

 **Alaska Dall's Sheep History and Research**



Brad Wendling

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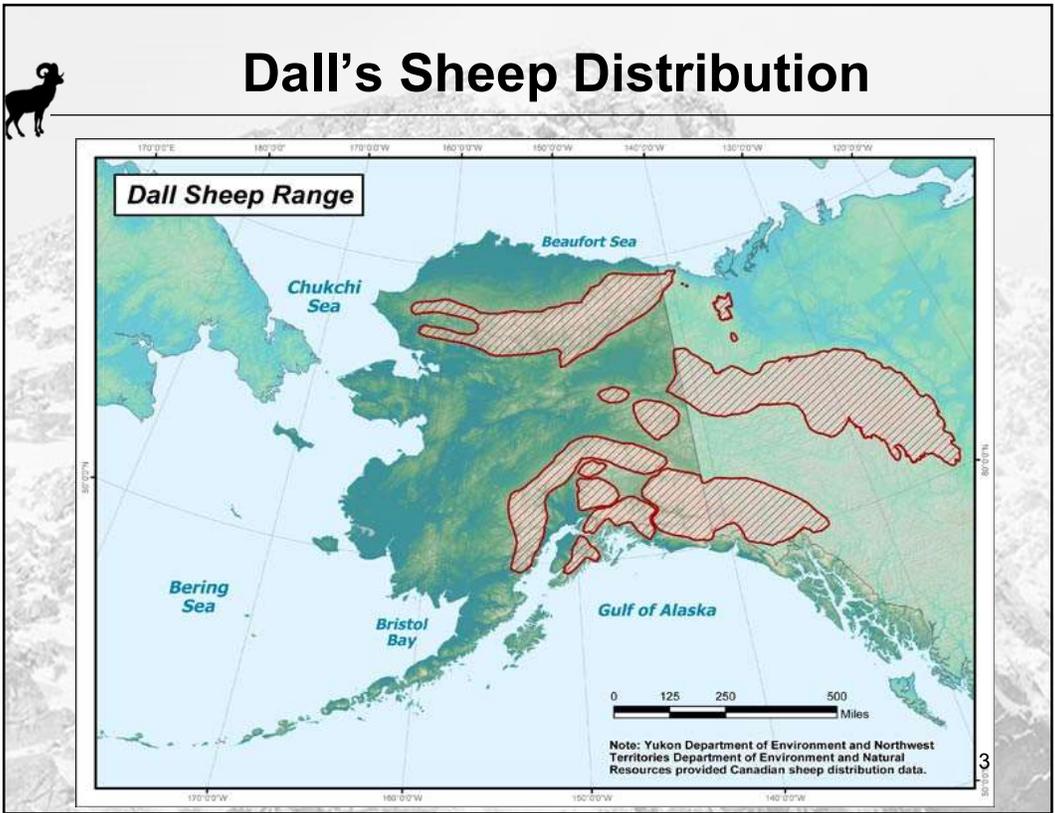
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 **General Description**



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Winter Habitat Use

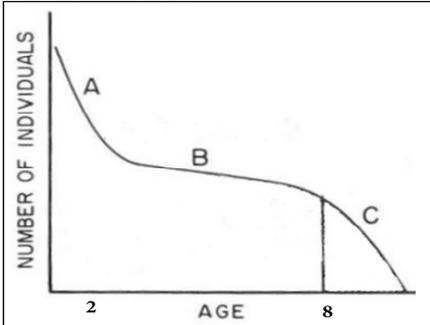
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Lambing

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Mortality



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Summer Habitat Use



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Hunting Regulations 1950 – 2023

1950's – 1978: $\frac{3}{4}$ curl

1979 – 1983: $\frac{7}{8}$ curl

1984 – present: full curl

figure 1 - Full curl ram

Full Curl Definition:

- 360 degrees or,
- 8 years old or,
- Both lamb tips missing

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Why Full Curl Strategy?

- ❑ Geist (1966, 1971) postulated “Dominance Mortality Hypothesis”
 - ❖ Male survivorship lowered because of rutting stress
 - ❖ Removal of large males increases the mortality of immature rams because of their increased participation in the rut.
- ❑ Heimer (1984) presented observational data collected from AK Range
 - ❖ Concluded heavy harvest of $\frac{3}{4}$ rams resulted in accelerated mortality in smaller rams and low productivity of ewes
- ❑ Full-curl harvest appealed to hunters
- ❑ BOG incrementally enacted more conservative horn regulations
- ❑ Disagreement and uncertainty with DMH (Whitten 2001, Murphy et al. 1990)

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Current Management Strategies

Sheep Hunt Types

- Registration Permit & General Season Hunts
- Drawing Permit Hunts
- General Season Hunts
- EO Closure*

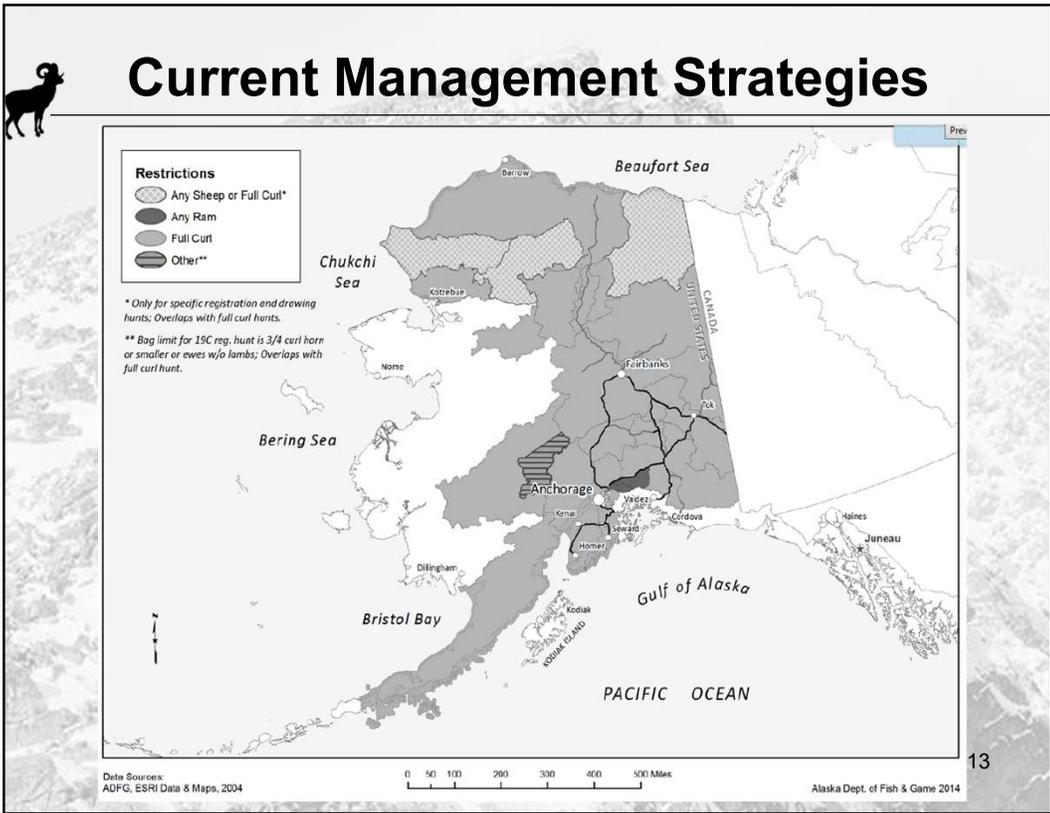
* Closed by Emergency Order at this time

Data Sources: ADFG, ESRI Data & Maps, 2004

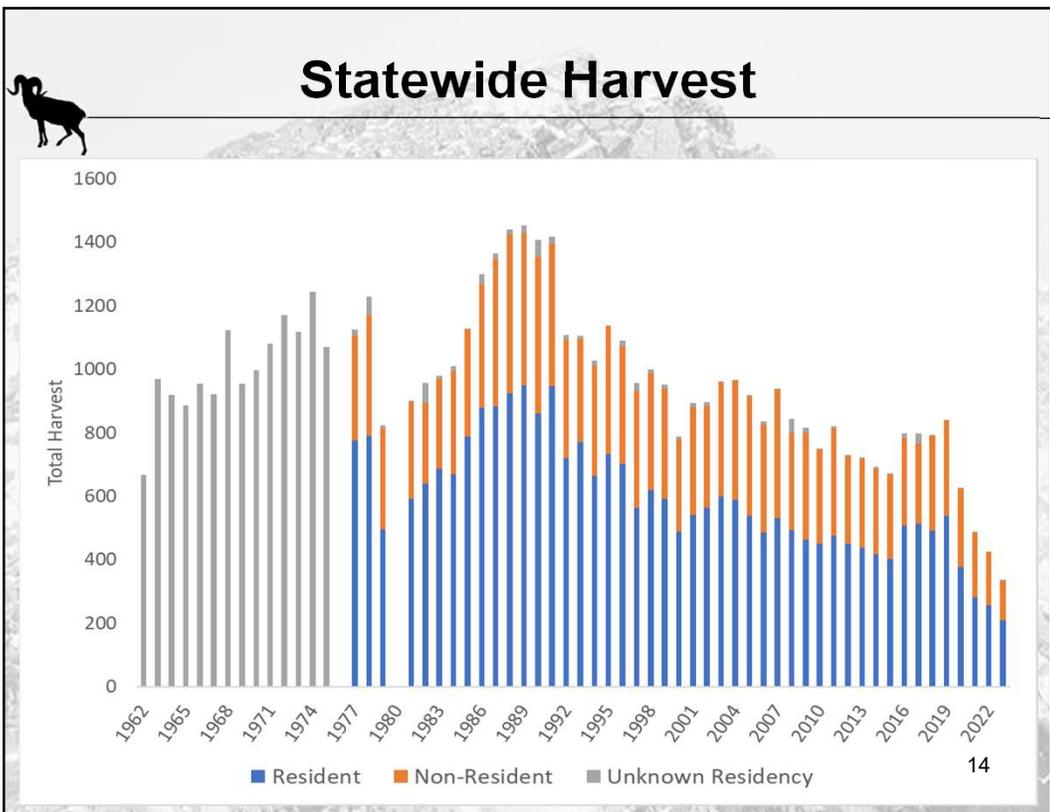
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Alaska Dept. of Fish & Game 2014

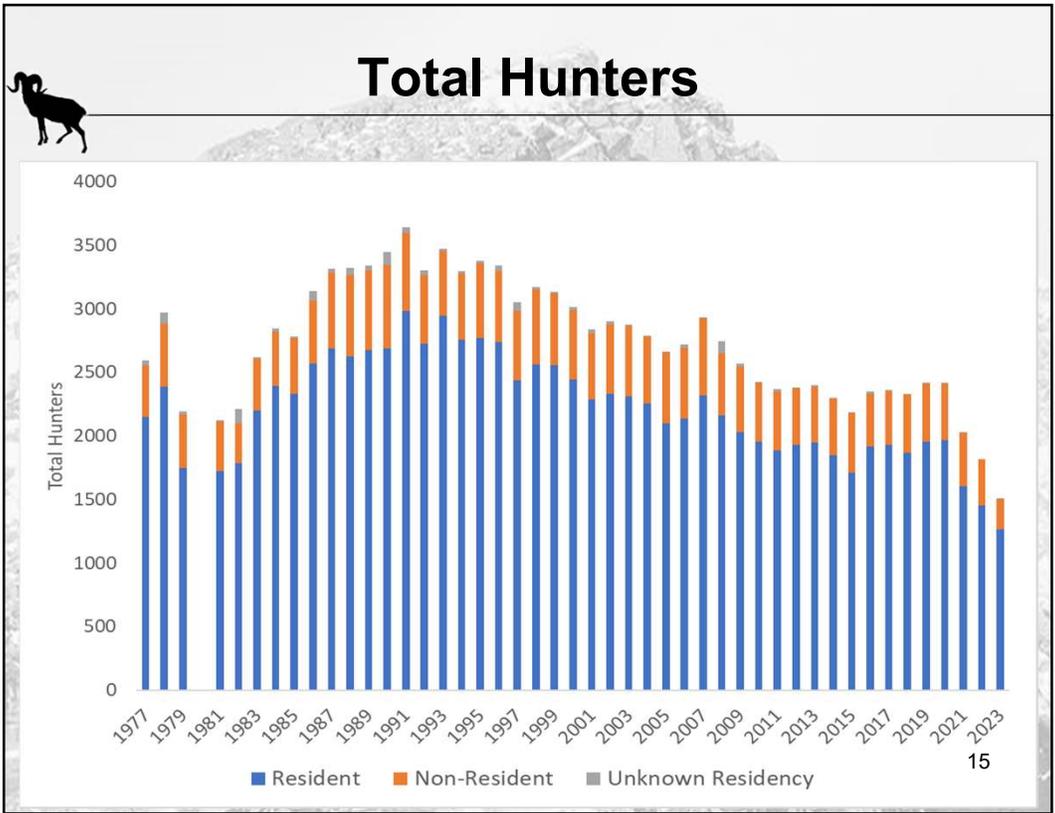
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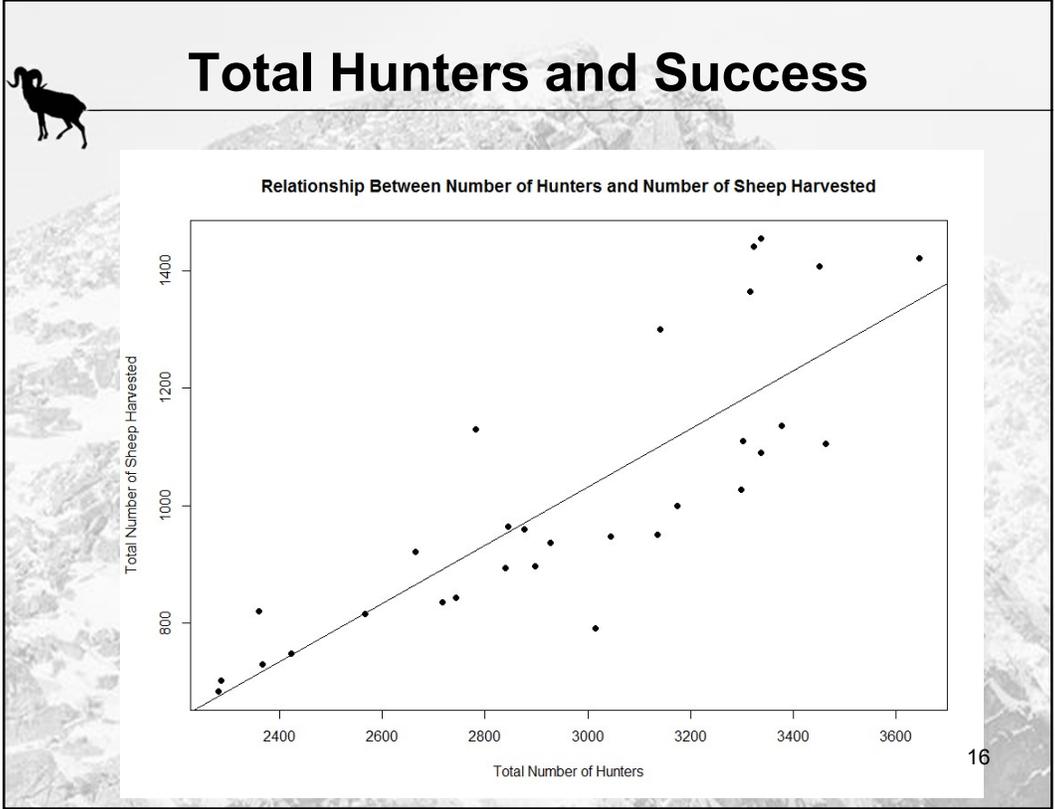
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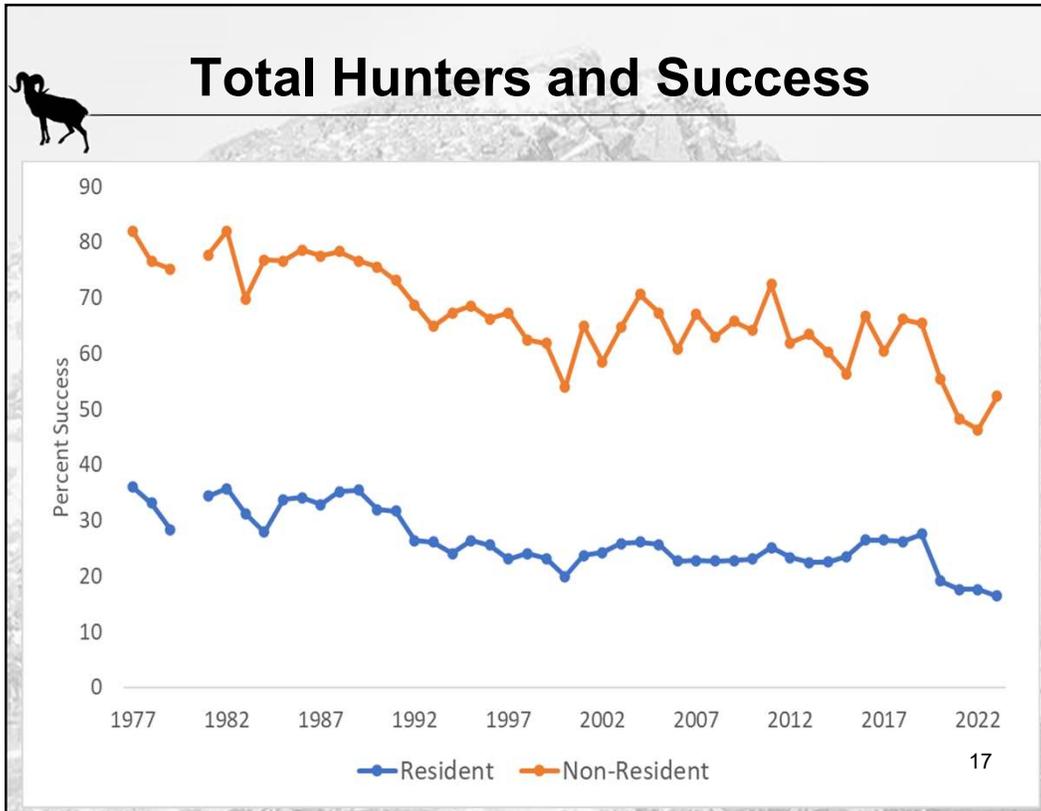
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Current Populations and Trajectories

Population decreases from recent peak

- **24A/25A Brooks Range** down by ~66%
- **19C Alaska Range** down by ~50-70%
- **20A Alaska Range** down by ~60-70%
- **TMA** down by ~70%
- **13A/14A Talkeetnas** down by 40-60%
- **13D Chugach** down by 60-70%
- **14C Chugach** down 50% 1990s-2007, stable since 2007
* ADFG survey data, 2000-2022

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Summary - Current Populations

Hunted and un hunted populations both decline

- NPS estimates 2010, 2011-2020
 - Denali NP down by ~50%
 - NE Gates of the Arctic down by 60%
 - Southcentral Brooks down by 40-70%
 - Western Baird (W. Brooks) down by 70%+
 - Wrangell St. Elias stable until 2019, but no current data

*NPS Dall's Sheep Survey memos, Denali and Wrangell-St Elias Nat'l Parks, and Arctic Network Dall's Sheep Resource brief, December 2020

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 **Extreme Weather**

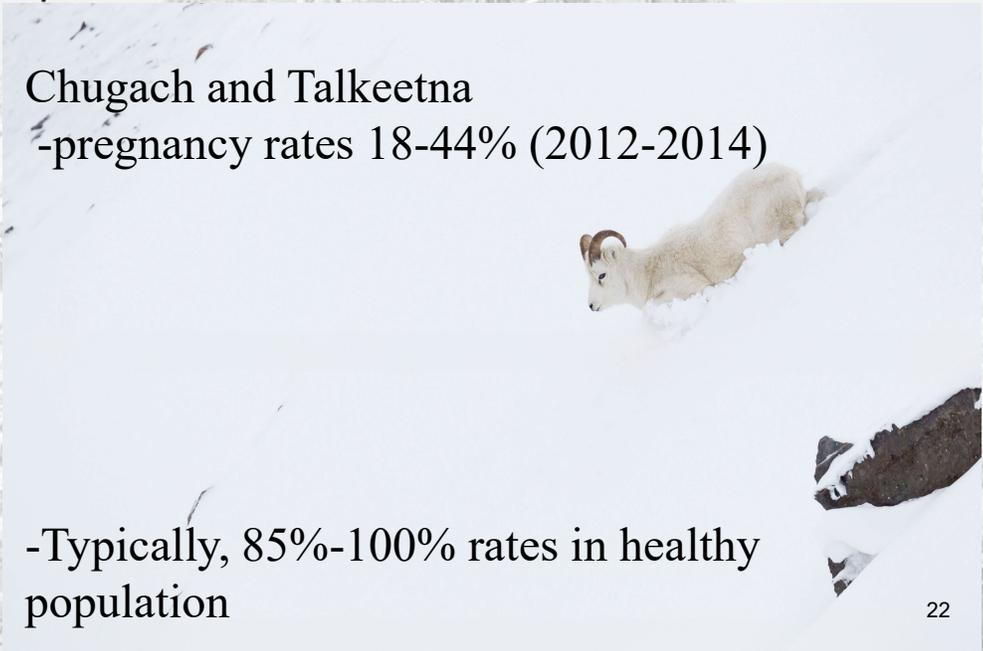


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 **Extreme Weather**

Chugach and Talkeetna
-pregnancy rates 18-44% (2012-2014)



-Typically, 85%-100% rates in healthy population

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Extreme Weather

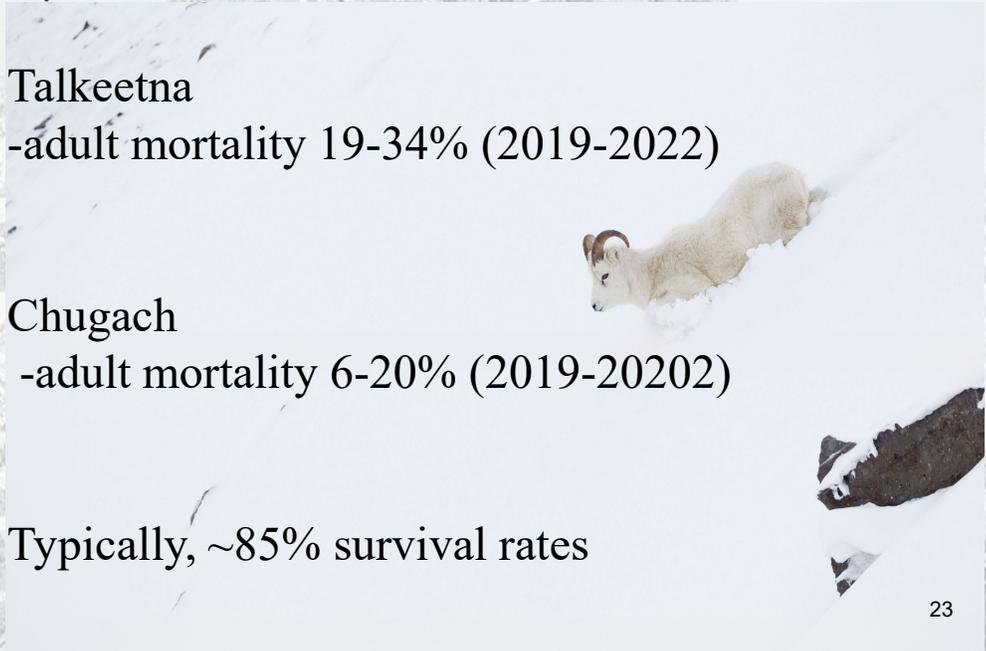
Talkeetna

-adult mortality 19-34% (2019-2022)

Chugach

-adult mortality 6-20% (2019-20202)

Typically, ~85% survival rates



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Extreme Weather

Brooks Range

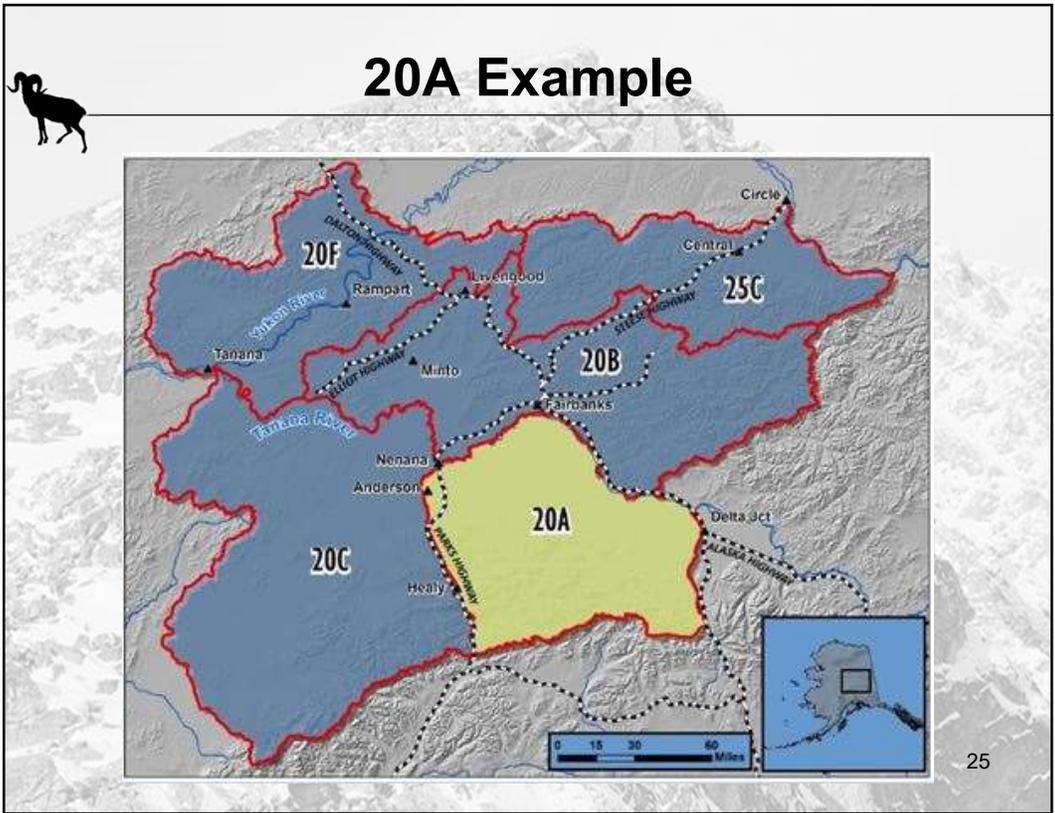
-Continuous Snow Season (2013)

~40-70% declines

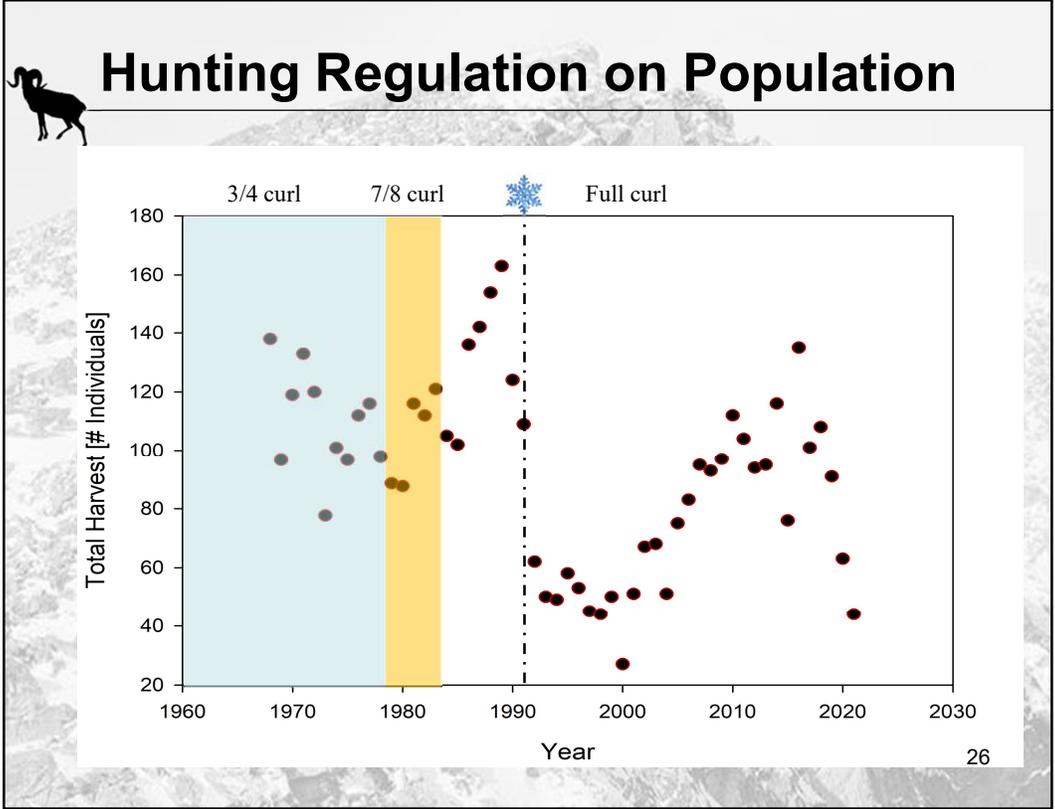


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Paradigm Shift ?

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Assessing Dall's Sheep Horn Morphometrics as a Management Tool

Brad Wendling, Joe Want, Chris Brockman

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Objectives

- Collect additional data at time of sealing: **1)** distance between annuli, and **2)** quantify degree of curl for each horn.
- Examine relationship between, degree of curl and **1)** age, and **2)** horn length.
- Estimate proportion of rams harvested that would have been legally available for harvest in previous hunting seasons based on degree of curl.

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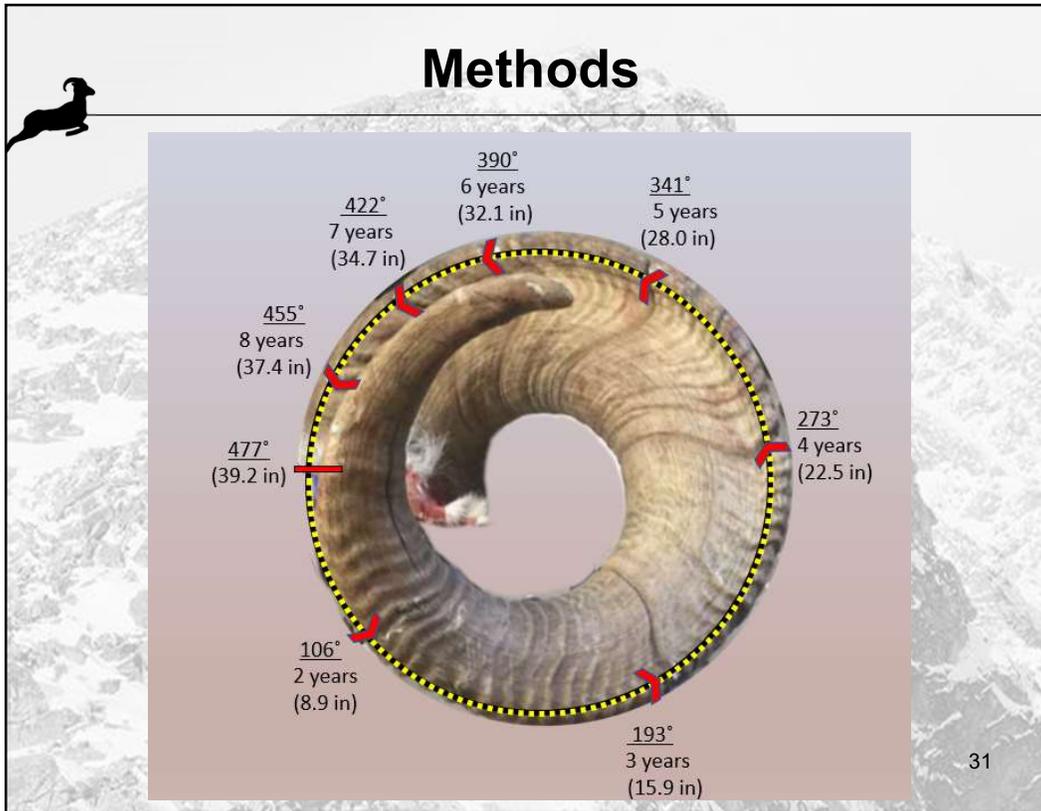


Methods

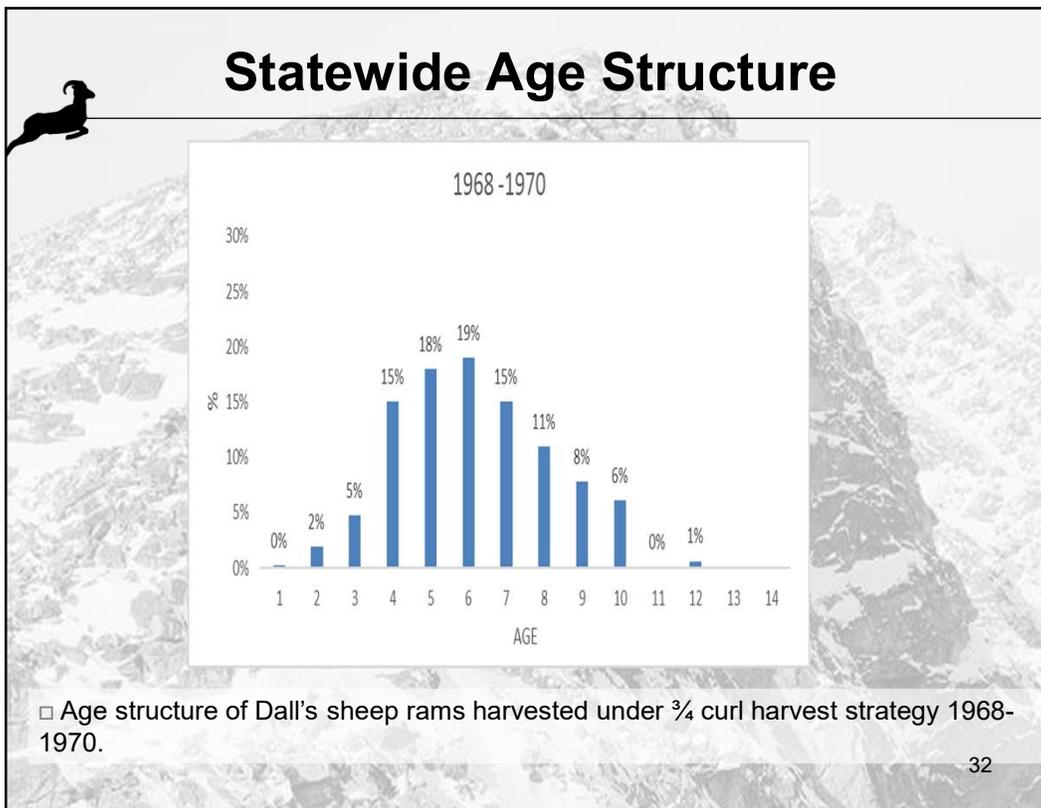
- Between 2016 - 2023 we measured and photographed ~ 2500 rams harvested statewide (~60% of harvest each season).
- No data collected in 2020 because of COVID
- Quantified age, total horn length, total degree of curl, length between annulus segments, degree of curl by annulus segments for each horn.
- Made comparison to 1968 -1970 data set (n=527)

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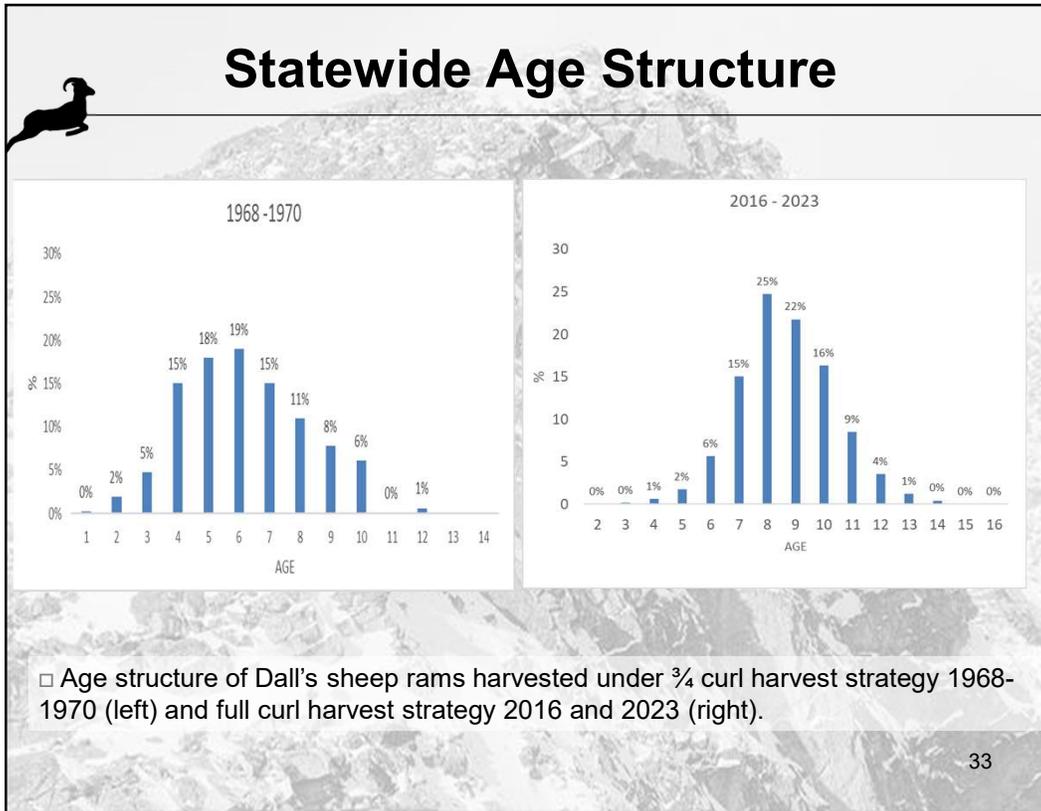
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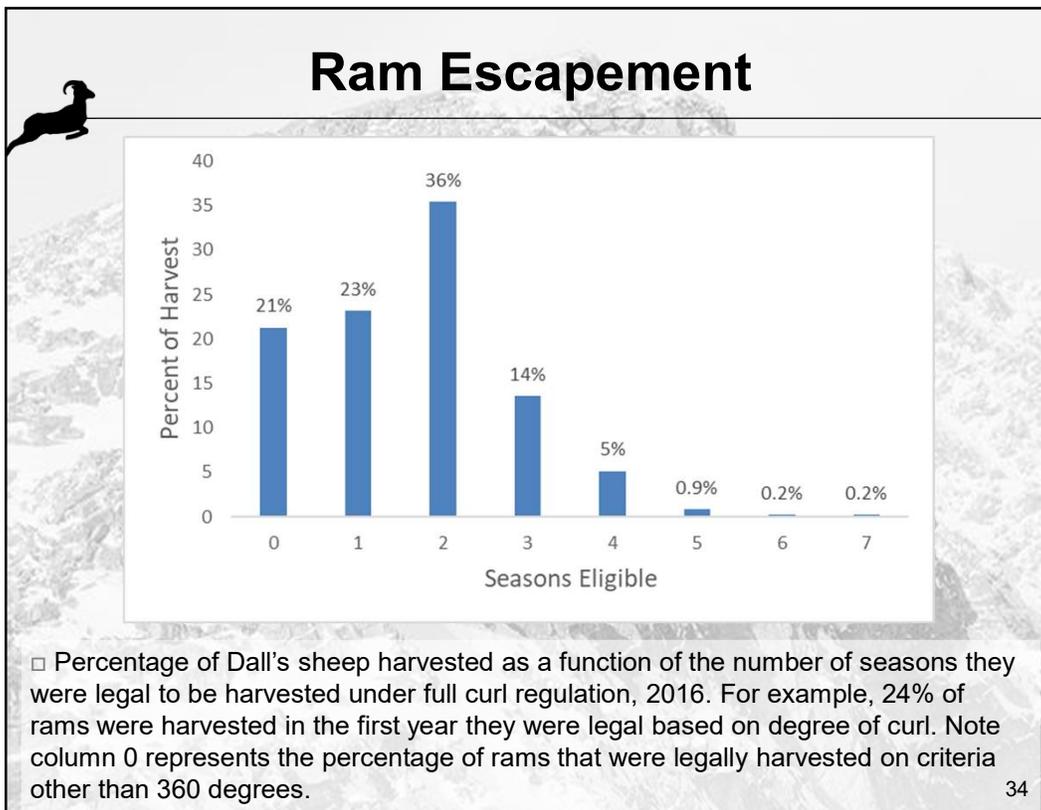
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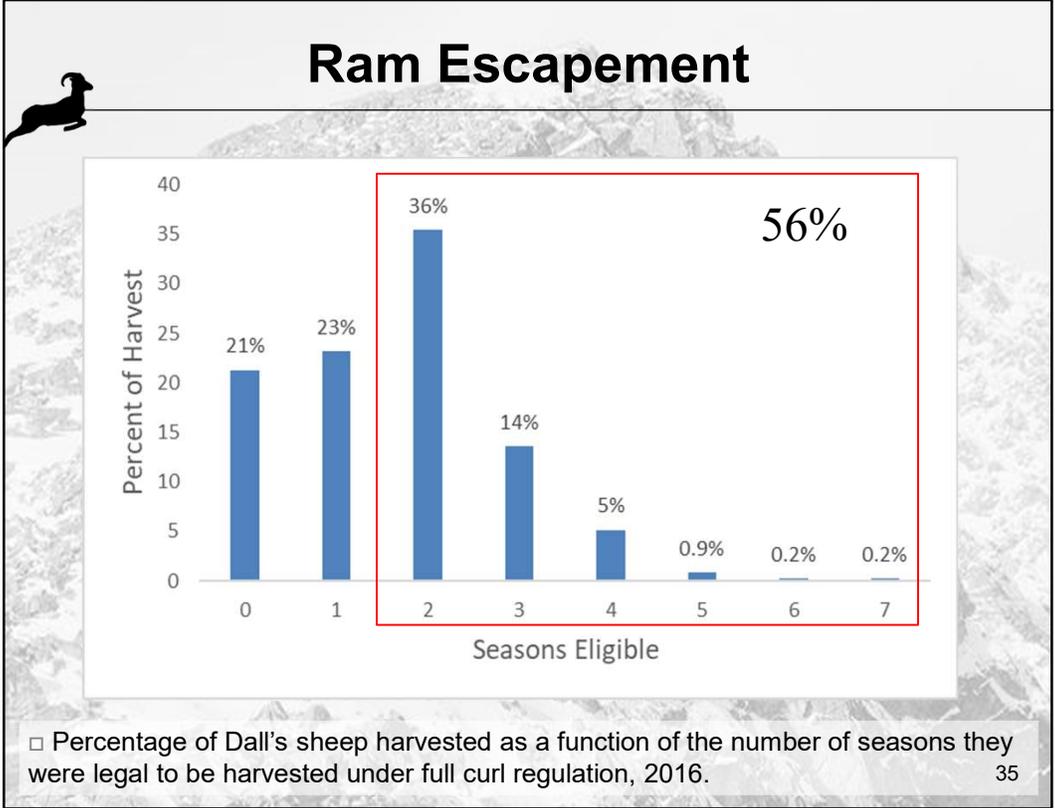
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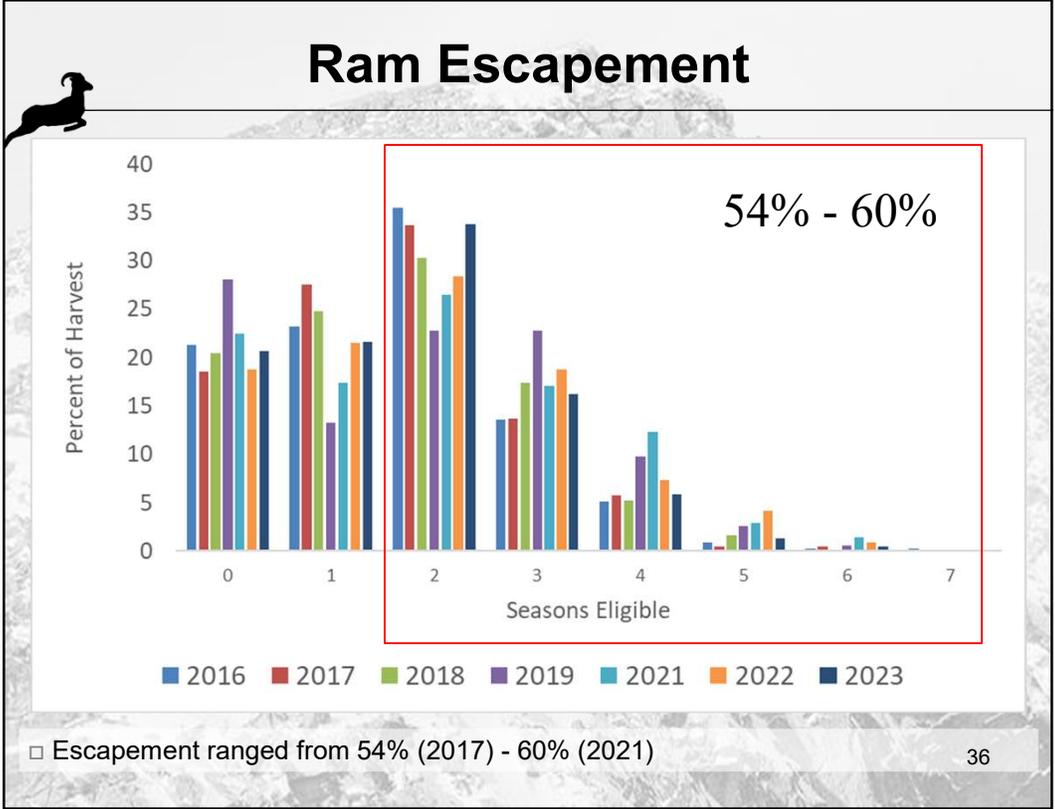
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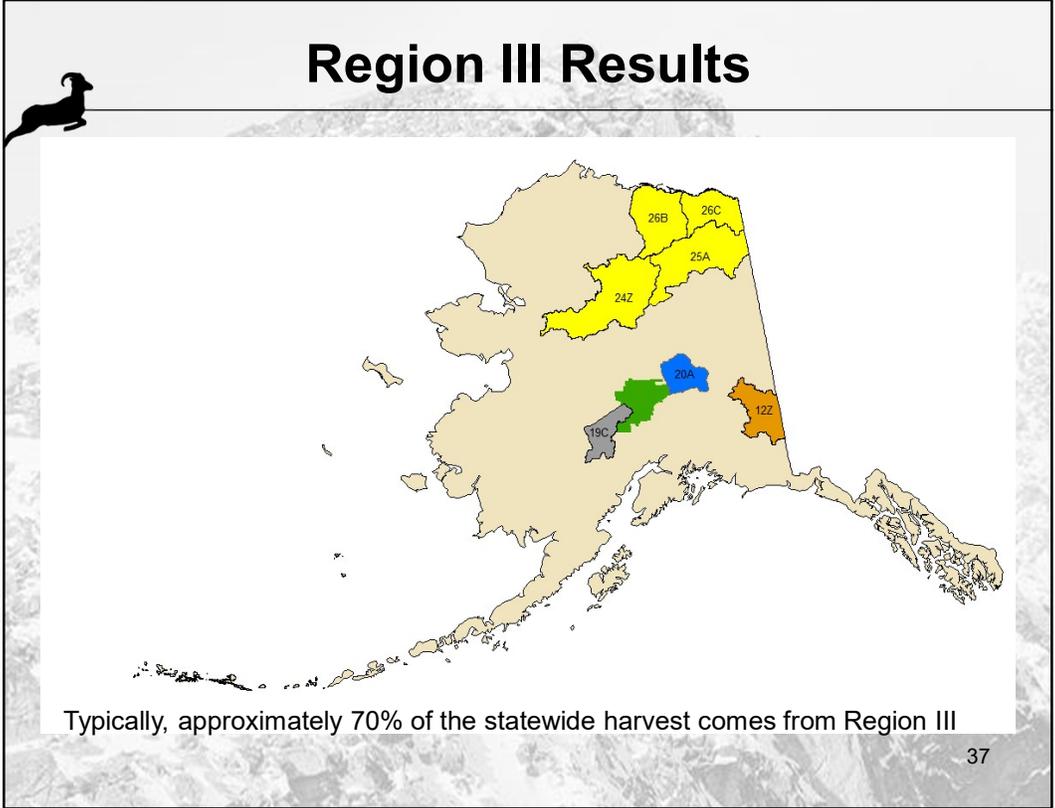
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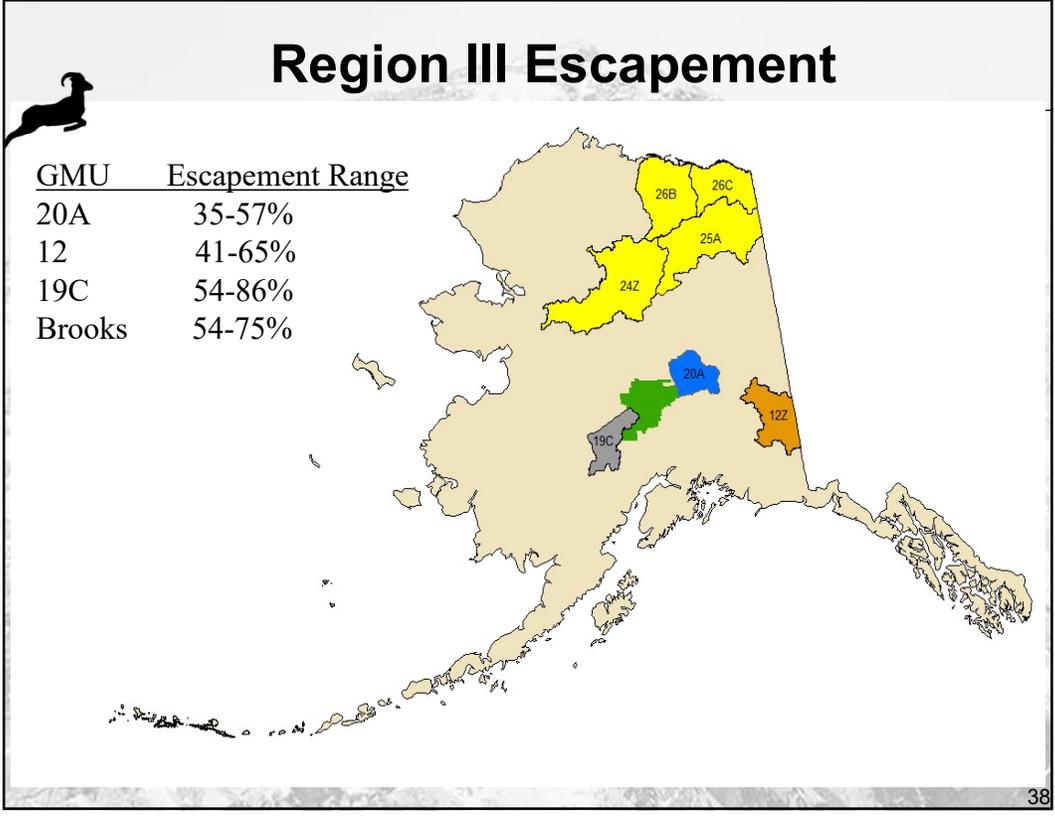
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Discussion

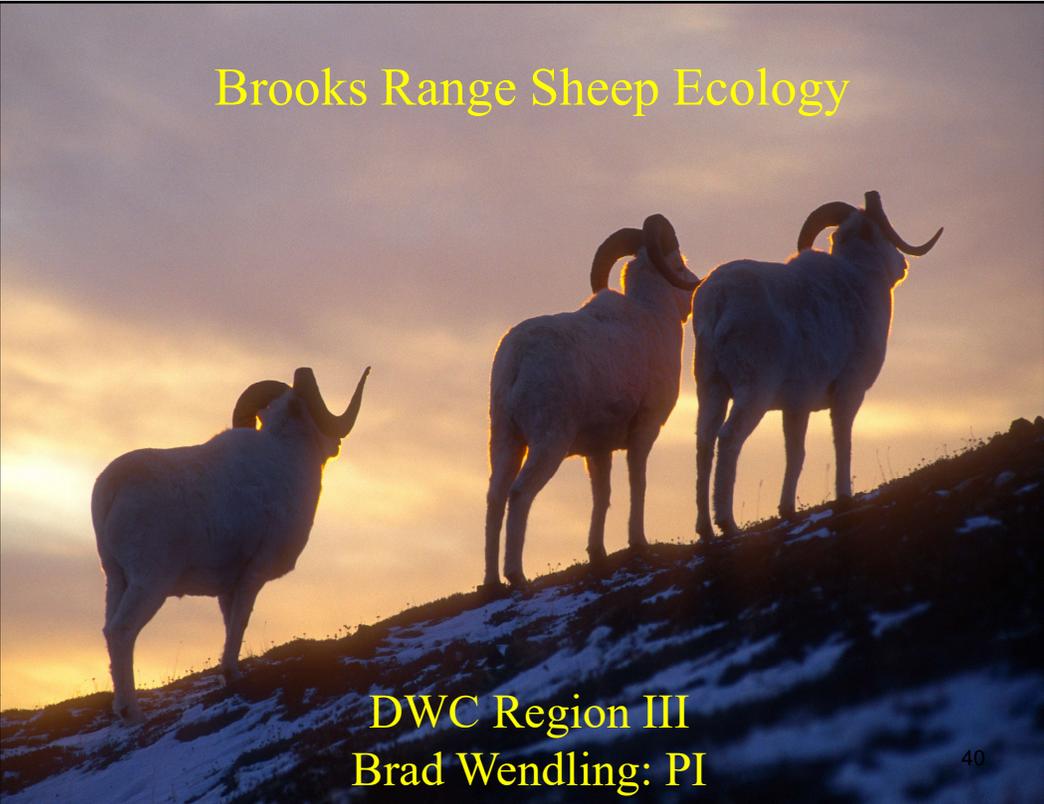


- Research examining the effects of selective harvest on mountain sheep has focused primarily on growth rates (e.g., total length, growth segments, horn volume), while the majority of North American sheep hunting harvest strategies are based on a defined minimum degree of curl.
- We demonstrate that between 2016 and 2023, under predominately full-curl hunting strategy, 57% - 66%, harvested rams were available for harvest for at least 1 hunting season after attaining 360° of curl.

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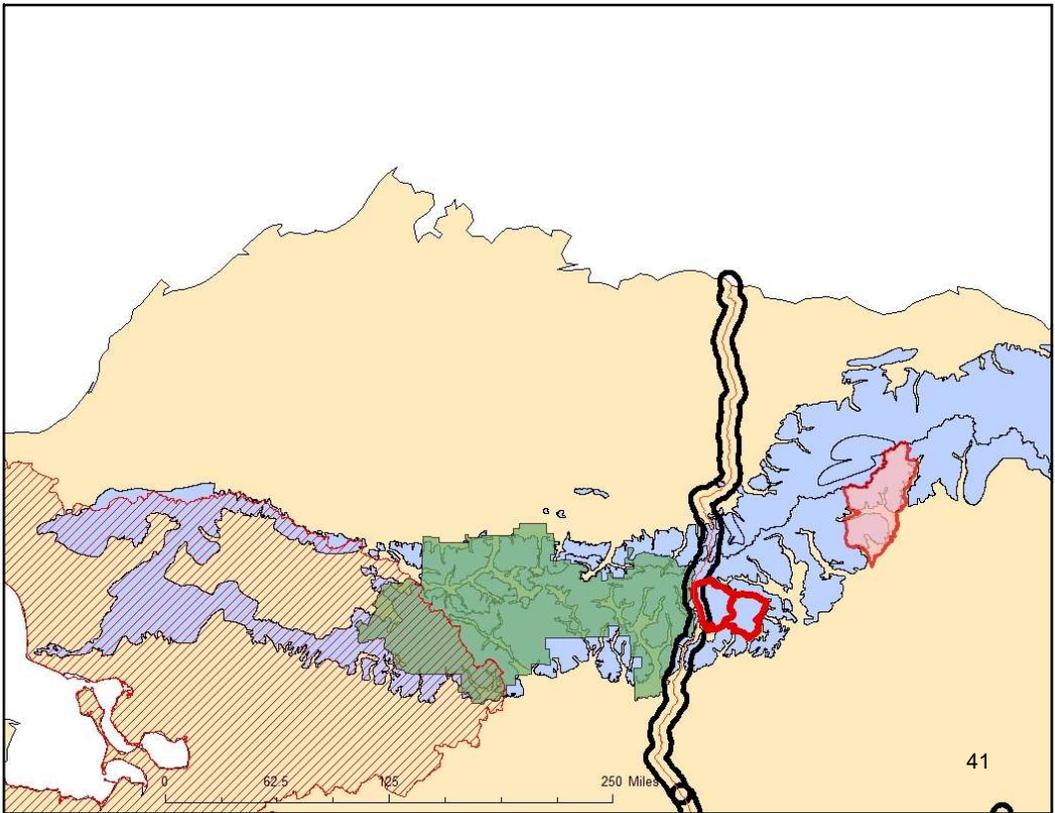
Brooks Range Sheep Ecology



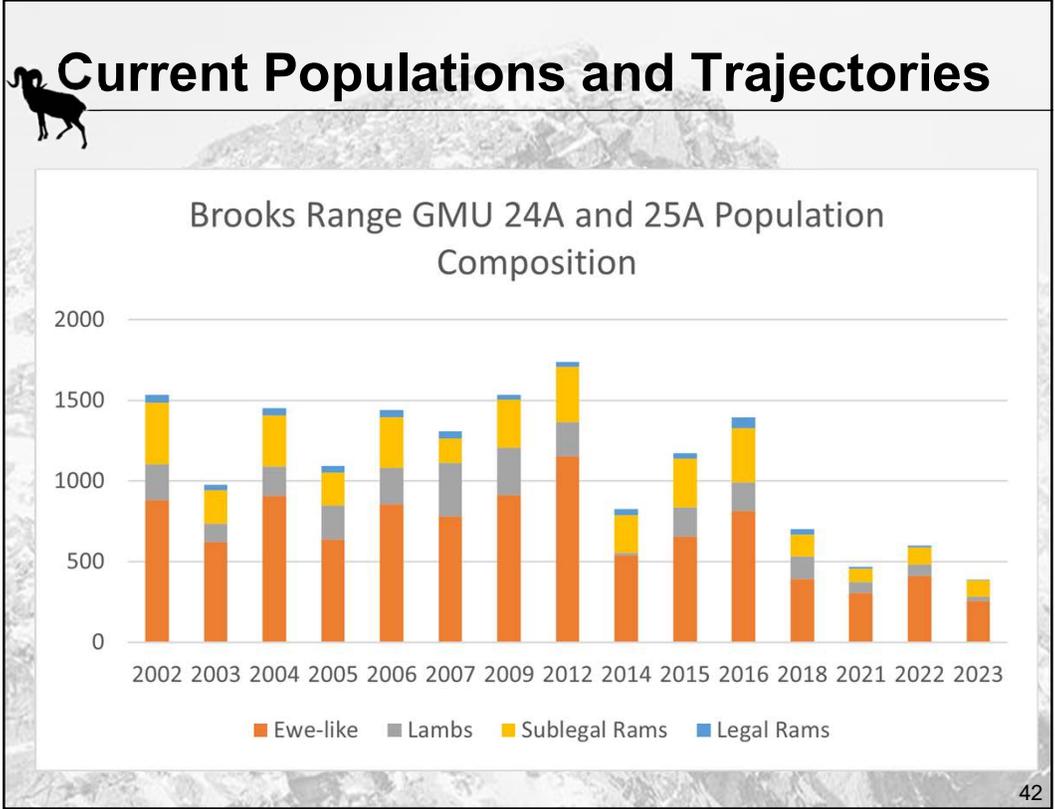
DWC Region III
Brad Wendling: PI

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Purpose of Research

Examine potential impacts of full curl harvest:

- Short term
 - ❖ Energetics
 - ❖ Winter survival

- Long Term
 - ❖ Genetic ramifications
 - ❖ Effects on population dynamics and fitness



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Experimental Design

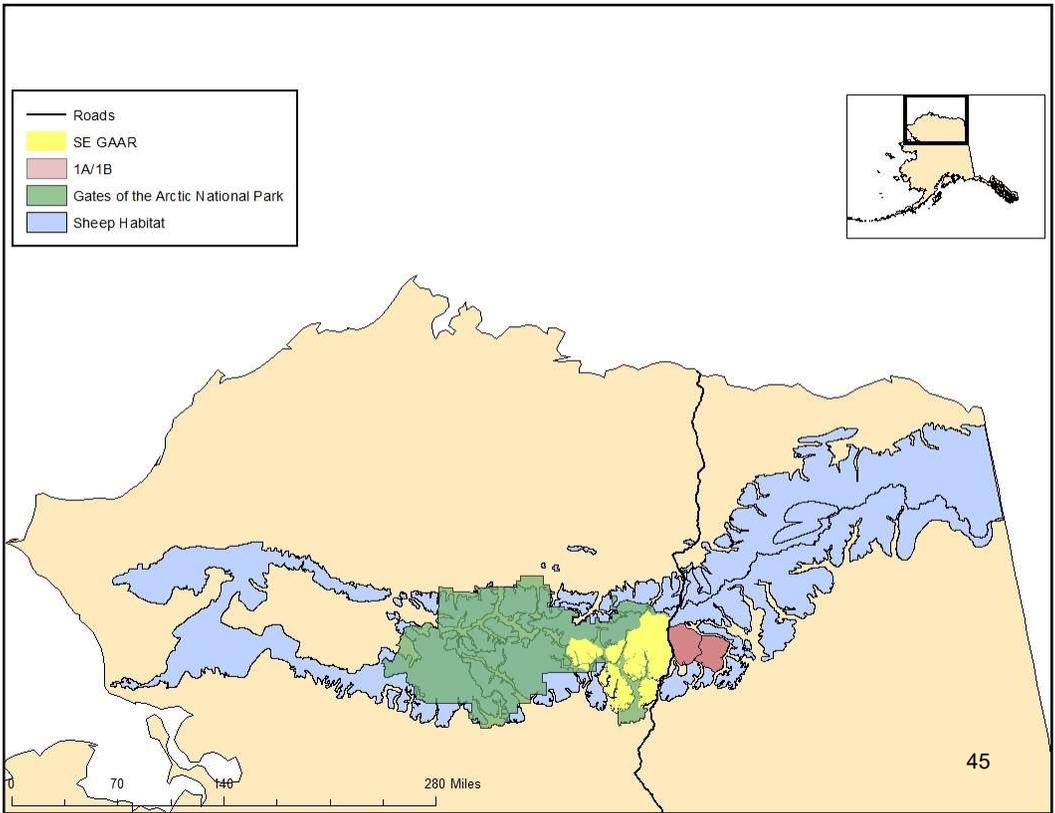
- 3 year study
- 2 Study areas with varying harvest intensity
- GPS/DNA mark sub full-curl rams and ewes
 - ❖ Follow sheep through the life of GPS collars
- Intensively DNA sample lambs/yearlings, and harvested rams in the study area (muscle tissue and fecal samples)



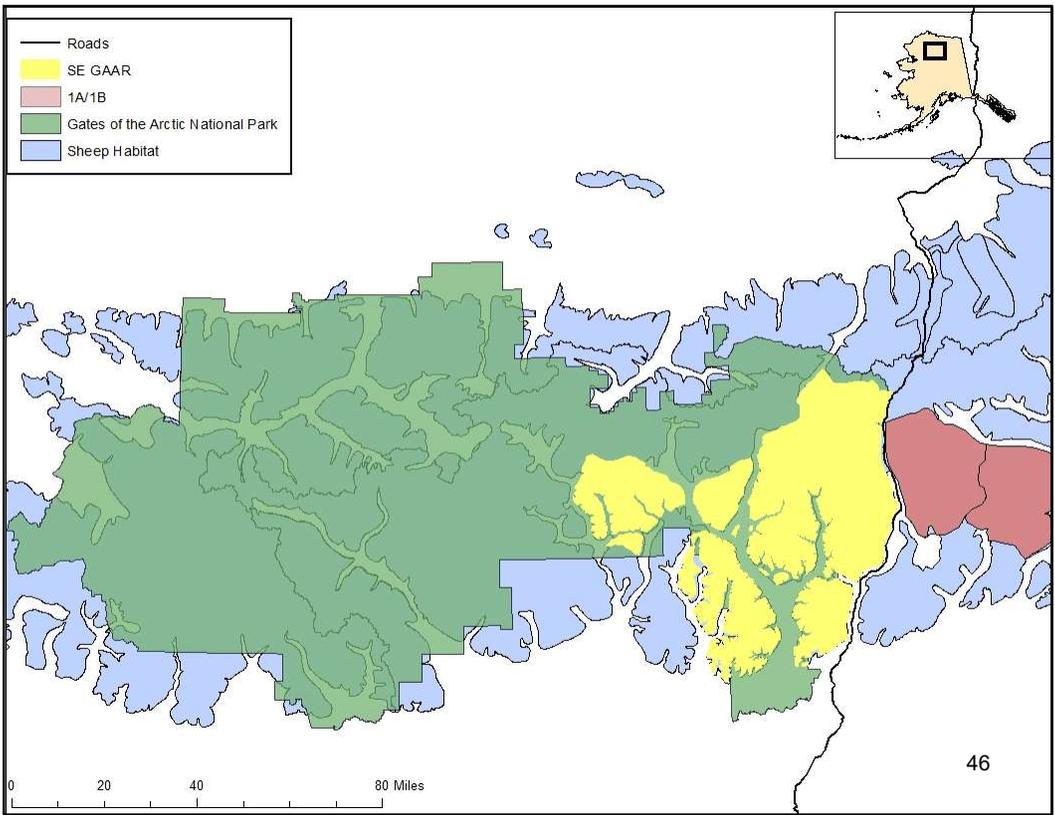


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Research Questions



Under Full Curl Harvest Strategy:

1. Are there differences in the health of sheep between the two study areas?
2. Is survival, recruitment and population growth lower?
3. Do sheep move more (energetic costs) in areas of heavy hunting pressure?
4. What is the reproductive contribution of immature males in heavy and lightly harvested systems?




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Improved Understanding of Dall's Sheep Ecology



- Survivorship curves of rams and ewes under 2 different harvest regimes
- Reproductive contribution of sub FC rams
- Home range size, movement rates, dispersal, habitat selection/use
- Herd Health
- Group size dynamics
- Sightability of marked animals?



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Schedule / Timeline



- June 2023: Capture rams and attach GPS collars and assess health
- March 2024: Capture ewes and attach GPS collars and assess health
- June 2024-2025: Estimate sightability correction factors during minimum count surveys
- August/September 2023-2026: Collect DNA from harvested rams that were taken near the heavily hunted study area at the time of compulsory sealing
- June 2024-25: biopsy dart yearlings.

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June 7 -11, 2023

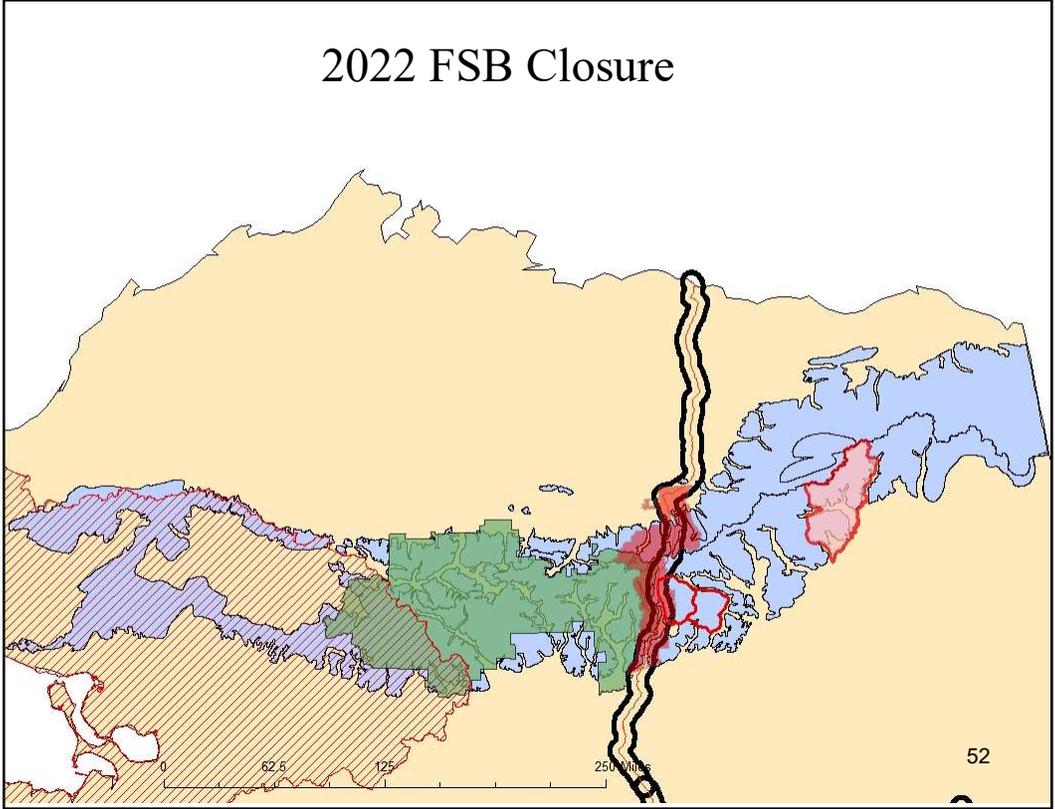


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Collaborators

Dr. Josh Schmidt - NPS
Mat Sorum - NPS
Dr. Eric Wald – NPS
Dr. Greg Breed – UAF
Boomer Hesley – UAF
Drs. Kimberlee Beckman, Annette Roug



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Questions?



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Biological Mitigation Strategies

Habitat improvement/burning
 ➤ (Cost, scale issues)

Transplants
 ➤ (Source population? Disease concerns)

Supplemental feeding
 ➤ (Cost, scale, concentrate animals and spread disease)

Predator control
 ➤ (Sheep not intensive management species, Eagles federally managed, multiple predator species utilize sheep)



***Strateg(ies) should be implemented in such a manner that we can rigorously and objectively evaluate success or failure**

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Allocative/Social Mitigation Strategies

- Unchanged
- Align season dates with moose/ caribou
- Truncate Season
- Access restrictions e.g. CUAs, nonmotorized zones
- Rotating hunt period based on last name
- 1 in 2, 3, or 4 years
- Statewide draw
- Complete closure

***Strateg(ies) should be implemented in such a manner that we can rigorously and objectively evaluate success or failure**

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