Species Management Report and Plan ADF&G/DWC/SMR&P–2026–13

Nelchina Caribou Herd Management Report and Plan, Game Management Unit 13:

Report Period 1 July 2017–30 June 2022, and

Plan Period 1 July 2022–30 June 2027

Heidi L. Hatcher

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Alaska Department of Fish and Game Division of Wildlife Conservation

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Species management reports and plans provide information about species that are hunted or trapped and management actions, goals, recommendations for those species, and plans for data collection. Detailed information is prepared for each species every 5 years by the area management biologist for game management units in their areas, who also develops a plan for data collection and species management for the next 5 years. This type of report is not produced for species that are not managed for hunting or trapping or for areas where there is no current or anticipated activity. Unit reports are reviewed and approved for publication by regional management coordinators and are available to the public via the Alaska Department of Fish and Game's public website.

This species management report and plan was reviewed and approved for publication by Todd Rinaldi, Management Coordinator for Region IV for the Division of Wildlife Conservation.

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Cover Photo: Nelchina caribou cows during the early calving season in Unit 13. ©2024 ADF&G. Photo by Heidi Hatcher.

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Purpose of this Report

This report provides a record of survey and inventory management activities for caribou (*Rangifer tarandus*) from the Nelchina caribou herd in Game Management Unit 13 for the 5 regulatory years 2017–2021 and plans for survey and inventory management activities in the next 5 regulatory years, 2022–2026. A regulatory year (RY) begins 1 July and ends 30 June (e.g., RY17 = 1 July 2017–30 June 2018). This report is produced primarily to provide agency staff with data and analysis to help guide and record agency efforts. It is also made available to the public to inform them about wildlife management activities. The Alaska Department of Fish and Game's (ADF&G, the department) Division of Wildlife Conservation (DWC, the division) publishes these reports on a 5-year cycle to document trends and describe potential changes in data collection activities for caribou.

I. RY17–RY21 Management Report

Management Area

Unit 13 encompasses 23,368 mi^2 and includes a large portion of the western Copper River Basin. Other drainages include portions of the Tonsina, Tazlina, Matanuska, Talkeetna, Susitna, Nenana, Gulkana, and Gakona river systems (Fig. 1). Unit 13 also includes portions of the Alaska Range, Chugach, and Saint Elias mountains. Habitat in Unit 13 includes high alpine, tundra, boreal forest, deciduous forest, and riverine wetlands. Unit 13 sustains healthy populations of wolves, Dall sheep, mountain goats, moose, brown bears, black bears, and a plethora of furbearers and small game. Plains bison venture from Unit 11 into Unit 13, and the Nelchina caribou herd spends most of the year (spring, summer, fall, and sometimes a portion of winter) in Unit 13.

Unit 13 is considered the management area for the Nelchina caribou herd because the herd is located in Unit 13 during much of the year; the herd's calving grounds are in Unit 13; and harvest opportunity for Nelchina caribou largely occurs in Unit 13, where the herd is most reliably found during fall caribou hunting seasons.

Additional maps for Unit 13 boundaries and special management areas can be found on the ADF&G website: http://www.adfg.alaska.gov/index.cfm?adfg=maps.main.

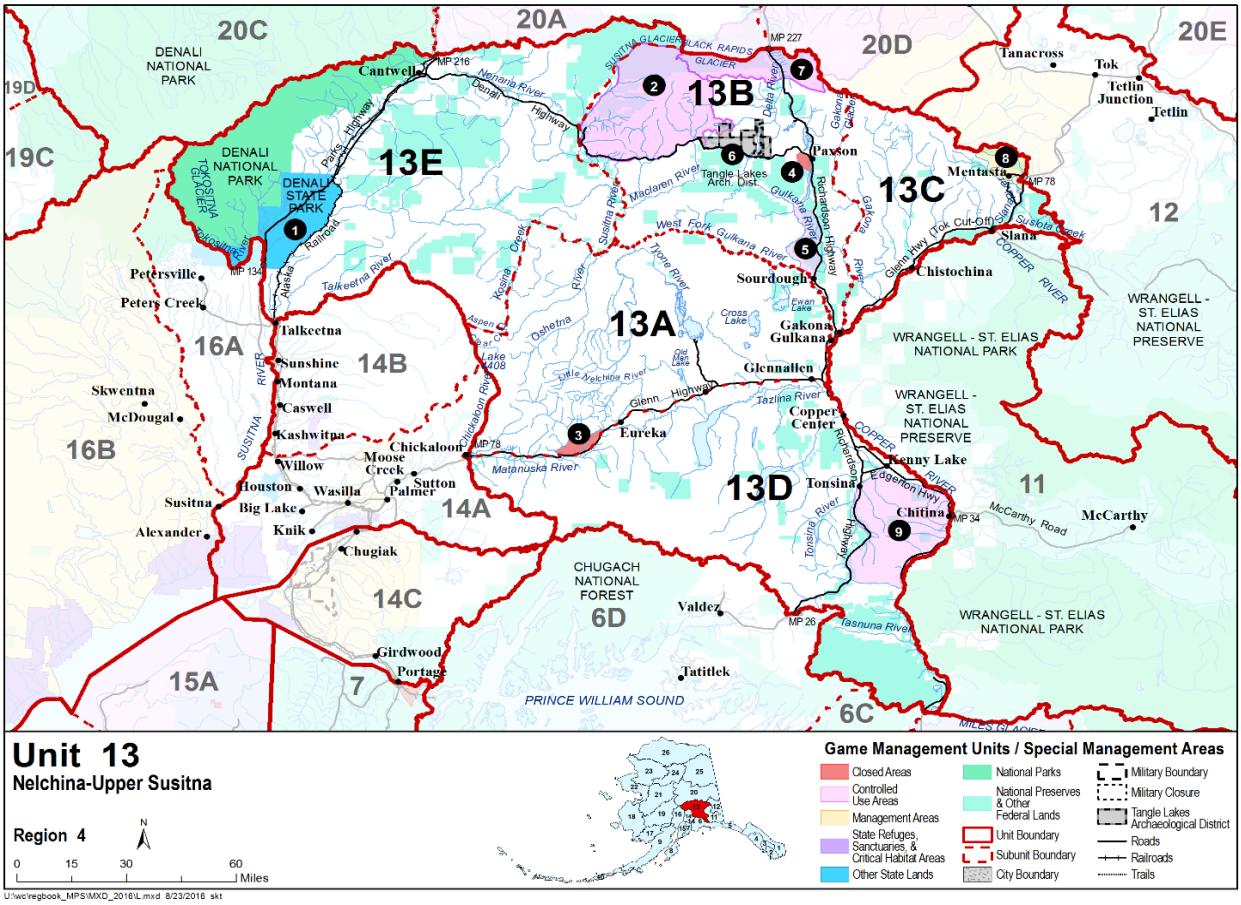

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Figure 1. Game Management Unit 13, Alaska, regulatory years 2017–2021.

Summary of Status, Trend, Management Activities, and History of the Nelchina caribou herd in Unit 13

Typical of caribou herds, the Nelchina caribou herd (NCH) has fluctuated in size over time. Following a peak herd size of about 70,000 animals in the mid-1960s and a decline to less than 10,000 animals in the early 1970s, range assessments were conducted and a strategy was devised to maintain the Nelchina herd below carrying capacity, to minimize herd fluctuations and provide more consistent harvest opportunities over time (Pegau and Hemming 1972, Pegau 1975, Pitcher 1990). As a result, since the late 1990s the annual population abundance objective for the herd has been 35,000–40,000 animals after the completion of the fall hunting period. Harvest quotas have been developed annually with the intent of achieving maximum sustained yield while maintaining a relatively stable herd size, according to the bounds of the abundance objective.

The NCH is important to large numbers of hunters because of its accessibility and proximity to large urban areas on the road system as well as to residents of the Copper River Basin. The herd has a long history as a source of subsistence opportunity for local and nonlocal residents, and caribou hunting permits have been issued for the Nelchina caribou herd since before statehood. Harvest permits have been issued by both state and federal agencies through joint management

of Nelchina caribou since RY90. Nelchina caribou are sometimes harvested in the Fortymile caribou registration hunt in Unit 20; consequently, portions of the Unit 20 hunt may be closed when Nelchina caribou move into the area if Nelchina quotas for that season have already been achieved. Federally qualified subsistence hunters target Nelchina caribou on federal lands when they migrate across the Richardson Highway in Unit 13 and when the herd is migrating through or wintering on Tetlin National Wildlife Refuge lands in Unit 12. Beginning in the late 2000s, the Board of Game established Nelchina caribou hunting opportunity through a Community Subsistence Harvest hunt structure, in addition to more typical registration hunts. A number of draw hunt opportunities have been added since then as well. The allowable harvest fluctuates annually depending on herd status. From 1990 to the early 2020s, herd management has resulted in the harvest of more than 96,000 caribou from the NCH thus far, with an average of more than 2,750 caribou per year.

Beginning in RY10 the NCH exceeded the abundance objective (35,000–40,000 caribou in the post-fall-hunt population) and experienced above average productivity most years through RY19. In response to the increase in herd size, harvest strategies were developed to maximize harvest and attempt to lower herd abundance to within the objective. These harvest strategies were similar to those used during a peak in abundance in the late 1990s. After a decade of increased harvest in the 2010s, which included a complex series of modifications to regulations and harvest framework through the Board of Game process, the herd's fall population was slightly lower than the abundance objective in RY20. The reduction strategy was then converted to a maintenance strategy with decreased harvest to maintain the herd within the objective in RY21. Following this, a series of deep-snow winters beginning in RY21 precipitated a decline in adult survival and calf recruitment, resulting in a sharp decline in abundance over a period of 1.5 years despite significant harvest restrictions and closures during that time (January 2022 through June 2023).

Management Direction

Since the late 1990s, the management direction for the Nelchina herd has been to provide long-term sustainable and predictable harvest by minimizing the typical boom-and-bust cycles observed in caribou herds. Management of this herd aims to maintain the herd below the carrying capacity of the herd's range through hunter harvest. While the overall management direction is valid, the herd population and composition objectives were established in an experimental fashion for a dynamic population and may warrant adjustment if the overall management intention cannot be achieved under the current objective framework (Lieb et al. 1988).

Existing Wildlife Management Plans

There are no existing formal wildlife management plans for Nelchina caribou.

Goals

- To provide the greatest opportunity to participate in caribou hunting.
- To provide for an optimum sustainable harvest of caribou.

CODIFIED OBJECTIVES

- Maintain a population of 35,000–40,000 caribou.
- Provide for an annual harvest of 3,000–6,000 caribou.

Amounts Reasonably Necessary for Subsistence Uses

The Board of Game (board) established a positive customary and traditional use determination for the NCH in Units 12 and 13. The current amount reasonably necessary for subsistence (ANS) was determined by the board to be 600–1,000 caribou, effective 1 July 2009.

Intensive Management

The NCH has been identified by the Board of Game as important for providing high levels of harvest for human consumptive use (positive finding); an abundance objective of 35,000–40,000 and a harvest objective of 3,000–6,000 caribou were established by the board.

MANAGEMENT OBJECTIVES

The NCH is managed based on the codified population and harvest objectives established by the Alaska Board of Game, as noted above. Based on the history of Nelchina herd management, the population objective is considered a post-fall-hunt objective. Additional management objectives are to maintain minimum bull-to-cow and calf-to-cow ratios of 40:100 after the fall hunt. It is important to note that a post-fall-hunt population of 35,000–40,000 caribou allows for roughly 50,000 caribou to use the spring–summer range prior to the hunting season each year, if the established objectives are achieved (harvest of 3,000–6,000 caribou annually with ratios of 40 calves and 40 bulls per 100 cows in the remaining population after the fall hunt).

MANAGEMENT ACTIVITIES

Assessing population status and trends, monitoring harvest and mortality, and assessing habitat conditions are integral components of Nelchina caribou management programs. Survey and inventory management activities are used to monitor sustained-yield management of the Nelchina caribou population and are described below.

1. Population Status and Trend

ACTIVITY 1.1. Monitor and evaluate caribou abundance and herd composition.

Data Needs

Since the late 1990s, the department has attempted to manage the NCH near maximum sustained yield. This management strategy proves difficult when annual composition or count data are inaccurate or unattainable. With inaccurate data the annual harvest quota may be set too high or too low and corrections must be made in subsequent years. Caribou abundance and herd composition data are necessary for determining population status in relation to management

objectives and for determining annual harvestable surplus to develop appropriate harvest quotas prior to the hunt.

Methods

NCH aerial counts are conducted in late June or early July as conditions allow. A stretch of warm, sunny weather during this time generally results in postcalving aggregations in open areas allowing for an aerial survey. Preceding these aggregations, fix-rates on Global Position System (GPS) collars increase, and flights are conducted regularly beginning in late June to monitor the herd. If aggregations are sufficiently tight and in photographable areas, a photo survey can be conducted with a photoplane. A photo survey seeks to document all caribou groups that include radiocollars, and if caribou are well aggregated then a Rivest estimate may be produced using group size and the number of collars per group, in addition to a minimum count (Rivest et al. 1998). If conditions are not sufficient to derive a Rivest estimate but caribou are distributed in small, scattered groups, a traditional minimum count may be conducted. Traditional minimum counts are performed with fixed-wing aircraft, utilizing experienced pilots and observers adept at spotting and counting or photographing caribou groups. Survey location is dependent upon the distribution of the herd at the time of the survey. Survey areas are assigned to individual aircraft. Pilot-observer teams search their assigned areas intensively for caribou which are documented via waypoints, datasheets, and digital cameras to confirm group sizes. If a successful survey is not achieved then a summer estimate is modeled using the best available data including previous fall estimate, overwinter mortality data for adults and calves, and spring parturition data.

NCH composition surveys are conducted immediately prior to or immediately following summer minimum counts or photo survey attempts, and again in the fall. This composition survey protocol determines the base number of summer cows and fall bull-to-cow ratios, as well as summer and fall calf-to-cow ratios to estimate early calf survival. Herd composition surveys are conducted via helicopter, with an experienced pilot and observer flying over groups of caribou to identify individuals as calf, cow, or bull. Bulls are further classified by antler size (small, medium, or large) during the fall survey. A fixed-wing spotter plane is used to guide the helicopter across the full distribution of the herd and ensure that no groups of caribou are counted twice. The observer conducting the composition survey records observations with a digital voice recorder. An additional observer records composition data on a paper form throughout the survey. Survey location is dependent upon the distribution of the herd at the time of the survey. An effort is made to sample caribou groups at different locations to represent the spatial distribution of the herd and minimize bias that can be caused by sexual segregation. A minimum of 10% of the expected population is a desirable sample size for each composition survey (Valkenburg et al. 2016).

Annual fall population estimates are derived by subtracting cow harvest from the summer cow base (determined by summer census and composition survey) to determine a base number for the fall cow population. The bull-to-cow ratio observed in the fall composition survey is used in conjunction with the fall cow base to determine the fall bull estimate, and the same is done with the calf-to-cow ratio to estimate the number of calves. The fall population estimate is necessary to determine if there is harvestable surplus available for the winter hunt that year. These data are also necessary to model population trajectories and estimate the harvestable surplus that may be available the following year.

Results and Discussion

Herd composition data and fall abundance estimates for calendar years 2017–2021 are reported in Table 1. Caribou did not aggregate sufficiently in calendar years 2017 or 2020 to conduct a summer count; fall abundance estimates were modeled for those years using the best available data. Fall estimates are typically less than summer estimates and summer minimum counts, as fall estimates consider fall harvest as well as the lower calf-to-cow ratios documented in the fall composition survey compared to the summer composition survey.

Table 1. Fall composition counts and estimated herd size, Nelchina caribou herd, Alaska, calendar years 2017–2021.

Year	Summer calves: 100 cows	Fall calves: 100 cows	Summer cows (%)	Fall bulls: 100 cows	Fall composition sample size	Estimate of fall herd size
2017[a]	54	35	50	35	2,625	40,123
2018	34	20	59	40	5,120	33,229
2019	65	41	52	32	4,791	46,528
2020[b]	–	17	–	28	4,036	34,526
2021	59	45	53	38	3,369	35,488

[a] A summer count was not conducted in 2017; the fall estimate was modeled using best available data.
[b] A summer count and summer composition survey were not conducted in 2020; the fall estimate was modeled using best available data.

Fall herd size can fluctuate from year to year due to many factors, including but not limited to strong or poor aggregation of caribou when the summer count is conducted, temporary emigration or immigration between herds, and variability in productivity and early calf survival. Among these, the latter is frequently the most significant driver of substantial fluctuations in fall herd size, as changes in cow productivity and early calf survival affect the number of calves on the landscape during the summer count. Fig. 2 provides a visual representation of the breakdown between adults and calves for the fall estimates from RY10 (the first time the herd was documented to exceed the abundance objective since RY96) to the end of this reporting period in RY21.

With a recent history of high production and fall abundance estimates above the objective most years since RY10, a reduction strategy was implemented during this reporting period in RY17, RY19, and RY20. Even with increased harvest, a minimum count of over 53,000 caribou was documented in summer 2019. The adult portion of the herd continued to exceed the fall abundance objective until RY20, after which the reduction strategy was no longer needed. For RY21 a maintenance strategy was adopted, with decreased harvest to stabilize the herd.

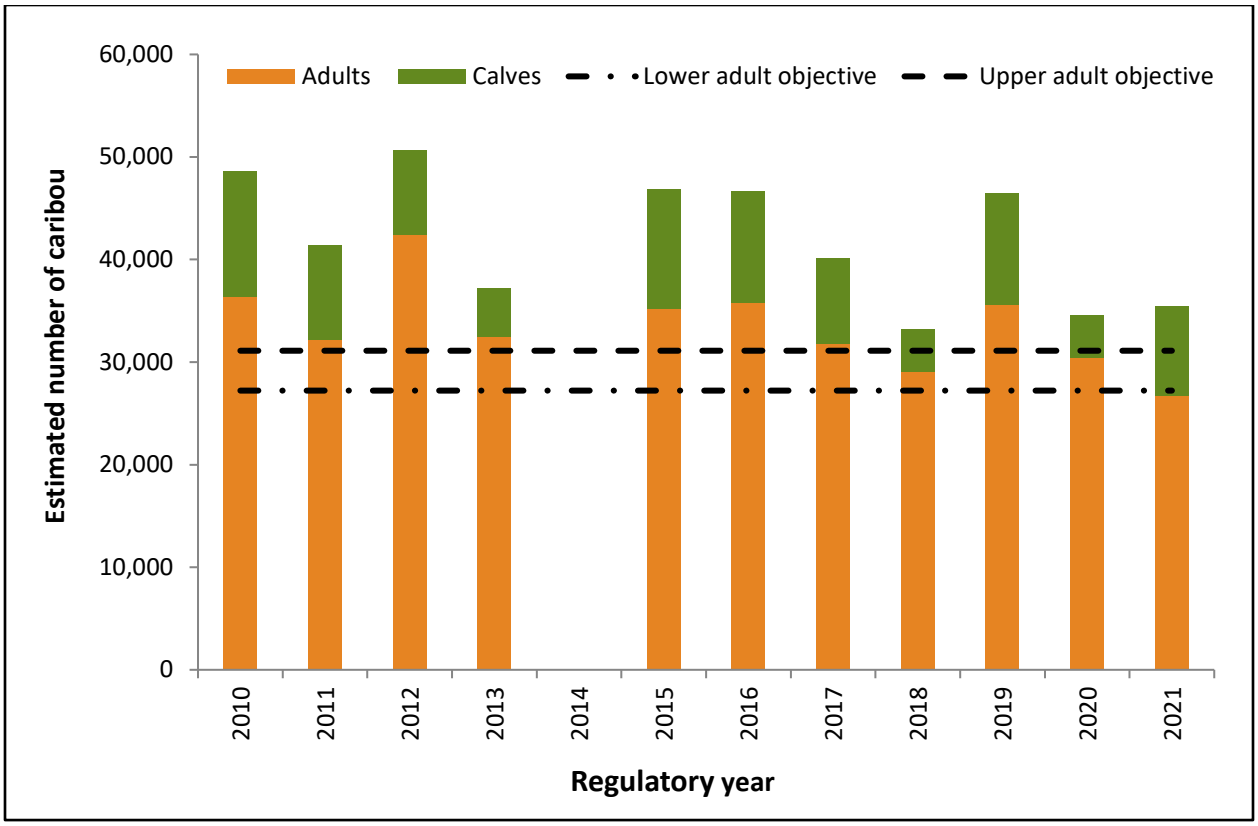


Figure 2. Fall estimate of adult and calf caribou abundance, Nelchina caribou herd, Alaska, regulatory years 2010–2021.

Recommendations for Activity 1.1

Modify.

Historically, traditional minimum counts have been conducted by pilot-observer pairs estimating group sizes from the air as caribou groups are documented during an intensive search of a designated area. The increased use of digital single-lens reflex (DSLR) cameras in recent years by observers in Super Cubs has provided the opportunity to compare pilot and observer estimates with actual counts in photos after the survey. For groups of caribou that are too large to feasibly count individual caribou from the plane (generally >25 caribou), pilot-observer pairs typically underestimate group size by 10–50%. Average accuracy varies by pilot-observer pair, but for all pilot-observer pairs the differences between estimates and actual group sizes tend to increase as the aggregate group sizes increase. This explains why conditions for a photo survey (maximum group sizes) are not appropriate conditions for a traditional minimum count without assistance from a designated photoplane; smaller groups scattered across the landscape are more conducive to a more meaningful count using the traditional count method, and even then photo assistance is necessary, whether from a hand-held DSLR in the Super Cub or with a photoplane in the area to capture larger groups. Hand-held DSLR cameras will now be standard for documenting group sizes during traditional minimum counts, and when available a photoplane will be utilized to document groups that are too large to effectively photograph from a Super Cub, even when aggregation is not sufficient to document all groups with a photoplane.

ACTIVITY 1.2. Maintain a pool of management collars within the herd.

Data Needs

A management collar is a collar fitted onto an animal that allows tracking of the animal via radio (VHF), satellite (GPS), or both. Collars aid in locating and assessing distribution of the NCH, which is crucial to the success of annual survey and inventory efforts (Activities 1.1 and 2.1). Collars also provide a means of evaluating parturition rates of known-age females annually (Activity 3.1). Calf weights and morphometric measurements gathered during collar deployment efforts provide indices by which overall herd health and habitat conditions can be monitored (Activity 3.1).

Methods

Captures via helicopter-darting chemical immobilization are conducted annually and follow protocols approved by the Institutional Animal Care and Use Committee (IACUC). Captures typically occur during the first week of October, when calves are 4-months old and the fall caribou hunting season has closed. During these capture events the goal is to target a minimum of 20 female calves of the year for deployment of VHF collars. Weights and morphometric data (mandible and metatarsus length) are collected from the 4-month-old calves, and these data are analyzed and reported under Activity 3.1. Adults are captured as needed to maintain a pool of GPS collars and replace old collars before the battery life is depleted. The goal is to spread captures across the geographical distribution of the herd during the capture period, but uncontrollable factors such as weather, habitat, animal behavior, or logistical constraints sometimes impede this goal. Proper distribution of collars is required to ensure success of survey efforts (Activity 1.1) and mortality monitoring (Activity 2.1).

Results and Discussion

Caribou collar deployments and collar retrievals for RY17–RY21 are reported in Table 2. Collar retrieval efforts were not included in the RY17–RY21 plan (Hatcher and Robbins 2021). GPS collar deployments increased during this reporting period as specific funding was secured to maintain a GPS collar pool because the old GPS collars from Susistna-Watana Hydroelectric Project studies were reaching the end of their functional lifespan.

Table 2. Management collar deployments and retrievals, Nelchina caribou herd, Alaska, calendar years 2017–2021.

Year	VHF collars deployed on 4-month-old females	GPS collars deployed on adult females	GPS collars deployed on adult males	Caribou collars retrieved from the field
2017	21	0	0	9
2018	20	0	0	26
2019	20	0	0	58
2020	21	20	0	23
2021	20	16	19	21

Annual and overwinter mortality data collected from the pool of collared animals are discussed in Activity 2.1. Data collected from 4-month-old calves during these deployment efforts are discussed in Activity 3.1.

Recommendations for Activity 1.2

Modify.

Presence-absence data were collected for antlers on 4-month-old calves during capture events prior to RY13, but collection of these data ceased in RY13 and following years. Antler data for 4-month-old calves may provide an additional nutrition-related index and collection of these data should be reinstated during capture efforts for review under Activity 3.1. Antlers require energy to grow and in other cervids antler growth during the first year has been linked to nutrition in utero, postnatal nutrition, and nutrition after the neonatal period (Dryden 2016). The proportion of polled (antlerless) female caribou on the landscape has shown an inverse relationship with range quality in caribou herds in Greenland (Thing et al. 1986).

Mortality data collected from regular checks of collared animals were not summarized nor regularly reported in previous reports and were not included in the plan for the RY17–RY21 reporting period. However, these data were collected during collar check flights and have been included in this report under Activity 2.1, although the frequency of collar check flights were inconsistent across portions of this reporting period. Mortality data from collar checks should continue to be collected, summarized, and reported, and the frequency of these collar checks should be standardized when more resources are available. A full roundup of collars should occur at the following intervals: in May prior to parturition surveys, in June or July prior to and during the abundance survey, in late September prior to capture and composition efforts, and at least once a month during the winter period (November through April).

Collar retrieval efforts have not been a regularly conducted activity for NCH, nor has this activity been included in previous plans or reports, but these efforts are necessary and should be conducted annually to confirm dropped collars and true mortalities, as well as to maintain clear airwaves to ensure continuation of collaring efforts into the future. Coordination of retrieval efforts with other offices and agencies will maximize the efficiency of these efforts. Collar retrieval efforts were conducted more regularly during this reporting period and thus were included in the report and will be added to the following planning period.

2. Mortality-Harvest Monitoring and Regulations

ACTIVITY 2.1. Monitor and analyze harvest and other mortality data.

Data Needs

The Alaska Board of Game has identified the Nelchina caribou herd as important for providing high levels of harvest for human consumptive use and established an annual harvest objective of 3,000–6,000 animals. The Board of Game also established an amount necessary for subsistence (ANS) of 600–1,000. Annual harvest tracking is necessary to examine harvest relative to the objective, to help direct future harvest strategies, and to ensure a sustained yield harvest. Monitoring harvest is also essential to inform the regulatory process. In-season harvest

monitoring is necessary for in-season management actions such as emergency closures when quotas are met, or season extensions when additional harvest is warranted. The harvest strategy for NCH is to achieve harvest quotas during the fall season, as the herd often migrates out of Unit 13 after the fall season and additional harvest may be difficult to achieve during the winter season. If harvestable surplus remains available after the fall season, winter seasons will remain open, but hunters may have varied opportunities for success, depending on the behavior of the herd. Harvest reports are important for understanding hunter effort and success. Tracking other sources of human-caused mortality such as vehicle collisions is also necessary to maintain a holistic understanding of human impacts on herd population trends.

Methods

Individuals who obtain a Unit 13 caribou permit from ADF&G are required to report on their permit after successful harvest, or after the end of the season for those who did not hunt or whose hunts were unsuccessful. Failure to report results in reminders and eventual penalty. Hunt reports are recorded in ADF&G's Wildlife Information Network (WinfoNet) harvest database, and include information regarding hunter residency, success, effort, hunt location, date of kill, sex of caribou, transportation used, and commercial services used. Reports are received by telephone, online, or via mail on a harvest report card.

Nelchina caribou harvest achieved on RC867 permits in the Fortymile hunt area are determined based on harvest location and respective herd movements, and these harvests are reported to Nelchina caribou management biologists by Tok ADF&G staff.

Additional harvest opportunity for Nelchina caribou is available for federally qualified subsistence users via federal permits issued by the Bureau of Land Management (BLM) for Unit 13, the National Park Service (NPS) for Unit 11, and Tetlin National Wildlife Refuge (U.S. Fish and Wildlife Service; USFWS) for Unit 12. Federal harvest information is retrieved by state wildlife managers from the Alaska Federal Subsistence Program database or federal agencies directly once the information becomes available. Harvest opportunity for Nelchina caribou is available in Yukon, Canada in years when the herd migrates out of Alaska during the winter. Estimated harvest in Yukon is reported by Government of Yukon to Nelchina herd management biologists in Alaska. The number of road-killed caribou that are salvaged by charities in Unit 13 is recorded by MATCOM Public Safety Dispatch and provided to ADF&G bimonthly.

Collars deployed on caribou during Activity 1.2 are tracked throughout the year. This collar pool provides an estimate of mortality rates for the represented portion of the herd. All sources of mortality are generally captured in the estimate of mortality rates, although specific sources of mortality are not typically identified. Mortality that is not captured would include incidents that incapacitate the radio transmission in the collar; in such cases the collar would be censored from the pool.

Seasons and Bag Limits

Seasons and bag limits were changed by Board of Game action and emergency orders throughout this reporting period. The overarching frameworks that were in regulation for harvest opportunities for NCH in RY17–RY21 are listed below.

Regulatory year	Unit 13 State hunt	Bag limit	Resident seasons	Nonresident seasons
2017–2021	CC001	1 caribou per household; a second caribou may be announced	10 Aug–20 Sep 21 Oct–31 Mar	Resident only
	DC485	1 caribou	10 Aug–20 Sep 21 Oct–31 Mar	Resident only
2017 only	RC566	1 caribou per household; a second caribou may be announced	10 Aug–20 Sep 21 Oct–31 Mar	Resident only
2018–2021	RC561	1 caribou per household; a second caribou may be announced	10–31 Aug 21 Oct–31 Mar	Resident only
	RC562		1–20 Sep 21 Oct–31 Mar	Resident only
2019–2021	YC495	1 caribou	1–5 Aug	Resident only
	DC475	1 bull	Nonresident only	20 Aug–20 Sep

Regulatory year	Federal hunt	Bag limit	Seasons for federally qualified subsistence users
2017–2021	Unit 13 FC1302	2 caribou in 13A/13B; 2 bulls in Unit 13 remainder	1 Aug–30 Sep 21 Oct–31 Mar
	Unit 12 FC1202	1 caribou	Winter season to be announced (1 Oct–30 Apr)

Results and Discussion

Harvest by Hunters

NCH harvest varies annually depending on hunter participation, caribou movements, quotas set according to harvestable surplus, and herd management strategies in relation to the established

abundance objective (reduction, maintenance, or herd growth strategies). Total reported NCH harvest by hunters in Alaska and Yukon is outlined in Table 3, which includes reported harvest that occurred outside of the regulatory framework described above, such as caribou harvested in Unit 13 without a proper permit. This reporting period included reduction strategies implemented in RY17, RY19, and RY20, as well as maintenance strategies implemented in RY18 and RY21. Very similar harvest strategies were used to arrest herd growth and decrease the size of the herd in RY90–RY99, when the herd displayed similar abundance and productivity metrics seen during recent years (Abbott 1993, Hicks 1997, Healy 2001).

Table 3. Reported harvest, Nelchina caribou herd, Alaska and Yukon, regulatory years 2017–2021.

Regulatory year	Bulls harvested	Cows harvested	Unknown sex	Total harvest
2017	2,660	2,252	8	4,920
2018	1,724	160	3	1,887
2019	1,653	1,233	6	2,892
2020	2,124	2,009	2	4,135
2021	853	907	1	1,761
Average	1,803	1,312	4	3,119

Permit Hunts

Nelchina caribou harvest in Alaska is restricted through permitted hunts as described in the regulatory framework outlined in the *Seasons and Bag Limits* section.

Federal subsistence harvest permits are available only to local federally qualified subsistence users, and these hunters are also qualified to participate in state harvest opportunities for Nelchina caribou. Federal subsistence hunt permit, hunter, and harvest data are provided by BLM and Tetlin National Wildlife Refuge, and these data are summarized in Table 4.

State subsistence harvest permits during RY17–RY21 were available to hunters under two different Tier I hunt structures that provide for the individual and communal patterns of use for Nelchina caribou, as identified by the Board of Game. Hunts RC566, RC561, and RC562 are open to all Alaska residents and are designed to provide for the individual pattern of use. These are household permits that must be applied for in the November–December application period prior to the fall hunting season of interest. All household members agree to only hunt in Unit 13 for moose and caribou. All qualified households that agree to the permit conditions are guaranteed a permit, and there is no limit to the number of permits that may be issued. The communal pattern of use identified by the Board of Game is addressed within the CC001 hunt structure, which has a series of hunt conditions, including a 2-year commitment as well as a commitment for all household members to only hunt in Unit 13 for caribou, although they can hunt within the entire Copper Basin Community Subsistence Harvest hunt area for moose. CC001 is open to all Alaska residents that commit to the hunt conditions and apply to be part of an established Community Subsistence Harvest hunt group that includes at least 25 members. There is no limit to the number of permits that can be issued under the CC001 hunt structure, but the Board of Game designated a limit to the total number of caribou that could be taken under the

CC001 hunt structure (up to 300 for RY17 and up to 400 for RY18 and subsequent years). State subsistence permits, hunters, and harvest are summarized in Table 5.

Table 4. Federal subsistence permit hunts, Nelchina caribou herd, Alaska, regulatory years 2017–2021.

Hunt number	Regulatory year	Permits issued	Permits hunted	Bulls harvested	Cows harvested	Unknown sex	Total harvest	Hunter success (%)
FC1302	2017	3,071	1,526	208	148	2	358	23
	2018	3,082	1,433	232	135	3	370	26
	2019	2,787	900	80	21	1	102	11
	2020	2,916	1,195	193	112	1	306	26
	2021	2,606	945	149	71	0	220	23
FC1202	2017	128	36	6	4	0	10	28
	2018	88	43	12	1	0	13	30
	2019	158	96	21	33	1	55	57
	2020	149	79	26	33	0	59	75
	2021	130	61	16	11	1	28	46

Table 5. State subsistence permit hunts, Nelchina caribou herd, Alaska, regulatory years 2017–2021.

Hunt number	Regulatory year	Permits issued	Permits hunted	Bulls harvested	Cows harvested	Unknown sex	Total harvest	Hunter success (%)
RC566	2017	8,444	5,219	1,487	1,243	3	2,733	52
RC561	2018	4,586	1,796	523	9	0	532	30
	2019	2,788	1,748	552	559	1	1,112	64
	2020	3,066	1,937	546	613	1	1,160	60
	2021	2,919	1,030	184	304	0	488	47
RC562	2018	4,181	2,081	521	7	0	528	25
	2019	2,886	1,792	653	405	2	1,060	59
	2020	3,825	2,536	736	618	0	1,354	53
	2021	4,181	1,643	239	250	0	489	30
CC001	2017	1,004	484	138	122	2	262	54
	2018	838	382	164	4	0	168	44
	2019	811	406	153	102	1	256	63
	2020	818	476	138	156	0	294	62
	2021	909	381	99	79	0	178	47

Additional harvest opportunity is available to Alaska residents under draw permits DC485 and YC495. These draw permits do not restrict hunters to hunting moose and caribou in Unit 13 only but have more limited season dates and bag limits. Limited hunting opportunity is also made available to nonresidents through draw permit DC475 when the herd is above the abundance objective. All draw hunt permits, hunters, and harvest are summarized in Table 6.

Table 6. State draw permit hunts, Nelchina caribou herd, Alaska, regulatory years 2017–2021.

Hunt number	Regulatory year	Permits issued	Permits hunted	Bulls harvested	Cows harvested	Unknown sex	Total harvest	Hunter success (%)
DC485	2017	4,998	3,055	802	731	1	1,534	50
	2018	5,000	1,219	257	3	0	260	21
	2019	399	261	99	73	0	172	66
	2020	2,000	1,320	397	422	0	819	62
	2021	2,000	649	105	165	0	270	42
YC495	2019	200	147	76	37	0	113	77
	2020	200	155	67	45	0	112	72
	2021	200	147	31	27	0	58	39
DC475	2020	50	26	12	0	0	12	46
	2021	50	35	18	0	0	18	51

Harvest Chronology

Harvest chronology varies annually based on seasonal variation in caribou behavior and migratory patterns, as well as annual changes to season dates when quotas are met or when additional harvest is needed to curtail the growth of the herd and hunting opportunity may be expanded. This chronology of harvest is heavily impacted by the season dates for the permit chosen by the individual hunter, especially for RY18–RY21, when hunters could choose August or September registration permits (RC561 or RC562). The management approach aims to achieve harvest objectives during the fall hunting seasons, as additional harvest is difficult to achieve after the herd migrates out of Unit 13. Migratory patterns cannot be predicted from one year to the next. The chronology of reported Nelchina harvest dates, for all state hunts combined, is outlined in Table 7 for RY17–RY21.

Transport Methods

The most popular form of transportation for successful Nelchina caribou hunters is all-terrain vehicles (ATVs) and off-road vehicles (ORVs), with the next most popular method of accessing the hunt area being highway vehicles (Table 8).

Table 7. State harvest chronology by month, Nelchina caribou herd, Alaska, regulatory years 2017–2021.

Regulatory year	Percentage of annual harvest								Harvest[a]
	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	
2017	38	48	5	2	1	2	1	3	4,522
2018	58	38	2	1	0	0	0	1	1,487
2019	46	46	3	1	0	0	2	2	2,710
2020	33	34	8	8	8	9	0	0	3,749
2021	63	37	0	0	0	0	0	0	1,501

Note: Chronology is influenced by season dates of the permit chosen by the hunter, as noted in the *Seasons and Bag Limits* section.

[a] Harvest data are from harvest reports that included date of kill information.

Table 8. State harvest by transportation type, Nelchina caribou herd, Alaska, regulatory years 2017–2021.

Regulatory year	Percentage of annual harvest						Harvest[b]
	Airplane	Boat	ATV/ORV[a]	Snowmachine	Highway vehicle	Other	
2017	3	9	50	7	29	2	4,514
2018	6	12	56	1	22	3	1,477
2019	3	6	57	3	26	4	2,705
2020	4	5	45	13	30	3	3,746
2021	5	8	64	0	20	4	1,500

[a] ATV stands for all-terrain vehicle and ORV stands for off-road vehicle.

[b] Harvest data are from harvest reports that included transportation information.

Other Mortality

Human-Caused Mortality

Additional sources of human-caused mortality include unpermitted harvest, wounding loss associated with hunting activities, incidental catch of caribou in traplines, caribou-vehicle collisions on highways, and caribou-train collisions on the railway.

The Department of Public Safety provides ADF&G with the number of caribou that are received by charities in Unit 13, which may include caribou struck by vehicles or surrendered to the Alaska Wildlife Troopers. These data are summarized in Table 9. No railway collisions with caribou were reported by the Alaska Railroad in Unit 13 for this reporting period. Wounding loss cannot be accurately estimated and likely varies annually with herd behavior and season dates. Incidental catch of caribou on traplines occurs when trappers are active in caribou wintering areas and incidental catch must be reported to ADF&G, but it is rare for trappers to comply with this requirement and most incidental catch goes unreported. While some sources of human-caused mortality cannot be accurately quantified, mortality rates captured through tracking the overall collar pool generally include all sources of human-caused and natural mortality.

Table 9. Caribou received by charities, Nelchina caribou herd, Alaska, regulatory years 2017–2021.

Regulatory year	Caribou received by charities
2017	4
2018	1
2019	7
2020	6
2021	7

Other Sources of Mortality

Caribou are at highest risk of mortality during the neonatal period, which biologists consider to be the first 15 days of life (Adams et al. 1995b). Mortality risk for calves during the neonatal period may be impacted by a number of interrelated factors such as the age of the dam (Adams 2005); nutritional condition of the dam at time of conception (Skogland 1983); nutritional condition of the dam during gestation (Adams 2005); winter severity (Adams et al 1995b, Adams 2003); timing of birth (Guinness et al. 1978, Adams et al. 1995b, Vuillaume et al. 2023); birth weight (Guinness et al. 1978, Adams et al. 1995a, Sams et al. 1996, Adams 2005); physical abnormalities (Roffe 1993, McKenzie 2018); maternal behavior (Roffe 1993, Nevard et al. 2023); nutritional availability for the dam during lactation (Skogland 1984); effectiveness of lactation and passive transfer of immunity (Roffe 1993, Sams et al. 1996, Nevard et al. 2023); extreme ambient temperatures or stochastic weather events after birth (Vuillaume et al. 2023); rate of calf development (Skogland 1984, Adams 2003, Butler et al. 2007); calving terrain (Gharajehdaghipour et al. 2025); predation pressure (Dale et al. 1994, Brockman et al. 2017, Adams et al. 2019, Gharajehdaghipour et al. 2025); and availability of other prey species (Van Ballenberghe 1985). When predation is primarily compensatory for adult cow caribou, predation of calves is likely similarly compensatory, with other factors listed above predisposing calves to mortality (Bender 2018).

Predation pressure on the calving grounds has likely declined over the history of Nelchina herd management. Brown bear management specifics can be found in the most recent Unit 13 *Brown Bear Management Report and Plan* (Hatcher 2023). Wolf management specifics can be found in the most recent Unit 13 *Wolf Management Report and Plan* (Hepler and Hatcher 2025). Overall wolf abundance is maintained at a relatively low level in Unit 13 due to the intensive management plan for moose in that area. The spring wolf minimum abundance estimate in Unit 13 was 250 wolves in RY17 (spring 2018), after which wolf control was activated to bring the RY18 unitwide spring wolf estimate (spring 2019) to 168 wolves. For RY19–RY21 the Unit 13 spring wolf estimate ranged from 126 to 161 wolves, with wolf control activated intermittently during that period. Wolf control programs also exist for portions of the Nelchina wintering grounds, specifically in Unit 20E to benefit moose and caribou populations in that area. Wolf control programs do not exist on federal lands, which the NCH uses during some winters, but many of those areas have active and successful wolf trappers when winter trapping conditions allow. With bear and wolf abundance maintained at relatively low levels, if there are years when summer calf-to-cow ratios suggest high calf mortality that cannot be easily explained by factors such as stochastic weather events, and predation pressure is not expected to have increased, it may become necessary to identify causes and rates of early calf mortality, as well as collect

neonatal calf weights or data relative to dam nutritional condition to determine if nutritional limitations may be affecting early calf mortality.

For the NCH, with a management strategy that was designed to avoid density-driven resource limitations, it is especially important to avoid nutritional limitations that could negatively impact calf survival and recruitment, adult survival, or both. Parturition data combined with summer and fall calf-to-cow ratios provide insight into approximate calf mortality levels, but causes and specific rates of mortality were not identified during this reporting period. Calendar years 2017, 2018, and 2019 showed large differences between summer and fall calf-to-cow ratios, suggesting relatively high mortality of calves over the summer despite wolf removal over the winter of 2018–2019. (Table 1). Low calf-to-cow ratios in calendar years 2018 and 2020 are indicative of either low productivity, high calf mortality, or a combination of the two; this coincides with low detection of parturition in the spring periods for those years (see activity 3.1). The oscillation between high calf-to-cow ratios in calendar years 2017, 2019, and 2021 and low calf-to-cow ratios in 2018 and 2020—prior to the occurrence of the severe winter of 2021–2022—is concerning, especially given the activation of wolf control in Unit 13 during that time. These trends suggest that cows may have been skipping years of effective productivity, which is consistent with parturition detection data for individual collared cows and further supported the decision to reduce the herd to within the abundance objective in an effort to avoid exacerbating the potential for population-level effects driven by nutritional limitations.

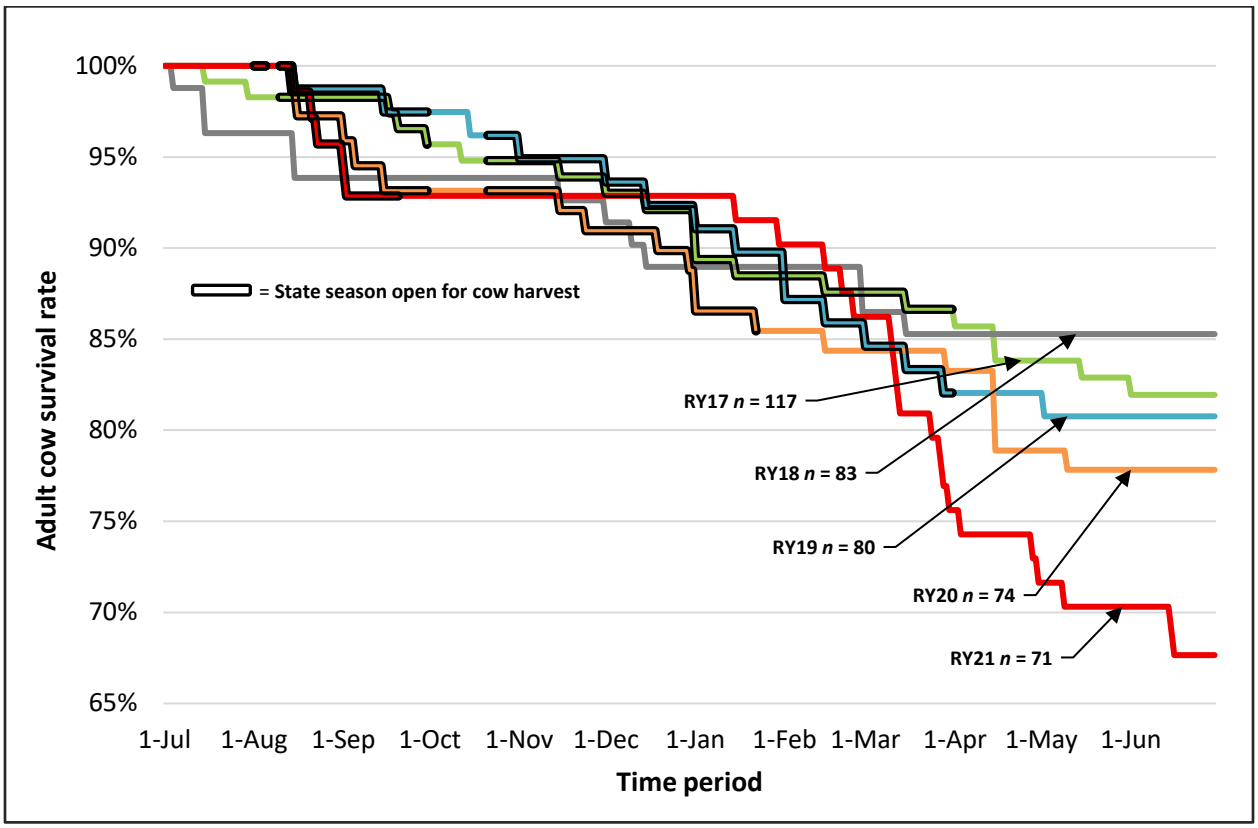
Collar Mortality Data

Kaplan-Meier survival curves (Figs. 3–5) were generated from collar mortality data, taking into account collars that were added or censored from the pool throughout the period in question, but collar check flights must be conducted regularly to provide a reasonable approximation of mortality over time. This information is helpful to assess periods of higher mortality rates, which may reflect challenges faced by the herd throughout the year (e.g., hunter harvest, difficult river crossings during migration, different predation pressure across the range, or exhausting energy reserves as the winter season progresses toward spring).

Fig. 3 presents Kaplan-Meier survival curves derived for the adult cow collar pool for each regulatory year. RY17 did not have regular collar checks throughout the winter. RY18 and RY19 had more frequent collar checks but still did not cover every month from October to July. RY20 and RY21 had the most frequent collar checks. For all years, regardless of frequency of collar checks, the number of caribou found dead at a particular collar check are equally spaced temporally between the last time heard alive and the date found dead. An exception to this method is made when locations of collars give specific clues as to the likely time period for mortality to have occurred, based on seasonal movements of the herd. When collars are retrieved the following spring, evidence at the site is used to confirm whether the caribou died or the collar slipped off, the latter of which is rare. In cases where evidence suggests the collar slipped off the animal, that collar is censored from the pool.

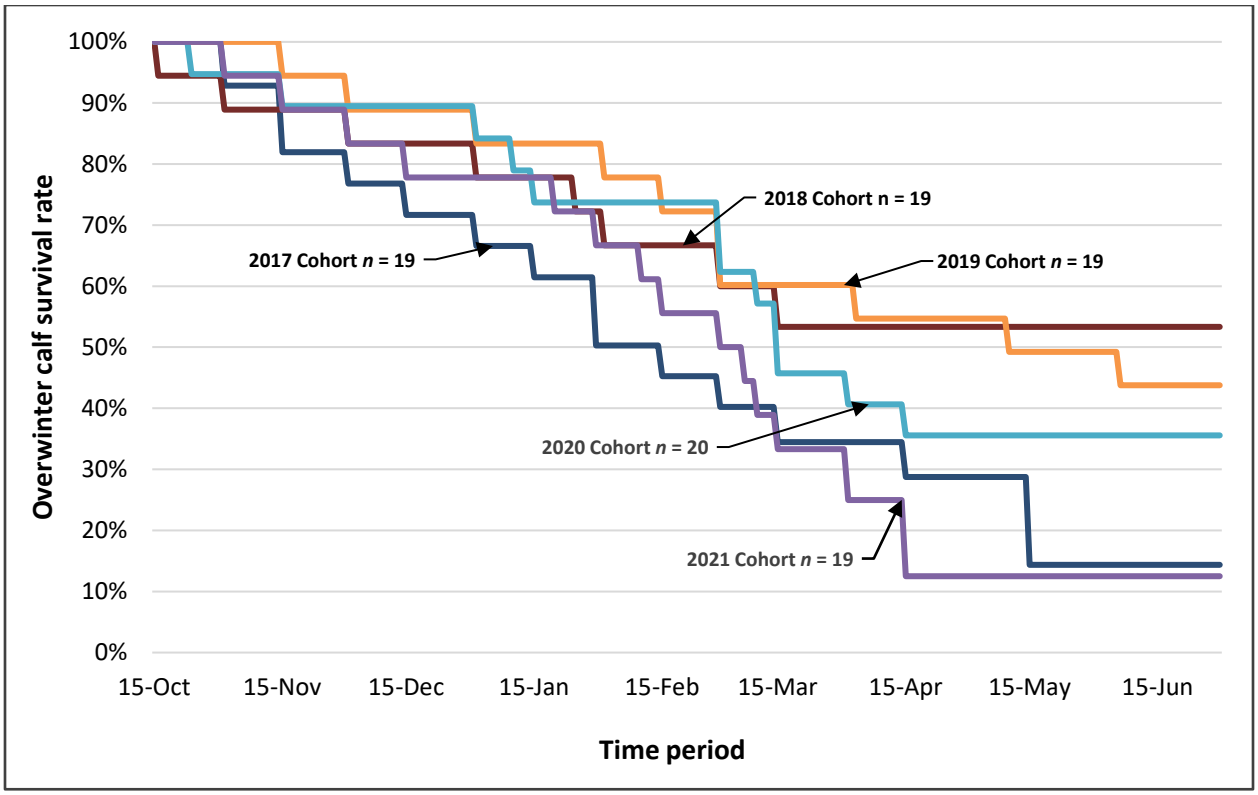
Kaplan-Meier survival curves were also derived for overwinter mortality of each calf cohort from October through June, after 4-month-old calves are collared (Fig. 4). The irregular frequency of collar check flights, as previously discussed, applies to these collars during RY17–RY21 just as it applied to the adult collars. Furthermore, overwinter survival for a cohort may be misleading, as it does not portray relative recruitment of that cohort unless associated with fall calf-to-cow ratios to account for differences in productivity or calf mortality prior to October.

To give a relative look at cohort recruitment, Fig. 5 portrays Kaplan-Meier curves applied to the fall calf-to-cow ratio for that cohort.



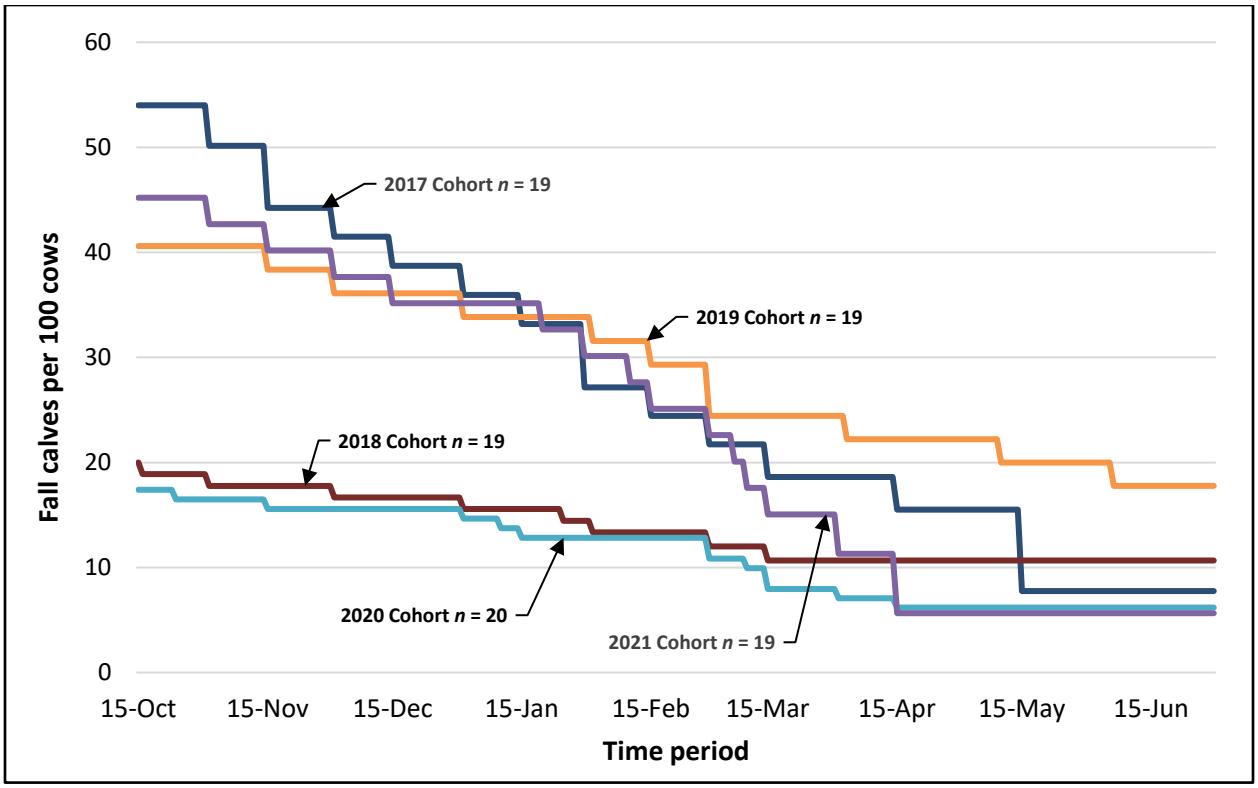
Note: For each regulatory year, *n* indicates the starting sample size on July 1.

Figure 3. Annual Kaplan-Meier survival curves for collared adult cows, Nelchina caribou herd, Alaska, regulatory years 2017–2021.



Note: For each cohort, *n* indicates the largest sample size; some cohorts had additional collared animals incorporated into the sample later in October or November.

Figure 4. Overwinter Kaplan-Meier survival curves for collared 4-month-old female caribou, Nelchina caribou herd, Alaska, regulatory years 2017–2021.



Note: For each cohort, *n* indicates the largest sample size; some cohorts had additional collared animals incorporated into the sample later in October or November.

Figure 5. Overwinter Kaplan-Meier survival curves for collared 4-month-old female caribou relative to fall calf-to-cow ratios, Nelchina caribou herd, Alaska, regulatory years 2017–2021.

Mortality Data Summary

RY17

Data portrayed in Fig. 3 shows mortality throughout the hunting season in RY17, which was a year with a harvest strategy aimed at reducing the herd and a subsequent harvest of over 2,200 cow caribou. Caribou traveled as far as Yukon, Canada during the winter of RY17, which represents a relatively long migration.

RY18

RY18 shows a higher overall survival rate, when the state hunting seasons had a bull-only bag limit, prohibiting harvest of cows by state hunters. Summer and fall calf-to-cow ratios were relatively low; a pause in reproduction or early loss of a calf would allow surviving cows to establish more energy reserves over the summer and fall and may contribute to a lower overwinter mortality rate if nutritional limitations were being experienced by cows. During the winter of RY18 most caribou wintered in the Mentasta Mountains and northern Wrangell Mountains (the North Wrangells). While some collared caribou traveled north of the Alaska Highway, they did not cross into Yukon during the winter of RY18, exhibiting an overall shorter migration compared to RY17.

RY19

The RY19 harvest approach had a similar reduction strategy as RY17, but early migration in RY19 resulted in only 1,233 cows harvested that season. The survival curve is very similar to the RY17 season despite similar abundance of adults estimated in the summer and almost half the amount of RY17 harvest, which suggests that non-hunting mortality may have been higher in RY19 than RY17, even with wolf reductions in Unit 13. In RY19 most caribou wintered on the western side of the Wrangell Mountains in Unit 11 which represents a shorter migration compared to RY17.

RY20

During RY20 relatively few cows raised calves through to the fall, which was a concerning pattern given the low fall calf-to-cow ratios observed in RY18, but this again may have provided more opportunity for cows to build mass and fat reserves over the summer if not lactating and if adequate nutrition was available. A reduction harvest strategy was implemented again, as the reduction benchmark had not been achieved in RY19. Nearly half of the herd wintered in Unit 13, representing virtually no migration, while a smaller portion of the herd wintered in the North Wrangells and Tetlin flats areas, and the remainder migrated north of the Alaska Highway toward Chicken. There was no statistically significant difference in overwinter mortality between collared cows that migrated and collared cows that remained in Unit 13, despite significantly less harvest pressure outside of Unit 13; this suggests that RY20 winter harvest in Unit 13 may have been compensatory mortality, or challenging winter migration conditions outside of Unit 13 may have contributed to mortality rates similar to Unit 13 where there was an active hunting season for part of the winter. Harvest quotas in Unit 13 were met in January 2021 and state hunts were closed by emergency order on January 22. A total of 2,009 cows were reported harvested, which was still less than the total harvested in RY17. Despite the lower harvest and early state season closure additional mortality occurred after the closure of the state hunting seasons, as portrayed in Figure 3, at a rate disproportionate to previous years, especially in April and May.

RY21

With herd reduction achieved, the harvest strategy for RY21 was shifted to a maintenance strategy with overall lower harvest quotas for state hunts. A total of 907 cow caribou were reported harvested over all hunting opportunities combined, and additional mortality not associated with harvest was documented in the collar pool during the fall hunting season. State quotas were met during the fall hunting season, and all state winter hunting seasons were closed by emergency order, as portrayed in Figure 3. The herd migrated after the fall hunting season with a small portion wintering in the North Wrangells, but most collared caribou traveled north of the Alaska Highway, and many traveled into Yukon as far as Dawson City. This represented one of the longest migrations in recent years. Unusually deep snow was experienced across the winter range and substantial adult cow mortality occurred in January through June, contributing to the start of a precipitous decline in herd abundance and suggesting that cow caribou did not have enough energy reserves to withstand the added energetic requirements associated with deep snow and long migration. Predation and harvest appear to have been largely compensatory mortality in RY21, supported by spring check flights on the wintering grounds that noted dead caribou, collared and uncollared alike, appearing as hair piles on the landscape, which is normally not indicative of predation events.

Alaska Board of Game Actions and Emergency Orders

A special Board of Game meeting was held in Glennallen in March 2017 to address Unit 13 moose and caribou regulations. At this meeting the bag limit for state subsistence caribou hunts in Unit 13 was changed from 1 caribou to up to 2 caribou, effective that same season, with the intention that the second caribou may be announced during winter seasons if additional harvest is necessary to curtail herd growth. In addition, the Tier I registration hunt RC566 was replaced with 2 different Tier I registration opportunities, effective RY18, with the goal of spreading permitholders temporally across the fall hunting season. During the application period in November and December prior to the following year's hunting season, interested households would choose between RC561, with fall season dates of August 10–31, or RC562 with fall season dates of September 1–20; both permits included winter season dates of October 21–March 31.

For RY17 an emergency order was issued to extend the fall season end dates for RC566 and CC001 from September 20 to September 30, to achieve additional harvest before the herd migrated out of Unit 13, as the fall estimate for the herd was above the abundance objective.

At the regular board cycle meeting for the Central and Southwest Region in February 2018 in Dillingham, the Board of Game established a youth caribou resident drawing permit for Unit 13 (YC495) with season dates of August 1–5, a bag limit of 1 caribou, and up to 200 permits to be issued. At this meeting the board also established a nonresident caribou drawing permit for Unit 13 (DC475) with season dates of August 20–September 20, a bag limit of 1 bull, and up to 200 permits to be issued. The board also modified the Community Subsistence Harvest hunt salvage requirements, which pertain to CC001. Meat of caribou taken throughout the CC001 hunting season is required to remain naturally attached to the bones until delivered to the place where it is to be processed for human consumption; previously the on-bone meat salvage requirement applied only to caribou harvested prior to October 1. The on-bone salvage requirement was also updated to include the meat of the brisket, neck, and back, in addition to the forequarters, hindquarters, and ribs as previously required.

For RY18, the NCH did not aggregate well, not all caribou returned to the typical summer count area, and the calf cohort size was small. With this information, a conservative maintenance approach was adopted for the harvest strategy, and an emergency order was issued prior to the start of the fall season to change the bag limits for RC561, RC562, CC001, and DC485 to 1 bull caribou. Emergency orders closed the RC561 season on August 18 and the DC485 season on August 26, when the hunts met their allotted quota of bulls. An emergency order was also issued to close the winter seasons for RC561, RC562, and DC485. CC001 remained open as scheduled, as that hunt did not achieve its allotted quota.

In January 2019 at the Board of Game's Southeast Region meeting in Petersburg, the board adopted findings 2019-223-BOG to provide recommendations to ADF&G for allocation of Unit 13 Nelchina caribou permits.

For RY19 an emergency order was issued to provide additional season dates of September 21–30 for RC561, RC562, CC001, YC495, and DC485 to achieve additional harvest prior to the migration of the herd outside of Unit 13. This emergency order was in response to a summer

minimum count over 53,000 caribou, as well as concern for declining herd health metrics such as calf growth and parturition rates in recent years.

For RY20 a reduction strategy remained in place, as the desired harvest to curtail herd growth was not achieved in RY19, because the herd was scattered during the fall hunting season and migrated out of Unit 13 prior to the winter hunting season. An emergency order was issued to add fall season dates of September 21–30 to hunts RC561, RC562, CC001, YC495, DC485, and DC475. A large portion of the herd remained in Unit 13 for the winter, and harvest quotas were achieved in January. An emergency order closed the winter season for DC485 on January 10, and the winter seasons for RC561, RC562, and CC001 were closed by emergency order on January 22.

For RY21 a maintenance harvest strategy was adopted, with reduced quotas. Hunts were closed by emergency order when their quotas were met: RC561 on August 17, DC485 on August 31, and RC562 on September 9. After the fall hunting season, no additional harvestable surplus was available for the winter season, and hunts RC561, RC562, CC001, and DC485 were closed by emergency order.

The Central and Southwest Region regular board cycle meeting that was scheduled for early 2021 was rescheduled for January 2022 due to the COVID-19 pandemic. Calls for proposals were solicited in 2020 and 2021 for deliberation during the January 2022 meeting, at which ADF&G presented draft findings outlining how harvestable surplus had been used to establish quotas for each of the permitted hunts (Record Copy 061). The board discussed these draft findings but did not give the department different guidance for establishing quotas.

Additional Board of Game actions occurred after the current reporting period which affect the RY22–RY26 planning period. During the March 2023 Southcentral Region meeting in Soldotna the board adopted the department's proposal to add a Tier II hunt in regulation to be implemented when the harvestable portion of the herd drops below the lower end of ANS. The Tier II hunt has season dates of August 10–September 20 and October 21–March 31, with a bag limit of 1 caribou and up to 1,000 permits. This department-generated proposal was in response to the NCH decline that was in progress despite hunt closures. The department also provided the board with a feasibility assessment for the intensive management of Nelchina caribou at this meeting.

At the January 2025 Central and Southwest Region meeting, the board requested that the department review the feasibility assessment for intensive management of the NCH and present an updated version at the Southcentral Region meeting in Kodiak in March 2026.

Recommendations for Activity 2.1

Modify.

Mortality data collected from regular checks of collared animals were not summarized or documented in previous reports and were not included in the plan for the RY17–RY22 reporting period. These data, however, were collected through collar checks in Activity 1.2 and have been summarized in the *Other Mortality* section of Activity 2.1. In future years these data should be collected in a more systematic way and used to produce Kaplan-Meier survival curves annually.

Calf mortality is not typically identified until after calves are 4-months old and VHF collars are deployed during Activity 1.2. When calves are experiencing high rates of mortality prior to 4-months old it may be necessary to investigate early causes of mortality to determine the potential effectiveness of intensive management actions to improve calf survival and recruitment.

3. Habitat Assessment-Enhancement

ACTIVITY 3.1. Monitor range condition relative to herd size through parturition rates of adult cows and weights and morphometric measurements of 4-month-old female calves.

Data Needs

The Nelchina caribou herd management strategy relies on maintaining the herd below the carrying capacity of the range to avoid precipitous declines. It is therefore necessary to understand the relative status of the range in terms of nutritional availability.

Variations in calf production generally relate to changes in body condition. While nutritional limitation can occur because of changes in annual weather patterns that negatively affect forage production or availability, it can also occur because of an overgrazed range. Low parturition rates over several years, or a declining trend in parturition rates, may indicate decreased nutritional availability on the summer range if not otherwise explained by weather patterns. Research conducted on the NCH during calendar years 1996–2000 demonstrated that nutritional limitations on the spring–summer range were negatively impacting parturition for 3-year-old and 4-year-old caribou at that time, when the herd was being reduced to within or below the abundance objective after a period of overabundance (Valkenburg et al. 2003). Assessment of overall parturition rates of adult females in the herd, as well as parturition rates amongst 2-year-old and 3-year-old females specifically, can provide insight into nutritional availability for the herd on its summer range (Adams and Dale 1998a, Boertje et al. 2012, Cook et al. 2004).

Average weight and morphometric measurements of female calves at 4-months old also provide indices for the nutritional status of the range. While annual weather conditions such as snow depth, timing of *greenup* (the appearance of new vegetation in the spring), and quality of the growing season can impact calf weights and measurements year to year, trends over time may indicate changing range conditions, which may signal necessary changes in management strategies or objectives.

Methods

Parturition rates for the recent history of the herd have been determined by observing radiocollared females 2-years-old or older from a fixed-wing aircraft during the first week of June. Caribou observed with calves, hard antlers, or distended udders were classified as parturient (Whitten 1991). The percentage of the collar pool that had been productive previously but skipped a year of detected productivity is tracked through the parturition history of individual collared cows.

Average weight and morphometric measurements of female calves at 4-months old have been collected since 1995 for the Nelchina herd. In October, calf weight, metatarsal length, and mandible length are collected for each female calf captured, unless extenuating circumstances

prevent the ability to collect these data. The averages for these respective metrics are compared to historical data collected from the Nelchina herd.

Results and Discussion

Parturition surveys were flown annually for all collared female caribou 2-years of age and older. No 2-year-old cows were detected to be parturient during RY17–RY21, which was a decline from the 5-year overall parturition rate of 7% for 2-year-old cows during the RY12–RY16 reporting period (n = 28; n indicates sample size). The 5-year rate for 3-year-old cows detected to be parturient during RY17–RY21 was 9% (n = 23), which was a decline from the RY12–RY16 rate of 56% (n = 62). Research indicates a threshold of 55% for the 5-year average of 3-year-old parturition; when the 5-year running average for 3-year-old parturition falls below 55% for a growing herd, the herd may begin to experience more pronounced fluctuations due to stochastic weather events that exacerbate nutritional limitations (Bergerud et al. 2008, Boertje et al. 2012). Figure 6 shows parturition data pertaining to RY07–RY21: the 5-year running averages of 2-year-old, 3-year-old, and 4-year-old parturition and the annual parturition rate for collared cows 4-years of age and older. 5-year averages are used in part to mitigate small sample sizes inherent in these methods (Boertje et al. 2012). The NCH parturition data suggest a trade-off between 2-year-old and 3-year-old parturition rates; the decline in the 5-year average of 2-year-old parturition coincides with the increase in the 5-year average of 3-year-old parturition observed in 2014 through 2018, when the herd existed at high abundance. The inverse relationship between the 5-year running average of 2-year-old parturition and the 5-year running average of 3-year-old parturition—when 2-year-old parturition >0—is statistically significant (*P-val* = 0.008; *P-val* indicates significance probability). Given that 2-year-old parturition may be affecting 3-year-old parturition rates for the following year, testing the inverse relationship with that 1-year lag accounted for results in an improved linear model fit and increased statistical significance (*P-val* = 0.0002). The substantial fluctuations in herd metrics observed during the RY17–RY21 reporting period coincided with a decline in the 5-year averages for 2-year-old, 3-year-old, and 4-year-old parturition, which supported implementing the strategy to reduce caribou abundance to the lower end of the objective when herd growth resulted in the high abundance observed in RY19.

Furthermore, during RY17–RY21 the overall detected parturition rate of all collared cows 4-years of age and older was 68% (n = 245; Table 10). This was a decline from the RY12–RY16 average of 87% (n = 436) and the RY07–RY11 average of 86% (n = 138). The percentage of previouslyproductive cows ≥4-years old that skipped a year of detected productivity was 42% in spring 2018 (RY17; n = 42), 30% in spring 2020 (RY19; n = 40), and 39% in spring 2022 (RY21; n = 23), compared to only 6% skipping a productive year in both spring 2017 (RY16; n = 52) and spring 2019 (RY18; n = 50). The overall lower parturition rates and evidence of cows skipping productive years further supported the urgency to reduce the size of the herd to mitigate density-dependent factors that may have been impacting productivity or early calf survival (Whitten 1995, Valkenburg et al. 2003). Similar low parturition rates were observed in the late 1990s and early 2000s, when nutritional limitations were impacting natality for 3-year-old and 4-year-old cows and it was concluded that the NCH range had been overutilized, as herd abundance had exceeded management objectives prior to that time (Healy 2001, Valkenburg et al. 2003).

Table 10. Detected parturition rates of collared female caribou, Nelchina caribou herd, Alaska, calendar years 2018–2022.

	3-years old		≥4-years old	
Year	Parturition rate (%)	n^a	Parturition rate (%)	n^a
2018	0	5	54	67
2019	17	6	90	58
2020	0	2	69	45
2021	17	6	77	44
2022	0	4	45	31

[a] *n* stands for sample size.

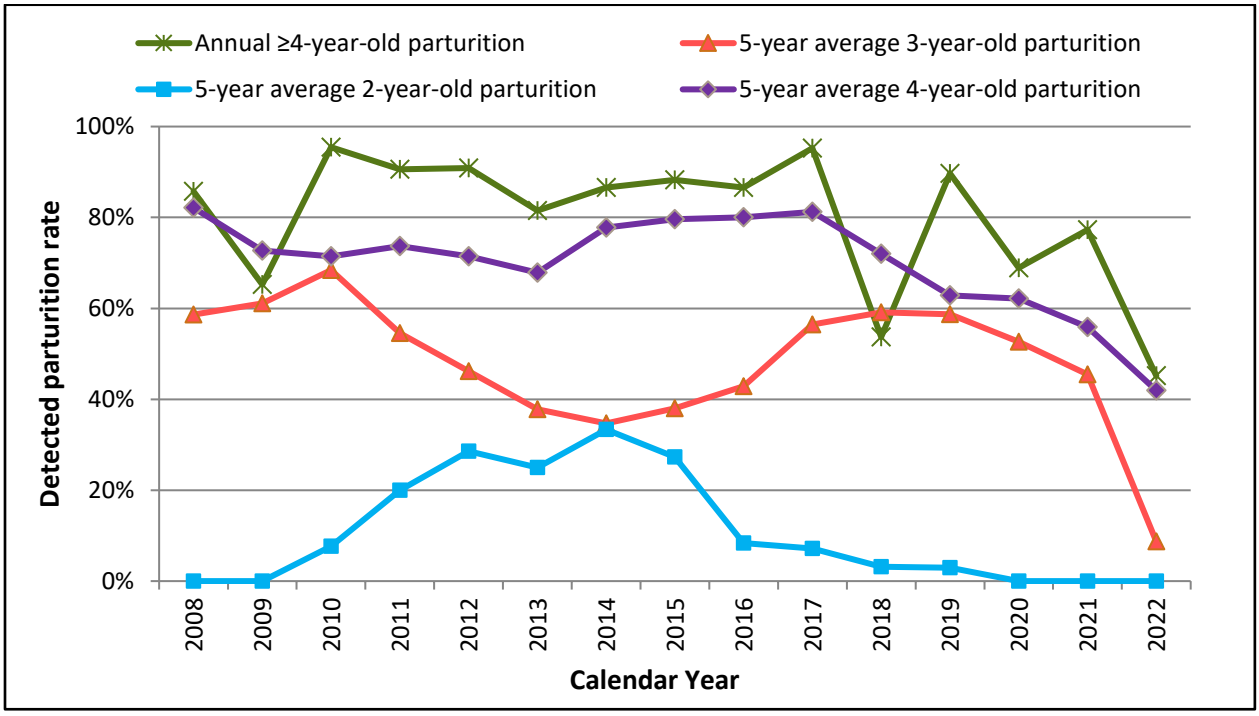


Figure 6. Detected parturition rates of collared female caribou, Nelchina caribou herd, Alaska, calendar years 2008–2022.

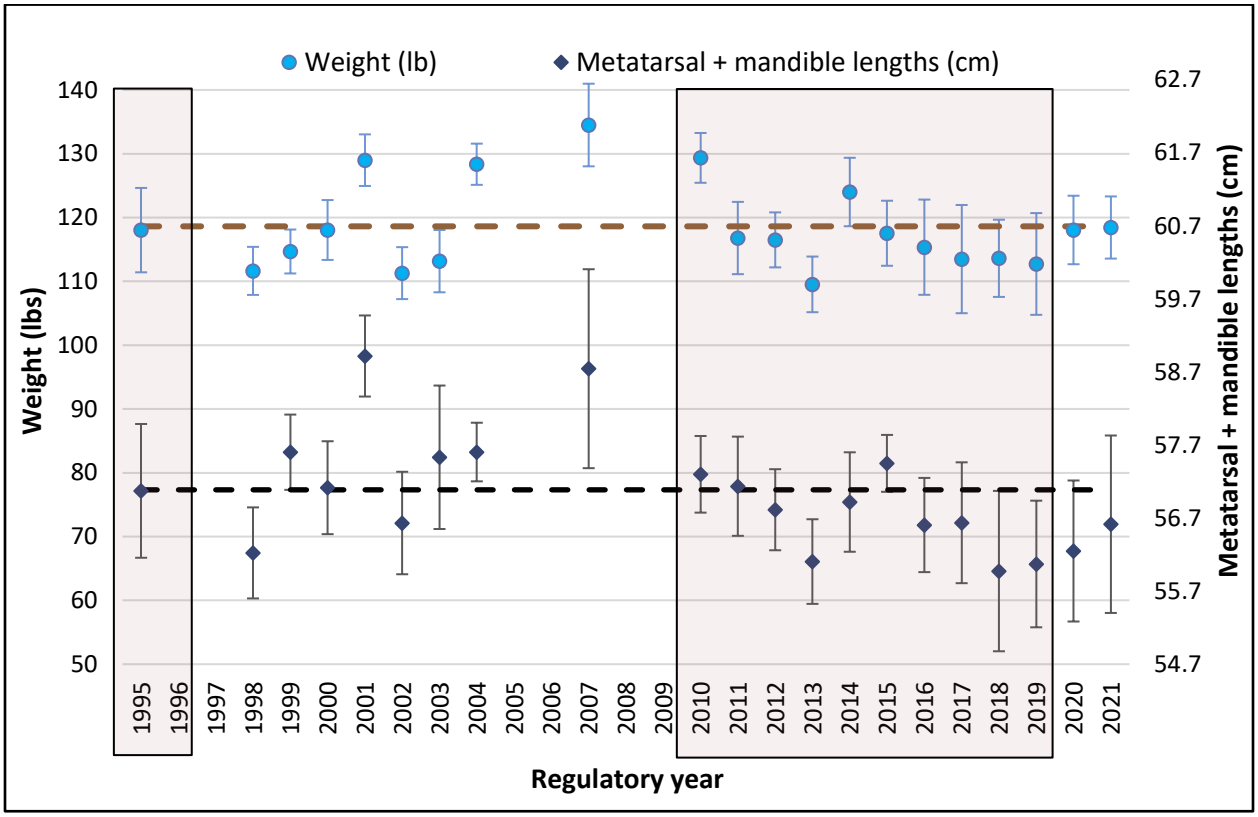
During this reporting period the weights, metatarsal lengths, and mandible lengths were collected for a total of 91 female 4- to 5-month-old calves (Table 11). Declining trends were observed in both weight and the combined metatarsal and mandible morphometrics during the period when herd abundance exceeded the objective in RY10–RY19 (Fig. 7). Captures conducted in RY21 had the additional goal of collecting blood-gas data for the Wildlife Health and Disease Surveillance program, which necessitated exceedingly short chase times to prevent calves from overheating during a longer than normal workup. As a result, these captures were less evenly dispersed across the distribution of the herd, which may have skewed the growth metric averages summarized in Table 11. Nonetheless, the higher averages observed in RY20 and RY21 suggested that the reduction in herd size may have helped alleviate density-dependent nutritional limitations that were suspected to be the cause of the declining trends in growth metrics observed

from RY10 through RY19. One factor that may affect calf growth metrics, which has yet to be explored in depth for the Nelchina herd, is the variation in the start date of calving from year to year. Observations of Nelchina calving suggest that the start of calving may vary by as many as 14 days from one year to the next, which may affect subsequent fall calf weights and morphometrics.

Table 11. Growth metrics for 4- to 5-month-old female calves, Nelchina caribou herd, Alaska, regulatory years 2017–2021.

Regulatory year	Weight (lb)			Metatarsal + mandible lengths (cm)		
	Mean	*n*[a]	SD[b]	Mean	*n*[a]	SD[b]
2017	113.5	17	17.8	56.6	19	1.8
2018	113.6	18	13.1	56.0	20	2.5
2019	112.7	20	18.2	56.1	18	1.9
2020	118.1	20	12.2	56.3	16	2.0
2021	118.4	16	9.9	56.6	18	2.6
1995–2021	118.3	509	13.9	57.1	497	1.9

[a] *n* stands for sample size.
[b] SD stands for standard deviation.



Note: Whisker plots include 95% confidence intervals. Only years with sample sizes >10 are included. The dashed lines represent the long-term average for each dataset. Shaded boxes denote time periods when fall abundance estimates generally exceeded the abundance objective.

Figure 7. Growth metrics of 4- to 5-month-old female calves, Nelchina caribou herd, Alaska, regulatory years 1995–2021.

Recommendations for Activity 3.1

Modify.

Following this reporting period it became apparent that traditional parturition checks in early June may miss parturition signs for cows that calved early and lost their calf soon after birth, resulting in lower apparent parturition rates that may in fact be more reflective of high neonate mortality or shifts in timing of calving rather than actual parturition. Deterioration of range quality can negatively impact birth rates and early calf survival, but other factors may affect early calf survival as well, so understanding which metrics are being affected can be important in assessing possible management actions to improve production or recruitment (Doerr 1979, Klein 1991, Post and Klein 1999). When resources are available the issue of teasing out low productivity versus high neonate mortality may be overcome with intensive parturition surveys (daily flights to check collared cows throughout the calving period), but this resource-intensive approach may not always be feasible. This approach will also identify dates of calving onset and peak calving, which may provide additional nutrition-related metrics associated with fall body condition of cows, which is in turn driven by spring, summer, and fall nutritional availability (Skogland 1983, Adams and Dale 1998b, Cook et al. 2004). Incidental to other fieldwork, the start of calving was observed in spring 2021 and spring 2022, with the start in 2022 roughly 10 days behind the start in 2021, suggesting that the body condition of cows may have been poor in fall 2021. Continuing to gather data relative to the start of calving will provide additional insight into factors affecting herd trajectory over time. Data from intensive parturition surveys, however, may not be directly comparable to historic data gathered using the less intensive early-June parturition checks. Less intensive parturition checks may be sufficient when the herd is not experiencing significant nutritional limitations, but in years when there may be concern for the health of the herd, more intensive parturition surveys may be warranted. A moderate-intensity approach with several flights spaced out every 4 or 5 days, beginning in mid-May to ensure that checks begin prior to peak calving, has been effective for this herd in the past (calendar years 1997–2001) and should replace the early-June check method in years when daily checks are deemed unnecessary or when resources are less available. Investigations into cause-specific mortality of neonatal caribou, as well as collection of neonatal calf weights, may also be warranted in times of increased concern for the health or trajectory of the herd to better understand potential effects of nutritional limitations and factors driving demographic rates.

Antler data for 4-month-old female calves will be collected during Activity 1.2. These data should be summarized and reported as an additional nutrition-related index under Activity 3.1.

ACTIVITY 3.2. Evaluate the range condition of the Nelchina calving grounds.

Data Needs

The range of the NCH has a long history of habitat assessment through the years (Hanson et al. 1958, Skoog 1968, Pegau and Hemming 1972, Pegau 1975, Lieb 1994). These investigations have occurred over different periods along the herd's cycles between high and low abundance and to some extent have helped to inform the current management objectives (Lieb et al. 1988; Pitcher 1990). While lichens have shown the ability to recover over time when caribou abundance is low, the NCH has proven that at only 20,000–30,000 caribou this herd can have a substantial negative effect on lichen flora, and in the past the herd has virtually eliminated all

preferred lichens on the calving grounds by the time abundance reached 40,000 animals (Lieb et al. 1988, Lieb 1994). In recent years, anecdotal observations on the Nelchina calving grounds during springtime fieldwork are limited in scope but do suggest that preferred lichens have been substantially reduced, if not all but eliminated in high use areas.

As lichens decrease from caribou use and trampling, allowing an increase in shrubs, the shrubs in turn reduce the opportunity for lichens to reestablish themselves in the future (Palmer and Rouse 1945; Pegau 1970). While this overall reduction in lichens and increase in shrubs could be beneficial for summer range, it may be detrimental for caribou winter range (Pegau 1975). Summer range is typically most important for growth and winter preparation, leaving winter range typically an area of maintenance for caribou (McEwan 1968, Klein 1970, Valkenburg et al. 2003). But it appears that the NCH may have a history of relying on vascular plants both before and after greenup (Skoog 1968). It is unclear how potential shifts in plant community variability and abundance may affect the nutritional availability for the herd and its subsequent growth or maintenance potential through each season.

If the management direction continues to seek to maintain the herd below the carrying capacity of the landscape, continuing to assess the range condition of the Nelchina spring–summer range will be especially necessary to inform the abundance objective for the herd. Factors such as gradual shifts in plant communities or impacts of maintaining a relatively large herd size over an extended period—rather than maintaining a lower herd size or allowing for natural fluctuations—may result in range degradation over time, necessitating a review of objectives to allow for sustained yield management. Documenting composition, abundance, and nutritional value of the vegetative community, and comparing these data with previous range studies as well as caribou forage patterns and nutritional requirements, will be valuable given high caribou abundance in recent years and potential climate-driven impacts on spring and summer forage availability.

Methods

No activities were conducted during RY17–RY22.

Results and Discussion

No activities were conducted during this reporting period, but traditional ecological knowledge and observations across the Nelchina range confirm that some portions of the summer and fall range have experienced an increase in tall shrubs such as alder and mature willows. These areas of very tall shrubs may be limiting forage availability for both moose and caribou. It may be prudent to consider prescribed burns or mechanical treatment in these areas.

It is important to note that stochastic events can impact caribou populations and may play a role in nutritional availability. In summer 2021, a Rusty Tussock caterpillar outbreak in a portion of the NCH summer range in Unit 13E was reported to decimate vegetation in the area, leading up to the first deep snow winter and the start of the herd decline in 2021–2022. The spatial extent of the Rusty Tussock devastation is unknown, but temporal effects may persist, as it was reported that blueberry bushes were not observed to fruit again until the summer 2024 in that area, and salmonberry distribution was reported to change in a localized area after the event (M. Heun,

owner of High Lake Lodge, personal communications August 2021, December 2023, and August 2024).

Recommendations for Activity 3.2

Discontinue as a management activity but continue to collaborate with research staff to develop methods for assessing range condition and the potential carrying capacity for caribou on the Nelchina spring–summer range, as the data need continues to be relevant. Initial research will be above and beyond work that can be accomplished under the standard management plan for the NCH, but activities may be developed in the future that might allow for more regular data collection relevant to this data need to inform management direction.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

Data Recording and Archiving

- State caribou harvest data is stored on ADF&G's internal database, WinfoNet. Federal caribou harvest data must be collected from BLM and is stored electronically on the Glennallen area biologist's hard drive.
- Field data sheets are stored in file folders located in the Glennallen area biologist's office. Additional field data is electronically stored on the Glennallen office shared drive.

Agreements

A funding agreement was in place each year of the RY17–RY22 reporting period for the Bureau of Land Management Glennallen Field Office to provide funds to assist with winter and spring collar status checks for the NCH. The funding agreement expired in August 2024.

Permitting

Permits are required for conducting NCH management activities on NPS lands in Wrangell-St. Elias National Park. Any helicopter-based activities require either a research permit (for capture efforts) or special use permit (for collar retrieval efforts).

Conclusions and Management Recommendations

The RY12–RY16 report emphasized the importance of reducing caribou abundance to within the herd objective due to declining herd health metrics (Hatcher and Robbins 2021). Herd health metrics continued to decline, but in RY20 the objective of herd reduction was achieved. Immediately following that achievement, the herd experienced the first of two back-to-back deep snow years, combined with some of the longest migrations on record for this herd, leading to a decline in abundance, productivity, and recruitment. Herd management has transitioned to herd recovery, and it will be important to establish whether the range can sustain fall abundance of 35,000–40,000 caribou over the long term—which requires approximately 50,000 animals on the spring–summer range annually—or if the abundance objective may be more appropriate as a summer objective to facilitate management of a healthy herd and avoid future precipitous declines.

A long history of range assessments for the NCH have shown that range condition can recover when caribou abundance is low, but that cumulative use over a period of high abundance led to overuse of both lichens and vascular plants on the range in the 1970s (Hanson et al. 1958, Skoog 1968, Pegau and Hemming 1972, Eberhardt and Pitcher 1992, Lieb 1994). A series of 5–8 years of moderate use by caribou can destroy established lichen communities; trampling of lichens prevents regrowth, and loss of lichens may facilitate shrub expansion, which further prevents lichen recovery (Pegau 1975). Lieb et al. (1986) suggested that in 1984 the range appeared to be able to sustain the herd, with a population of less than 25,000 animals at that time, but Lieb (1994) also recognized that "lichens generally ceased to increase in areas of substantial caribou use" at that level, and as the herd continued to grow to higher abundance the preferred lichen biomass in the core calving area had been virtually eliminated by 1989, when there were approximately 40,000 caribou on the landscape. With the recent history of herd abundance, similar degradation of the range can be expected, and anecdotal observations on the spring, summer, and fall ranges in recent years support this expectation.

While the NCH shows highly variable use of fall and winter range, it returns to the same general area in the eastern Talkeetna mountains every year during the calving and early summer season. While the caribou may use a different portion of that spring and early summer range from one year to the next or move to different portions of that range during the spring and summer seasons, the spring and early summer range as a whole encompasses roughly 2,000–2,500 square miles. The current abundance objective to maintain 35,000–40,000 caribou in the post-fall-hunt population, with 40 calves and 40 bulls per 100 cows, requires significantly more caribou to be on the landscape during calving and early summer (prior to harvest and early calf mortality), and herd growth can be difficult to control at this abundance when productivity and survival are high. When the herd is productive and held stable within the abundance objective in the fall, wildlife biologists would expect at least 40,000–50,000 caribou on the spring and early summer range leading into each fall hunting season. This equates to more than 20 caribou per square mile (~7.7 caribou per square kilometer) utilizing the spring and early summer range from mid-May through July during a period of high energy demands for lactation and early calf growth. The forage resources on the calving grounds that are most vulnerable to overgrazing are lichens, as these organisms can take decades to grow and their availability may be especially important during years when parturition and early lactation occur prior to greenup, but vascular plants are also important for the NCH in spring and these may be impacted by overuse over an extended period as well (Skoog 1968, Lieb 1994). To avoid overutilization of resources on the spring and early summer range, a lower caribou abundance objective may be warranted, or converting the current abundance objective from a fall to summer objective may be considered, but additional research will be necessary to define the importance of lichens compared to vascular plants for the NCH, especially on the calving grounds prior to greenup.

Herd health metrics have been collected for the NCH since the 1990s. Strong evidence of nutritional limitation on the summer range was observed in the 1990s with herd abundance between 30,000 and 50,000 animals; research at that time recommended maintaining the herd around 30,000 animals (Valkenburg et al. 2003). Herd health metrics generally showed stable or improving trends from RY02 through RY07, when the herd had summer abundance estimates that ranged between 31,000 and 39,000, whereas those metrics generally showed declining trends as the herd was maintained with summer abundance estimates over 40,000 animals for most of RY10–RY19; the decline in herd health metrics was more evident in the later years as

the higher abundance approached nearly a decade on the landscape, possibly reflecting a cumulative effect. The full history of herd health metrics supports the scientific recommendation to maintain the herd around 30,000 animals. The fall herd estimate between RY97 and RY09 ranged between 29,000 and 39,000, averaging 33,600 animals. During that same period an average of 1,962 caribou were harvested annually. Harvest in RY09 was 792 caribou, which is still within the range of the current ANS (600–1,000). Harvest was above the current ANS for all years from RY97 to RY08, showing that maintaining the herd at a lower level may provide sufficient harvestable surplus to exceed ANS and will allow for greater success in preventing herd growth that exceeds the upper end of the abundance objective.

The codified objectives to provide a harvest of 3,000–6,000 animals annually with an abundance objective of 35,000–40,000 animals represent an expected harvest rate of 8%–13% annually if the abundance objective continues to be considered a post-fall-hunt objective. This harvest rate can be attained, albeit sometimes with difficulty, when the population of the herd is above the abundance objective and herd reduction is the management strategy, but this harvest rate will result in a decline in abundance and cannot be sustained during a long-term maintenance strategy when the herd is within the abundance objective. To target sustained yield, a long-term maintenance harvest rate objective should be 4%–8%, with the ability to harvest at a higher rate when the herd's population is increasing beyond the abundance objective.

Additionally, abundance objectives for total caribou numbers are problematic because adult numbers can be manipulated through harvest, but calf numbers cannot easily or predictably be manipulated through management activities. Reporting total caribou in relation to the objective results in large fluctuations between seasons of high and low productivity or early calf survival, which can be difficult for the public to interpret. The herd can be managed with codified objectives as determined by the Board of Game, but objectives for adult caribou numbers are more meaningful for the public. Management reports will continue to document herd abundance with population estimates of adults in comparison to calves, with a relative objective for adults as calculated using the objective for abundance as established through the Board of Game process.

II. Project Review and RY22–RY26 Plan

Review of Management Direction

The overall management direction to maintain the Nelchina caribou herd below carrying capacity and provide more predictable and sustainable long-term harvest is a reasonable management direction as long as the Board of Game continues to support this direction. The objectives by which this direction is pursued may need to be modified over time as additional information is learned regarding long-term sustainable abundance for this herd and the ability to achieve sufficient harvest to maintain the herd within the established abundance objective.

MANAGEMENT DIRECTION

No change from RY17–RY21 report.

GOALS

- To provide the greatest opportunity to participate in caribou hunting.
- To provide for an optimum sustainable harvest of caribou.

CODIFIED OBJECTIVES

No change from RY17–RY21 report, unless modified through the public process during this planning period.

Amounts Reasonably Necessary for Subsistence Uses

No change from RY17–RY21 report, unless modified through the public process during this planning period.

Intensive Management

No change from RY17–RY21 report, unless modified through the public process during this planning period.

MANAGEMENT OBJECTIVES

No change from RY17–RY21 report, unless modified through the public process during this planning period.

REVIEW OF MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1. Monitor and evaluate caribou abundance and herd composition.

Data Needs

No change from the RY17–RY21 report.

Methods

Methods are the same as described in the RY17–RY21 report except for one change: Beginning in RY22, hand-held DSLR cameras will be standard for documenting smaller caribou groups during traditional minimum count surveys to ensure a more accurate minimum count is obtained, as opposed to pilot-observer group size estimations alone.

ACTIVITY 1.2. Maintain a pool of management collars within the herd and track mortality of collared animals.

Data Needs

In addition to the data needs listed in the RY17–RY21 report, mortality data for collared animals can be utilized to estimate mortality rates for different portions of the herd over different seasons

from year to year, which is necessary for Activity 2.1. This information is also necessary for planning purposes to maintain an adequate pool of GPS collars in the herd. In order to plan for the continuation of collaring activities, old collars must be removed from the landscape to allow their frequencies to be reused.

Methods

Per the recommendations discussed in the RY17–RY21 report, frequency of collar checks for the herd will become more standard. Collar retrieval efforts will be made annually to remove frequencies from the airwaves and also to confirm if collars are associated with mortalities versus an animal dropping a collar.

When resources allow, collar check flights should occur in May prior to parturition surveys, in June or July prior to and during abundance surveys, in late September prior to capture efforts and composition surveys, and at least once a month during the winter period (November through April).

When resources allow, collar retrieval efforts should occur as new mortalities are identified. When less resources are available then collar retrieval efforts should occur at least once annually after snowmelt or before collar locations are obscured again by snow. Collaboration and coordination with other management programs as well as other agencies will ensure efficiency in collar retrieval efforts across the range of the NCH.

2. Mortality-Harvest Monitoring

ACTIVITY 2.1. Monitor and analyze harvest and other mortality data.

Data Needs

In addition to the data needs listed in the RY17–RY21 report, mortality rates of collared animals include all sources of mortality, rather than just harvest, and so are necessary for interpreting and predicting herd population trends. Furthermore, identifying cause-specific mortality rates of neonatal caribou will be crucial during herd recovery periods for assessing the feasibility of potential intensive management activities should they become necessary.

Methods

Annual mortality data for collared adult cows will be used to derive Kaplan-Meier survival curves for each regulatory year (July through June) and overwinter mortality data from collared 4-month-old calves will be used to derive Kaplan-Meier survival curves for each calf cohort from October through June.

During periods of concern for the trajectory of the herd, neonatal calf captures may be conducted following IACUC-approved protocols to deploy collars on neonatal caribou. Neonatal calf weights will be collected to inform Activity 3.1. Collars will be tracked daily and mortalities will be assessed as soon as possible to determine cause of death. Remains will be collected for necropsy and disease testing.

Harvest monitoring methods will continue to follow those outlined in the RY17–RY21 report.

An additional "may be announced" federal caribou hunt was established in Unit 11 by the Federal Subsistence Board, effective RY22, with the intention of targeting Nelchina caribou when those animals are moving through or wintering in Unit 11; should that hunt be implemented, ADF&G management biologists will obtain that harvest data from the Alaska Federal Subsistence Program database.

3. Habitat Assessment-Enhancement

ACTIVITY 3.1. Monitor range condition relative to herd size through parturition rates of known-age cows and growth metrics of 4- to 5-month-old female calves.

Data Needs

As described in the RY17–RY21 report, more intensive methods may be necessary to address the data needs related to parturition. Calf growth metrics will continue to be collected as described in the RY17–RY21 report; in addition, antler data for 4-month-old female calves will be collected and summarized with calf weights and morphometric measurements.

Because antlers require energy to grow, antler data for 4-month-old calves may provide an additional nutrition-related index. In other cervids, antler growth during the first year has been linked to nutrition in utero, post-natal nutrition, and nutrition after the neonatal period (Dryden 2016). Furthermore, the proportion of polled (antlerless) female caribou on the landscape has shown an inverse relationship with range quality in caribou herds in Greenland (Thing et al. 1986).

Methods

To better address the data needs under this activity, intensive parturition surveys may be utilized in years when there is concern for the health of the herd. It is important to note that these data may not be directly comparable to historic early-June parturition checks, but will provide better insight into actual parturition rates, as opposed to missing signs of parturition in cows that calved early and subsequently lost their calves to early calf mortality. While the end result may be the same, low parturition and early neonate mortality may be driven by different mechanisms, thus providing different insights into the health and status of the herd, as well as what management activities may be warranted. Dates of calving onset and peak calving will be identified with intensive parturition surveys, which provide an additional nutrition-related metric associated with fall body condition of cows, which is in turn driven by summer and fall nutritional availability (Skogland 1983, Adams and Dale 1998b, Cook et al. 2004).

In years of high concern for the health or trajectory of the herd, additional work may be conducted to collect neonatal calf weights. Neonatal calf weights provide an additional nutrition-related metric that may be informative when analyzing early calf mortality rates (Skogland 1984, Sams et al. 1996, Adams 2005, McKenzie 2018, Adams et al. 2019).

Per the recommendations discussed in the RY17–RY21 report, antler data collection for 4-month-old calves will be reinstated during calf capture efforts beginning in RY23.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

Data Recording and Archiving

No changes from the RY17–RY21 report.

Agreements

The funding agreement for the Bureau of Land Management Glennallen Field Office to provide funds to assist with winter and spring collar status checks for the NCH expired in August 2024. A new funding agreement is not likely to be arranged.

Permitting

No change from the RY17–RY21 report. Permits for collaring activities and collar retrieval efforts are secured from the National Park Service as needed, based on seasonal caribou movements and range use.

Acknowledgments

Special thanks to our skillful and experienced contracted wildlife pilots, who make it possible to conduct survey and inventory activities for the NCH and have been monitoring this herd for decades. We also thank our colleagues at local federal agencies who support management of this herd through various means such as funding, permitting, and collaborative communication.

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