

**Project: Mentasta Caribou Herd Population Monitoring (2017-2020)**  
**PEPC Project Number: 72880**

**Introduction:**

The protection of habitat for and populations of caribou is specifically stated in the enabling legislation of Wrangell-St. Elias National Park & Preserve (WRST). Caribou are also a vital sign to be monitored by the Central Alaska Monitoring Network (CAKN). The Mentasta caribou herd has primary spring, summer (calving), and fall ranges in WRST and experienced significant and prolonged population declines beginning in the early 1990's. As a result, all sport and subsistence harvest of the Mentasta herd ceased in 1989 and 1992, respectively. Harvest of the Mentasta herd remains closed within WRST. The herd is managed under a multi-agency cooperative herd management plan.

**Methods**

The caribou monitoring design requires maintaining a sample of radiocollared female caribou in the herd. Radiocollar deployment in the Mentasta caribou herd is limited to the first half of September because they are commonly mixed together with the much larger Nelchina caribou herd during mid-September to early May. Adult female caribou are captured by helicopter darting (chemical immobilization). A small tandem aircraft (PA-18 supercub), works closely with the capture helicopter to locate caribou for darting, monitor darted caribou during chemical induction, and check on caribou that have been captured on previous days. Once a caribou is immobilized, it is fitted with a mortality-sensing radiocollar that has a colored and numbered vinyl marker. Standard body measurements are taken and a blood sample is drawn. Caribou are weighed by placing the caribou in a weighing net and lifting with a weighing bar or tripod/come-a-long combination attached to a digital load cell. Once processing is complete, caribou are given antagonist drugs to reverse the effects of chemical immobilization. Each caribou that is handled must be relocated within 3 days of capture to determine that they survived the capture event.

The herd size estimate is derived from a post-calving census and a fall sex and age composition survey. The post-calving census is conducted in late June when caribou tend to be in open, high-elevation habitats, particularly on warm days with little wind. A day or 2 prior to the census, all caribou are radio-located to provide an assessment of their distribution. During the census, 3 tandem fixed-wing aircraft, each with a biologist on board, are used to search the herd's summer range above 4,000 feet on the flanks of Mount Sanford and Mount Drum from the Cheshnina River on the south to the upper Copper River/Copper Glacier on the north and east. Each aircraft crew searches for caribou, without the aid of telemetry, in a pre-assigned sector, expending 4-5 hours of survey time. Caribou groups that are observed are counted and classified as cows, calves, and obvious bulls (small bulls that are indistinguishable from cows fall in the "cow" class). Observers use radiotelemetry to determine whether a group is marked (includes  $\geq 1$  radioed caribou) and the identity of all radioed caribou in each marked group. Once the survey is completed, the aircraft crews compare their results to determine which radiocollared caribou were missed during the survey. Immediately following the survey, radiocollared caribou that were unaccounted for during the survey are radio-located and their groups counted and classified. The group's location determines whether they were in the survey

area and missed or outside the survey area and not available to be observed. Groups located outside the survey area are accounted for in the population estimate.

The fall sex and age composition survey is conducted during the rutting period when adult cows and bulls are well mixed. Composition surveys provide data to assess fall calf recruitment (calf:cow ratio) and adult sex ratios (bull:cow ratio) used in estimating herd size and evaluating bull survival. The fall survey is conducted using a small helicopter and 1-2 biologists to determine composition of caribou groups and a fixed-wing aircraft and pilot to help locate caribou groups. All caribou encountered are classified as cows, bulls, or calves based on their appearance and external sex characteristics. Bulls are further classified as small (antlers and body size indistinguishable from cows), medium (antlers and body size larger than adult cows, but with smaller beam diameter, shorter length, and fewer points than fully-mature bulls), or large (large-bodied individuals with fully developed antlers (3+ feet) with thick beams, long antler length, and many points).

Herd size is estimated by applying the sightability-model approach to the post calving census to account for detection probabilities that vary with group size. This method is best suited to small caribou herds that lack large post-calving aggregations and inhabit mountainous terrain. Group size of marked groups and whether each group was observed or missed during the survey is used to determine the relationship between sightability and group size via logistic regression, to arrive at detection probabilities relative to group size. With that information, caribou missed in unmarked groups can be accounted for in a population estimate for the survey area. Further, a variance and confidence interval can be derived for the estimate. The final fall herd size estimate is derived using the estimated number of cows during the June census and the number of calves and bulls per 100 cows observed during the fall sex and age composition survey.

## **Results:**

GPS radio collars facilitate monitoring of the Mentasta Caribou Herd. Wrangell-St. Elias National Park and Preserve (WRST) Wildlife Biologist Judy Putera and Denali National Park & Preserve Wildlife Biologist Bridget Borg collaborated to capture and collar 11 adult female Mentasta caribou during September 4-5, 2019. Captures occurred above 4000 ft. on the slopes of Mt. Drum and Mt. Sanford between the Nadina River and Boulder Creek. Telonics GPS/Iridium collars (TGW-4677-4) were deployed. The collars are programmed to obtain a GPS location every 12 hours and data are transmitted to WRST through the Iridium satellite network.

The Mentasta caribou herd post-calving census was conducted June 29 and July 1, 2017, June 21, 2018, June 21, 2019, and June 25, 2020.

## **2017**

The Mentasta caribou herd post-calving census was conducted June 29 and July 1, 2017, June 21, 2018, June 21, 2019, and June 25, 2020. the fall composition count was conducted 8 September 2017 (Tables 1 and 2).

## 2018

The Mentasta Caribou Herd post-calving census was conducted 21 June 2018 and the fall composition count was conducted 11 September 2018 (Tables 1 and 2).

Ten captures were conducted on October 22<sup>nd</sup> and one capture was conducted on October 23<sup>rd</sup> for a total of 10 female adults.

## 2019

The Mentasta Caribou Herd post-calving census was conducted 21 June 2019 and the fall composition count was conducted 6 September 2019 (Tables 1 and 2). A sightability model was used to estimate the number of cows present during the census. The sightability model is based on the number of radiocollared caribou missed during the current and previous surveys. For the fall population estimate, we use the fall calf:cow ratio relative to estimated number of estimated June cows. Observed fall bulls most likely include Nelchina bulls, thus we estimate Mentasta caribou fall bulls based on a 30 bulls per 100 cows ratio.

## 2020

WRST and ADF&G completed the Mentasta caribou post-calving census on June 25, 2020. WRST completed the Mentasta caribou fall composition count of September 6, 2020. We counted 405 total caribou during the census in 2020 compared to 249 caribou in 2019. This increase is not explained by calf production the previous year, but may be due in part to Nelchina caribou returning late from their winter range. Some of these late returning caribou may have failed to migrate back to their traditional calving grounds, remaining in WRST. This theory is supported by the presence of 3 radiocollared Nelchina caribou in the Mentasta caribou calving/summer range in 2020. Additionally, small groups of caribou could have moved in from other areas such as the Tonsina Controlled Use Area.

A sightability model, based on the number of radiocollared caribou missed during the current and previous surveys is used to derive the estimated number of June cows (Table 1). We use the fall calf:cow and bull:cow ratios relative to the estimated number of June cows to determine the estimated fall calves and bulls. The observed number of caribou during the fall composition count is presented in Table 2. Caution should be used when interpreting the 2020 Mentasta population estimate, particularly to alter caribou harvest regulations in GMU 11. We should determine whether this is a one year phenomenon or part of a longer term trend.

**Table 1. Fall population estimates for the Mentasta caribou herd based on the June post-calving census and fall sex and age composition count.**

| Year | Estimated June Cows | Estimated Fall Calves | Estimated Fall Bulls | Fall Population Estimate |
|------|---------------------|-----------------------|----------------------|--------------------------|
| 2017 | 263                 | 47                    | 79                   | 389                      |

|      |                  |     |     |                   |
|------|------------------|-----|-----|-------------------|
| 2018 | 323              | 51  | 96  | 470               |
| 2019 | 302              | 77  | 100 | 479               |
| 2020 | 590 <sup>1</sup> | 106 | 454 | 1150 <sup>1</sup> |

<sup>1</sup>May include Nelchina caribou

**Table 2. Mentasta caribou herd fall sex and age composition counts.**

| <b>Year</b> | <b>Cow</b> | <b>Calf</b> | <b>Bull</b> | <b>Total</b> | <b>Calves:<br/>100 Cows</b> | <b>Bulls:<br/>100 Cows</b> |
|-------------|------------|-------------|-------------|--------------|-----------------------------|----------------------------|
| 2017        | 91         | 18          | 79          | 188          | 20                          | 87                         |
| 2018        | 72         | 16          | 66          | 154          | 22                          | 92                         |
| 2019        | 113        | 29          | 107         | 249          | 26                          | 95                         |
| 2020        | 98         | 18          | 75          | 191          | 18                          | 77                         |