

# Historic Use of the Chisana Caribou Herd by Residents of Northway Village



Photo: Greg Risdahl, USFWS

## Elder Interviews

by  
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## Historic Use of the Chisana Caribou Herd

### INTRODUCTION

One of the purposes of Tetlin National Wildlife Refuge (Tetlin Refuge) outlined in Section 302(4)(B) of the Alaska National Interest Lands Conservation Act, ANILCA, is to participate "...in coordinated ecological studies and management of the Chisana caribou herd..." In 2010 and 2011, Tetlin Refuge participated in the development of a management plan for the Chisana caribou herd for 2010-2015 (Plan). The Plan is a multi-agency effort that includes Federal, State, Provincial and tribal governments on both sides of the Alaska-Canada border. During the public review process for drafting the Plan, a need for Traditional Ecological Knowledge (TEK) was identified. Strategy 5.1 of the final Plan states that the cooperators will "*conduct collaborative local and traditional knowledge studies to document Chisana caribou herd historical and current range use.*"

In the spring of 2011, Tetlin Refuge Information Technicians (RITs) conducted interviews with Northway village elders about the range and historic use of Chisana caribou. Interviews were documented using a Sony mini Camcorder and interviewees were asked a standard set of interview questions. The interview format was open-ended to allow interviewees to speak freely about their experiences growing up and hunting Chisana caribou, while engaging in their seasonal subsistence lifestyle.

Out of 21 potential interview candidates identified, 7 were selected to be interviewed based on their initial responses regarding their knowledge, or lack thereof, of Chisana caribou. Three of the 7 interviewees were

camera-shy and did not want to be filmed. Thus, film footage was obtained from four Native elders during this study. Each of the individuals selected to be interviewed stated that they knew the difference between the mountain-woodland (Chisana) and barren ground (Nelchina, Fortymile and Mentasta) caribou in the area. Each elder interviewed had personal experience hunting Chisana caribou. Some also trapped and provided additional information about Chisana caribou from experiences gained while running their traplines. The TEK gathered during these interviews with elder residents of Northway village expands on our knowledge and understanding of the historic range and use of the Chisana caribou herd.

### ELDER INTERVIEWS

#### 1940s-1950s

#### Avis Sam



Photo: Steve Hildebrand, USFWS, retired

Avis Sam traveled throughout the Upper Tanana River valley as a young girl, beginning in the 1940s. She has knowledge

and memories of hunting and trapping with her father, Steven Northway, brother of Walter Northway, both on and off present day Tetlin Refuge. Starting north of Northway Village, the family traveled by dog team in the winter to the South Fork River into the Ladue River drainage and back down Gardiner Creek, then across to the Black Hills and into the Nutzotin Mountains in what is now Wrangell St. Elias National Park and Preserve.

As a young girl, Avis recalls waiting to hunt for caribou at the foothills of the Nutzotin Mountains near Stuver Creek with her father and uncle. She stated that the herds of caribou came over the Black Hills in what "... looked like a wave of motion." When the caribou showed up near camp, Avis and the other children were told by her father and the other hunters to stay in the tent because of the dangers associated with hunting close to camp. "There was a lot of shooting going on," she said.

Avis' father, Stephen Northway, said that the caribou they hunted back then did not move much and had bigger bodies. "The head was too big to fit in the oven, and we had to split it in half to cook it," she said. "The legs were bigger and hide thicker, too. It was more like a moose." Though Avis and her family did not call these caribou 'Chisana caribou', they knew they were different from the Nelchina caribou, which migrated through the area at a different time of year, and because of their much larger bodies.

### **1950s-1970s**

#### **Danny Thomas**

Danny Thomas is a lifelong hunter and trapper whose area has included the Black Hills, Nutzotin Mountains, Ten Mile and Stuver Creeks and the Chisana River

drainage. Danny trapped for thirty years, beginning in 1948 when he was eight years old, through the 1950s into the mid-1970s. His grandfather, Chief Walter Northway, and uncle, Teddy Northway Sr., born in 1935, played an important role in his training as an expert outdoorsman.

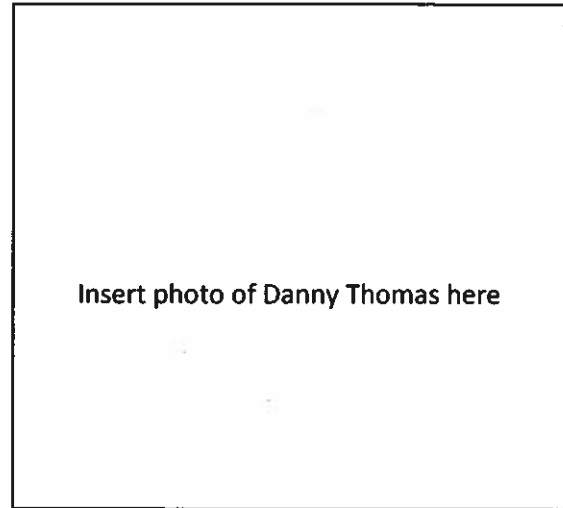


Photo: credit

Danny belonged to an early generation of trappers that did things the old way. When he first trapped, he traveled by dog team, and later, by snowmachine, which made travel faster and easier and allowed him to extend his trapline. His line ran east of the Nabesna River to the Black Hills, Stuver Creek, Ten Mile and Mirror Creek. He had cabins on Stuver Creek and in the Black Hills (Figure 1). Beginning in 1950, Floyd Miller offered to fly Danny's gear out to his trapline cabin on Stuver Creek and then pick it up at the end of the season to help him out.

Danny remembers seeing the big bodied mountain caribou come up from the Chisana River drainage while trapping the Nutzotin Mountains, and Stuver, Scottie, Snag and Ten Mile Creeks. He said they called these big bodied, large antlered caribou *Tomaganak*, and knew they were different from the migratory Nelchina caribou.

Danny said that his grandfather Walter Northway used to go to a trading post owned by Herman Kessler in the 1930s and 1940s. The trading post was located close to Stuver and Scottie Creeks at the end of the Black Hills, and near the Chisana River and Snag Creek (Figure 1). On trips to the trading post, 'Grandpa' Walter Northway hunted along the way because the moose around Northway had been hunted out. He was sometimes lucky and brought back one of the big bodied mountain caribou from the Chisana River drainage to share with the village.

Danny also remembers Teddy Northway Sr. warning Northway hunters not to shoot the lead bulls from this mountain herd when they crossed the Alaska Highway between MP 1242 and the Alaska-Canada border at MP 1220, or the caribou would change their migration route. Danny believes that this may be part of the reason why the Chisana caribou no longer pass through the refuge as they once did; i.e., the lead animals were shot, and knowledge of their traditional travel routes was lost or changed.

#### **1960s-1980s** **Howard Fix**

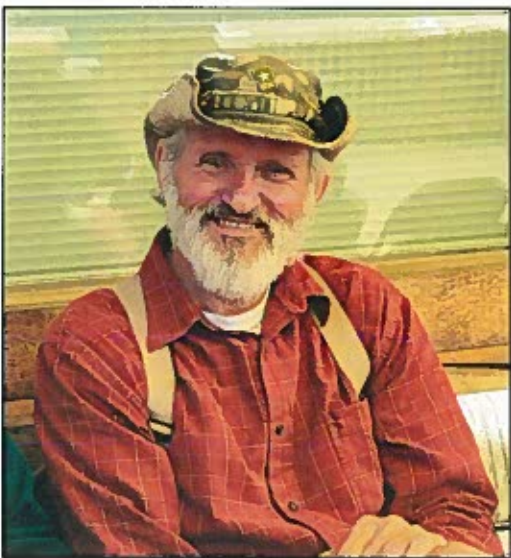


Photo: Greg Risdahl, USFWS

Beginning in 1964, Howard Fix trapped the Nabesna River trail from Northway Village to the Black Hills and Jatahmund Lake, and as far south as Pickerel Lake on the Pickerel Lake Winter Trail. The area Howard trapped overlaps the area that Avis Sam trapped, but two decades later. From the 1960s through the 1980s,

Howard occasionally ran into Chisana caribou while out on the trapline. He noted that the timing of the migration of the Nelchina and Chisana caribou differed; although, "Sometimes," he said, "you could tell that the two herds mixed because the Chisana were much larger. Some were as big as moose!" These were the caribou the hunters selected to harvest back then because they were big and fat, and in really good shape.

According to Howard, the Chisana caribou herd wandered as far north as the Black Hills during the time that he trapped, up until about 15 to 20 years ago. He noted that they were present on Tetlin Refuge when the rivers and streams were still flowing, while the Nelchina did not arrive until after the rivers and streams had frozen over and the ground was covered with snow.

Howard said that the Chisana caribou were always bigger and in better shape than the Nelchina caribou. He postulated that because the Nelchina traveled 300 to 400 miles—all the way from the Talkeetna Mountains—and had already gone through the rut before arriving on Tetlin Refuge, they had lost a considerable amount of their body condition. He also believes that the Chisana caribou have bigger antlers in general, and shed them later in the season than the Nelchina. He attributes this, again, to the overall better condition of the Chisana caribou compared to the Nelchinas.



Howard believes that the antler configuration of mountain caribou bulls, like those of the Chisana, is different than that of barren ground caribou like the Nelchina or Fortymile caribou. He said that the main beams of Chisana caribou bulls have a pronounced bend or elbow, whereas the main beam of barren ground caribou antlers tend to curve gradually overhead in a 'C' shape. In cross-section, he says that barren ground caribou (e.g., Nelchina) antlers are more round, while the mountain-woodland (Chisana) caribou antlers tend to be flattened, oval or blade-like.

**1960s-1980s**

**Louie Frank**

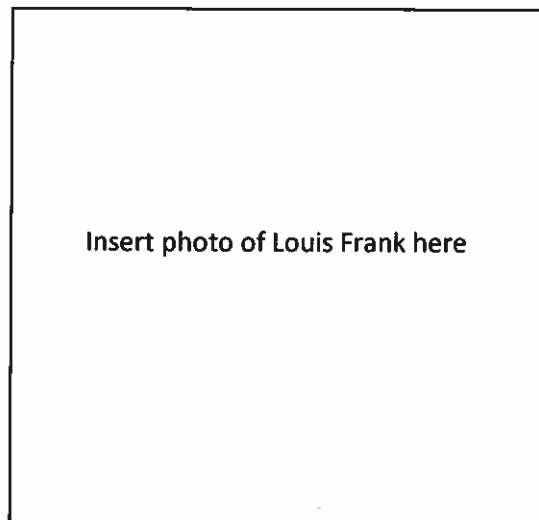


Photo: credit

Louie Frank and his family moved to Northway from the Nabesna Village area early in the Twentieth Century. He said they floated down the Nabesna River to Northway to get away from the smallpox and measles that were hitting most of the villages in the Upper Tanana in the early 1900s. From 1965 until 1975, Louie trapped the Chisana River east to the Carden Hills and Beaver Creek. He continues to trap today, but closer to home on the Nabesna River drainage.

Louie hunted Dall sheep, moose and caribou in the Nutzotin Mountains in Wrangell St. Elias National Park and Preserve, south of Tetlin Refuge, beginning in the mid-1960s through about 1975. He probably had the most knowledge about the Chisana caribou herd of anyone interviewed because he grew up around Scotty and Mirror Creek, where Chisana caribou were consistently present when the population was larger.

Louie often saw caribou in Snag Creek and Cottonwood Creek, and knew they were Chisana caribou because of their bigger bodies, longer legs and larger feet. According to Louie, Chisana caribou hooves are also more curved and cupped than the Nelchina caribou. He explained that the Upper Tanana Athabascan Indians even have different names for Chisana caribou compared to other types of caribou. The people of Northway called Chisana caribou *Uzii choo*, which means 'big caribou', while the Scotty Creek dialect for Chisana caribou was *Uzii ma*, meaning 'lighter color'.

In addition, Louie explained that Nelchina caribou did not show up around Northway until the 1950s. He told a story about crossing the Nabesna River one day and unexpectedly bumping into a herd of caribou. He raced back to the village to tell his friend Teddy Northway Sr. about what he'd seen. Teddy Sr. was skeptical that Louie had actually seen caribou, but went back across the river with him to look. They ended up shooting several caribou that day and brought the meat back to the village to share. Louie said that the 1930s, 40s and 50s were very lean times, with not much to eat in the village. The arrival of the Nelchina caribou in the 1950s was a very welcome sight.

According to ADF&G the Nelchina caribou population contained only 5,000 to 15,000

animals in the 1940s (ADF&G 2005). The herd increased dramatically in the 1950s, "... aided by intensive predator control conducted by the federal government." The population peaked in 1995 at an estimated 50,000 animals. In 2010, ADF&G estimated that the Nelchina caribou population numbered about 44,954 animals in the summer (Becky Schwanke, pers. com. 2010). Today, the population is still above ADF&G's management objective (35,000-40,000) at approximately 42,000 animals (Becky Schwanke, pers. com. 2011).

## DISCUSSION

### Caribou Ecotypes

Chisana caribou are the only mountain (mountain-woodland) caribou in the state of Alaska and is a 'sedentary ecotype' caribou herd (Bergerud et. al. 2008). The Chisana, and other sedentary ecotype caribou, do not make long distance migrations between winter ranges and calving areas. In contrast, Alaska's barren ground herds, such as the nearby Nelchina and Fortymile caribou herds, make annual treks of several hundred miles between their calving and wintering areas. For this reason, the Nelchina and Fortymile herds are what are considered a 'migratory ecotype'.

The Chisana caribou herd's core range is in the mountains and valleys of the upper Chisana River drainage. They make short distance moves seasonally to areas with good forage, or scatter during the calving season. Occasionally, apparently when population numbers are high, the herd may travel further from their core range, going northeast into Canada near Beaver Creek, or north onto Tetlin National Wildlife Refuge.

Sedentary ecotype caribou, such as the Chisana herd, disperse during the spring calving season as a strategy to minimize

their predation risk. They use areas with abundant water (e.g., near small ponds and lakes), extensive muskeg, or travel into high alpine areas to escape their major predators—wolves and bears. This 'space-out' strategy increases the amount of time predators must spend searching for newborn calves, thus enhancing their overall survival (Bergerud et. al. 2008).

Migratory ecotype caribou, on the other hand, usually have distinct calving grounds, which are typically above timberline. This puts them as far away as possible from where predators, wolves in particular, like to den—beneath forest cover—and where the snow cover goes off quickly in the spring. The dead and dry vegetation provides excellent camouflage for brown, newborn calves. The 'anti-predator' strategy used by migratory ecotype caribou is referred to as 'space-away' by Bergerud et. al. (2008). Caribou cows using this strategy separate themselves from wolves and bears by calving long distances away from areas with significant numbers of the large predators, and where other prey species such as moose occur in low abundance, which would otherwise attract the predators to the area.

Both sedentary and migratory ecotype caribou typically winter below timberline in areas of abundant lichen—their preferred forage—known as 'lichen pastures', or in areas in with low snow cover at higher elevation where slopes are blown free and, again, where there is an abundance of readily accessible lichen for winter forage.

It is interesting to note that both calving strategies (space-away and space-out) can be exhibited by the same herd. This is a result of single herd using the different types of habitats available to them within their home range in different ways. For example, two Interior Alaska barren ground caribou

herds—the Delta, a migratory herd, and the Yanert, a sedentary herd—were once classified as separate herds. Today, they are considered a single herd—the Delta herd. ADF&G radio telemetry monitoring data showed that the Delta and Yanert herds mixed regularly, and were in fact a single herd using their home range in two distinctly different ways. Subsequent genetic analyses validated this observation and provided the evidence and impetus to manage them as a single herd.

Similarly, in Ungava, an area Eastern Canada, a barren ground *migratory* herd called the George River herd, and the Tornjat Mountain herd, a barren ground *sedentary* herd, are managed as one because they mix regularly and are the same genetically, though they exhibit two distinct behavioral ecotypes. Because of different selection pressures (e.g., predator avoidance and forage availability) within the different environments available to them, these two groups of caribou have adopted two different calving strategies to maximize their reproductive success and survival.

#### Population Dynamics

Little is known about Chisana caribou population trends prior to the 1960s (ADF&G 2005). Nevertheless, caribou population changes observed by Northway elders interviewed for this study correspond well with wildlife population information collected by the state and federal agencies. Early estimates varied from as low as 50 Chisana caribou in the 1940s to over 3000 in the 1960s. Likewise, Northway hunters stated that they observed significant changes in the size of the Chisana caribou herd as far back as the 1920s—as far back as they could collectively remember—and that bull:cow and calf:cow ratios varied from year to year as well.

Because of the need for more forage to meet the energy demands necessary to sustain a larger population, it seems plausible that the Chisana herd would have to travel greater distances to find enough food to eat. In fact, ADF&G survey data indicates that the Chisana caribou herd peaked in 1964 at about 3000 animals (Skoog 1968), while Northway hunters noted that the Chisana and Nelchina caribou herds were first observed mixing in the 1950s and 1960s.

By the late 1970s, however, the Chisana caribou herd had declined to about 1000 animals, and their core range shrank back to the country around the headwaters of the Chisana River drainage. ADF&G installed radio transmitting collars on some of the caribou to monitor the population beginning in the 1970s. Radio telemetry data showed that a few Chisana caribou were still present on Tetlin Refuge in the 1980s (Figure 2). By 1988, the herd had increased to about 1900 animals. But, from the 1990s on, the herd began to steadily decline until it reached its lowest level in 2002, with an estimated 315 animals in the herd. From 2003 until 2010, the Chisana caribou population rose and remained relatively stable at around 700 animals (Table 1). About 600 caribou were counted during a fall survey by ADF&G in 2011.

#### Harvest

According to some TEK recorded at the 2001 Northway/White River First Nation Traditional Knowledge Workshop, residents from Scotty Creek and Northway Village regularly hunted Chisana caribou up until the 1940s, but rarely thereafter (ADF&G 2005). Northway elders interviewed for this historic use study seem to contradict the assertion made during the 2001 workshop. The Northway elders stated that they regularly hunted Chisana caribou from the 1940s through the early 1990s when the

Chisana herd traveled north following the Chisana River; specifically, from the Carden Hills to the Black Hills near Herman Kessler's trading Post, and as far north as Scotty Creek where it enters the Chisana River near Sweetwater Creek—where the new Seaton Roadhouse Interpretative and Recreation Site is located adjacent to the Alaska Highway. In addition, several Northway residents, including Harold Northway and Talbert Felix, flew out to the community of Chisana in the 1980s to hunt Chisana caribou.

Though the Chisana caribou population declined from 1979 through 1994, ADF&G (2005) stated that hunter harvest had little to do with the decline (Table 2). Guides operating in the area, as well as local subsistence hunters, voluntarily curtailed hunting in response. In 1994, ADF&G closed the Chisana caribou herd to all hunting.



Photo: Nelchina bull, Greg Risdahl, USFWS

The Northway elders interviewed for this study selectively hunted Chisana caribou over Nelchina caribou because of their larger body size. In addition to providing more meat, the Chisana caribou were fatter and tasted better, according to the elders. Even after the Nelchina herd became available in the 1950s and significantly more abundant in later decades, Northway hunters

still preferred to hunt Chisana caribou over Nelchina for the reasons stated.

Sedentary ecotype caribou bulls such as the Chisana do not travel far to breed. They mate in small groups, where there is greater familiarity among males, and therefore spend less time fighting for breeding rights to females (Bergerud et al. 2008). As a result, breeding bulls retain more of their muscle mass and go into the winter in better condition. In contrast, migratory caribou bulls such as the Nelchina rut in large aggregations while on the move and are known to lose considerable body weight on their long journey to their winter range.

### Morphology and Genetics

The Chisana caribou herd is the only mountain caribou herd in Alaska as noted earlier. Genetic analysis conducted by Zittlau et al. (2000) found that the Chisana caribou herd is most closely related to other mountain-woodland caribou herds in the Yukon Territory, whereas the genetic distance between the Chisana caribou herd and nearby Alaskan barren ground caribou herds, such as the Nelchina, Fortymile and Mentasta, is large.

Northway elders uniformly assert that the Chisana caribou are larger and have bigger antlers that look different than the barren ground Nelchina caribou. Some of the Native elders stated that the Chisana bulls have the heaviest antlers and contain many tines, and are flattened in cross section. Local Alaskan hunting guides in the area agree, stating that Chisana caribou are much larger in the body, and bulls, on average, have among the largest antlers of any Interior Alaskan caribou herd (Entsminger, pers. com. 2011).

Butler (1986) found that sedentary ecotype woodland caribou had shorter antler beam lengths and narrower spreads, contained



more mass in the brow and bez times and contained more space between the brow and bez times than migratory ecotype caribou (Table 3). Other caribou biologists have noted that migratory barren ground and sedentary woodland caribou differ in the cross section of their antler main beams as well (Jacobi 1931, Banfield 1961). Migratory male caribou generally have round or oval main beams in cross section and are smooth in contour, while sedentary male caribou have main beams that are compressed and often have vertical ridges that run along the tops and bottoms of the antlers, sometimes giving them a diamond-shaped cross section. Finally, migratory ecotype caribou have larger antlers in comparison to their body size than sedentary ecotype caribou and have a gradual curve to the main beam, whereas sedentary caribou often have a sharp bend in their main beams (Butler 1986).

The Boone and Crocket Club (B&C) of North America recognizes five subspecies of caribou: the mountain, woodland, barren ground, central Canada barren ground, and Quebec-Labrador. According to the B&C records book, the caribou with the largest antlers are the barren ground caribou of Alaska, followed closely by mountain caribou. Caribou antlers are 'scored' for size by adding together the spread of the antlers in inches, counting the total number of points, and measuring the length of antler beams, tines and circumferences and then subtracting out the differences between corresponding tines, overall beam length and corresponding circumferences.

So, for example, the B&C World Record mountain caribou scores 459  $\frac{3}{8}$ ", while the top barren ground caribou ever taken scores 477", respectively (B&C Records of North American Big Game). The minimum score for a trophy class or record book mountain

caribou is 390 B&C points. The minimum score for a barren ground caribou is 400 B&C record book points.



B&C record book mountain caribou



B&C record book barren ground caribou

## SUMMARY

The Northway elders interviewed for this historic use survey made a clear distinction between—and preference to hunt—the larger, sedentary ecotype mountain Chisana caribou herd over the more abundant migratory ecotype Nelchina herd. Though the season has been closed on the Chisana caribou herd since 1994, the elders uniformly expressed their interest in being able to hunt Chisana caribou again, if the season is ever reopened.

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## TABLES

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Table 1. Chisana caribou herd demographics, 1987-2011. (Data modified from ADF&G 2008, 2011 and Wrangell St. Elias National Park and Preserve 2011).

| Year          | Bulls:<br>100 Cows | Calves:<br>100 Cows | %<br>Calves | Cows        | Bulls       | Total         | Estimated<br>Population |
|---------------|--------------------|---------------------|-------------|-------------|-------------|---------------|-------------------------|
| 1987          | 39                 | 28                  | 17          | 456         | 175         | 760           | 1800                    |
| 1988          | 36                 | 31                  | 19          | 587         | 206         | 979           | 1882                    |
| 1989          |                    |                     | 9           |             |             | 625           | 1802                    |
| 1990          | 36                 | 11                  | 7           | 581         | 214         | 855           | 1680                    |
| 1991          | 40                 | 1                   | 1           | 607         | 239         | 855           | 1488                    |
| 1992          | 31                 | 0                   | 0           | 867         | 274         | 1142          | 1270                    |
| 1993          | 24                 | 2                   | 2           | 578         | 139         | 732           | 869                     |
| 1994          | 27                 | 11                  | 8           | 390         | 108         | 543           | 803                     |
| 1995          | 21                 | 4                   | 4           | 433         | 92          | 542           | 679                     |
| 1996          | 16                 | 5                   | 4           | 313         | 49          | 377           | 575                     |
| 1997          | 24                 | 14                  | 10          | 374         | 94          | 520           | 541                     |
| 1998          | 19                 | 4                   | 3           | 187         | 35          | 231           | 493                     |
| 1999          | 17                 | 7                   | 6           | 257         | 45          | 318           | 470                     |
| 2000          | 20                 | 6                   | 5           | 330         | 62          | 412           | 425                     |
| 2001          | 23                 | 4                   | 3           | 281         | 64          | 356           | 375                     |
| 2002          | 25                 | 13                  | 10          | 186         | 46          | 258           | 315                     |
| 2003          | 37                 | 25                  | 15          | 374         | 139         | 603           | 720                     |
| 2004          | 38                 | 21                  |             |             |             | 538           |                         |
| 2005          | 46                 | 23                  | 14          | 353         | 162         |               | 706                     |
| 2006          | 48                 | 21                  | 13          |             |             | 532           |                         |
| 2007          | 50                 | 13                  | 8           | 442         | 219         | 719           | 766                     |
| 2008          | 44                 | 21                  | 16          | 324         | 141         | 408           |                         |
| 2009          | 49                 | 15                  | 9           | 308         | 150         | 505           |                         |
| 2010          | 42                 | 23                  | 14          | 379         | 156         | 622           | 696                     |
| 2011          | 38                 | 16                  | 11          | 359         | 135         | 542           |                         |
| <b>Totals</b> | <b>790</b>         | <b>319</b>          | <b>208</b>  | <b>8966</b> | <b>2944</b> | <b>13,974</b> | <b>18,355</b>           |
| <b>Means</b>  | <b>33</b>          | <b>13</b>           | <b>9</b>    | <b>408</b>  | <b>134</b>  | <b>582</b>    | <b>918</b>              |

Table 2. Chisana caribou harvest by residency, 1981-1994 (data from ADF&G.)

| Year | Total Hunters | AK res Hunters | AK res Harvest | Nonres Hunters | Nonres Harvest | Total Harvest | Local Hunters | Local Hunters | Town |
|------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|---------------|------|
| 1981 | 32            | 23             | 14             | 9              | 23             | 23            | 3             | 2             | N, G |
| 1982 | 33            | 21             | 10             | 12             | 21             | 21            | 6             | 2             | N, T |
| 1983 | 31            | 22             | 17             | 9              | 26             | 26            | 5             | 3             | C, N |
| 1984 | 43            | -              | -              | -              | -              | 31            | -             | -             | -    |
| 1985 | 90            | -              | -              | -              | -              | 65            | -             | -             | -    |
| 1986 | 54            | -              | -              | -              | -              | 41            | -             | -             | -    |
| 1987 | 58            | -              | -              | -              | -              | 49            | -             | -             | -    |
| 1988 | 38            | -              | -              | -              | -              | 34            | -             | -             | -    |
| 1989 | 44            | -              | -              | -              | -              | 30            | -             | -             | -    |
| 1990 | 48            | 27             | 12             | 21             | 21             | 33            | 7             | 3             | -    |
| 1991 | 38            | 17             | 8              | 21             | 13             | 21            | 0             | 0             | -    |
| 1992 | 28            | 17             | 6              | 11             | 10             | 16            | 2             | 2             | -    |
| 1993 | 32            | 17             | 11             | 15             | 8              | 19            | 4             | 2             | C, M |
| 1994 | 0             | 0              | 0              | 0              | 0              | 0             | 0             | 0             | -    |

- = Hunter residency data unavailable 1984-1989

N = Northway

G = Glennallen

T = Tok

C = Chisana

M = McCarthy

Table 3. Comparison of barren ground (migratory) and mountain/woodland (sedentary) caribou antler and body morphology (from studies by Banfield 1961, Bergerud et al. 2008 and Butler 1986.)

| <b>Characteristic</b>              | <b>Barren Ground/Migratory</b>                                                                         | <b>Mountain/Woodland/Sedentary</b>                                                                                |
|------------------------------------|--------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Beam length                        | Long/tall vertical growth                                                                              | Short/compact                                                                                                     |
| Beam shape                         | Long, 'C'-shape w/angle near top                                                                       | Lays parallel to back w/sharp elbow                                                                               |
| Beam cross section                 | Round or slightly oval and smooth                                                                      | Oval with vertical ridges                                                                                         |
| Antler length to body length ratio | Greater                                                                                                | Less                                                                                                              |
| Beam spread                        | Wide                                                                                                   | Narrow                                                                                                            |
| Rear tine                          | Often absent                                                                                           | Present                                                                                                           |
| Antler top                         | Large mass/heavy tops                                                                                  | Smaller/less mass                                                                                                 |
| Brow and bez tine mass             | Smaller, weakly tined                                                                                  | Larger, massive tines                                                                                             |
| Space between brow and bez         | Narrowly spaced                                                                                        | Spaced farther apart                                                                                              |
| Body Size                          | Smaller                                                                                                | Larger                                                                                                            |
| Fighting strategy                  | Fight with tops                                                                                        | Fight with brow, bez tines, often lock                                                                            |
| Calving strategy *                 | Space-away = mass calving, near water or muskeg to escape predators, or scattered in high alpine areas | Space-out = dispersed calving, above timberline away from predator dens in timber and enhanced group watchfulness |
| Wintering strategy                 | Below tree line, areas with low snow cover                                                             | Below tree line, areas with no snow, lichen pastures                                                              |

\* Both kinds of calving behavior (space-away and space-out) can be exhibited by a single caribou herd.



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## FIGURES

Figure 1. Tetlin Refuge map showing historic travel routes, traplines and trapline cabins of Northway elders interviewed in juxtaposition to Chisana caribou radio telemetry data collected from 1988 to 2008. (Map by Scott McGee, USFWS Cartographer, Anchorage.)

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## APPENDICES

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## Traditional Ecological Knowledge (TEK) and Historic Use of Chisana Caribou—Interview Questions

Questions to begin a conversation:

- 1) Did you or someone you know ever hunt Chisana caribou?
- 2) How important were Chisana caribou to you, your family, or the village as a whole?
- 3) In what seasons, where, and how were Chisana caribou hunted?
- 4) What type of firearm or other hunting method was used?
- 5) What methods of butchering and preserving were used?
- 6) Was there a shift to new technologies—rifles, snow machines?

Related, though perhaps less obvious, are questions concerned with the social worlds in which a hunter learned to hunt, and participated in a hunt. Traditional knowledge is shared knowledge, and understanding the social world of hunters is central to understanding their traditional knowledge.

- 7) Who taught you to hunt? Did you hunt with your Father? Uncle? In-laws?
- 8) Were younger people taught to hunt in a group, or as individuals?
- 9) Did the sharing of knowledge occur during a hunt, or was it more general, perhaps during other activities?
- 10) Was meat shared, and with whom?

Other questions explore the physical, social and spiritual worlds of the environment. Many hunters see the environment as alive with *non-human* beings that have their own wills, motivations, languages and kinship systems. Hunters may follow the descriptions and explanations of the environment wherever they lead, especially if they lead in unexpected directions.

- 11) What *physical* characteristics distinguish Chisana from other caribou?
- 12) What are the *social* characteristics that distinguish Chisana from other caribou?

Social characteristics include migratory behavior, but they may also include interpretations of Chisana caribou behavior related to, for example, bull-cow relationships and cow-calf relationships. It is also important to recognize that Chisana caribou are part of the larger human/animal environment, with other humans and other animals playing their parts.

- 13) Are there any special relationships between Chisana caribou and other animals where you live?



Finally, traditional ecological knowledge is forever changing. New technologies result in new ways of hunting and thinking about the environment, just as new social forms—often imposed from without—result in new ways of hunting and thinking about the environment. The imposition of the Refuge itself, with all of the new rules and regulations, inevitably results in the reorganization of local meanings.

Studies of TEK often elevate in importance knowledge from the past, and regard as unimportant knowledge of the present. Yet present ecological knowledge is just as important to understand as past ecological knowledge.

- 14) Are there any recent changes in technology, demographics or lifestyles that may have affected traditional ecological knowledge or traditions?