The Mulchatna Caribou Herd

Mulchatna Caribou - Seasonal Distribution
The Mulchatna Caribou Herd – What we know....

1. Survey & Inventory Data
   a. Abundance Estimates
   b. Fall Composition Survey
   c. Parturition Survey

Mulchatna Caribou – Survival (95% CI)

*Biased High?
Mulchatna Caribou - Reproduction

S&I data estimated pregnancy rates (4+ years old)
- Avg. 82%, Range 73% - 95%
- Prev 5yr avg 75%

Probability of a cohort reaching reproductive age
- 18% - 88%
- 7 years < 50%
Mulchatna Caribou - Age-specific Pregnancy

Mulchatna Caribou – Calf Fate

Non Predation Cause of Death
- Disease
  - Pneumonia
  - Accidents
  - Drowning
  - Congenital Defects
    - Underdeveloped/Abnormal Organs
  - Maternal Health/Birthing Complications
    - Starvation
    - Brucellosis weak calves
Mulchatna Caribou – Calf Fate by Calving Ground

<table>
<thead>
<tr>
<th>Year</th>
<th>East</th>
<th>West</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>2012</td>
<td>1.00</td>
<td>0.90</td>
</tr>
<tr>
<td>2013</td>
<td>0.80</td>
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</tr>
<tr>
<td>2014</td>
<td>0.70</td>
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<tr>
<td>2015</td>
<td>0.60</td>
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<tr>
<td>2016</td>
<td>0.50</td>
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<td>2017</td>
<td>0.40</td>
<td>0.30</td>
</tr>
<tr>
<td>2018</td>
<td>0.30</td>
<td>0.20</td>
</tr>
<tr>
<td>2019</td>
<td>0.20</td>
<td>0.10</td>
</tr>
<tr>
<td>2020</td>
<td>0.10</td>
<td>0.00</td>
</tr>
<tr>
<td>2021</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

RC 4, Tab 1.4

Mulchatna Caribou - Wolf Harvest

[Map showing Mulchatna Caribou capture sites and wolf harvest UCUs.]

Lone Village
Ilamna
Dillingham
Mulchatna Caribou - Wolf Harvest

Correlation 1 to 1
- Positive 1
- No Relationship 0
- Negative 1

Mulchatna Caribou - Wolf Harvest

Expect

<table>
<thead>
<tr>
<th></th>
<th>Wolf Removal</th>
<th>MCH abundance</th>
<th>All calf:cow ratio</th>
<th>All calf survival</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>No Relationship</td>
<td>0</td>
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<td>0</td>
</tr>
<tr>
<td>Negative</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
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</table>
Mulchatna Caribou - Wolf Harvest

• Conclusions
  • Lack of clear evidence that wolves were/are a primary factor driving calf survival or herd abundance
  • Alternatively, the assumption that wolf harvest is a proxy for wolf density/wolf predation may not be appropriate

Review of successful wolf control programs
National Research Council (1997)

1) Wolves were the primary predator of all age classes of the targeted ungulate
2) Aerial wolf reduction occurs over areas of at least 10,000 km²
3) Wolves are reduced to at least 55% of their pre-control numbers for at least 4 years
4) Weather is favorable for ungulate survival

Mulchatna Unit 17 wolf control program

1) Not Assessed the role of wolves in caribou mortality in any age class was not assessed.
2) Criteria met Mulchatna WCA is >25,000 km²
3) Not Assessed wolf abundance was not determined prior to control initiation, nor at the 2017 expansion of control area
4) Not Assessed

Health: What is the current health of MC?
• Body Condition U/S
• Disease Screen
• Spring/Summer Diet Isotopic

Pregnancy: How variable is reproductive success?
• Pregnancy rates and pauses

Survival: How long do MC live and why do they die?
• Seasonal survival est.
• Identify important causes of mortality

Genetic Structure: Is the MCH one herd?
• Genetically compare the East vs. West
• Characterize seasonal space use in East vs. West
Mulchatna Caribou - Adult Female Research

Objective 1. Quantify caribou health metrics: body condition, disease, and variation in reproductive success.

1. What is and why do we care about body condition?
   - Body Condition: state of body components (i.e. fat, protein) that influences fitness
     - Individual survival
     - Reproductive success
     - Susceptibility to disease

2. Combined mass, body condition score, rump and loin fat and loin depth via u/S (Cook et al. 2021) to calculate an individual’s % body fat
Mulchatna Caribou - Adult Female Research

Objective 1. Quantify caribou health metrics: body condition, disease, and variation in reproductive success.

   - Moderate Nutritional Limitation
     • depressed pregnancy rates
     • slow juvenile growth
     • increased winter mortality
   - Mulchatna adult females
     • % Body fat 8.13% ± 2.96 SD, ranged 4% - 16%

4. Lactation and Fall Body condition
   - Non lactating (n = 19)
     • %BF 10.2% (± 3.37 SD)
   - Lactating (n = 26)
     • %BF 6.66% (± 1.95 SD)

Brucellosis (B. Suis)
   - Zoonotic disease bacterial infection in domestic feed animals and AK ungulates and other wildlife, transmitted through exchange of fluids (i.e. breeding and after birth)
   - Symptoms
     • Lameness, joint inflammation
     • Late term abortions, retained placentas, weak calves, infertility
     • Implications for adult survival

Health: What is the current health of MC?
Objective 1: Quantify caribou health metrics: body condition, disease, and variation in reproductive success.

### Health: What is the current health of MC?

<table>
<thead>
<tr>
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<th>2020</th>
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<tbody>
<tr>
<td></td>
<td>East</td>
<td>Central</td>
<td>West</td>
</tr>
<tr>
<td>Positives</td>
<td>4</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Negatives</td>
<td>17</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>Total</td>
<td>57</td>
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</tbody>
</table>

Prevalence proportion of the sample population with a condition at the sample period (%).

Objective 2: Estimate age specific survival rates and identify the proximate cause of death in adult caribou.

### Survival: How long do MC live and why do they die?

- Unknown: 30% (n=9)
- Bear: 20% (n=2)
- Firearm related: 50% (n=5)

Map showing locations and cause of death.
Mulchatna Caribou - Adult Female Research

Objective 2: Estimate age specific survival rates and identify the proximate cause of death in adult caribou.

Survival: How long do MC live and why do they die?

Mulchatna Caribou – Take Home Message.....
Mulchatna Caribou – Take Home Message.....

Historic Challenges

1. **Density Dependent Effects**  reduction in quantity and quality of forage cascades into reduced body condition, impacting pregnancy, susceptibility to disease, and survival
   • Sustained periods of reduced survival in young and prime aged breeding females in early 2000s
     Age structure issues  small and poor quality breeding stock
   • Pre/Post 2009 difference in pregnancy rates of 2, 3, and 4 year olds
   • Vegetation Community Changes
     20 50+ years for lichen dominated veg community recovery
     Increase shrub incursion onto alpine tundra

Mulchatna Caribou – Take Home Message.....

Current Challenges

1. **Nutritional condition**  large variability in fall body condition, with lower % fat in lactating females (Moderate Nutritional Limitation)
2. **Brucellosis**
   • High prevalence rates, concentrated in Western/Central range
   • Increased observations of retained placentas and swollen joints and encounters of neonatal mortalities (e.g. stillborn, weak calves)
3. **Mortality**
   • Out of Season harvest  wounding loss and Illegal harvest is currently the predominate cause of death in adult females
     Need to understand past and present harvest dynamics (i.e. total animals taken and proportion of females harvested)
   • Non human predation  none of our current data streams point to non human predators as a significant challenge to MC adults
     Recommend a thorough review of Unit 17 IM program
Mulchatna Caribou – Next Steps…..

We are in the 2nd of our 3 year of the study

• Process samples from fall 2021 captures  brucellosis screening, diet, genetics
• Monitor for mortalities and determine cause of death
• Track the reproductive success of all collared females (n  100) relative to calving grounds, fall body condition, and brucellosis exposure status