# 2026 BOG Dall's Sheep Report

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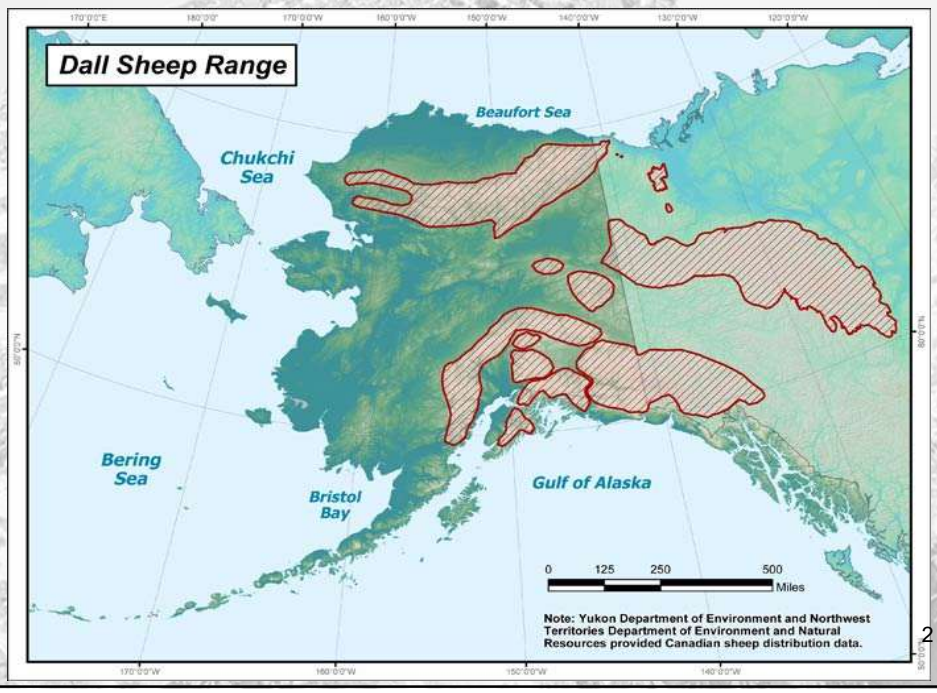
# Dall's Sheep Distribution

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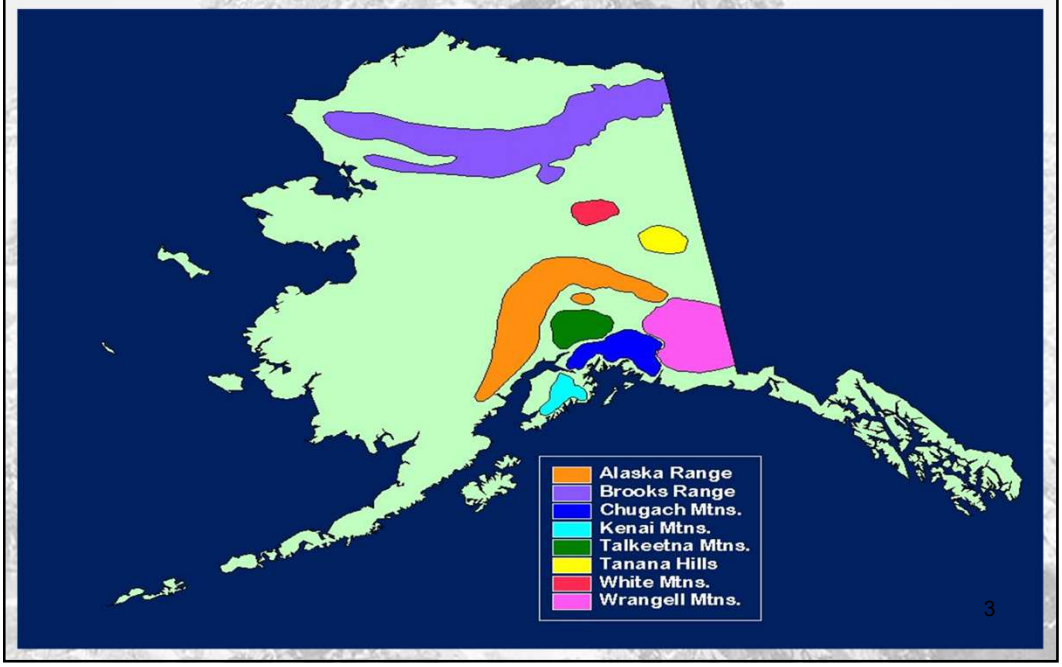
## Alaska Dall's Sheep Populations

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## Recent Changes

- Sheep Hunter Orientation Course (2026)
- GMU 19C Draw Hunts (2026)
- Aircraft Restrictions (2025)
- GMU 19C Closure (2023)
- GMU 14A (2023) and GMU 13D (2026) Draw Hunt Bag Limit Change
- Brooks Range (2022) and Yukon-Charley (2024) Federal Closures

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## Recent Changes

- Increased Tag Fees (2017)
- Youth Sheep Hunt (2016)
- Non-Residents: 1 sheep every 4 years (2016)
- Aircraft Restrictions (2015)
- GMU 23 Closure (2015)
- Chugach Mountains: General Season to Draw (2008)

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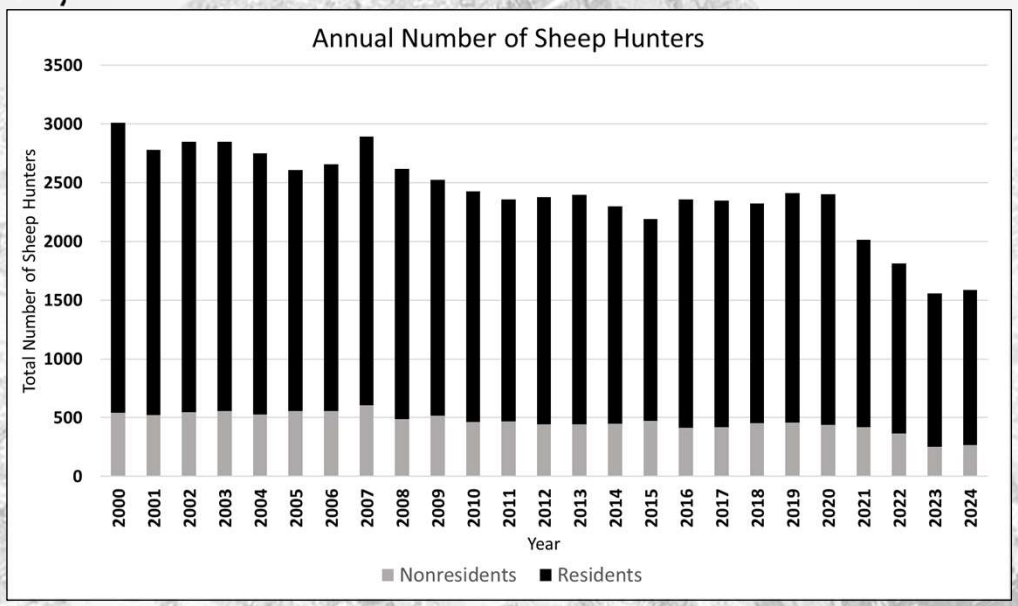
## Statewide Hunter Participation

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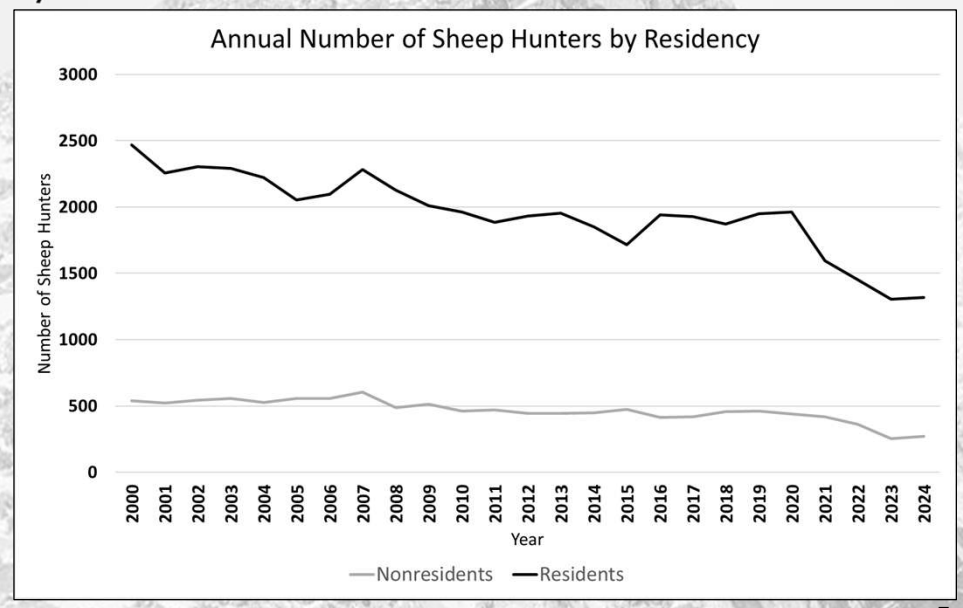
# Statewide Hunter Participation

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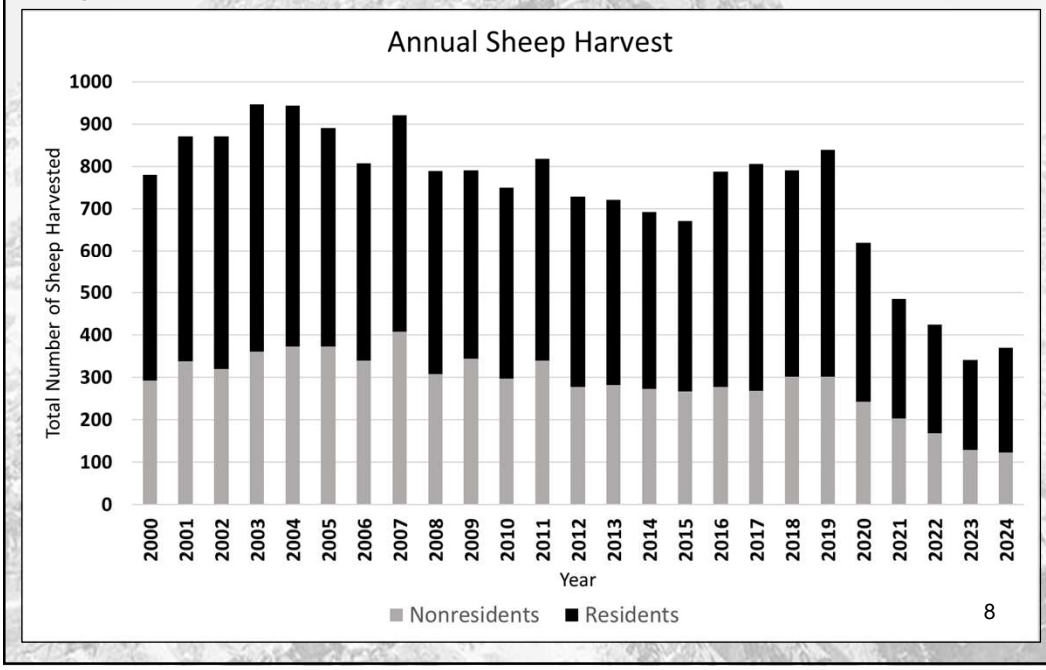
# Statewide Harvest Levels

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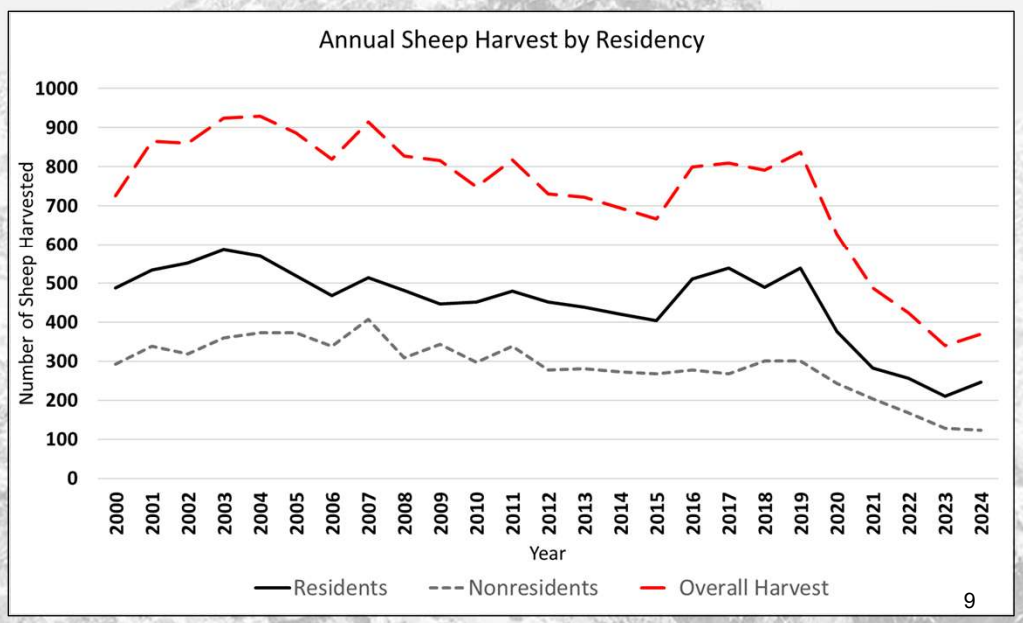
# Statewide Harvest by Residency

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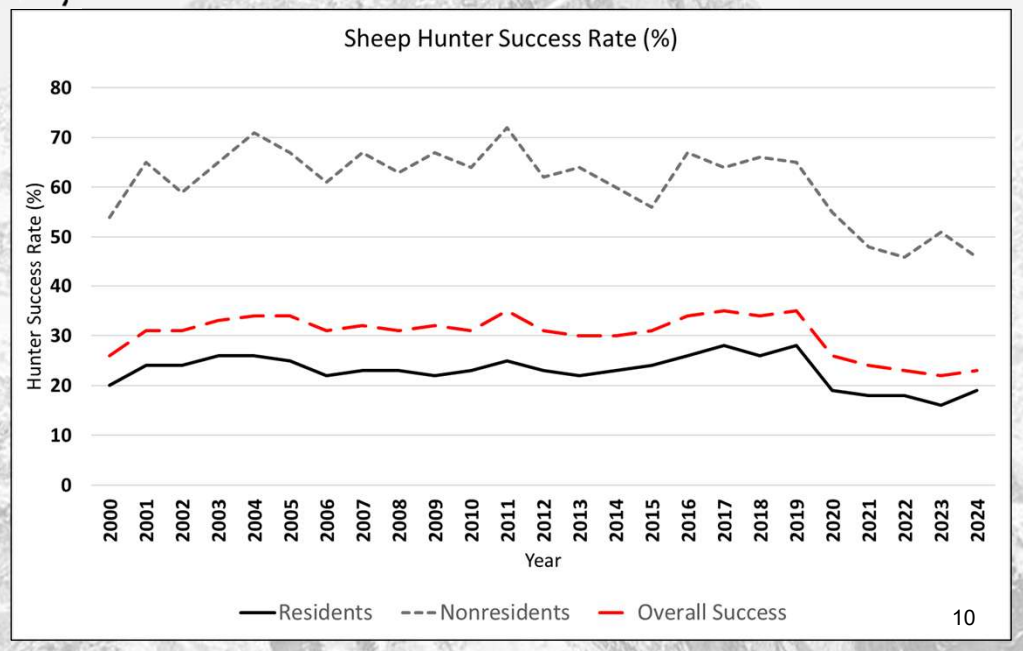
# Statewide Success Rate by Residency (%)

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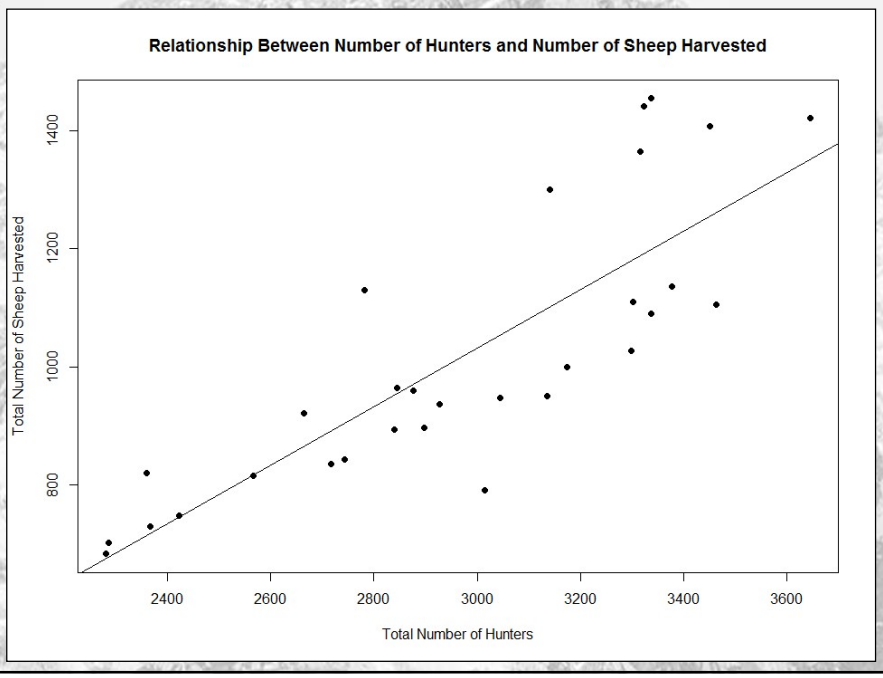
# Total Hunters and Success

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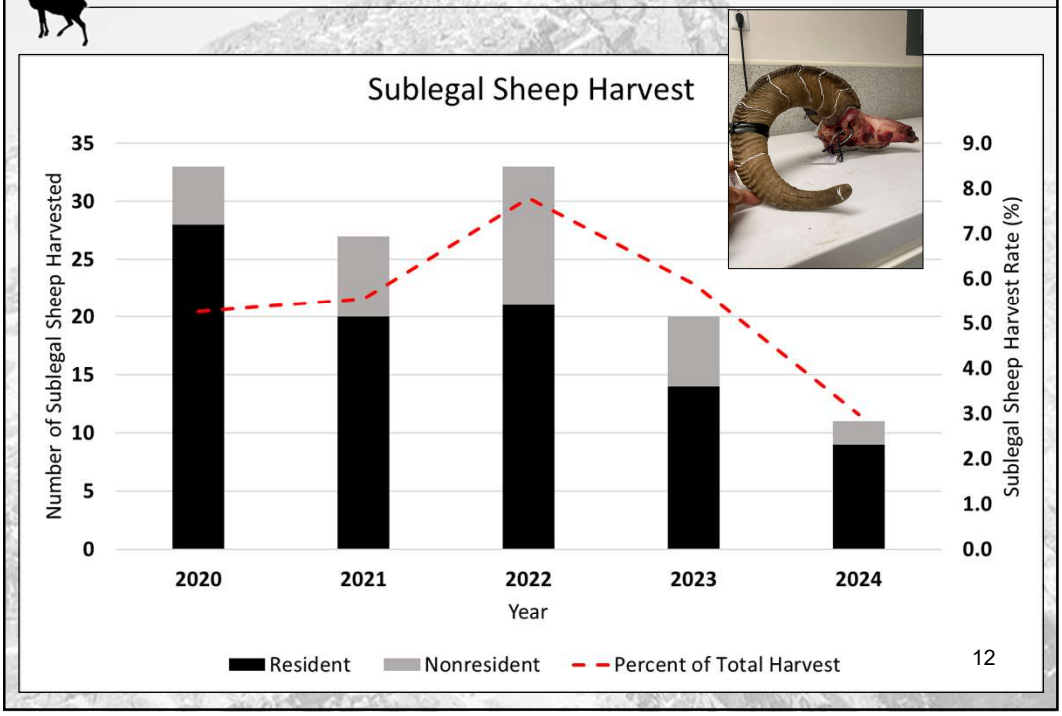
# Sublegal Harvest

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# Current Populations and Trajectories

- Data from a range of survey areas across latitudes
  - Sheep population declines aren't limited to one mountain range.
  - Declines consistent across HT, drawing, subsistence, and closed
- Background
  - Imperfect/incomplete data. (Funding, weather, pilot availability)
- Survey techniques – caveats and assumptions
  - Minimum count – not corrected for sightability
- Small area relative to entire GMU
- What we count represents an index of the population

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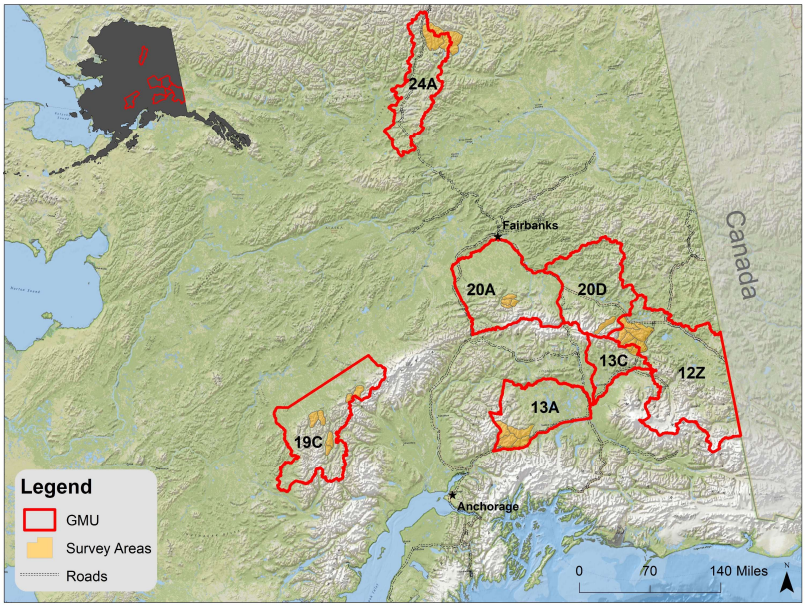
# Current Populations and Trajectories

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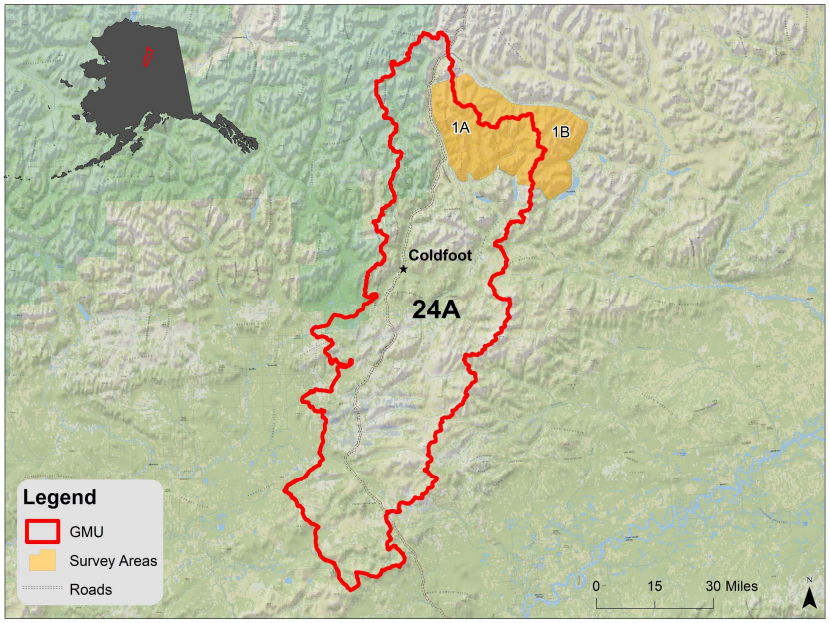
# Current Populations and Trajectories

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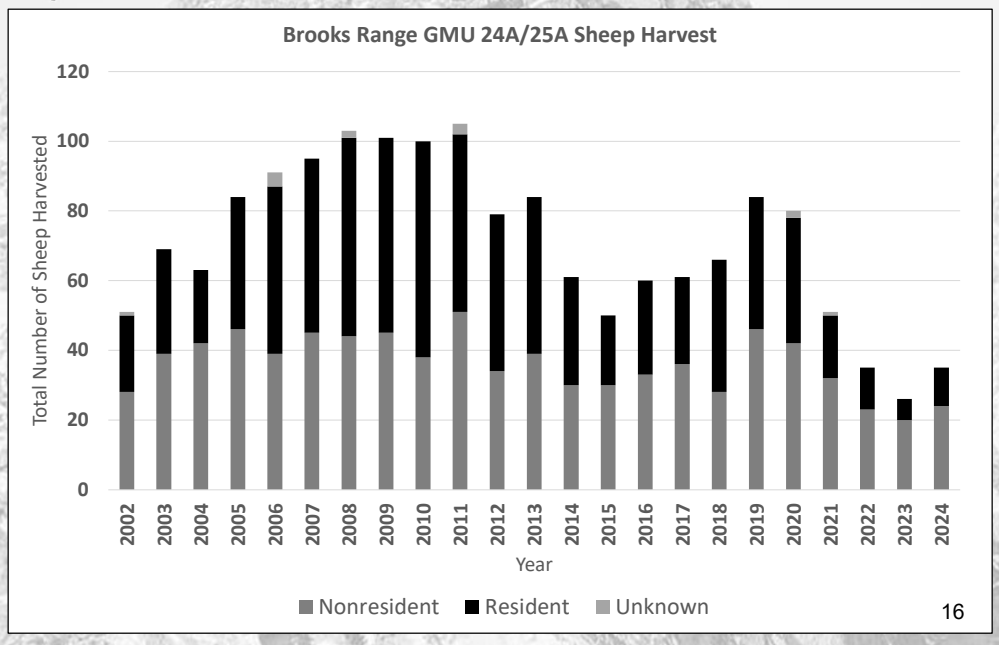
# Current Harvest Levels

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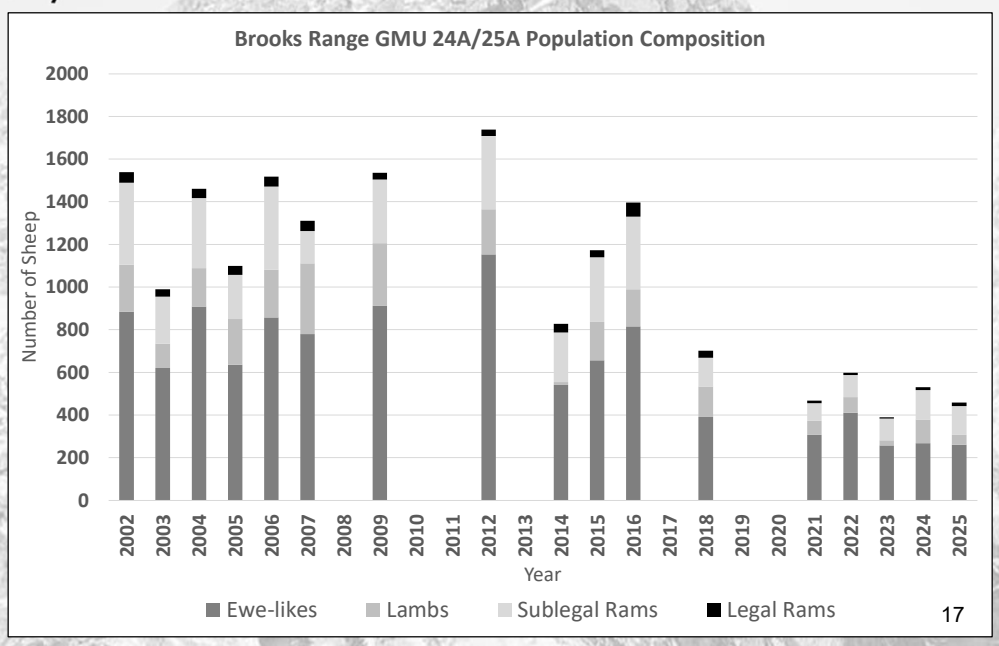
# Current Populations and Trajectories

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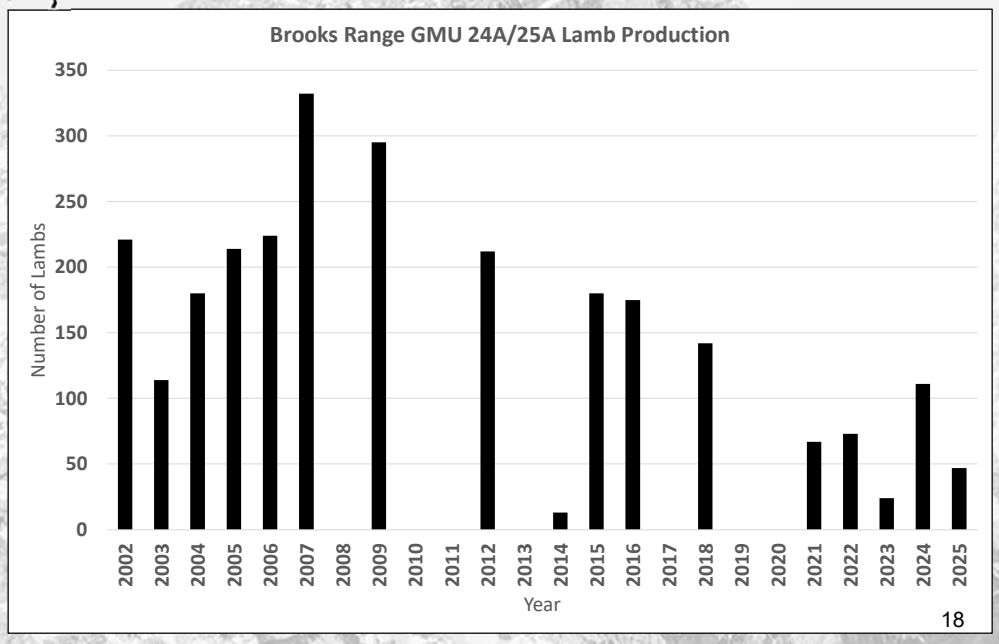
# Current Populations and Trajectories

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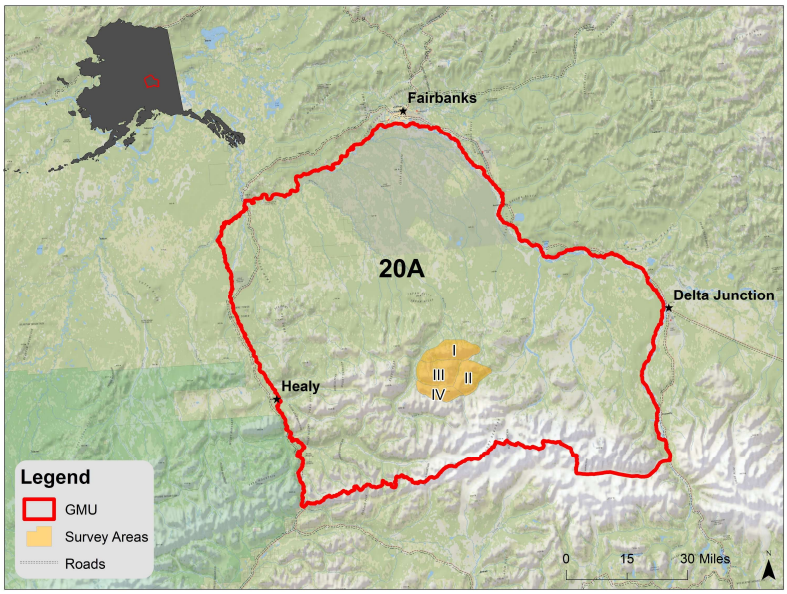
# Current Populations and Trajectories

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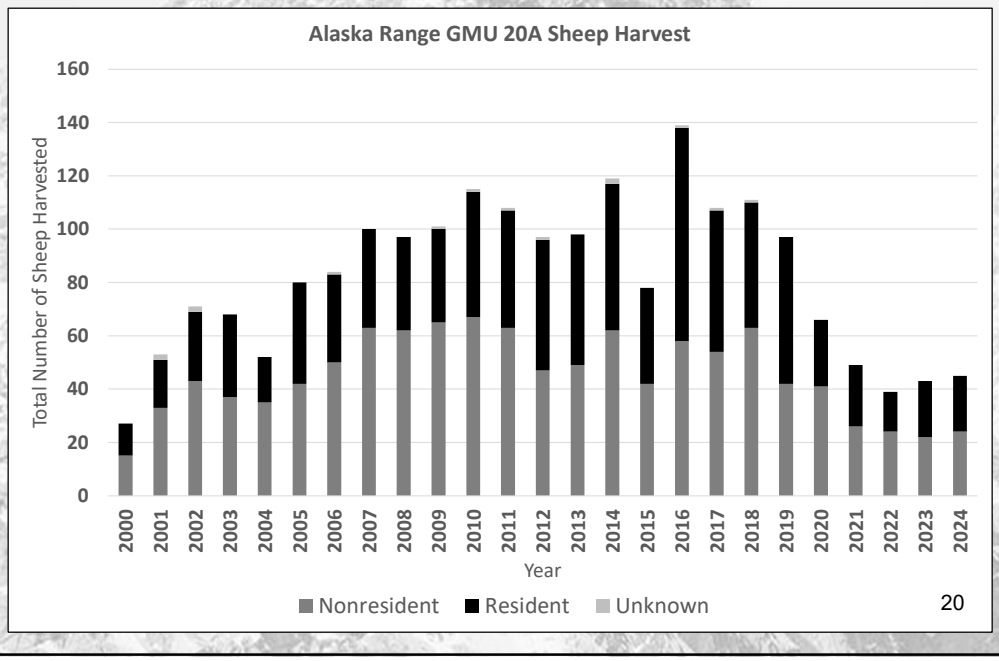
# Current Harvest Levels

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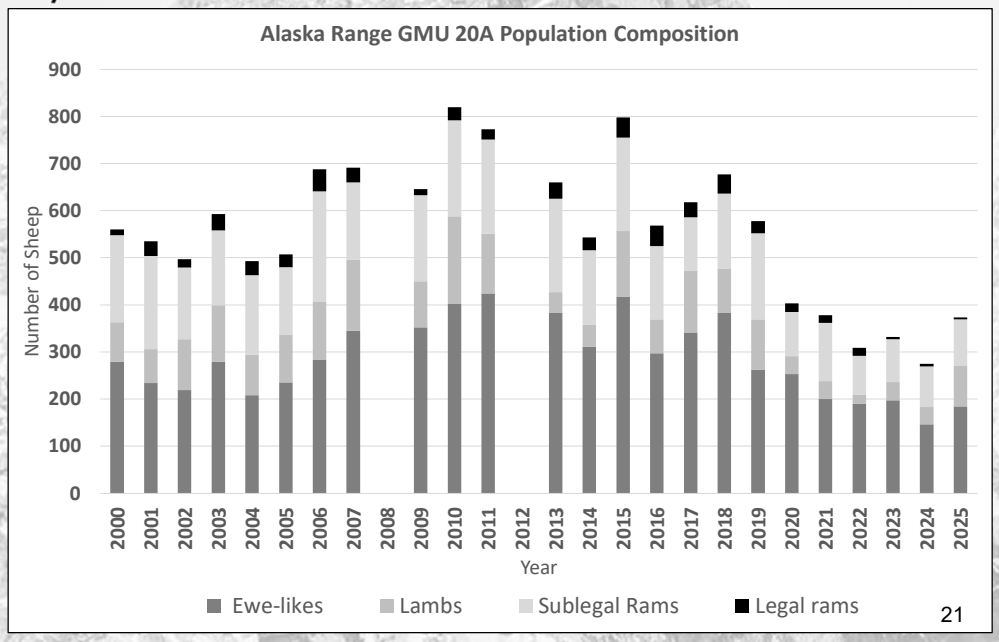
# Current Populations and Trajectories

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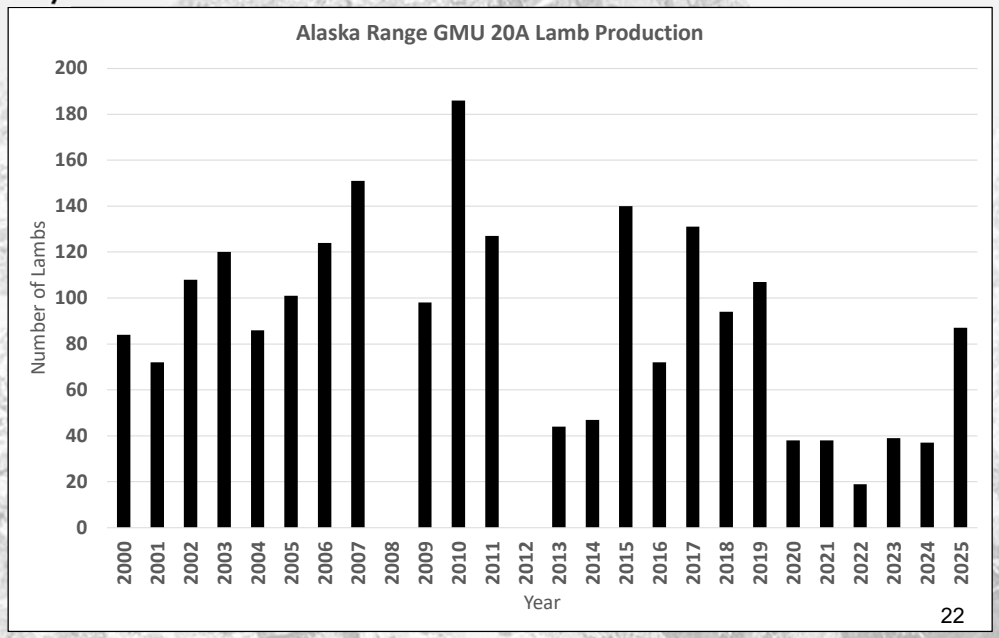
# Current Populations and Trajectories

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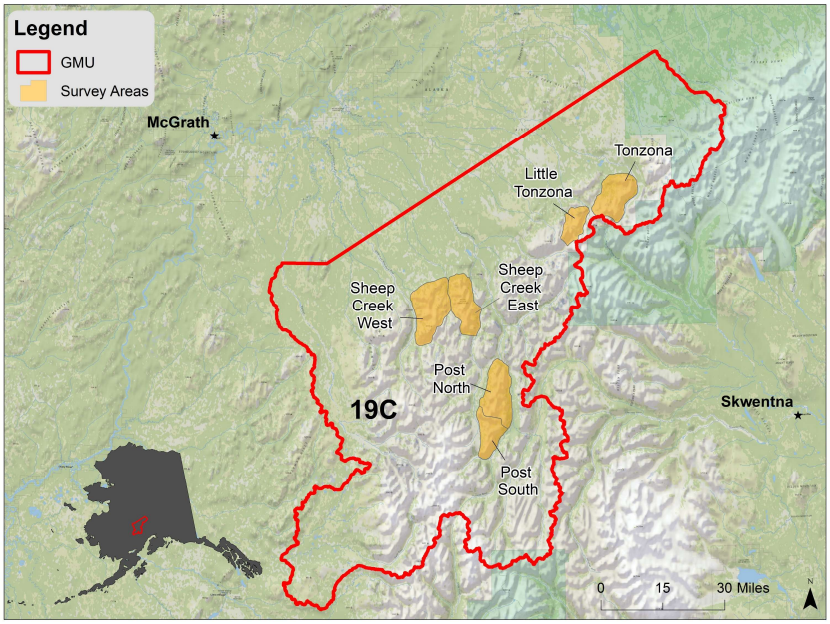
# Current Populations and Trajectories

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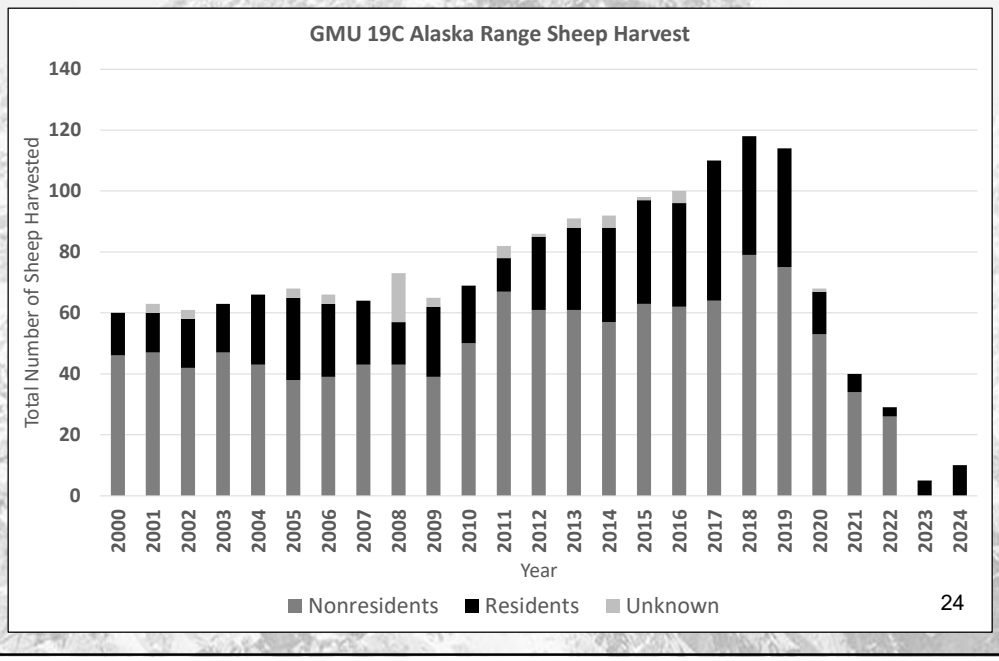
# Current Harvest Levels

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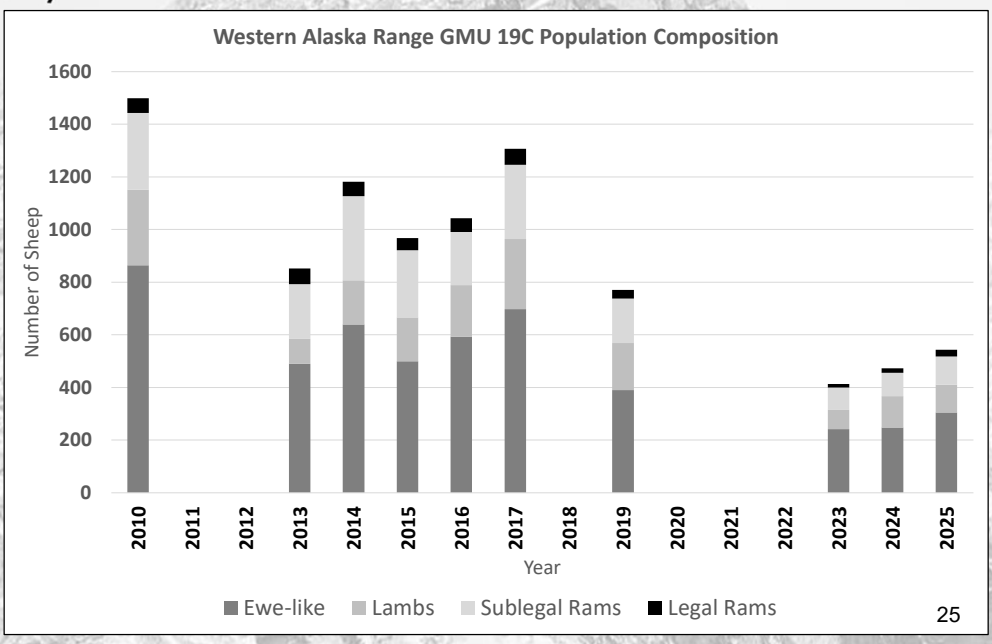
# Current Populations and Trajectories

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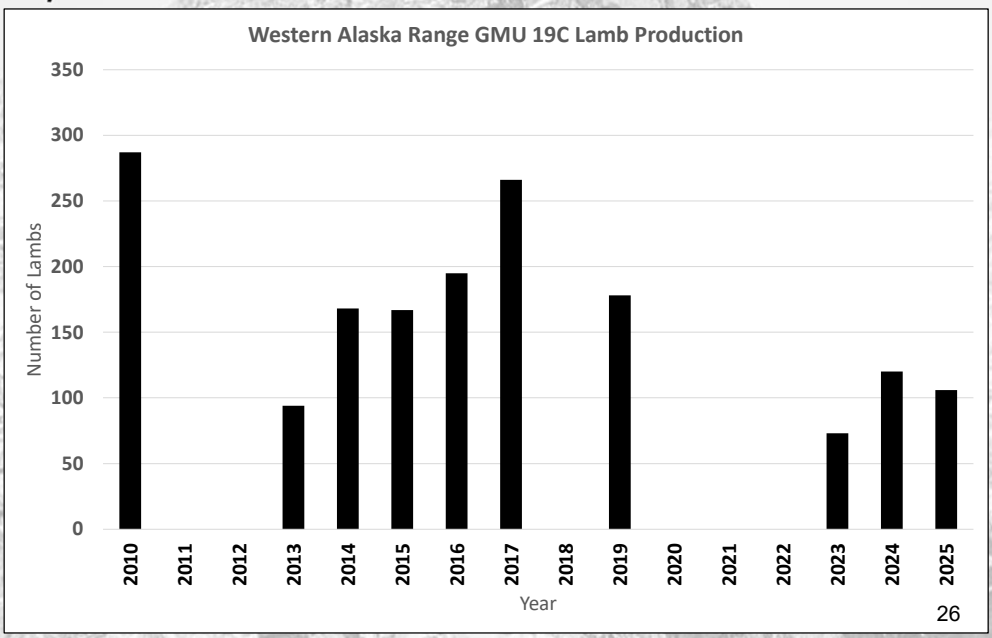
# Current Populations and Trajectories

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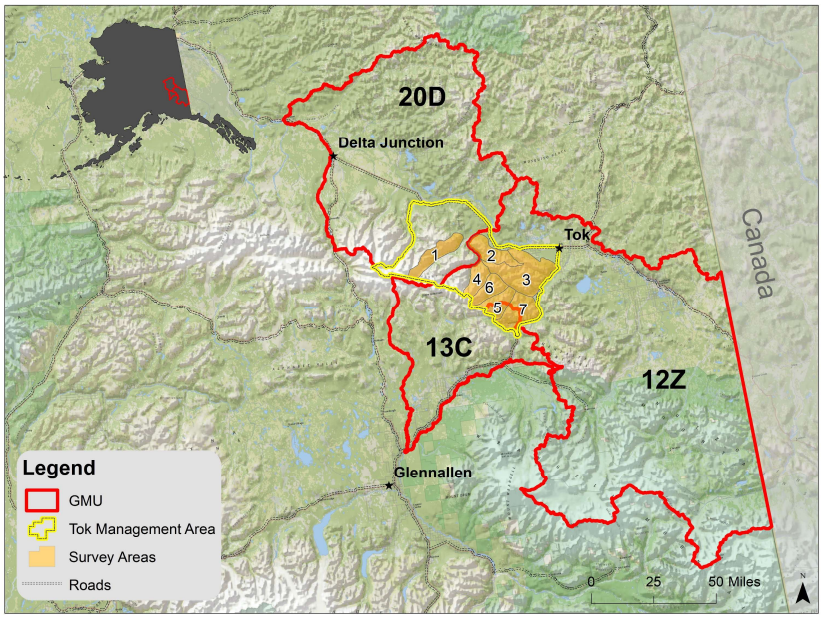
# Current Populations and Trajectories

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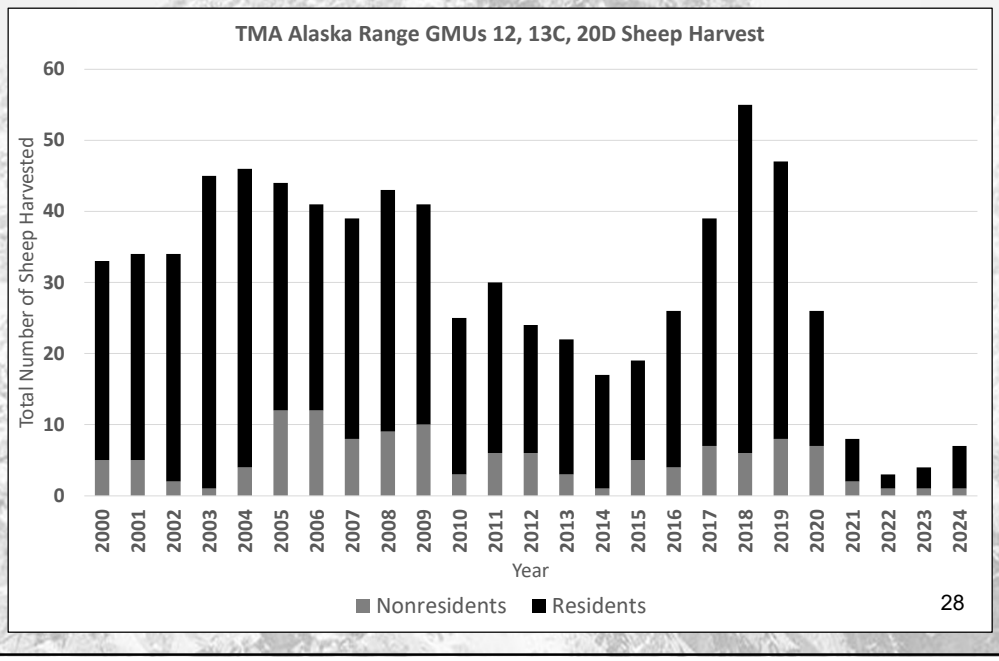
# Current Harvest Levels

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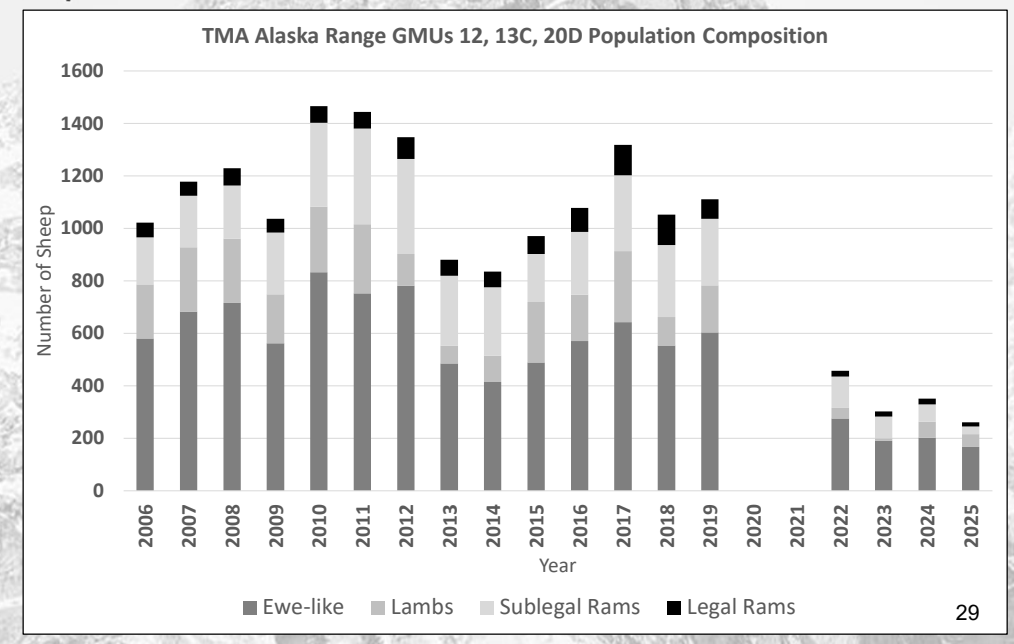
# Current Populations and Trajectories

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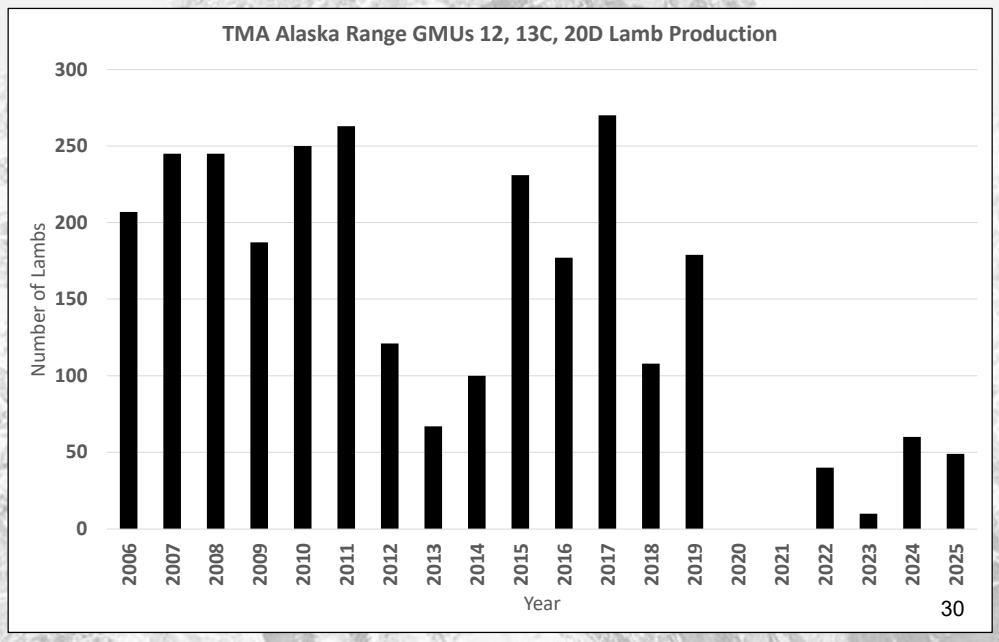
# Current Populations and Trajectories

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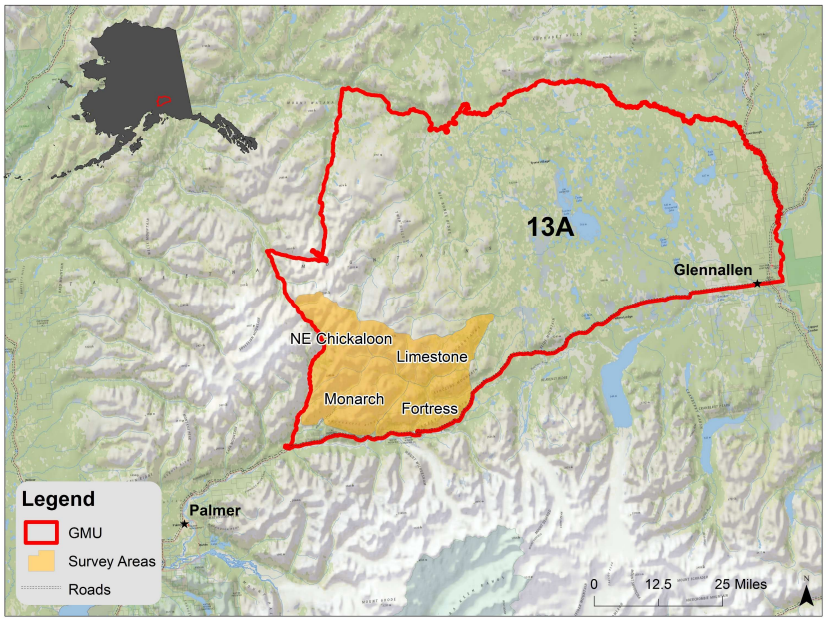
# Current Populations and Trajectories

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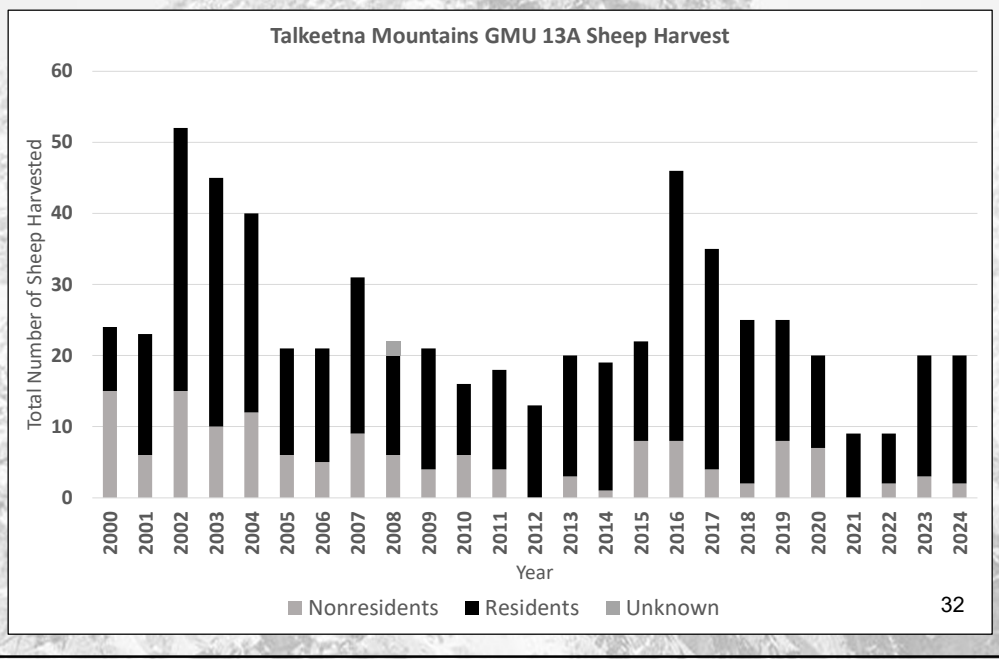
# Current Harvest Levels

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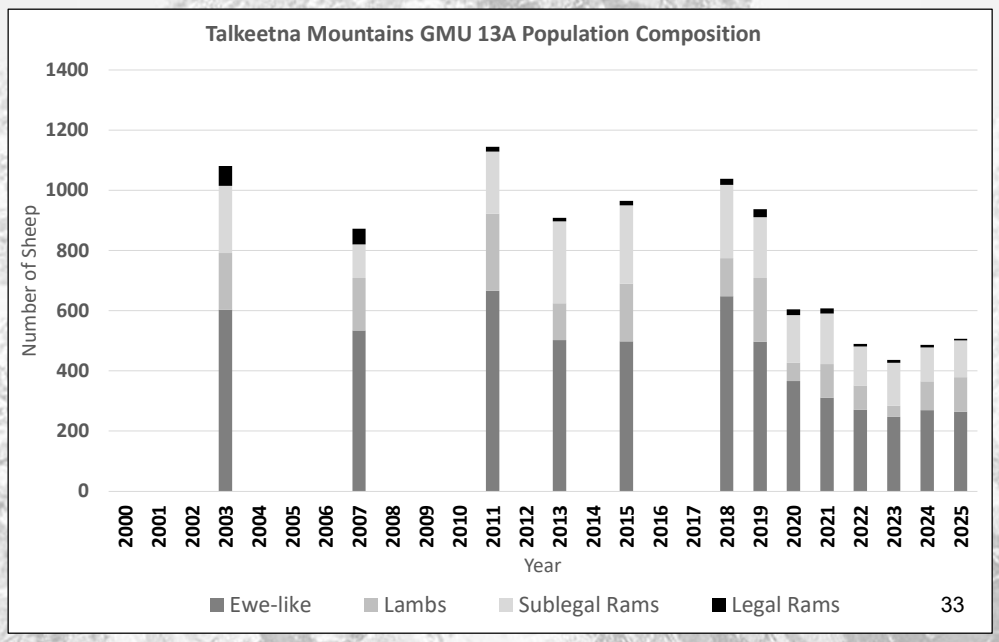
# Current Populations and Trajectories

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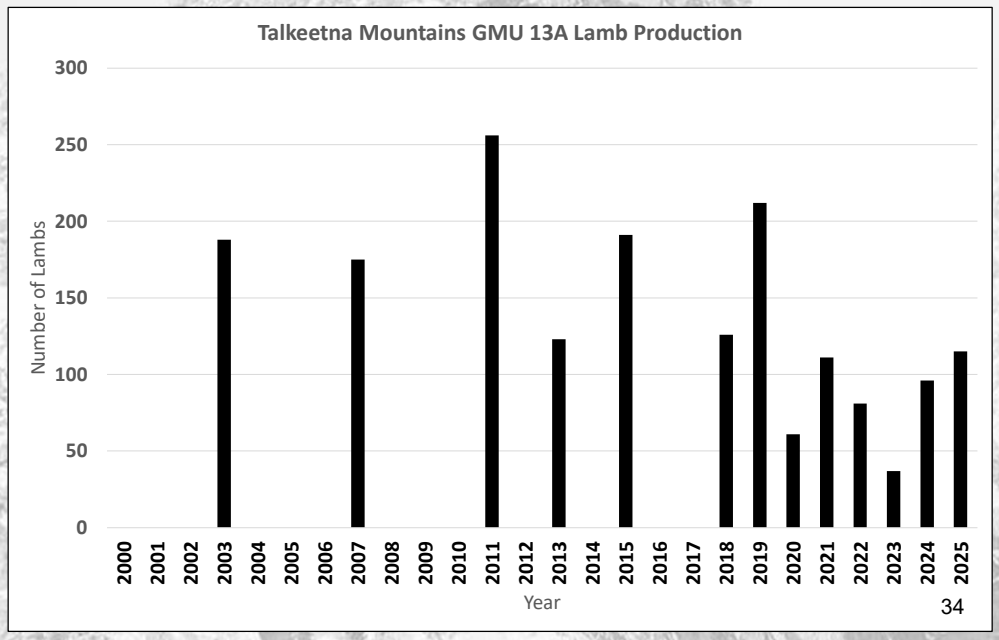
# Current Populations and Trajectories

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## Summary - Current Populations

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, 2000-2025**

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## Summary - Current Populations

Hunted and unhunted populations are similar

- **NPS estimates 2010, 2011-2020, 2023, 2024**
  - **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 down by 60-70%**

***NPS Dall's Sheep Survey memos, Denali and Wrangell-St Elias Nat'l Parks, and Arctic Network Dall's Sheep Resource brief, December 2023 and 2024**

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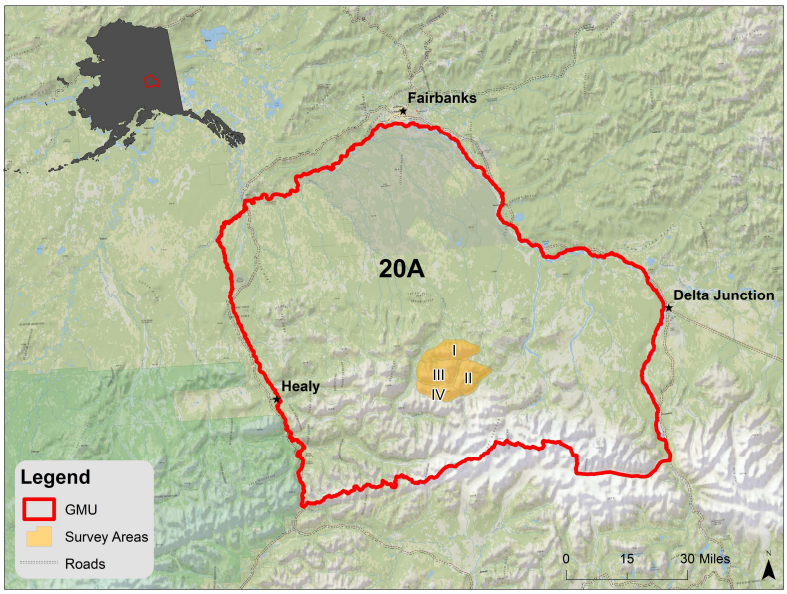
# GMU 20A Decline/Rebound

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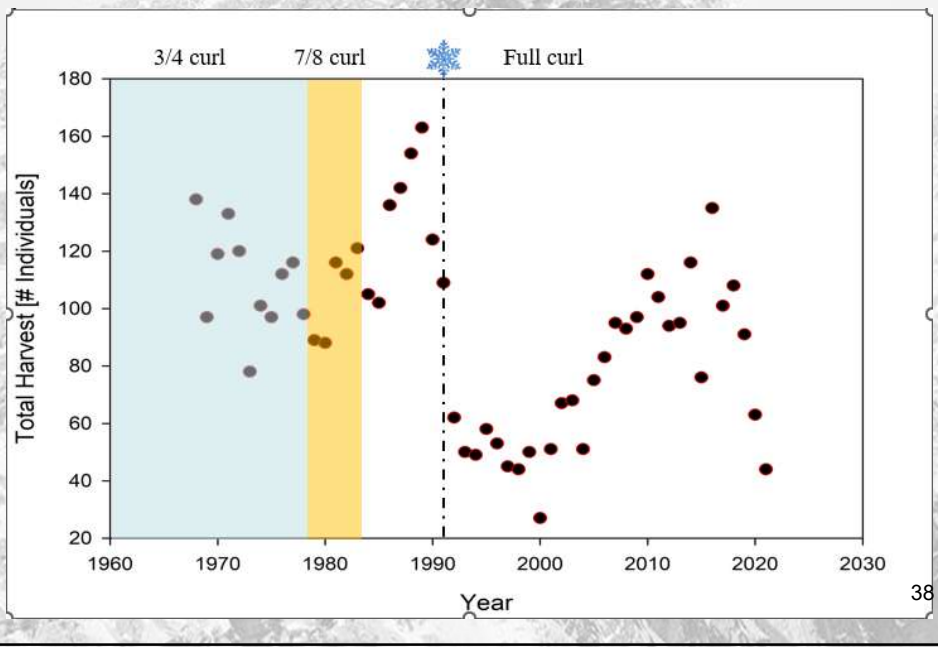
# GMU 20A Decline/Rebound

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# Chugach Range Research

Initiated 2009 in GMU 13D in response to decreased population. GMU 14C project added 2012

Establish a baseline demographic picture: "What is driving sheep populations in southcentral Alaska?"

Pregnancy, recruitment, rates and causes of mortality, disease

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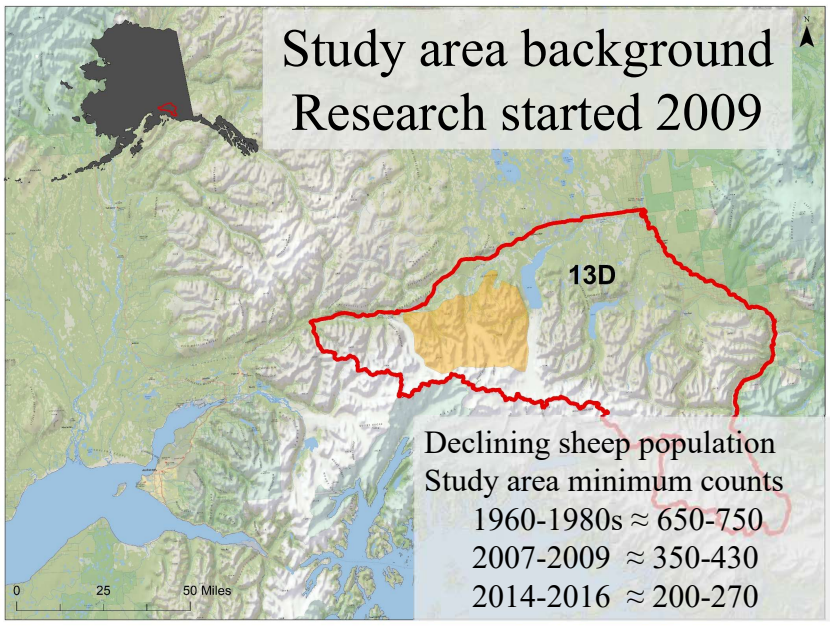
# Chugach Range Research

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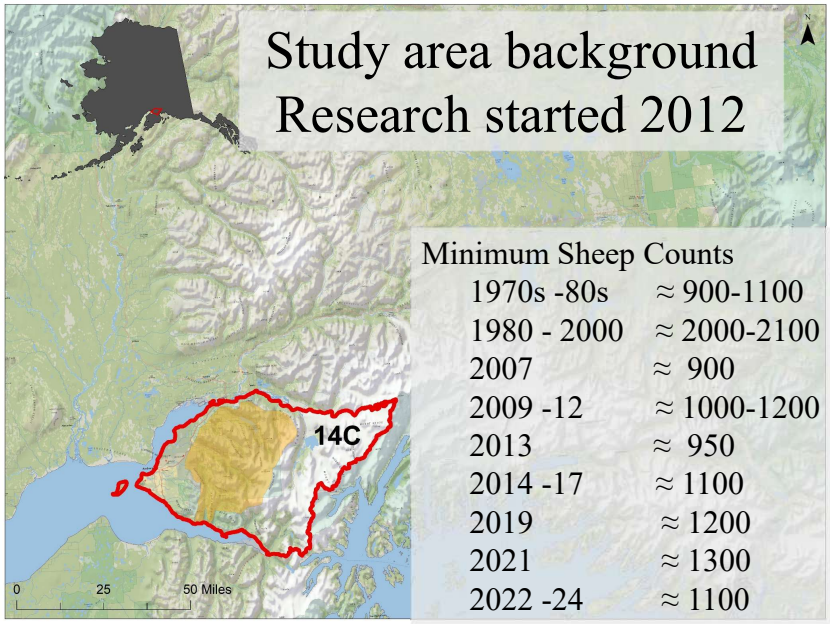
## Chugach Range Research




Minimum Sheep Counts

| | |
|---|---|
| 1970s -80s | ≈ 900-1100 |
| 1980 - 2000 | ≈ 2000-2100 |
| 2007 | ≈ 900 |
| 2009 -12 | ≈ 1000-1200 |
| 2013 | ≈ 950 |
| 2014 -17 | ≈ 1100 |
| 2019 | ≈ 1200 |
| 2021 | ≈ 1300 |
| 2022 -24 | ≈ 1100 |

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## Chugach Range Research

Adults: Body condition, pregnancy status, disease, blood chemistry, rates and causes of mortality

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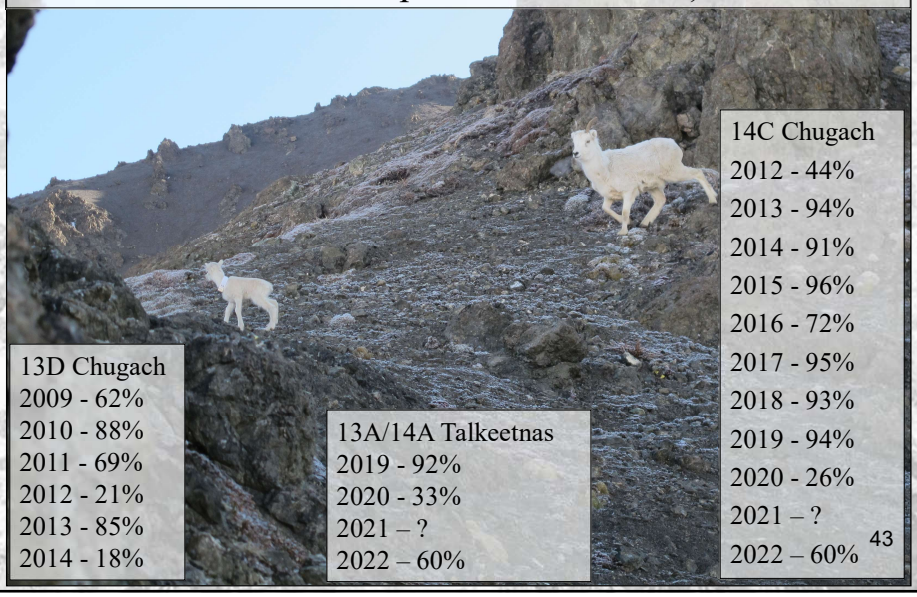
# Pregnancy Rates

Typically 85%-100% (AK Range, Arthur, 2003; BC Stone's sheep, Wood et al. 2012)



13D Chugach
2009 - 62%
2010 - 88%
2011 - 69%
2012 - 21%
2013 - 85%
2014 - 18%

13A/14A Talkeetnas
2019 - 92%
2020 - 33%
2021 – ?
2022 – 60%

14C Chugach
2012 - 44%
2013 - 94%
2014 - 91%
2015 - 96%
2016 - 72%
2017 - 95%
2018 - 93%
2019 - 94%
2020 - 26%
2021 – ?
2022 – 60%

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# Chugach-Adult Mortality

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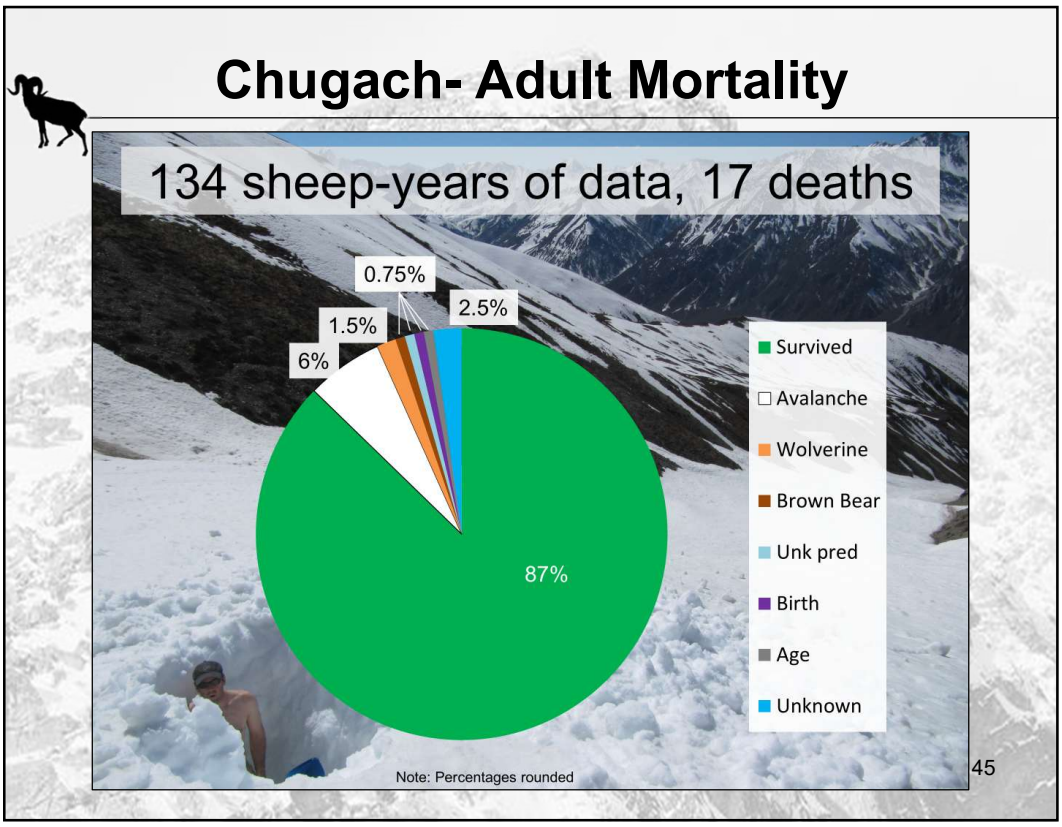
Chugach- Adult Mortality
134 sheep-years of data, 17 deaths
0.75%
2.5%
1.5%
6%
87%
Survived
Avalanche
Wolverine
Brown Bear
Unk pred
Birth
Age
Unknown
Note: Percentages rounded
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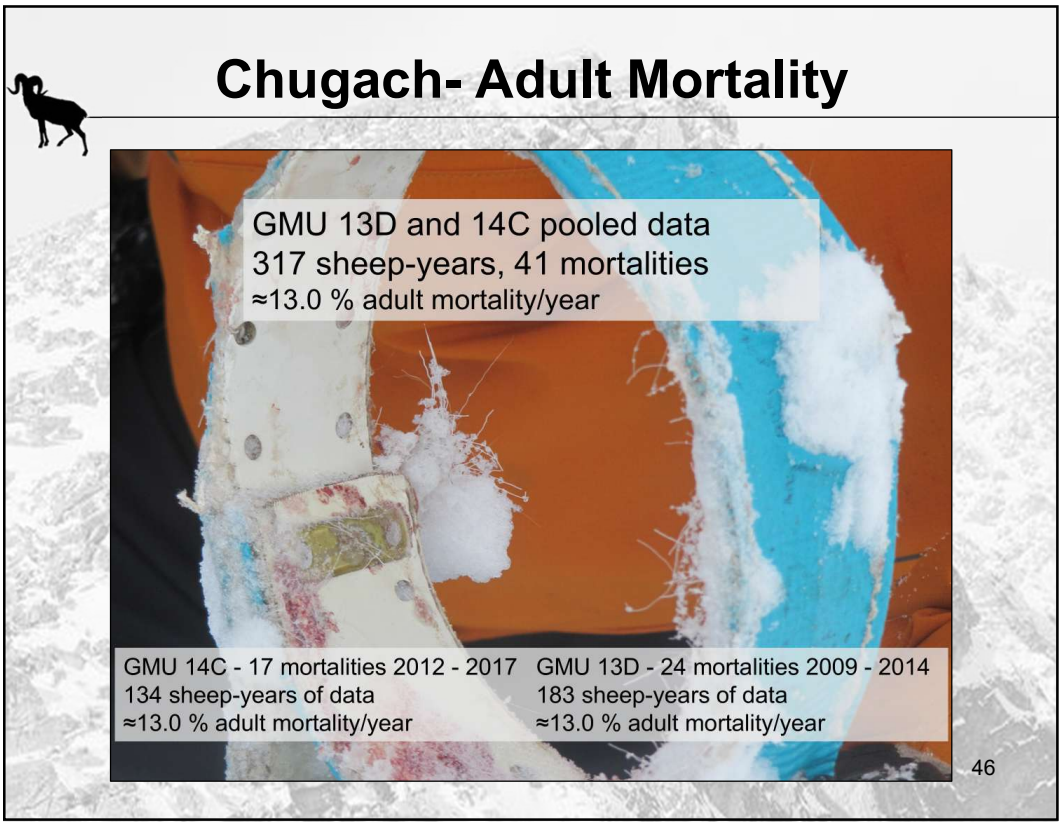
Chugach- Adult Mortality
GMU 13D and 14C pooled data
317 sheep-years, 41 mortalities
≈13.0 % adult mortality/year
GMU 14C - 17 mortalities 2012 - 2017
134 sheep-years of data
≈13.0 % adult mortality/year
GMU 13D - 24 mortalities 2009 - 2014
183 sheep-years of data
≈13.0 % adult mortality/year
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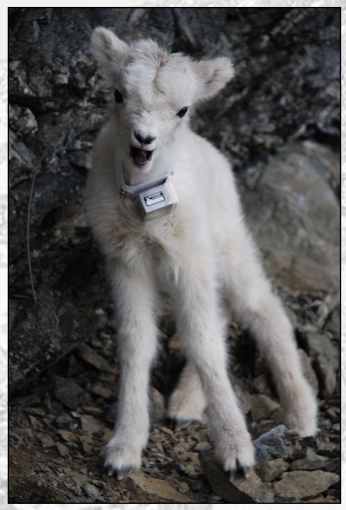
## Chugach- Lamb Mortality



Lambs: Rates and causes of mortality, recruitment

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## Chugach-Lamb Mortality

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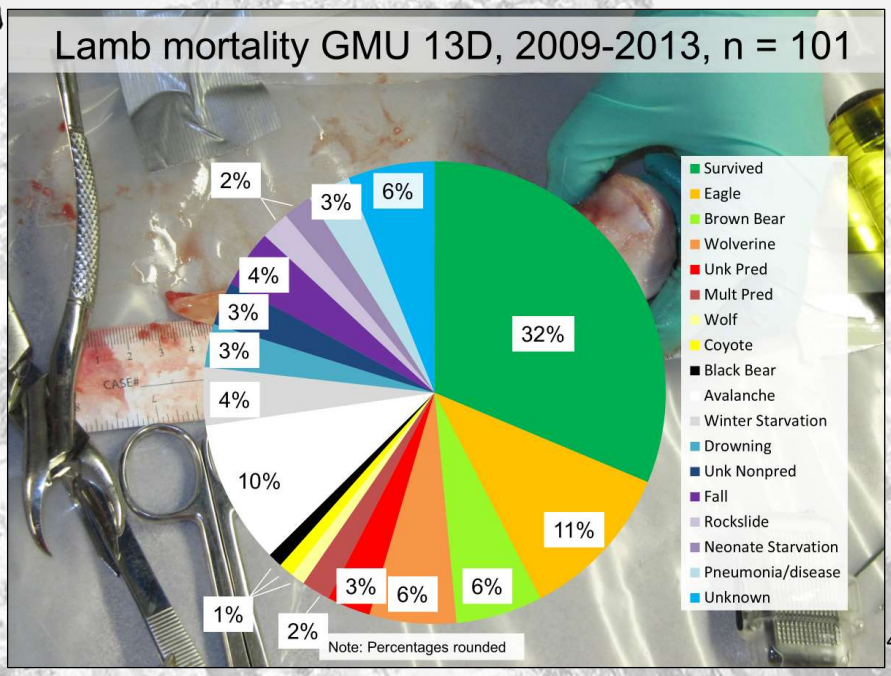
# Chugach- Lamb Mortality

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# Chugach- Lamb Mortality

Trends and comparisons lamb survival to 1 year

13D 2009-2013 ≈ 42, 9, 15, 64, 50%
14C 2012-2014 ≈ 66, 64, 42%

AK Range 1999-2003 = 12, 23, 16, 36% (Arthur 2003)
Brooks 2009-2011 = 68, 48, 28% (Arthur 2012)

50% of GMU 13D Chugach lamb mortality due to predation (31/62 diagnosed lamb deaths caused by predators)

AK Range 1997-2003 = 90% (Scotton 1997; Arthur 2012)
Brooks 2009-2011 = 72% (Arthur 2012)

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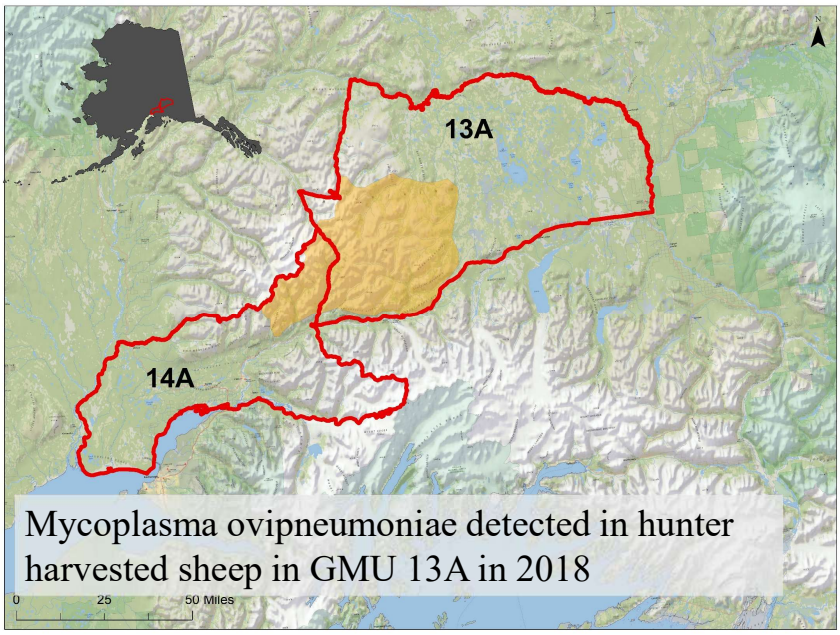
## Talkeetna Mountains Research




Mycoplasma ovipneumoniae detected in hunter harvested sheep in GMU 13A in 2018

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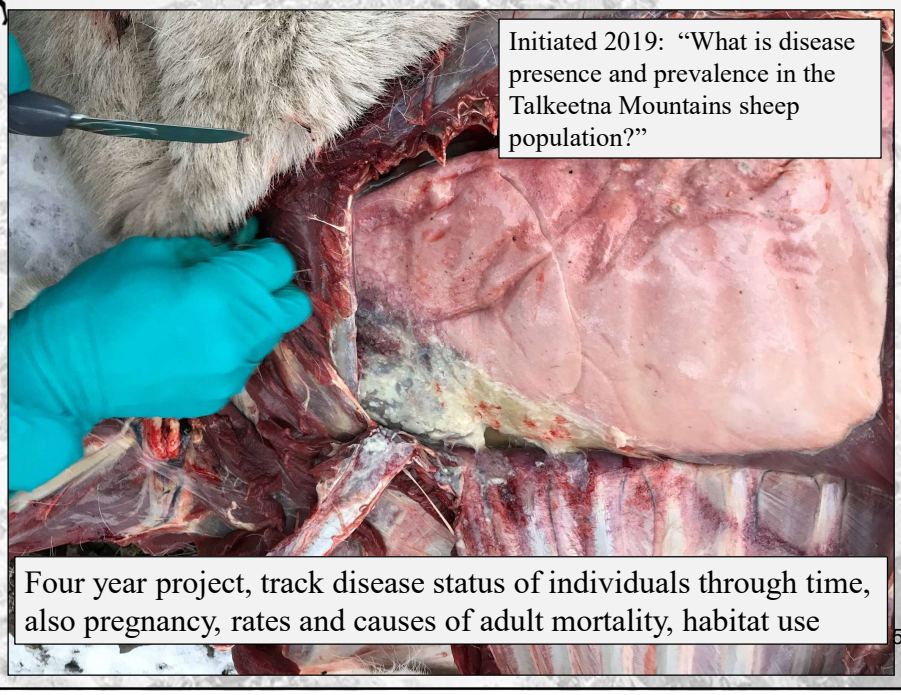
## Talkeetna Mountains Research



Initiated 2019: "What is disease presence and prevalence in the Talkeetna Mountains sheep population?"

Four year project, track disease status of individuals through time, also pregnancy, rates and causes of adult mortality, habitat use

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## Chugach and Talkeetnas

40-80 GPS-collared sheep caught and sampled annually

Long term project to track disease status, pregnancy rates, rates and causes of mortality, habitat use through time.

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## Talkeetna Mountains Research

All sheep tested for

- Mycoplasma ovipneumoniae *(M ovi)*
- Bovine respiratory syncytial virus (BRSV)
- Infectious bovine rhinotracheitis
- Parainfluenza-3 (PI-3)
- Toxoplasmosis
- Brucella ovis
- Johne's disease
- Bovine viral diarrhea

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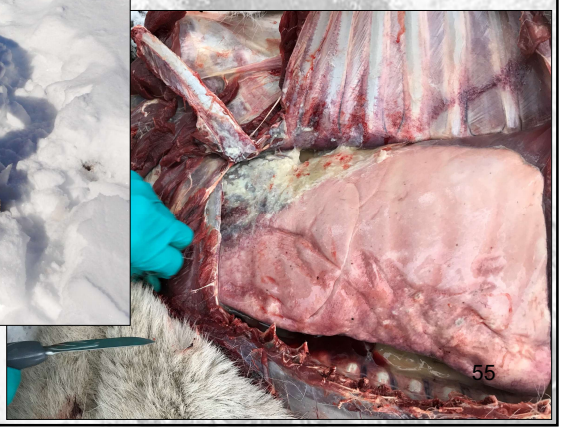
## Current Research Conclusions

M ovi, other pathogens present but do not appear to have population level effects.



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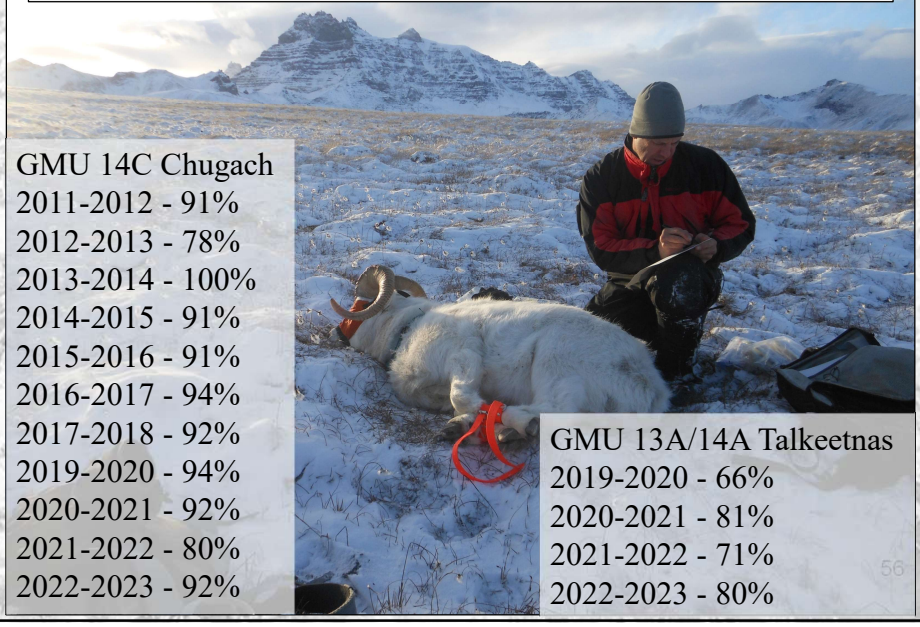
## Current Research Conclusions

Adult survival rates vary between ranges and years



GMU 14C Chugach
2011-2012 - 91%
2012-2013 - 78%
2013-2014 - 100%
2014-2015 - 91%
2015-2016 - 91%
2016-2017 - 94%
2017-2018 - 92%
2019-2020 - 94%
2020-2021 - 92%
2021-2022 - 80%
2022-2023 - 92%

GMU 13A/14A Talkeetnas
2019-2020 - 66%
2020-2021 - 81%
2021-2022 - 71%
2022-2023 - 80%

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## Current Research Conclusions

### Predation and Disease

Predation – Accounts for less in Chugach sheep than in other ranges. ~1/4-1/6 adults, 1/3 lambs.

Low level loss, and broad distribution of mortality across several predator species suggests Chugach populations are not predation limited

Low level presence/prevalence of major wildlife diseases; no population-level effects

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## Current Research Conclusions

### Nutrition and pregnancy

Low pregnancy + Poor body condition

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= Changing nutrition, habitat, weather conditions driving lamb production and population trajectory

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## Changing Climate

Future implications unknown, but…

Winter Conditions

- Icing, rain on snow, avalanches all cause elevated mortality

Habitat loss

- Advancing shrubline – Alder, willow growth into alpine

Summer nutritional changes

- Poor nutrition in hot, dry conditions

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## Changing Climate

- Historic population declines seemed to be the result of a single event
  - Example = Early 1990s 20A decline probably related to 1991 Mt. Pinatubo eruption
- By some metrics (mortality rates on collared populations and lamb production) current populations have experienced 6 weather events in the last 10 years
- New paradigm with warming arctic
- Populations likely to persist at lower densities
- Small isolated populations (e.g. Yukon-Tanana uplands, Glacier Mountain CUA, Kenai) of concern

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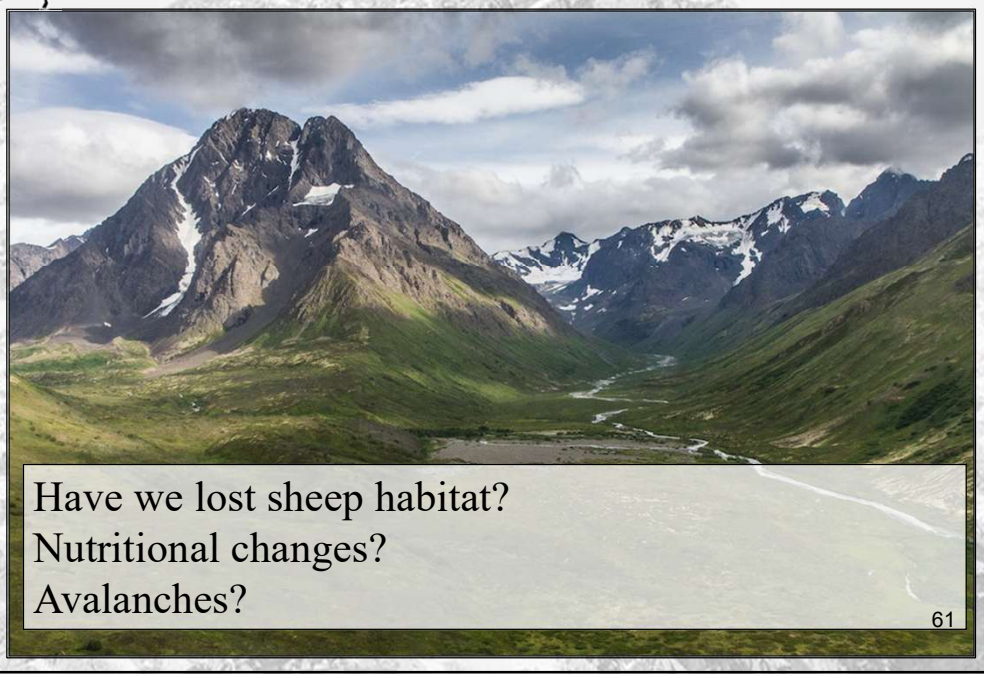
## Current Research Direction



Have we lost sheep habitat?
Nutritional changes?
Avalanches?

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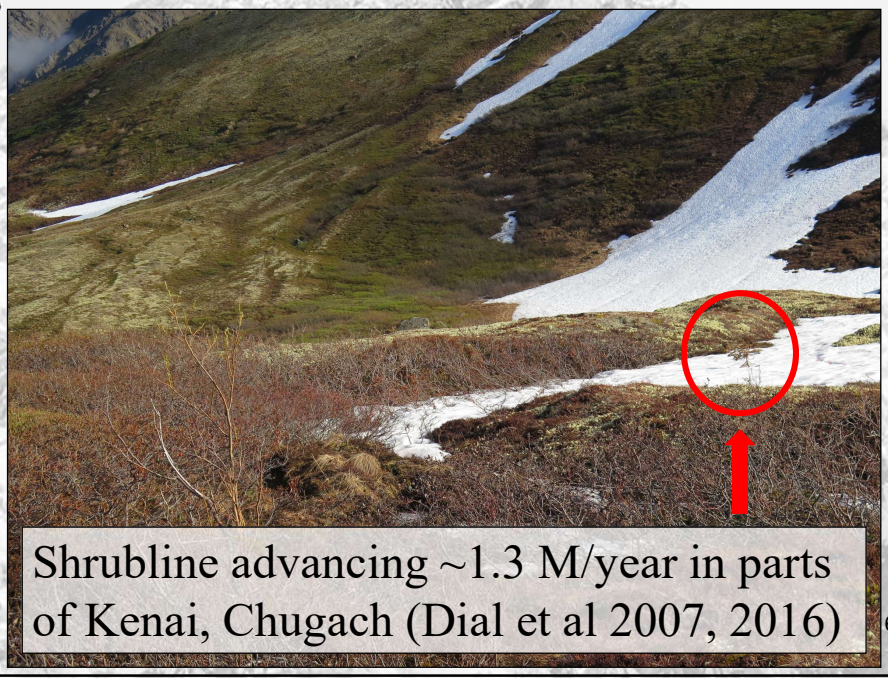
## Habitat Loss



Shrubline advancing ~1.3 M/year in parts of Kenai, Chugach (Dial et al 2007, 2016)

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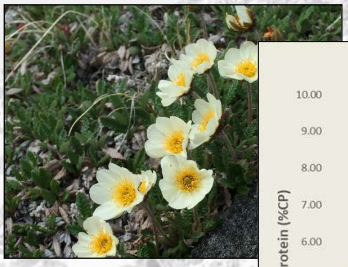
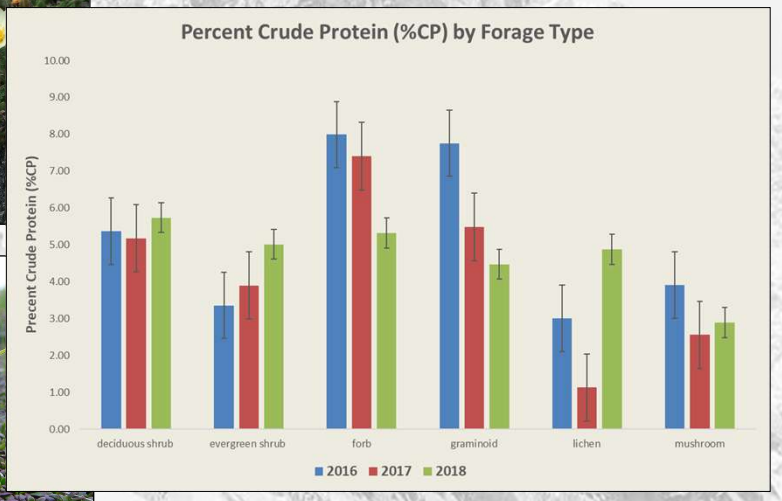
# Nutritional Changes






Changes in protein content in important forage types across years (L. Metherell MS research, UAF, in progress)

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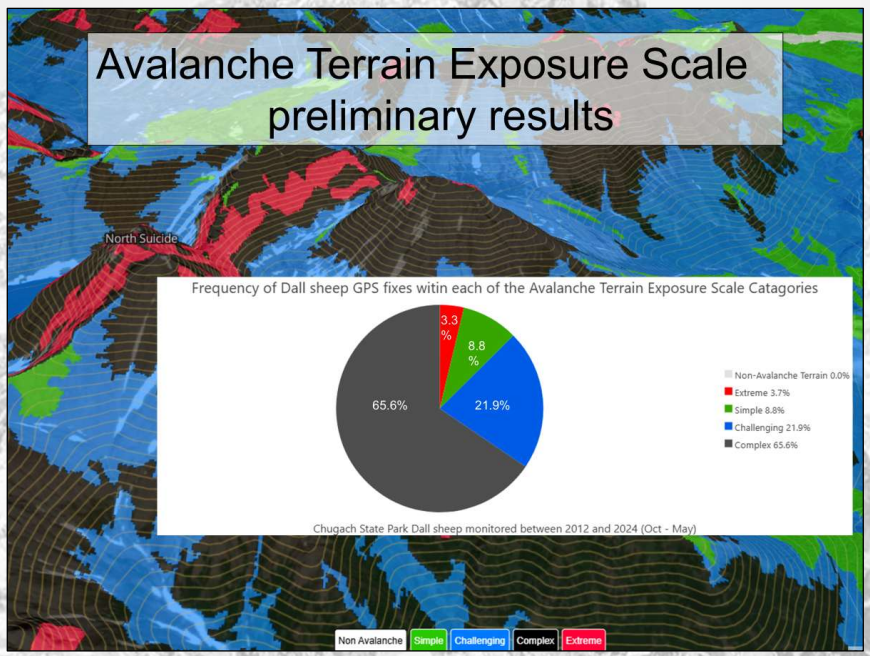
# Winter Conditions/Avalanches

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Region 3 Dall's Sheep Research

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Assessing Dall's Sheep Horn Morphometrics as a Management Tool
ALASKA
DEPARTMENT OF FISH AND GAME
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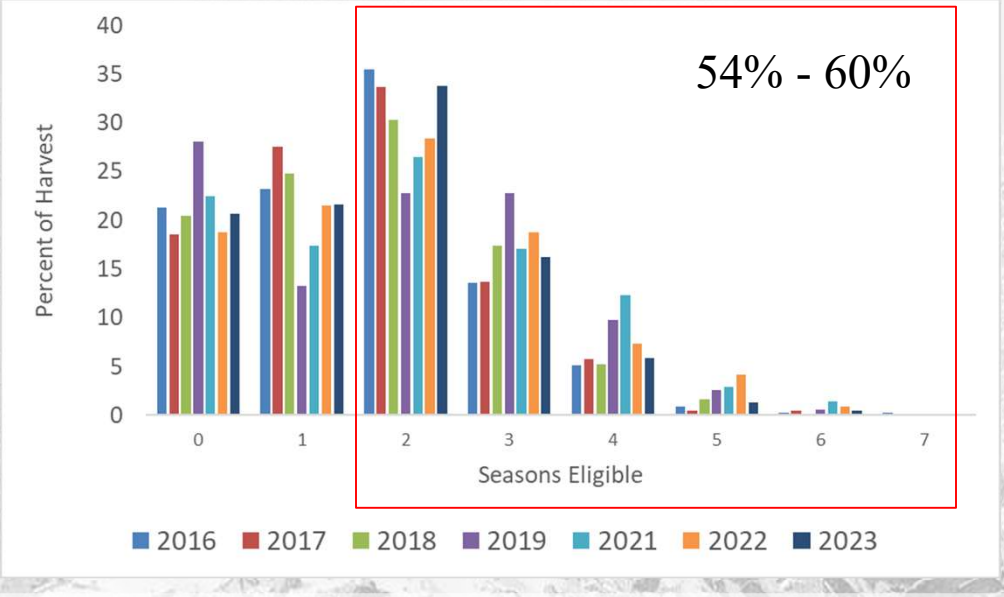
# Ram Escapement




- Escapement ranged from 54% (2017) - 60% (2021)

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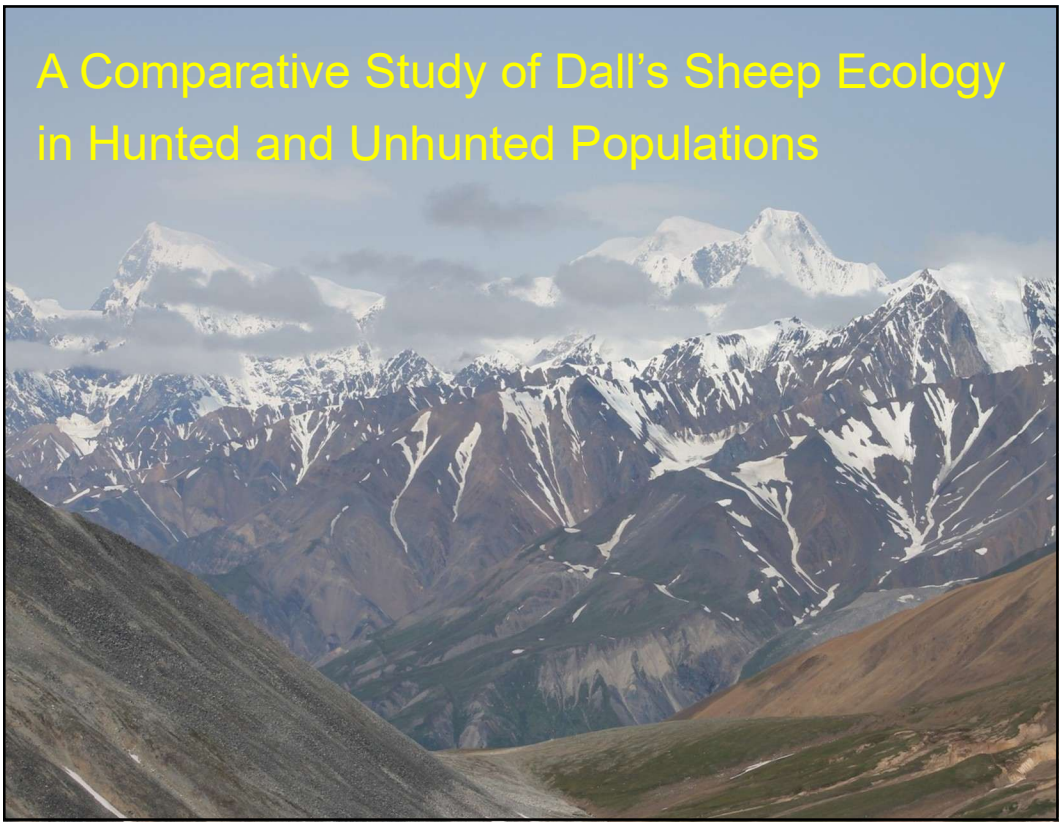


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# Purpose of Research

**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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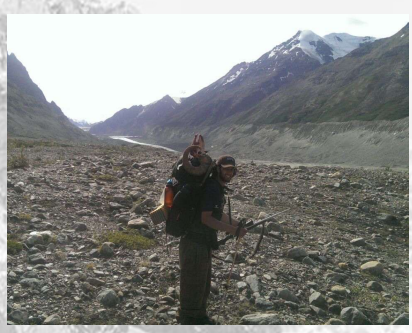
# Research Questions

**Under Full Curl Harvest Strategy:**

1. Are there differences in the health of sheep between the four 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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# Experimental Design

- 4 year study
- 4 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 nursery groups, and harvested rams in the study areas fecal samples)

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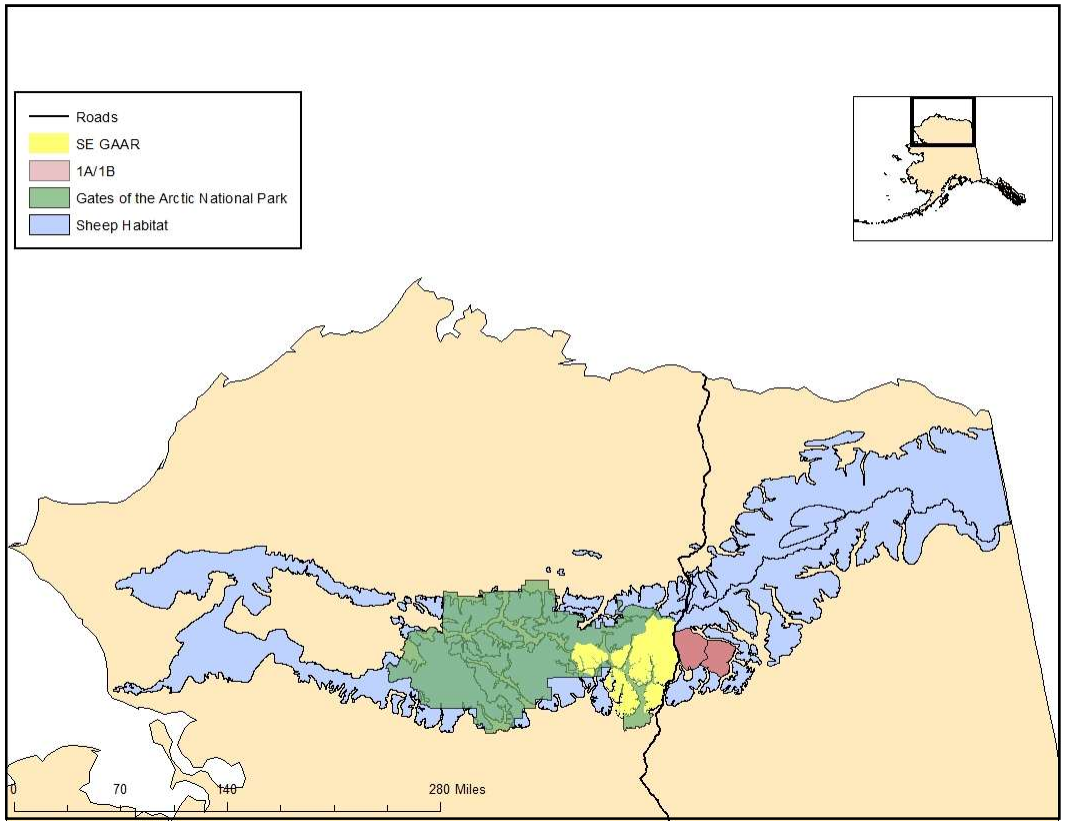


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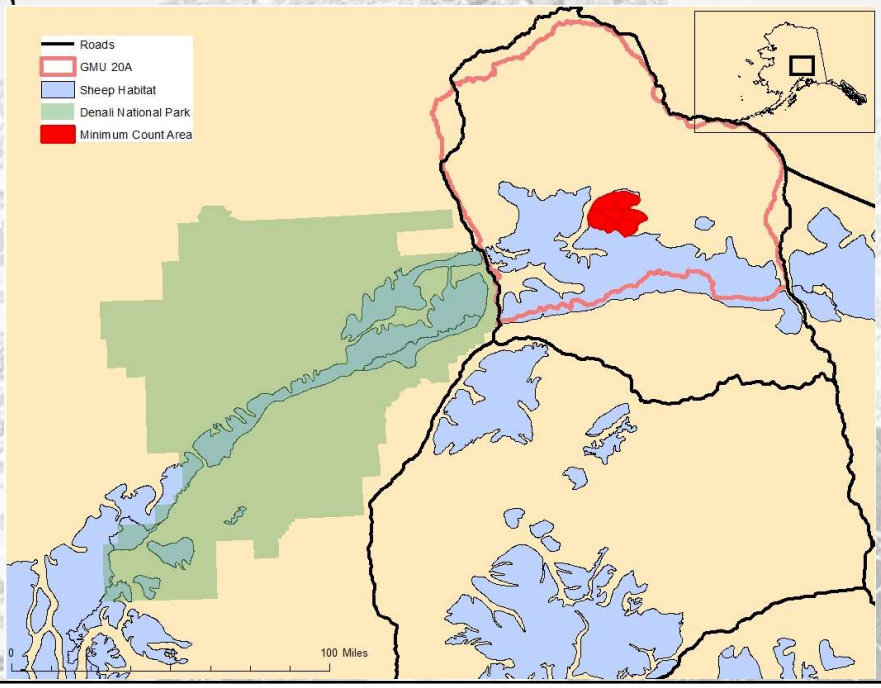
# Alaska Range

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# Health Assessment

| Serology | GAAR (n= 21) | Treatment (n= 26) |
|---|---|---|
| *Mycoplasma ovipneumoniae* | Neg | Neg |
| Parainfluenza type 3 (PI3) | Neg | **Exposure** |
| Respiratory Syncytial Virus (BRSV) | Neg | Neg |
| *Toxoplasma* | **Exposure** | **Exposure** |
| Lentiviruses | Neg | Neg |
| Leptospirosis (5 biovars) | Neg | **Exposure** |
| Brucellosis | Neg | Neg |
| Contagious ecthyma | **Exposure** | Neg |
| *Chlamydiophila sp.* | Neg | Neg |
| *Coxiella burnetti* (Q- fever) | Neg | Neg |

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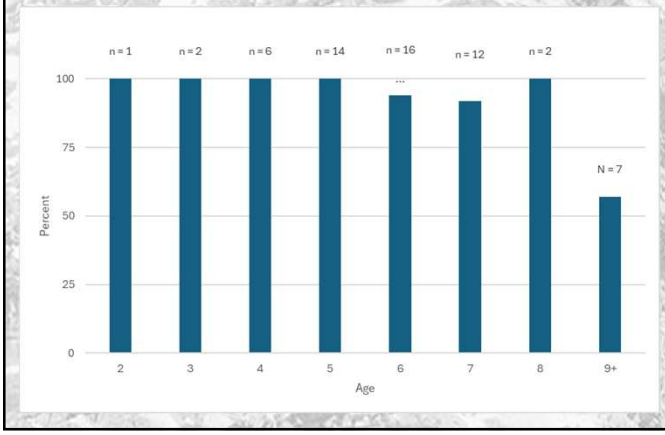
# Pregnancy Rates

| | | n | Positive | Negative | % Pregnant |
|---|---|---|---|---|---|
| 2024 | Gates | 30 | 29 | 1 | 97 |
| | Treatment | 30 | 26 | 4 | 87 |
| 2025 | Denali | 30 | 25 | 5 | 83 |
| | 20A | 31 | 29 | 2 | 94 |

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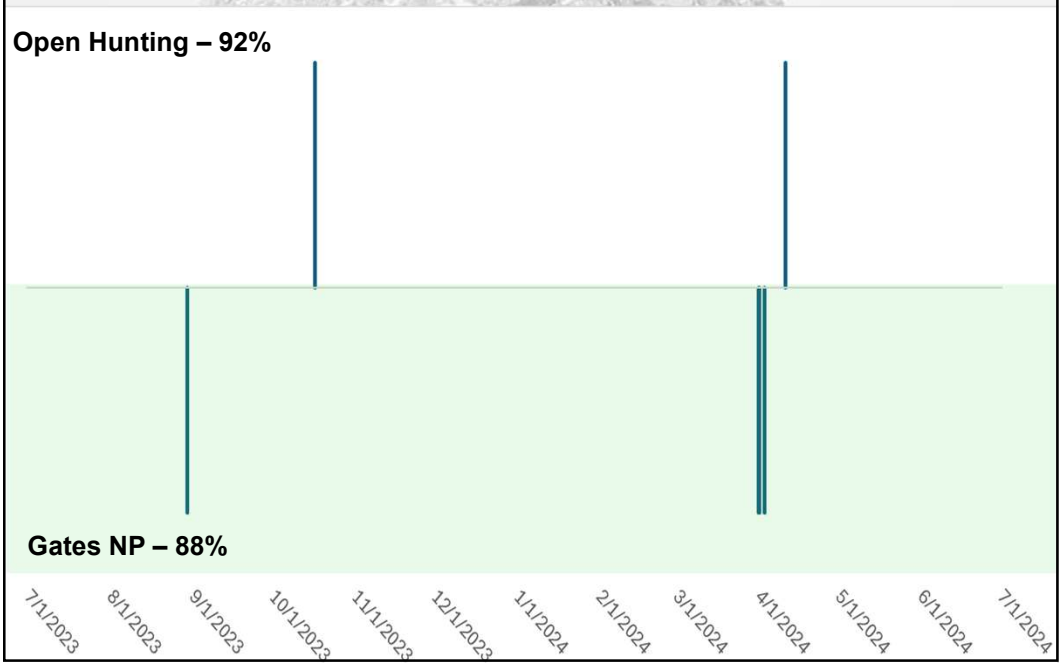
# Brooks Rams Survival (year 1)

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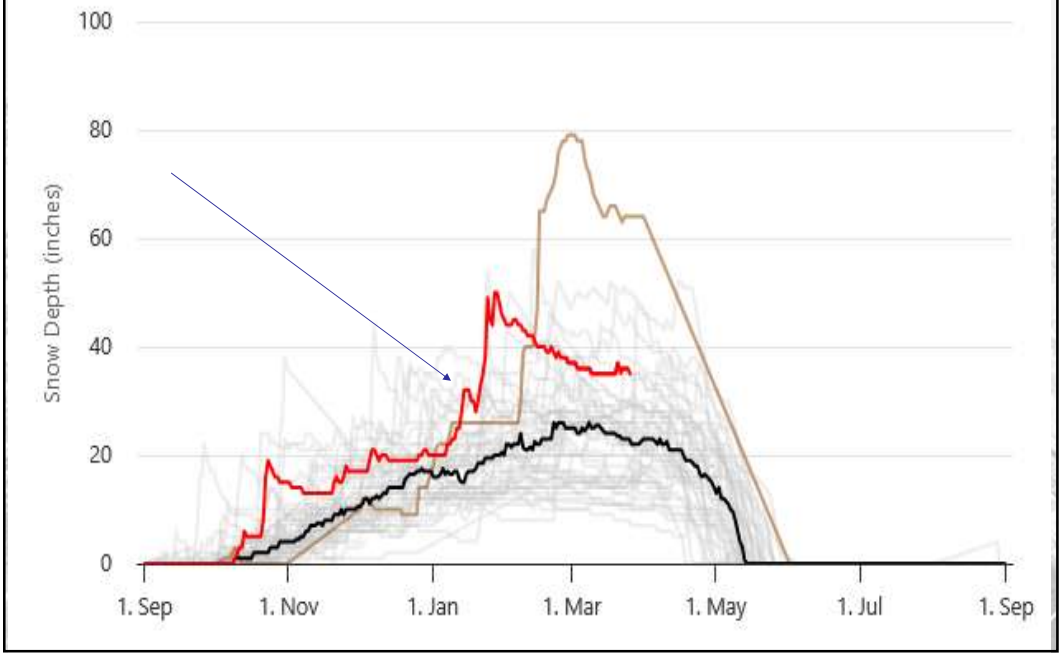
# Wiseman Snow (1918 - 2025)

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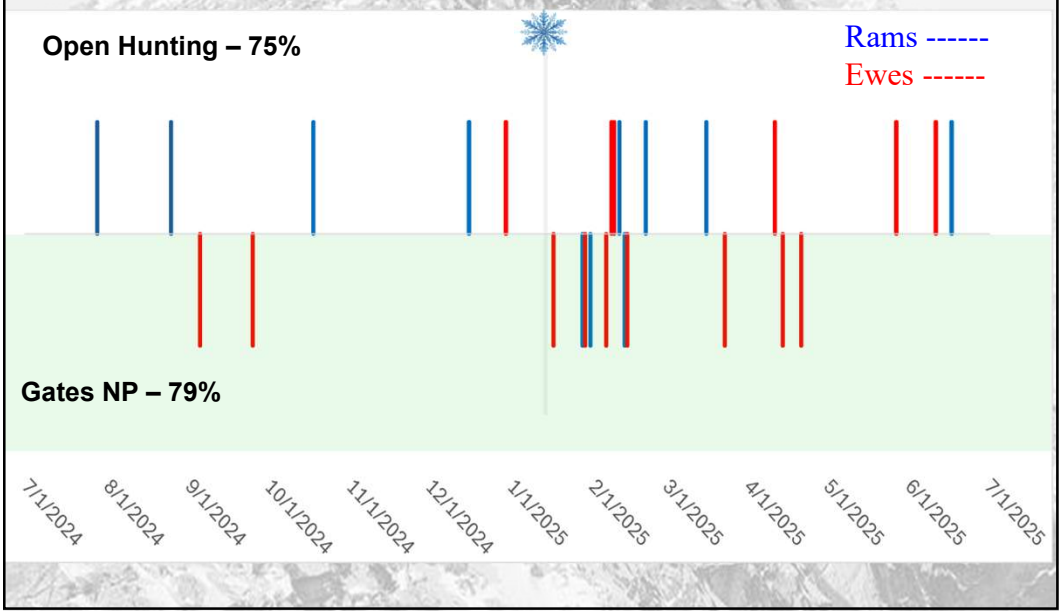
# Brooks Survival (year 2)

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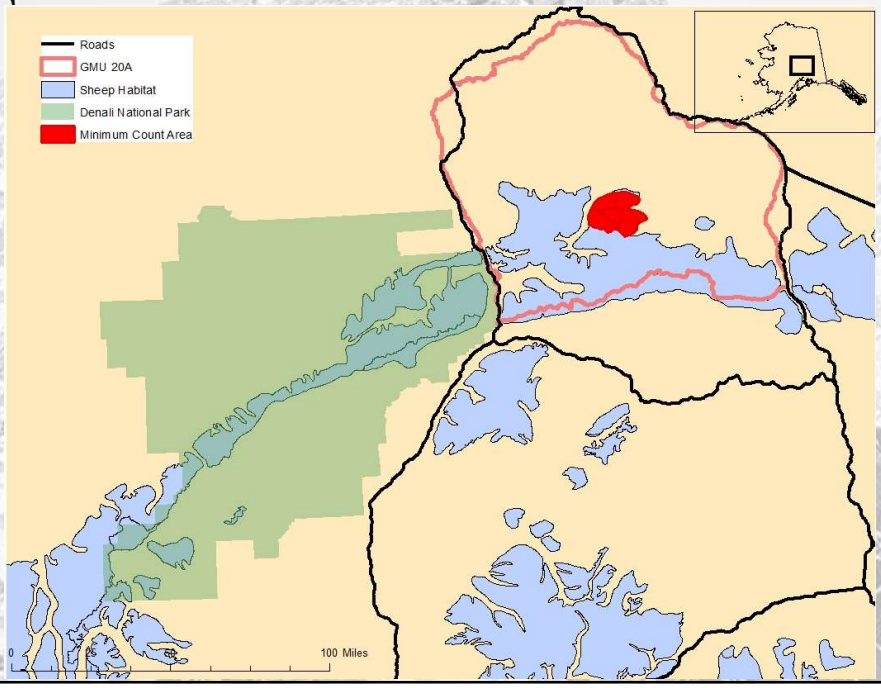
# Alaska Range

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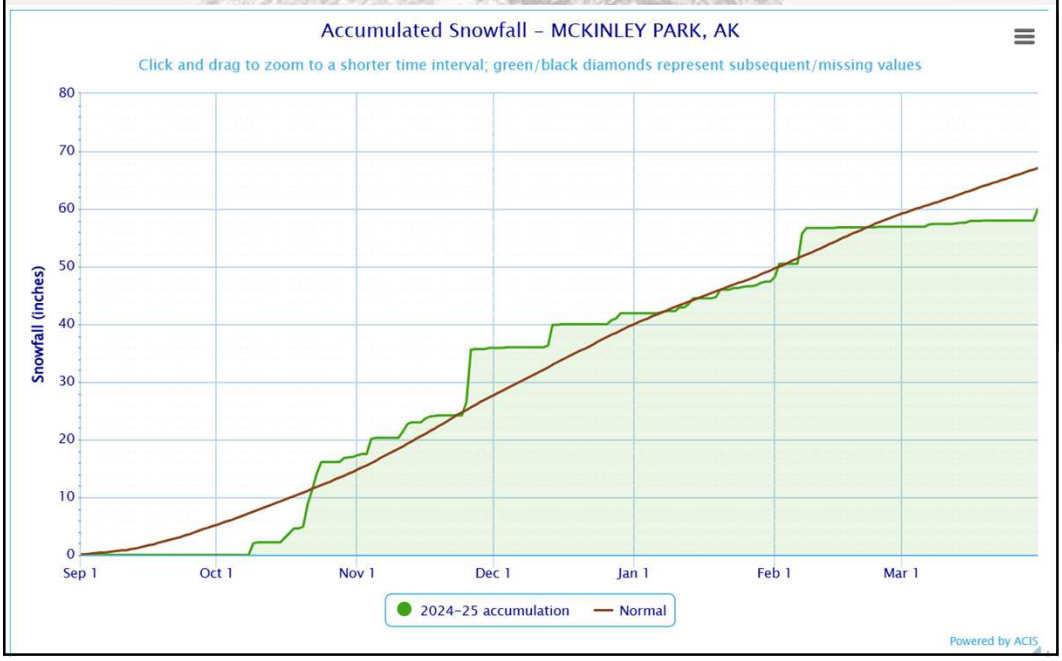
# Alaska Range Snow Data

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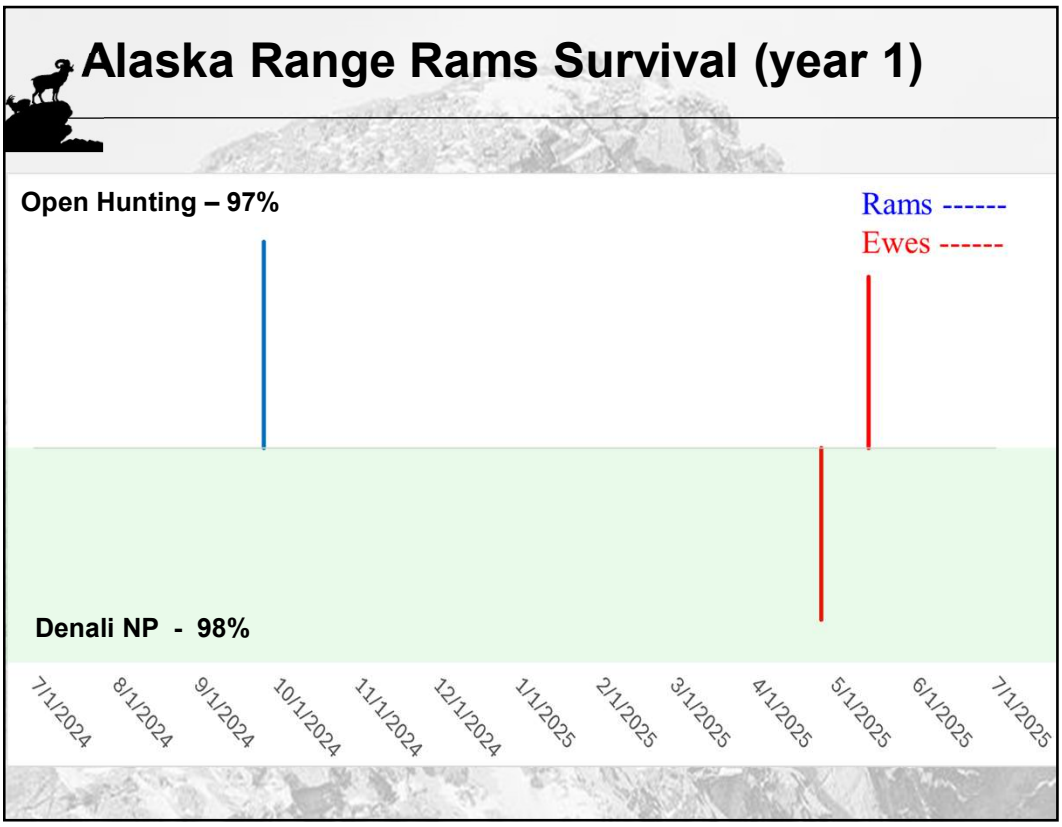
# Alaska Range Rams Survival (year 1)

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# 2025 Minimum Count Comparison

| | Total Adults | Ewe Like | Lambs | Sub Full Curl | Full Curl | Lambs: 100 Ewes |
|---|---|---|---|---|---|---|
| Brooks Treatment | 412 | 260 | 47 | 135 | 17 (11%) | 18 |
| Gates | 202 | 133 | 32 | 57 | 12 (17%) | 24 |
| Denali | 637 | 365 | 142 | 172 | 117 (40%) | 39 |
| 20A | 884 | 606 | 233 | 258 | 20 (7%) | 38 |

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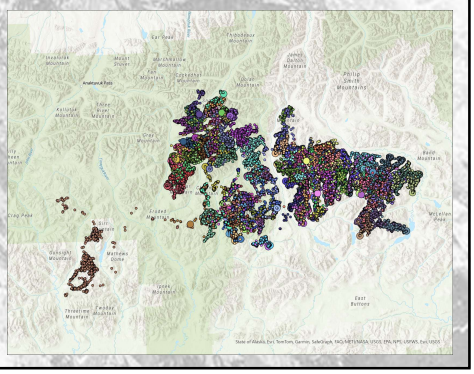
## Future Directions

Integrated Population Models

Movement Analyses



Genetic Analyses

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## Collaborators

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Lindsey Dreese
Dr. Eric Wald – NPS
Dr. Zack Delisle - NPS
Dr. Bridget Borg
Drs. Kimberlee Beckmen, Annette Roug

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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, rumen requires time to adapt)

Predator control
- (Sheep are now an IM 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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## What do we know for sure?

- Climate and weather are primary drivers of sheep numbers and population trajectories; large scale declines and recoveries have happened in the past
- Current declines are continent-wide; managers in BC, Yukon, NWT report declines of similar magnitude
- FC harvest is conservative and not driving population declines
- Previous hunt closures and/or drawing hunts have not resulted in population recovery (Brooks Range GMU 23, Chugach GMU 13D)
- Current research suggests population trajectories similar between hunted and unhunted areas in Brooks and Alaska ranges
- Lamb production statewide 2020-2025 indicates low numbers of rams available for harvest through at least 2028-2033
- Populations likely to persist at lower levels

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## What do we know for sure?

- Predator communities and impacts on sheep populations vary between mountain ranges and between years
- Multiple predator species utilize sheep, secondary effects possible due to predator interactions. Any discussion of predator removal should incorporate a robust pre-treatment dataset.
- Sheep hunters are crazy

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# Questions?

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