

Caribou Management Report and Plan, Game Management Unit 10: Unimak Island Caribou Herd

Report Period 1 July 2012–30 June 2017, and

Plan Period 1 July 2017–30 June 2022

David W. Crowley



2020

Species Management Report and Plan ADF&G/DWC/SMR&P-2020-1

Caribou Management Report and Plan, Game Management Unit 10: Unimak Island Caribou Herd

Report Period 1 July 2012–30 June 2017, and

Plan Period 1 July 2017–30 June 2022

PREPARED BY:

David W. Crowley

Area Wildlife Biologist

APPROVED BY:

Todd A. Rinaldi

Management Coordinator

REVIEWED BY:

Michael R. Guttery

Research Coordinator

©2020 Alaska Department of Fish and Game

Alaska Department of Fish and Game
Division of Wildlife Conservation
PO Box 115526
Juneau, AK 99811-5526



Funding for survey and inventory project 3.0 was provided through the Federal Aid in Wildlife Restoration grant program.

Hunters are important founders of the modern wildlife conservation movement. They, along with trappers and sport shooters, provided funding for this publication through payment of federal taxes on firearms, ammunition, and archery equipment, and through state hunting license and tag fees.

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 Todd A. Rinaldi, Management Coordinator for the Division of Wildlife Conservation.

Species management reports and plans are available via the Alaska Department of Fish and Game's public website (www.adfg.alaska.gov) or by contacting Alaska Department of Fish and Game's Division of Wildlife Conservation, PO Box 115526, Juneau, AK 99811-5526; phone: (907) 465-4190; email: dfg.dwc.publications@alaska.gov. The report may also be accessed through most libraries, via interlibrary loan from the Alaska State Library or the Alaska Resources Library and Information Services (www.arlis.org).

This document, published in PDF format only, should be cited as:

Crowley, D. W. 2020. Caribou management report and plan, Game Management Unit 10: Report period 1 July 2012–30 June 2017, and plan period 1 July 2017–30 June 2022. Alaska Department of Fish and Game, Species Management Report and Plan ADF&G/DWC/SMR&P-2020-1, Juneau.

Please contact the authors or the Division of Wildlife Conservation at (907) 465-4190 if you have questions about the content of this report.

The State of Alaska is an Affirmative Action/Equal Opportunity Employer. The Alaska Department of Fish and Game complies with Title II of the Americans with Disabilities Act of 1990. This document is available in alternative communication formats. If you need assistance, please contact the Department ADA Coordinator via fax at (907) 465-6078; TTY/Alaska Relay 7-1-1 or 1-800-770-8973.

ADF&G does not endorse or recommend any specific company or their products. Product names used in this publication are included for completeness but do not constitute product endorsement.

Cover Photo: Biologist Chris Peterson releasing captured caribou on Unimak Island with Shishaldin Volcano in the background. ©2011 ADF&G.

Contents

Purpose of this Report.....	1
I. RY12–RY16 Management Report	1
Management Area.....	1
Summary of Status, Trend, Management Activities, and History of Caribou in Unit 10.....	1
Population	2
Predation control.....	3
Harvest History	3
Management Direction.....	4
Existing Wildlife Management Plans	4
Goals	4
Codified Objectives	5
Amounts Reasonably Necessary for Subsistence Uses	5
Intensive Management.....	5
Management Objectives.....	5
Management Activities	5
1. Population Status and Trend	5
2. Mortality-Harvest Monitoring and Regulations.....	10
3. Habitat Assessment-Enhancement.....	12
Nonregulatory Management Problems or Needs.....	12
Data Recording and Archiving	12
Agreements	12
Permitting.....	12
Conclusions and Management Recommendations	13
II. Project Review and RY17–RY21 Plan	13
Review of Management Direction	13
Management Direction.....	13
Goals	13
Codified Objectives	14
Amounts Reasonably Necessary for Subsistence	14
Intensive Management.....	14
Management Objectives.....	14
Review of Management Activities.....	14
1. Population Status and Trend	14
2. Mortality-Harvest Monitoring	16
3. Habitat Assessment-Enhancement.....	16
Nonregulatory Management Problems or Needs.....	16
Data Recording and Archiving	16
Agreements	16
Permitting.....	16
References Cited	17

List of Figures

Figure 1. Relief map showing Unimak Island in Unit 10 off the southwestern tip of the Alaska Peninsula.....	2
Figure 2. Historical population levels of caribou reported on Unimak Island, Alaska.	7
Figure 3. Unimak Island caribou parturition rate, 95% confidence intervals, and sample size during regulatory years 2007–2016.	8

List of Tables

Table 1. Unimak Island caribou herd composition, USFWS population counts and predicted population size, 2011–2016.	6
Table 2. Unimak Island caribou calf survival based on individually radio marked calves.	10
Table 3. Unit 19 Unimak Island, Alaska, caribou harvest 1997–2008.	11



Purpose of this Report

This report provides a record of survey and inventory management activities for caribou (*Rangifer tarandus granti*) in Unit 10 for the previous 5 regulatory years and plans for survey and inventory management activities in the 5 years following the end of that period. A regulatory year (RY) begins 1 July and ends 30 June (e.g., RY12 = 1 July 2012–30 June 2013). This report is produced primarily to provide agency staff with data and analysis to help guide and record its own efforts, but is also provided to the public to inform them of wildlife management activities. In 2016 the Alaska Department of Fish and Game's (ADF&G) Division of Wildlife Conservation (DWC) launched this 5-year report to more efficiently report on trends and describe potential changes in data collection activities over the next 5 years. It replaces the caribou management reports of survey and inventory activities that were previously produced every 2 years.

I. RY12–RY16 Management Report

Management Area

Unimak Island is the easternmost in the chain of Aleutian Islands extending from the southwestern tip of the Alaska Peninsula (Fig. 1), and the only Aleutian Island with indigenous caribou, brown bears and wolves. The island is volcanic in origin with ongoing volcanic activity. Largely unvegetated habitats of glaciers, snowfields or ash-flats dominate at elevations over 330 yards (Pitcher et al. 1990); extensive unvegetated lava flows and cinder blows are also present at lower elevations. Vegetation communities on Unimak Island lack caribou lichens and have a relatively low willow component which is usually important in summer diets for caribou (Legner 2014). However, the island has relatively diverse and abundant forb species, such as sedges, that are adequate forage for caribou (Legner 2014). Predators of caribou occur on Unimak Island at varying densities. Potential predators include bald eagles (*Haliaeetus leucocephalus*), brown bears (*Ursus arctos*), golden eagles (*Aquila chrysaetos*), wolverines (*Gulo gulo*), and wolves (*Canis lupus*). The range of the Unimak Island caribou herd (UCH) is the entire island (approximately 1,500 mi²). The village of False Pass (population 42) is the only human community on the island.

Summary of Status, Trend, Management Activities, and History of Caribou in Unit 10

Skoog (1968) speculated that the Alaska Peninsula was marginal habitat for sustaining large caribou populations because of severe icing conditions and ash from frequent volcanic activity affecting food supply and availability, and these conditions also occur on Unimak Island. Calving occurs primarily on the Bering Sea side of the island from several thousand feet in elevation (primarily ash and snow habitat) down to the coastal tundra plains where heavy alder stands are used to avoid predators.

There are historical reports of caribou moving between the Alaska Peninsula and Unimak Island, including what may have been a substantial immigration of the Unimak caribou herd (UCH) in 1976 (Pitcher et al. 1990). Recently, genetic studies have determined that the UCH are

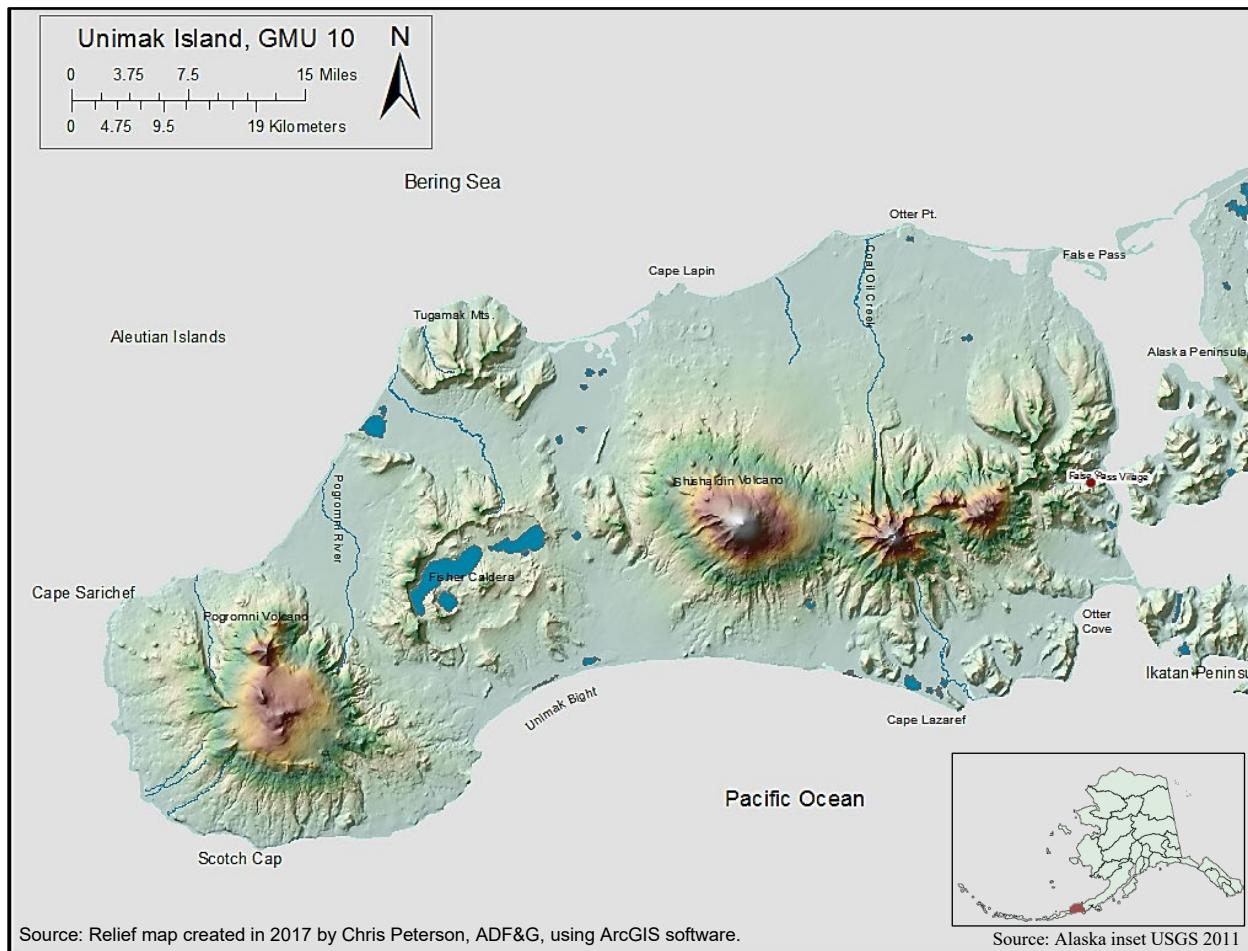


Figure 1. Relief map showing Unimak Island in Unit 10 off the southwestern tip of the Alaska Peninsula.

genetically isolated from mainland caribou with sufficient fidelity to calving areas on the island to be designated a separate herd from the Southern Alaska Peninsula caribou herd (SAP) which ranges on the mainland (Zittlau et al. 2009; Mager 2012).

POPULATION

Caribou numbers on Unimak Island have cycled widely over the decades as have the Northern Alaska Peninsula (NAP) and SAP caribou herds. Sellers et al. (1999) summarized a history of the UCH, with comparison to the mainland SAP as follows:

“Caribou numbers in Unit 9D and on Unimak have fluctuated widely, but not synchronously. In 1925 Murie (in Skoog 1968) estimated 5,000 caribou between Port Moller and the tip of the Alaska Peninsula and another 7,000 on Unimak Island. By 1949 the FWS estimated 500 caribou on the mainland. Surveys in 1949 and 1953 by the FWS reported no caribou on Unimak Island; but by 1960 Skoog (1968) reported “1,000 south (of Port Moller, author’s note), most...being on Unimak Island”. By 1975 the SAP had increased to at least 2,267 in 9D and 3,334

on Unimak Island (with 5,000 estimated; author's note). The winter of 1975–76 was severe and reports of dead caribou on the island suggested a die off.

Conceivably emigration from Unimak could have contributed to population growth in Unit 9D during the late 1970s. By the early 1980s, only a few hundred caribou remained on Unimak. Meanwhile the mainland segment (the SAP; author's note) grew continuously to peak at 10,200 by 1983.”

Following the precipitous decline in the late 1970s and early 1980s the UCH population again reversed its course and began growing. By RY97 the herd had grown to at least 600 caribou and by RY00 to approximately 1,000 animals (Butler 2009). The population was relatively stable until RY05 (or possibly earlier, prior to commencement of annual surveys) when composition surveys began indicating low annual calf-to-cow ratios. This continued through RY12 when it bottomed out at 3 calves per 100 cows. Population size and bull-to-cow ratios declined correspondingly, and predation on calves was suspected to be the cause of poor calf survival (Butler 2009). Pregnancy rate appeared to be normal in 2008 (85%) but from 2009–2013 pregnancy rate ranged from 65% to 70%. The current population is approximately 300–400 animals.

Monitoring of the herd using radiocollared cows began in 1997 and satellite collars were added in 2011. Lem Butler, former King Salmon Area Biologist (ADF&G, personal communication) investigated calf survival on Unimak Island in 2010 but poor weather conditions, protracted parturition, and low number of calves available for capture limited the collection data and inference. Most of the collared calves died during the first weeks of life when predation was the most suspect cause of death. The efforts in 2010 highlighted the logistical and weather difficulties associated with conducting research on Unimak Island.

PREDATION CONTROL

Given the declining population size and poor calf survival of the UCH, the Alaska Department of Fish and Game recommended implementing a wolf removal program in 2009 when the herd numbered around 400 animals. During peak calving, wolves were to be removed on the calving grounds using the same strategy employed for wolf removal on SAP's calving grounds (Butler 2009). However, because nearly all calving grounds are on federal wilderness lands, the program was not supported nor authorized by the U.S. Fish and Wildlife Service (USFWS). Because of UCH's small population size and isolation from mainland caribou, ADF&G biologists were concerned that caribou could be extirpated from Unimak Island without management intervention. The window of opportunity has likely passed as the herd continued to decline to approximately 200 animals by 2011, and the risk of losing the herd to a stochastic event such as severe icing or volcanic ash fallout outweighed the high cost of predator control.

HARVEST HISTORY

Traditionally, residents of Unimak Island living in False Pass mostly hunted caribou on the mainland in Unit 9D (Fall et al. 1990, 1996; USFWS 2010). State and federal hunts were closed by emergency orders in 1993 when the then-combined SAP and UCH herds declined below 2,500 caribou. The federal subsistence season reopened in regulatory year 2000 when the UCH reached 1,000 animals and herd management was officially separated from the SAP (Sellers

2003). The state general season reopened in RY01. State and federal UCH hunts were once again closed in RY09 following the most recent decline and remain closed.

Management Direction

ADF&G manages caribou on the sustained yield principle using the best scientific knowledge available for the benefit of the resource and people of Alaska.

EXISTING WILDLIFE MANAGEMENT PLANS

- Alaska Wildlife Management Plans: Southwestern Alaska (ADF&G 1976)
- Division of Wildlife Conservation Strategic Plan (ADF&G 2002)
- Unimak Island Caribou Herd Operational Plan (Butler 2008)

GOALS

There are no specific goals identified for the UCH. Goals identified in the Alaska Wildlife Management Plans for Southwestern Alaska (ADF&G 1976) are to provide the following opportunities:

- To view, photograph and enjoy wildlife;
- Optimum harvest;
- The greatest opportunity to participate in hunting;
- To hunt caribou under aesthetically pleasing conditions;
- To take large animals;
- For scientific and educational study.

The following goals and objectives identified in the Unimak Caribou Herd Operational Plan (Butler 2008) seek to identify:

- Population objectives and threshold levels;
- Specific management actions and strategies for the UCH keyed by the current population (2010) in relation to population objectives and threshold levels; and
- Opportunities and document specific collaborations between ADF&G and USFWS.

CODIFIED OBJECTIVES

Amounts Reasonably Necessary for Subsistence Uses

The UCH has a positive customary and traditional use determination. The amount necessary for subsistence (ANS) in Unimak Island combined with the SAP in Unit 9D is 100–150 caribou (5AAC 99.025).

Intensive Management

The intensive management population objective is 1,000 caribou, and harvest objective is 150–200 caribou annually.

MANAGEMENT OBJECTIVES

No formal management objectives are in place for the UCH. The Unimak Caribou Operational Plan (Butler 2008) recommended a minimum population size of 1,000 caribou with a fall bull-to-cow ratio of 35 bulls:100 cows.

MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1. Conduct fall composition survey to estimate sex and age ratios, productivity, mortality and trends.

Data Needs

Sex and age ratios are used to predict population trend, productivity and herd size.

Methods

DWC biologists conducted aerial surveys using fixed-winged aircraft to assess population composition in October each year during this reporting period except RY15 because of poor weather (Table 1). Pilots located caribou groups with radiotelemetry equipment, and biologists aboard an R-44 helicopter determined composition of each group (cow, calf, yearling, and bull: small, medium or large). Since UCH groups are small and scattered, all caribou encountered during the survey are included in the sample (except for those collared caribou detected by radio signal without visual confirmation while in the clouds), and therefore our sample sizes can be considered an index to population trend. We assessed survey comprehensiveness using the proportion of radiocollared caribou encountered relative to total number of radiocollared caribou. Composition data were entered into a deterministic computer model (an Excel spreadsheet) to help calculate predicted herd dynamics and size based on observed composition parameters and harvest.

Results and Discussion

Our data indicate that the UCH ended its decline and probably began increasing during the reporting period. Department staff conducted composition surveys of the UCH in October during

each year of the reporting period except RY15 (Table 1). Proportion of bulls in the population remained below the minimum objective of 35 bulls:100 cows but did remain on an increasing trend since RY11 (Table 1). Proportion of calves also remained on an increasing trend since RY11. Using survey results as input parameters, the population size calculated by computer model began to increase during the reporting period. Minimum counts by Izembek National Wildlife Refuge (INWR) and our composition sample sizes also increased during the reporting period (Table 1).

Table 1. Unimak Island caribou herd composition, USFWS population counts and predicted population size, 2011–2016.

Regulatory Year	Bulls: 100 Cows	Calves: 100 Cows	Percent Calves	Percent Cows	Percent Bulls	Sample Size	Predicted Population Size ^a	INWR ^b Counts
2011	5.8	6.7	6.0	88.9	5.1	117	232	224
2012	9.5	2.7	2.4	89.2	8.6	83	202	
2013	9.6	19.2	14.9	77.6	8.8	67	228	148
2014	15.1	21.5	15.7	73.2	13.1	127	260	230
2015 ^c							322	334
2016	32.9	40.3	23.3	57.8	24.7	258	404	

^a Calculated by Excel spreadsheet, no confidence intervals.

^b Izembek National Wildlife Refuge (INWR) staff flew fall or winter surveys when snow conditions were good.

^c No composition survey because of poor weather.

The UCH declined after reaching only 1,200 caribou in RY02 (Fig. 2). This suggests setting an upper limit of approximately 1,000 caribou for several years to monitor body condition and pregnancy rate. Therefore, we propose that our population management objective range should remain at 800 to 1,000 caribou with a bull ratio of 35 bulls:100 cows as recommended in the operational plan (Butler 2008).

Recommendations for Activity 1.1

The Unimak Caribou Operational Plan (Butler 2008) recommended a minimum population size of 1,000 caribou with a fall bull-to-cow ratio of 35 bulls:100 cows. These should be adopted as management objectives for Unimak Island. Based on historic herd fluctuations and observations by Murie (1935) and others, the island supported thousands of caribou for brief periods (Fig. 2). This had long-lasting impacts to the nutritional conditional of the range. Caribou movements between the island and mainland were common and expected when caribou numbers were very high. Whether caribou crossed the strait by swimming or on sea ice is unclear. Turner (1886) reported that the polar hare—now known as the Alaska hare (*Lepus othus*)—observed on Unimak Island crossed on sea ice formed at False Pass (the channel, not the village). Unimak Island is at the southern extreme for sea ice formation in the Bering Sea; ice forming near False Pass was much more frequent early in the twentieth century than it is now (Historical Sea Ice Atlas 2018). The potential for mainland movements remains an unknown variable. We believe that the population range should be 800 to 1,000 caribou given the recent peak of 1,200 and subsequent decline.

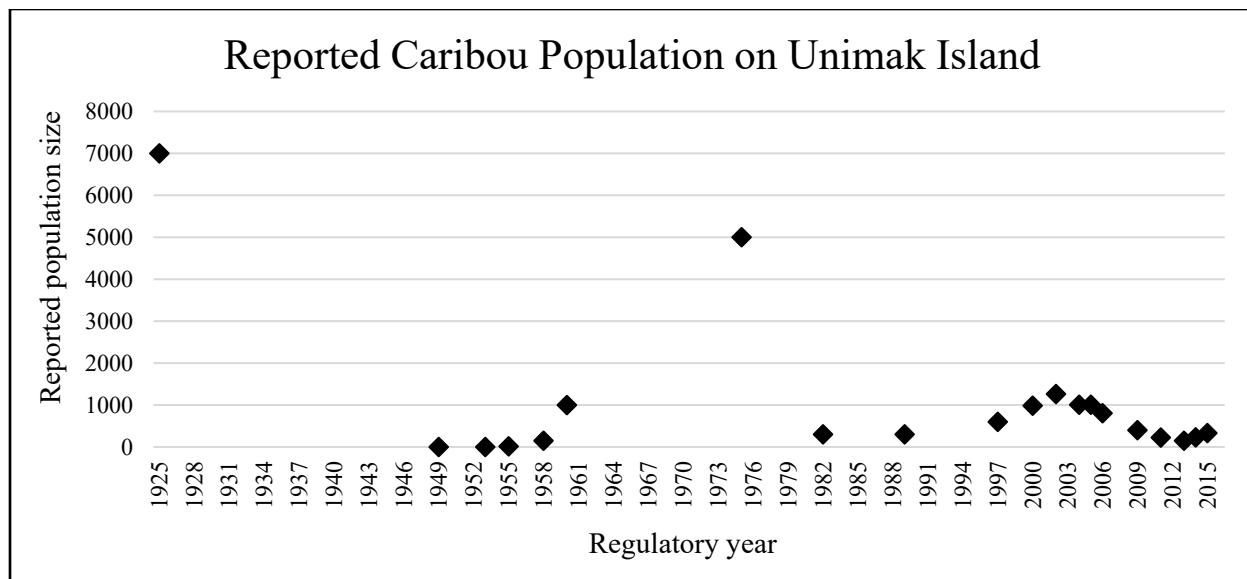


Figure 2. Historical population levels of caribou reported on Unimak Island, Alaska.

ACTIVITY 1.2. Conduct parturition survey to estimate pregnancy rate.

Data Needs

Pregnancy rate is an indicator of productivity used to help predict herd size and is a surrogate for herd nutritional condition.

Methods

We flew parturition surveys in late May or early June, attempting to sample at least 25% of the herd. Fixed-winged aircraft pilots located caribou groups with radiotelemetry equipment, and ADF&G biologists aboard an R-44 helicopter counted and determined composition and pregnancy status of each sample. We classified caribou on the calving grounds as parturient cow (with calf at heel, hard antlers or distended udder), nonparturient cow, yearling, or bull (Whitten 1995). We also observed radiocollared females to potentially document age-specific pregnancy rates. Data were entered into a computer model to help assess and predict herd size.

Results and Discussion

We flew a parturition surveys on the UCH each year of the reporting period (Fig. 3). Pregnancy rate increased substantially in RY15 following 7 years of low pregnancy rate. The current rate is sufficient to allow continued population increase. High pregnancy rate is a strong indication of good nutritional condition of the range. A lower pregnancy rate may be normal for this isolated island herd with occasional spikes in productivity.

Recommendations for Activity 1.2

Continue, given the peculiar recent history of parturition rate.

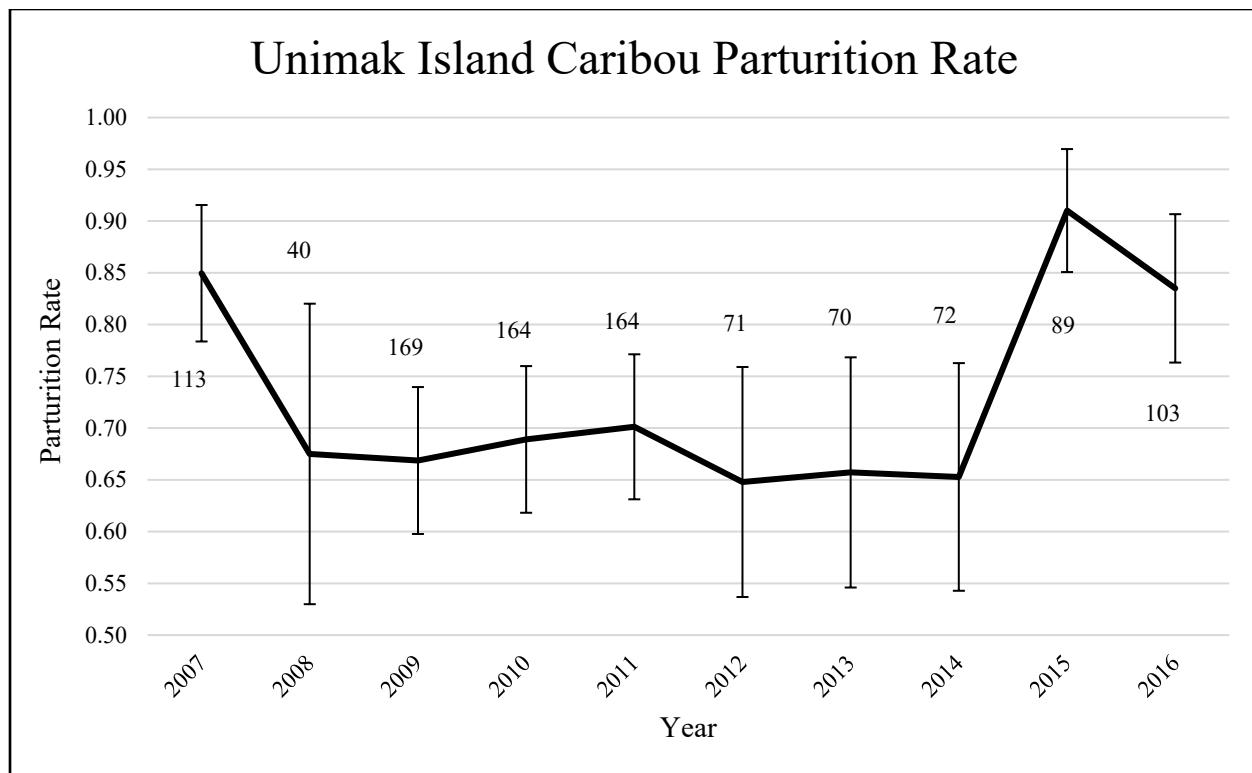


Figure 3. Unimak Island caribou parturition rate, 95% confidence intervals, and sample size during regulatory years 2007–2016.

ACTIVITY 1.3. Maintain an adequate number (20–30) of widely distributed radiocollared caribou on the UCH.

Data Needs

Population size, composition, seasonal movements and survival rate are monitored periodically through radiotracking collared caribou. Maintaining an adequate number of collared animals for surveys aids in locating an adequate survey sample size and obtaining a widely distributed sample, particularly when at low density.

Methods

Caribou were immobilized using standard techniques approved by an Animal Care and Use Committee using R-44 helicopter and fixed-wing aircraft support. During each capture standard measurements and blood samples were taken as required.

Results and Discussion

We captured and collared 10 cows in April 2016, 11 in 2014, and 6 in 2012 on Unimak Island. Cows were in good body condition with low-level warble fly infestations. As of June 2017, there were approximately 22 active radio collars deployed on the UCH.

Recommendations for Activity 1.3

Continue.

ACTIVITY 1.4. Investigate calf mortality on the UCH as needed (e.g., if calf ratio declines below 10 per 100 cows) to determine factors limiting calf survival. This is not an annual activity.

Data Needs

An assessment of predation on caribou calves is important in developing intensive management projects to more aggressively manage a caribou population. Calf survival is an index of recruitment into the population and is used to help predict population size and trends.

Methods

In early June 2014 and 2015, daily flights were conducted on Unimak Island using a fixed-winged aircraft. Post-parturient cows were located to evaluate the parturition status of all previously radiocollared cows. The timing of calf collar deployment was matched as closely as possible to the progression of calving based on the calving of marked cows and the number of neonates encountered per day.

Calves were located via collared cows or systematic searching. Age of each calf encountered was evaluated from an R-44 helicopter and an attempt was made to catch all calves greater than 2 hours old but still young enough to be chased and captured which was generally 2 days old or less. When a candidate was located, the helicopter hovered to drop off one or 2 crew members to capture the calf by hand. To avoid abandonment, we only captured dry calves (i.e. calves that were several hours old) and avoided capturing calves that were in groups of caribou. Latex gloves were discarded after each use to avoid scent transfers that might lead to abandonment.

Each calf captured was marked with a VHF transmitter set to mortality mode. The transmitter was attached to the elastic on an expandable nylon collar which was designed to break off if the animal grew sufficiently. Radio collars weighed 134g (1.7% of body mass on average). Weight of each calf was measured using a spring scale and cloth sling which was discarded after each use to avoid scent transfer. The sex of each calf, condition of the umbilicus, hoof characteristics, posture, and running ability were recorded and later used to evaluate age. Handling time averaged less than one minute. Birth mass was estimated from capture weight and age (Adams 2005).

When a calf mortality signal was detected, DWC biologists travelled by R-44 helicopter to the site and evaluated the cause of death. Mortality investigations typically occurred within a few hours of death (sometimes the predator was still present) and remains were transported to a field camp for a detailed necropsy. Evidence of predation was based on whether predators were present on site as well as signs such as wounding patterns, tracks, hair, scat, caching behavior, bone fragments, and remnant hide configuration. We examined all remains to determine if other factors contributed to death. The first 15 days of life were considered the neonatal period.

Results and Discussion

In 2014 we captured, marked and monitored the survival of 18 neonate calves investigating cause of death within 24 hours. At time of capture by helicopter, calf ages ranged from a few hours to 4 days old, with a mode of 2 days. Average weights for captured calves were 8.0 kg (17.6 lbs.) for males ($n = 6$) and 8.1 kg (17.8 lbs.) for females ($n = 8$).

UCH calves were surprisingly susceptible to capture after being separated from the dam and confused by the helicopter's rotor wash. The capture biologist would mimic the dam by crouching or crawling away from the calf, and often the calf would mistake the captor for the dam and run in for the catch. Using this technique, we captured around 8 calves that could have easily outrun us. Our peak captures (and failed chases) occurred 8–9 June. The last day we observed a newborn calf was on 14 June at 4,400 feet elevation on the slope of Shishaldin Volcano. All other observed caribou calves appeared to be in good health.

Predators were responsible for 3 of the 6 calf mortalities investigated in 2014; 2 attributed to wolves and one to brown bear. One additional calf died of starvation with the dam nearby. The remaining 2 calves were censored because of capture-related events; one by abandonment and one because its death by a brown bear may have been assisted by capture-related events. With 2 calves censored, 12 of 16 calves (77% of calves; Table 2) had survived when we departed on 14 June, but many calves had not reached 2 weeks of age.

We monitored survival of 22 neonate calves on Unimak Island in 2015. We captured most calves during 3–6 June, finally adding 3 more neonates on 12 June. Average male weights were 8.04 kg (17.7 lbs.) and 8.14 kg (17.8 lbs.) for males (n=6) and females (n=9), respectively. Calf survival was better in 2015 than in 2010 and 2014 (Table 2). Of the 2 mortalities investigated in 2015, both were attributed to brown bears.

Table 2. Unimak Island caribou calf survival based on individually radio marked calves.

Age survived	2010	2014	2015
2 weeks	91%	77%	91%
1 month	14%	53%	86%
2 months	ND	47%	73%

Recommendations for Activity 1.4

Repeat if calf-to-cow ratio drops below 10 per 100 cows.

2. Mortality-Harvest Monitoring and Regulations

ACTIVITY 2.1. Monitor the UCH caribou harvest through hunter harvest reports and contact with hunters and guides.

Data Needs

Harvest data are an important component of managing the UCH for sustained yield when hunting occurs.

Methods

Hunting for UCH caribou was closed in RY09 and remained closed through RY16.

Results and Discussion

Harvest by Hunters

Hunting was closed during the reporting period. Table 3 indicates that harvest rate during the period of decline should have been sustainable under normal survival conditions.

Hunter Residency and Success

There were no open hunting seasons during the reporting period.

Other Mortality

Stochastic events such as wide-spread icing and volcanic eruptions could potentially reduce or eliminate the caribou population on the island.

Alaska Board of Game Actions and Emergency Orders

None.

Table 3. Unit 19 Unimak Island, Alaska, caribou harvest 1997–2008.

Regulatory Year	State Hunt Harvest		Federal Harvest ^a	Total Reported	Estimated		Predicted ^c Population Size	Harvest Rate (%)
	Male	Female			Other ^b	Total		
1997			6	6	10	16	1,047	1.5
1998			3	3	10	13	1,060	1.2
1999			0	0	10	10	1,075	0.9
2000	20		5	25	10	35	1,080	3.2
2001	11	1	0	12	10	22	1,166	1.9
2002	10		0	10	10	20	1,238	1.6
2003	15		0	15	10	25	1,240	2.0
2004	15		0	15	10	25	1,193	2.1
2005	12	1	0	13	10	23	1,091	2.1
2006	13		1	14	10	24	882	2.7
2007	9		2	11	10	21	672	3.1
2008	9		0	9	10	10	477	2.1

^a Subsistence harvest (US Fish and Wildlife Service 2010).

^b Other human-caused mortality including wounding loss, unreported and illegal.

^c Calculated by Excel spreadsheet, no confidence intervals are generated.

Recommendations for Activity 2.1

Continue to collect harvest information during years when state or federal seasons are open. The intensive management harvest objective of 150–200 caribou for Unimak Island is too high (Table 3), it should instead be the same as the ANS of 100–150 in combination with SAP harvest. Ideally, the codifying of harvest objectives based on unreliable population counts should be avoided for a population this small and remote. Harvest levels should be reviewed annually and revised as necessary.

3. Habitat Assessment-Enhancement

ACTIVITY 3.1. Evaluate range condition through body condition assessment of captured females and pregnancy rates.

Data Needs

Assessment of body condition is an index to the nutritional status of the range.

Methods

See capture methods in Activity 1.3 above. Body condition was a subjective ranking from one (emaciated) through 5 (obese) based on palpation of soft tissue at withers, ribs and hips (Gerhart et al. 1996) and warble load (low, medium or high), and agreed upon by ADF&G staff working on each animal.

Results and Discussion

Body condition assessment is recorded in capture records. Captured cows have been in good condition (moderately fat with low or no warble loads). However, pregnancy rates were relatively low until 2015 suggesting that something other than nutrition was limiting pregnancy.

Recommendations for Activity 3.1

Continue.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

Data Recording and Archiving

Digital data are backed up daily on an in-house server (O:\WC-DIV). Paper records are stored in file cabinets and on shelves in the area biologist and assistant area biologist offices. Archived records are stored in indexed and labeled boxes, second floor of new warehouse (O:\WC-DIV\Admin King Salmon Area Office\Filing system\archived filing system index).

Agreements

Unimak Caribou Herd Operational Plan - A cooperative plan of the Alaska Department of Fish and Game and the United States Fish and Wildlife Service. Effective 01 March 2008 (Butler 2008).

Permitting

- Izembek National Wildlife Refuge Special Use Permit (#2017-1) for Wilderness Area helicopter-assisted caribou captures.
- IACUC approval for caribou capture activities (#2015-33).

Conclusions and Management Recommendations

Population metrics of the UCH indicated that around RY12 the long-term decline in caribou numbers ended and began a slow increase. Bull-to-cow ratios increased from a low of 6 bulls:100 cows in RY11 to 33 bulls:100 cows in RY16 (Table 1). Similarly, calf-to-cow ratios increased from 3 calves:100 cows in RY12 to 41 calves:100 cows in RY16. Calf survival increased considerably during the reporting period. Model-predicted population size and counts by INWR indicate a population size of approximately 350 to 400 caribou by RY16 (Table 1). Bull-to-cow ratio remained slightly below the operational plan management objective and the population size far below the population objective. Therefore, we recommend no resumption of hunting, which has been closed since RY09.

II. Project Review and RY17–RY21 Plan

Review of Management Direction

MANAGEMENT DIRECTION

Management direction for the UCH is in monitoring mode only. Herd size is dangerously low, hunting is closed, and predation control is currently not an option.

GOALS

Goals identified in the Alaska Wildlife Management Plans: Southwestern Alaska (ADF&G 1976) can be abbreviated to provide the following opportunities:

- The greatest sustained opportunity to participate in hunting caribou;
- To hunt caribou under aesthetically pleasing conditions;
- To take large-antlered caribou.

Providing a population level for sustainable harvest also provides other uses such as viewing, especially by local village residents, and photography. These goals outline the role of the Division of Wildlife Conservation when faced with land use practices such as mining or reindeer herding that may put a caribou herd at risk.

The first goal implies that we should avoid a population crashes to prevent hunting closures and allow population recovery. However, controlling the population size of the UCH may not be possible given remoteness, access difficulty, and hunter limitations. Of the few local hunters, most are limited to coastal areas only (by boat) whereas most caribou are associated with alpine and subalpine habitat. On the other hand, the department was prohibited from initiating predator control when the population was critically low, and calf predation high, because most of the island is federal lands including designated Wilderness.

CODIFIED OBJECTIVES

Amounts Reasonably Necessary for Subsistence

The ANS for the UCH in combination with the SAP is 100–150 caribou. This is a reasonable harvest quota given the low human population in Unit 9D, specifically False Pass, whose residents do much of their caribou hunting on the SAP.

Intensive Management

The intensive management population objective is 1,000 caribou, and harvest objective is 150–200 caribou annually. We believe that the population range should be 800–1,000 caribou given the recent peak of 1,200 and subsequent decline. The harvest objective is too high (Table 3), it should instead be the same as the ANS above. Under the cooperative plan: “population objectives may be modified by managers and regulatory agencies over time as new information becomes available regarding sustainable population size and population fluctuation.” (Butler 2008).

MANAGEMENT OBJECTIVES

1. Sustain a total population with a minimum of 800 caribou and a maximum of 1,000 caribou.
2. Maintain a minimum fall bull-to-cow ratio of 35:100.

REVIEW OF MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1. Conduct fall composition survey to estimate sex and age ratios, productivity, mortality and trends.

Data Needs

We use the fall composition survey to monitor bull-to-cow ratio, number, and percent of bulls in the population determine harvest quota, provide maximum hunting opportunity, and provide input to our population model. Calf parameters are also used in the model and to monitor productivity and survival. A decline in the calf-to-cow ratio of <10 calves:100 cows coincident with a similar decline in bulls may trigger a calf mortality study, an activity used in the past on the UCH (see Activity 1.4 in report section above) but not anticipated in the next 5 years. Composition surveys have also provided a means to monitor population trend. This activity should continue.

Methods

The methods are described in the Methods section above. Results will be reported with 95% binomial confidence intervals as appropriate.

ACTIVITY 1.2. Conduct parturition survey to estimate pregnancy rates and a minimum estimate of abundance.

Data Needs

Pregnancy rate indicates reproductive potential as well as nutritional condition of cows. Pregnancy rate is a parameter used in our population simulation model for the UCH which should continue during the next 5 years. We will continue to refine sample size and precision and/or statistical power of pregnancy rate (e.g., binomial confidence interval), and present these values in future reports. Typically, obtaining a large sample size for the UCH parturition survey has been relatively easy if enough radio collars are deployed.

Methods

The methods are described in the Methods section above. Results will be reported with 95% binomial confidence intervals as appropriate.

ACTIVITY 1.3. Maintain an adequate sample of widely distributed radio-collared caribou on the UCH.

Data Needs

This is a routine management activity in monitoring caribou populations. It is necessary to maintain an adequate number of collared animals for surveys, critical for locating adequate sample sizes and obtaining a wide distribution during surveys, particularly when at low density. Maintaining 20–30 marked cows in the population has been adequate for other management activities.

Methods

All caribou were immobilized from an R-44 helicopter along with a fixed-wing spotter plane using standard techniques approved by an Animal Care and Use Committee. Each caribou was fitted with a VHF radio collar.

ACTIVITY 1.4. Investigate calf mortality as needed to determine factors limiting calf survival.

Data Needs

As needed, repeat calf mortality study to determine factors limiting calf survival. Given the current status of the herd, including increasing population size and good (25 or higher) calf-to-cow ratio, we do not anticipate conducting further calf mortality study in the next 5 years. Calf survival is an index of recruitment into the population and is used in a computer model to predict population size and trend. An assessment of calf predators is important in developing intensive management projects if necessary to more aggressively manage a caribou population.

Methods

No change from report.

2. Mortality-Harvest Monitoring

ACTIVITY 2.1. Monitor the caribou harvest through hunter harvest reports and contact with hunters and guides. This is a routine management activity for most caribou herds in Southcentral and Southwestern Alaska.

Data Needs

Harvest data will, upon resumption of hunting, be an important component of managing the UCH for sustained yield. This activity should continue.

Methods

No change from report.

3. Habitat Assessment-Enhancement

ACTIVITY 3.1. Evaluate range condition through body condition assessment of captured females and pregnancy rates.

Data Needs

Assessment of body condition is an index of the nutritional status of the range.

Methods

This is a routine management activity that is quickly accomplished while capturing and collaring caribou, the data from which are recorded online with capture records. We capture caribou on the UCH every few years, this is not an annual activity.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

Data Recording and Archiving

No changes from report.

Agreements

No changes from report.

Permitting

INWR Special Use Permit expires April 2018 and should be updated.

References Cited

- Adams, L. G. 2005. Effects of maternal characteristics and climatic variation on birth masses of Alaskan caribou. *Journal of Mammalogy* 86:506–513.
- Alaska Department of Fish and Game. 1976. Alaska wildlife management plans: A public proposal for the management of Alaska's wildlife: Southwestern Alaska. Draft proposal subsequently approved by the Alaska Board of Game. Division of Game, Federal Aid in Wildlife Restoration Project W-17-R, Juneau. Alaska Department of Fish & Game. 2002. Strategic Plan. Division of Wildlife Conservation, Juneau, Alaska.
- Butler, L. B. 2008. Unimak caribou herd operational plan. A joint plan of the Alaska Department of Fish and Game and the United States Fish and Wildlife Service. Alaska Department of Fish and Game, King Salmon, Alaska.
- Butler, L. B. 2009. Unit 9D caribou management report. Pages 43–51 [In] P. Harper, editor. Caribou management report of survey and inventory activities 1 July 2006–30 June 2008. Alaska Department of Fish and Game, Division of Wildlife Conservation, Federal Aid in Wildlife Restoration Project 3.0, Juneau.
- Fall, J. A., R. J. Walker, and R. T. Stanek. 1990. Subsistence use of the southern Alaska Peninsula caribou herd. Alaska Department of Fish and Game, Division of Subsistence, Technical Paper No. 191., Juneau.
- Fall, J. A., L. Brown, and C. Utermohle. 1996. The harvest and use of plant, wildlife, and fish resources in False Pass, Unimak Island, Alaska. Alaska Department of Fish and Game, Division of Subsistence, Technical Paper No. 183., Juneau.
- Gerhart, K. L., R. G. White, R. D. Cameron, and D. E. Russell. 1996. Estimating fat content of caribou from body condition scores. *The Journal of Wildlife Management* 60(4):713–718.
- Historical Sea Ice Atlas. 2018. Historical sea ice concentration database. 1850 to present. University of Alaska Fairbanks International Arctic Research Center, Scenarios Network for Alaska and Arctic Planning and National Oceanic and Atmospheric Administration. <http://seacieatlas.snap.uaf.edu/explore>. (Accessed July 27, 2018).
- Mager, K. H. 2012. Population structure and hybridization of Alaskan caribou and reindeer: integrating genetics and local knowledge. Doctoral dissertation. University of Alaska Fairbanks.
- Murie, O. J. 1935. Alaska-Yukon caribou. United States Bureau of Biological Survey, 54: 1–93. Washington: United States Government Printing Office.
- Legner, Kate A. 2014. Seasonal movements, diet composition, and diet nutritional quality of Unimak Island caribou. Master of science thesis, University of Alaska Anchorage.
- Pitcher, K., C. Dau, D. Johnson, D. Sellers, and R. West. 1990. Causes of low calf recruitment in the Southern Alaska Peninsula caribou herd and recent herd history. Cooperative project

between Alaska Department of Fish and Game, Division of Wildlife Conservation and U.S. Fish and Wildlife Service, Izembek National Wildlife Refuge. Research Progress Report, Juneau.

Sellers, R. A., P. Valkenburg, R. C. Squibb, M. Roy, and B. Dale. 1999. Survival, natality, and calf weights of caribou on the Alaska Peninsula, 1998–99. U.S. Fish and Wildlife Service and Alaska Department of Fish and Game, Division of Wildlife Conservation, Cooperative Agreement 99-017, King Salmon.

Sellers, R. A. 2003. Unit 10 caribou management report. Pages 73–75 [In] C. Healy, editor. Caribou management report of survey and inventory activities 1 July 2000–30 June 2002. Alaska Department of Fish and Game, Juneau.

Skoog, R. O. 1968. Ecology of the caribou (*Rangifer tarandus granti*) in Alaska. Doctoral dissertation, University of California, Berkeley.

Turner, L. M. 1886. Contributions to the natural history of Alaska: results of investigations made chiefly in the Yukon district and the Aleutian Islands. Washington: Government Printing Office.

U.S. Fish and Wildlife Service. 2010. Management alternatives for the Unimak Island caribou herd environmental assessment. Washington, D.C.

Whitten, K. R. 1995. Antler loss and udder distention in relation to parturition in caribou. Journal of Wildlife Management 59(2):273–277.

Zittlau, K., R. Farnell, P. Valkenburg, J. Nagy, A. Gunn, and C. Strobeck. 2009. Part 3. Genetic diversity among woodland and Grant's caribou herds. Pages 147–164 [In] K. McFarlane, A. Gunn, and C. Strobeck, editors. Proceedings from the caribou genetics and relationships workshops, Edmonton, Alberta, 8–9 March 2003. Department of Natural Resources and Environment, Government of the Northwest Territories, Manuscript No. 183, Fort Smith, Canada.

