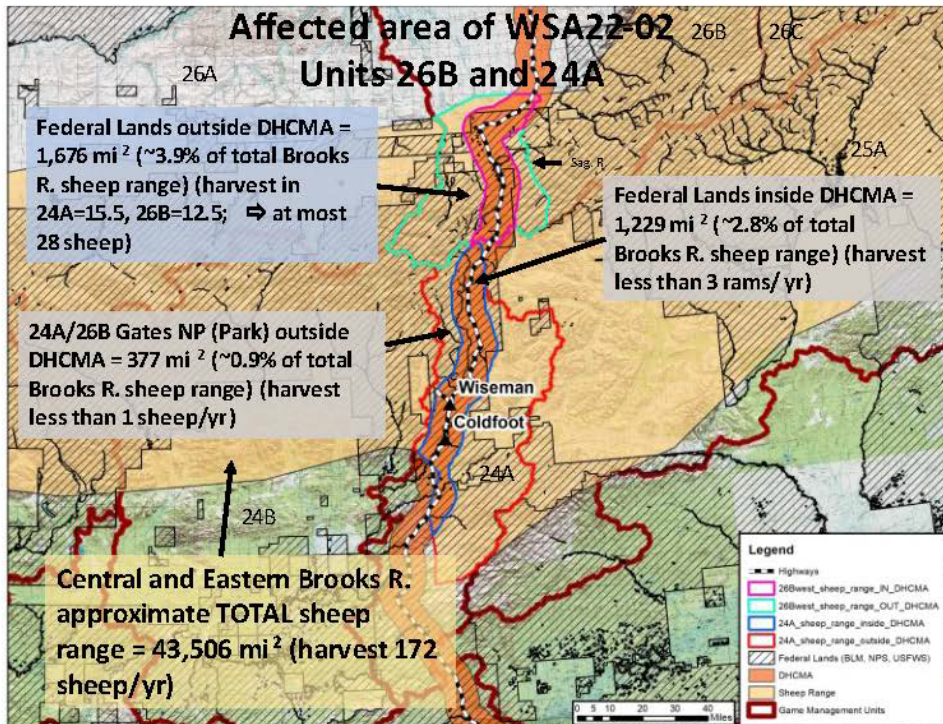


Figure 2. Proposed closure area in Units 26B and 24A and the Dalton Highway Corridor Management Area (DHCMA).

*A Closure Would Not have a Meaningful Biological Population Effect*

The Central and Eastern Brooks Range sheep range is managed by the Department as a functional population; therefore, assessment of any proposed management action requires an assessment of the potential effect at the population level. It is important to recognize that the proposed closure area does not constitute a distinct biological sheep population, separate from the Central and Eastern Brooks Range sheep population. Because the proposed closure would only affect approximately 3.9%-7.5% of the Central and Eastern Brooks Range sheep range, lacking more specific distribution data, we infer that it would only have the potential to affect a small portion of the sheep population. However, the effectiveness of proposed closure assumes sheep are only on federal lands and that hunters would not redistribute themselves to other areas within the Central and Eastern Brooks Range sheep range. To the latter point, historical statewide harvest data demonstrates hunter redistribution is a common response to regulation changes and to the former point survey data has clearly documented sheep on non-federal lands within the proposed closure area. Regardless, the potential effect of the proposed regulation is not biologically meaningful.

This sheep population assessment is relevant for two reasons, because the potential effect of the closure is insignificant at the population level and because hunters (federally qualified and non-federally qualified) would simply redistribute themselves within the huntable sheep range. More importantly, the population of sheep in the Central and Eastern Brooks Range continues to be viable and the population continues to provide a harvestable surplus that exceeds the average annual harvest.

*A Closure Would have a Minimal Effect on Harvest*

For the proposed closure area, the ten-year average sheep harvest for Units 24A and 26B (west of Sag. R.) combined is 28 sheep (15.5 sheep in 24A and 12.5 sheep in 26B west of Sag. R.). The 28 sheep average harvest represents 16% of the total harvest (172 sheep harvested) of Central and Eastern Brooks Range sheep range. However, because most or all the 24A harvest occurs on state managed lands despite being a small portion of the area [26% of 24A and 16% of 26B (W. of Sag R.) sheep range is State or Private lands], the actual mitigation effect of the proposed closure would be far less than 28 sheep harvested.

We estimate the combined average annual harvest rate of the Central and Eastern Brooks Range sheep range to be 1-2% (compare to moose and caribou harvest rates at 5%) and that the proposed closure would only reduce that harvest rate by 10-15%. The current harvest rates are very conservative, and the proposed closure effect would not be measurable or biologically significant at the population level. It is important to recognize two key strategic inferences of the proposed closure: one is that none of the sheep within the closure area would be harvested outside of the closure area, in other portions of the Brooks Range. The second is that hunters will not redistribute themselves. It is likely that both inferences are false because historical harvest records inform us those hunters will simply move to the areas with open seasons, and the sheep will not be isolated within the closure areas. Therefore, we conclude that the current harvest rates are very low, and the harvest rate of the proposed closure would be inconsequential.

The conclusion that the current harvest level and management strategy is conservative, is corroborated by rams:100 “ewe-like” ratios observed in areas where the harvest is limited to full-curl rams. Sheep trend count surveys conducted from 2002 to 2021 in a portion of Units 24A and 25A counted an average of 42 rams:100 “ewe-likes” (Figure 3). Which is comparable to averages of ram:100 ewe-likes estimates from 2009-2021 in the Itkillik R. (42.9 rams:100 ewe-likes; CV range = 13% to 27%), from 2014-2021 near Anaktuvuk Pass (49.9 rams:100 ewe-likes; CV range = 13% to 31%) and from years 2010, 2015, 2021 in the GAAR total area (54.7 rams:100 ewe-likes; CV range = 8% to 10%). These rams:100 ewe-likes average values were based on abundance estimates using distance sampling methodology (conducted by NPS). Due to classification errors (e.g., small immature rams misclassified as ewes), we expect the *actual* ram:100 ewe ratio to be even higher if ewe-like rams were moved from the denominator to the numerator. Age estimates derived from growth annuli from rams harvested since 1987 in the Brooks Range indicated 65% of rams harvested were greater than 8 years of age (Figure 4). The age estimates also indicate a mature ram age structure is perpetuated annually and that harvest is not having a significant effect on the population. In other words, where we document high male:female ratios and older age-at-harvest in other big game populations, it consistently indicates that harvest is low, sustainable, and likely having little biological effect on the population. Because the weather-related decline impacted the entire population, it is likely male and female lambs sustained similar levels of mortality.

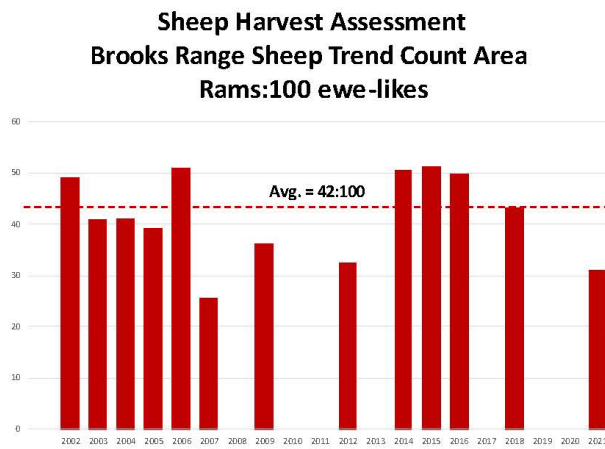


Figure 3. Ram:100 ewe-likes from trend count surveys conducted from 2002-2021 in Units 24A and 25A.

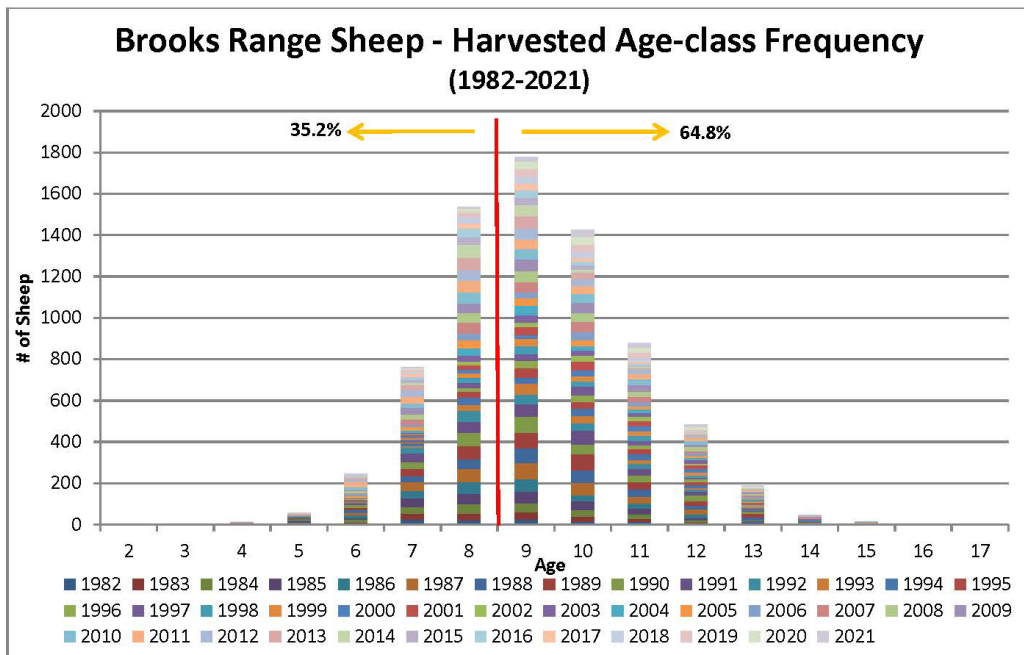


Figure 4. Age class frequency from sheep harvested in the Brooks Range from 1982 to 2021.

Additional Information

Like other sheep populations in Alaska, the current weather-related decline of the sheep population in the Central Brooks and Eastern Brooks Range was significant. ADF&G continues to assess the situation using GAAR population estimates, trend count surveys, and harvest data. ADF&G also plans to deploy satellite-collars in the Central Brooks and Eastern Brooks Range sheep population to further understand this population and evaluate hunting effects on sheep population dynamics beginning in 2022.

However, although the decline is real, lambs continue to be counted in annual aerial surveys and a representative age structure of rams continue to be harvested each year, even from the smaller (numerical) cohorts of the early 2010s. Additionally, providing a harvestable surplus from big game populations with small herds (e.g., 500-1,000) is not unprecedented (e.g., Wolf Mtn. Caribou, 21C Moose, Nunivak Island Muskox, etc.), while the Central Brooks and Eastern Brooks Range sheep population is likely 10,000-20,000 sheep, based on extrapolations of recent population estimation surveys from the GAAR. ADF&G has consistently demonstrated with sheep and other big game populations, that it is not necessary to conduct an annual count of a harvested population or enumerate the abundance of each individual cohort, where very conservative management strategies are employed. In fact, because sheep are one of the few big game populations where age structure and cohort data are available from harvest data, it further reduces the imperative for annual survey data.

Additionally, as previously discussed, approximately 28% the Central Brooks and Eastern Brooks Range sheep population resides within the GAAR. With relatively minimal harvest in the GAAR, and harvest that includes any-ram and ewe harvest, the GAAR represents a significant refugia to the sheep population. The presence of that refugia enhances the opportunity for genetic interchange, age, and sex class interchange, sink migration, and escape terrain from hunting pressure.

The Central Brooks and Eastern Brooks Range sheep population declined due to weather, not harvest. Sheep population fluctuations of varying magnitudes and causes are not unprecedented in Alaska, and those populations have recovered under the full-curl strategy. This is further evidence of the compensatory nature of the full-curl harvest strategy. The proposed closure will not accelerate the recovery or mitigate weather-related declines.

While we recognize the proponent has concerns regarding the declines in the area sheep populations over the past decade, ADF&G believes, based on the information we have gathered in our role as the manager of wildlife in Alaska, that the population of sheep in the Central and Eastern Brooks Range continues to be viable and healthy. As a viable and healthy population, we believe existing Dall sheep numbers can provide both continued opportunity for rural residents to engage in a subsistence way of life as required by ANILCA Section 801(1), as well as for existing state Dall sheep hunting as approved by the Alaska Board of Game (BOG) to continue. Current subsistence harvest numbers of the sheep in the proposed closure area are estimated to be very low (< 3 sheep/year and other hunting activities are already highly restricted (GAAR *hard park* or the DHCMA) for more than 41% of the proposed closure area.

Cc: Randy Ruaro, Chief of Staff, Governor's Office  
Doug Vincent-Lang, Commissioner, Alaska Department of Fish & Game  
Eddie Grasser, Director, Division of Wildlife Conservation  
Ryan Scott, Assistant Director, Division of Wildlife Conservation  
Lisa Olson, Operations Manager, Subsistence Section  
Cheryl Brooking, Assistant Attorney General, Department of Law



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## APPENDIX 1



### **Koyukuk River Advisory Committee letter of concern to the Alaska Board of Game, Record Copy, for the State Wide meeting March 4-11, 2022 Fairbanks.**

The Committee expressed concern to Region III ADFG staff at the 2-3-2022 telephonic meeting regarding the vast decline in Dall Sheep population and ram composition. The Committee spent at least 30 minutes with Mr. Stout and Beth Lenart without the least acknowledgement of a management issue.

The Department is willing to take risks with the Dall sheep population, in GMU 24A and 26B with out analyzing or modeling the data. Blindly following the flawed unbending Full Curl management strategy developed using steady recruitment, (Heimer, Watson 1986). The full curl management data collected was during steady recruitment time frames from the early 1970's to mid 1980's. The two catastrophic deep snows with rain in GMU 24 A&B, with loses of three cohorts each (6) in the last 10 years is unprecedented, and are not analyzed in the full curl management model.

The Committee expressed concern with Region III ADFG apathy. The Committee discussed a letter to be written to the BOG regarding this issue.

This left the Committee at a juncture to move to the BOG level to inform the Board. The Committee discussed a letter to be written to the BOG regarding this issue. Vincent Simon made a motion to have Chairman Reakoff write a letter outlining the issues in a Record Copy (RC).  
Darrel Vent 2<sup>nd</sup>.

The vote was unanimous to support writing and transmit it the letter to the BOG as a Record Copy to describe the primary issues with current GMU 24A sheep management:

\*Sheep Population is around 25% for the typical surveys since 2002 in the Central Brooks Range survey units 1A and 2B.  
Most or all of 2B is in GMU 25A.  
(The snow shadow of the GMU 25A subunit, and (2B survey unit), has typically higher sheep population, the Koyukuk GMU24A – 1A survey unit.)

\*The ADF&G data collection does not have vital age composition, for 1/2, 3/4, and 7/8 curl rams. These composition data would show the nearing elimination of the remaining breeding rams. This data would also show what the age composition of the ewes. Legal ram data only, does not and cannot support a harvestable surplus analysis. The Department does not have data, is unwilling to collect composition data, to analyze the flawed full curl management during sever extreme weather affects on the Dall Sheep Populations.

#### -----Vital Factors-----

\*The extreme recent weather events in the past 10 years have eliminated all but the approaching legal status rams. Current Dall Sheep population needs conservation of remaining rams for two years to sustain the diminished breeding component.

Koyukuk River Fish & Game Advisory Committee



\* GMU 24A has longest seasons in Alaska, combined with high hunter participation and access. The General hunt in the DHCMA in GMU24A, which runs through October 5 since the 2020 regulatory year, endorsed by the ADFG Region III staff during deliberation to extend the season.

At the March 2020 GOG meeting ADFG staff blatantly made false statements to the Board assuring that the “population in the central Brooks Range was stable or increasing”.

\*Survey flown survey in 2018 showed a 50% decline from the 2016 survey. The Koyukuk River AC, had commented extensively for two years prior regarding the deep snow/ icing events. The Koyukuk River AC apposed the proposal to lengthen the Dall Sheep season in the DHCMA by additional 15 days. I as Chairman of the AC complained to the Commissioner’s office after the proposal passed, stating that the department should not make statements to the Board with false information.

\*There is documented take of 10% sublegal rams in the sealing records. There is also un-calculated incidental harvest mortality, wound loss, and discarded sublegal rams. Known detrimental biological ramifications of 3 year old and younger rams breeding adult ewes, once most breeding age rams are eliminated. (Heimer, Watson 1986). The full curl management strategy was to maintain breeding 6-8 year old rams in the population. Current management will exacerbate the recovery of the much-diminished Dall sheep population in GMU 24A, once all the remaining rams are lost to hunting and predation in the next two years.

\*The Department current false statements to the public that the vastly diminished National Park sheep will emigrate to bolster the areas hunted under full curl management. It is known fact that collared sheep have very small home ranges that they know. When populations are very diminished they are less inclined to move. It is completely ludicrous for ADFG staff to attend meeting stating outright false information to be used by decision makers on the BOG. Very few sheep will emigrate outside of NPS units.

\*The Koyukuk River AC requests in this BOG RC;  
For the Alaska Board of Game to direct the Department to issue an Emergency Order to drastically reduce or eliminate harvest of rams in GMU 24A for two regulatory years.

\*Direct the Department to collect sheep survey data to include ram composition data, for 1/2 curl, 3/4 curl, and 7/8 curl and 4/4 curl. Age composition data is to track full curl recruitment for sustained yield. There is a large and vital data set lacking currently, for vitally important sustained yield management.

\*Direct the Department to review the full curl strategy to track ram composition to maintain sustained yield during consecutive multi-cohort losses that have become more common in all mountain ranges in Alaska.

\*Direct the Department to review telemetry data to realistically assess emigration from NPS lands, to make valid assessments.

**Jack Reakoff**  
**Koyukuk River AC Chairman**

Koyukuk River Fish & Game Advisory Committee