

# Caribou Management Report and Plan, Game Management Unit 9D: Southern Alaska Peninsula Caribou Herd

Report Period 1 July 2012–30 June 2017, and

Plan Period 1 July 2017–30 June 2022

**David W. Crowley**

**Christine C. Peterson**



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# Caribou Management Report and Plan, Game Management Unit 9D: Southern Alaska Peninsula Caribou Herd

Report Period 1 July 2012–30 June 2017, and  
Plan Period 1 July 2018–30 June 2022

**PREPARED BY:**

David W. Crowley  
Area Wildlife Biologist

Christine C. Peterson  
Assistant Area Wildlife Biologist

**APPROVED BY:**

Todd A. Rinaldi  
Management Coordinator

**REVIEWED BY:**

Meg Inokuma  
Biometrician

Jeffrey Stetz  
Research Coordinator

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



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

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## Purpose of this Report

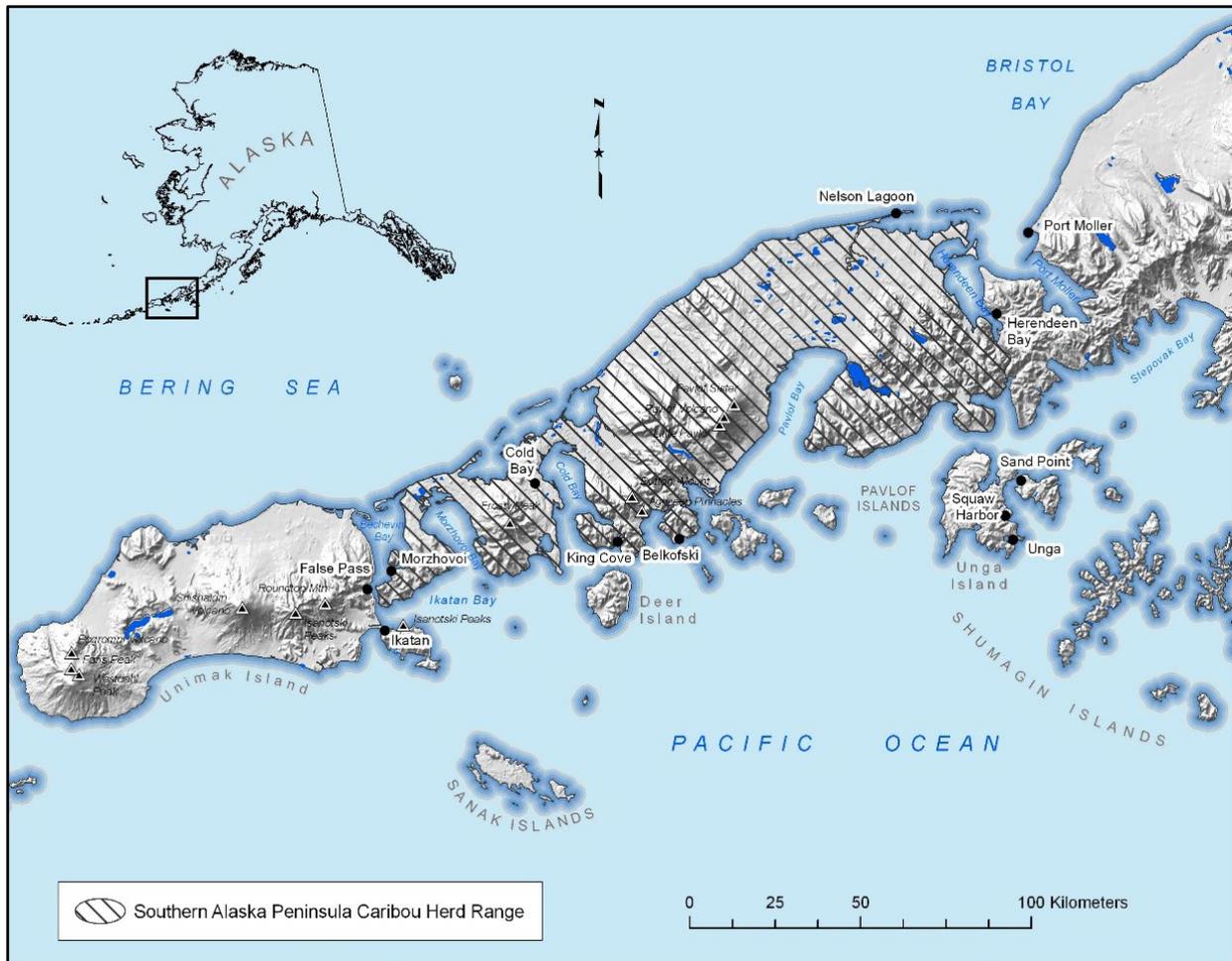
This report provides a record of survey and inventory management activities for caribou in Unit 9D for the previous five regulatory years and plans for survey and inventory management activities in the five years following the end of that period. A regulatory year (RY) begins 1 July and ends 30 June (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 Division of Wildlife Conservation launched this 5-year report to more efficiently report on trends and describe potential changes in data collection activities over the next five years. It replaces the caribou management reports of survey and inventory activities that were previously produced every two years.

## I. RY12–RY16 Management Report

### Management Area

Game Management Unit 9D is approximately 3,325 mi<sup>2</sup> and consists of the southwestern portion of the Alaska Peninsula, bounded on the northeast by a line from the southernmost head of Port Moller Bay to the head of American Bay, on the northwest by the Bering Sea, on the southeast by the Pacific Ocean, and on the southwest by Bechevin Bay and Isanotski Strait at False Pass (Fig. 1). Mountains of the Aleutian Range extend down the Pacific coast of the peninsula providing cool, maritime conditions, alpine tundra, heavy precipitation and high winds. The area is of volcanic origin with ongoing seismic and volcanic activity. Largely unvegetated areas of glaciers, snowfields, or ash-flats dominate in elevations over 300 m (Pitcher et al. 1990); cinder blows is a term used for low-elevation, unvegetated to lightly vegetated areas of volcanic ash, sand and cinders maintained in various sizes and shapes by the wind. Portions of three ecological regions are found in Unit 9D including the Aleutian Range, Bristol Bay Lowlands, and the Alaska Peninsula (Nowacki et al. 2001).

Predators of caribou (*Rangifer tarandus*) occur throughout the Alaska Peninsula at varying densities. Potential predators include bald eagles (*Haliaeetus leucocephalus*), brown bears (*Ursus arcticos*), coyotes (*Canis lantrans*), golden eagles (*Aquila chrysaetos*), wolverines (*Gulo gulo*), and wolves (*C. lupus*).



**Figure 1. Map showing Southern Alaska Peninsula caribou herd range, Unit 9D at the southwestern tip of the Alaska Peninsula.**

## **Summary of Status, Trend, Management Activities, and History of Caribou in Unit 9D**

The range of the Southern Alaska Peninsula Caribou Herd (SAP) extends from Port Moller, southwest to Isanotski Strait at False Pass. 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. The SAP traditionally calves in the Black Hill/Trader Mountain saddle area (BHTM) and on the Caribou River Flats (CRF). Some smaller groups calve between Cold Bay and Bechevin Bay, and in the Joshua Green River valley and lowlands.

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 genetically isolated from mainland caribou with sufficient fidelity to calving areas on the island to be designated a separate herd from the SAP (Zittlau et al. 2009; Mager 2012). Both radiotelemetry and genetic studies indicate the SAP is also separate from the Northern Alaska Peninsula caribou herd (NAP; Zittlau et al. 2009; Mager 2012). Genetic differentiation of the

SAP is due in part to geographic barriers and isolation (Mager 2012). Pitcher et al. (1990) suggested that the insular condition of the SAP was also related to the absence of range into which it might expand that was not already occupied by other caribou herds (i.e., NAP and UCH). In October 1998, six caribou in the extreme southeastern corner of Unit 9E and eight caribou in the northeastern portion of Unit 9D were fitted with satellite collars to further investigate whether interchange between herds occurred in this area. None of these caribou were detected moving from the unit in which they were captured, nor have caribou cows radiocollared in the last two decades.

The SAP has been characterized by wide population fluctuations, ranging from 500 to more than 10,000 caribou. Following a peak of more than 10,000 caribou in 1983, the SAP began a steep decline (Pitcher et al. 1990). By 1993 the herd was below 2,500, the threshold at which all hunting was closed. Poor nutrition appears to have played a major role in the decline of the SAP in the 1980s and early 1990s (Post and Klein 1999). Predation by wolves and brown bears, and human-induced harvest may also have contributed to the decline (Pitcher et al. 1990; Sellers et al. 1999).

The SAP population stabilized during the mid-1990s (Sellers 1995, 2005). In early 1997, a survey conducted by Izembek National Wildlife Refuge (INWR) staff showed a substantial increase in numbers, and a federal subsistence season was opened that fall. The herd continued to grow slowly and in RY99 a general state hunt was opened. Herd size grew to a minimum of 4,100 caribou by 2002 (Butler 2007). Following this brief recovery, from 2002 to 2007, estimates of calf recruitment were chronically low, and population size declined rapidly bottoming out at approximately 657–750 caribou in 2007 (Butler 2009). State and federal hunts were closed in RY07 because of increasing concern for the status of the herd.

#### PREDATOR CONTROL

Sellers et al. (1999) identified wolves as an important contributor to an overall mortality rate of 69% for calves on the SAP in 1999. Predation mortality was not limited to the first two weeks of life common to other caribou populations, but rather was prolonged with approximately half of mortality occurring after calves reached two weeks of age (Sellers et al. 1999). In 2007, 99% of SAP calves died before reaching one month of age, which Butler (2009) attributed primarily to predation. Nutrition was probably not a factor based on body condition of captured adult females, high pregnancy rates and blood serology analysis (Butler 2009). In spring and summer 2008 a predator control program was implemented to reduce wolf predation on caribou calves on the calving grounds. Selective removal of 28 wolves from two selected wolf packs during calving in 2008 immediately improved calf survival. Calf survival increased from less than 1% in 2007 to 64% in 2008 (Butler 2009). This program continued with selective removal of 8 wolves in 2009 and 2 wolves in 2010, after which the program was deactivated. The SAP population size, calf-to-cow ratio and bull-to-cow ratio increased rapidly after wolf control and continued to increase during the reporting period.

#### HARVEST HISTORY

Harvest of the SAP was fairly high from RY80 to RY85, probably exceeding 1,000 in several years. Starting in RY86, restrictive regulations reduced harvests as the herd continued to decline. By RY93 the herd was below 2,500 and all hunting was closed through RY98. In RY99, a state hunt with a 1 caribou bag limit was resumed in Unit 9D with a resident season 1–20 September and 15 November–31 March. Between RY99 and RY04 the bag limit was 1 caribou for residents and 1 bull for nonresidents. In RY05 the resident bag limit went from 1 caribou to 1 bull in the

fall portion of the season or 1 antlerless caribou during the winter. State and federal hunts were once again closed in RY08 because of concern over the herd's status.

## **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).
- Strategic Plan (ADF&G 2002).
- Southern Alaska Peninsula Caribou Herd Operational Plan.

### **GOALS**

To provide:

- The greatest sustainable opportunity to participate in hunting caribou.
- An opportunity to hunt caribou under aesthetically pleasing conditions.
- An opportunity to take large-antlered caribou.

### **CODIFIED OBJECTIVES**

#### Amounts Reasonably Necessary for Subsistence Uses

The SAP has a positive finding for customary and traditional use. The amount necessary for subsistence (ANS) in Unit 9D is 100–150 caribou (5AAC 99.025). Codified regulations provide a Tier II drawing hunt for residents only, when harvestable surplus is below 1,000.

#### Intensive Management

The SAP is recognized as an intensive management population. Intensive management (IM) programs for the SAP were approved by the BOG in 2008 (5AAC 92.108). The IM population objective established by the Board of Game (BOG) for the SAP is 1,500–4,000 caribou. The IM harvest objective for the SAP is 150–200 caribou annually

### **MANAGEMENT OBJECTIVES**

- Sustain a total population with a minimum of 3,000 caribou and a maximum of 4,000 caribou.
- Maintain a minimum fall bull-to-cow ratio of 35:100.
- Provide limited harvest of bulls when the herd exceeds 1,000 caribou.
- Cow harvests may be authorized when the population exceeds 2,000 caribou and population size is increasing based on 3 years of population data.

## MANAGEMENT ACTIVITIES

### 1. Population Status and Trend

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

#### *Data Needs*

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

#### *Methods*

We conducted aerial surveys to assess population composition in October each year during this reporting period except RY15. Fixed-winged aircraft pilots located caribou groups with radiotelemetry equipment, and biologists aboard a helicopter determined composition of each group (cow; calf; yearling; and bull: small, medium, or large). We assessed survey comprehensiveness using the proportion of radiocollared caribou encountered relative to total radiocollared caribou. Composition data were entered into a deterministic model to assess and predict herd dynamics and size.

#### *Results and Discussion*

Department staff conducted composition surveys of the SAP in October during each year of the reporting period except 2015 (Table 1). Proportion of bulls in the population remained above the minimum objective of 35 bulls:100 cows (Table 1). Proportion of calves was on an increasing trend until at least 2014, and thereafter apparently stabilized at a productive level. Using survey results as input parameters, the population size predicted by computer model continued to increase during the reporting period. The computer model has provided more consistent results for predicting population size compared to adjusting sample size with collar detection rate as a population index, because both sample size and collar detection can vary widely depending on flying conditions. The computer model predicts a post-hunt population above our lower management objective (3,000 caribou) by 2019 given current input parameters.

**Table 1. Southern Alaska Peninsula caribou herd composition, U. S. Fish and Wildlife Service population counts and predicted population size, 2012–2016.**

Regulatory year	Bulls: 100 cows	Calves: 100 cows	% Calves	% Cows	% Bulls	Sample size	Model-predicted population size	INWR <sup>a</sup> counts
2012	45	20	12	60	27	500	1,181	
2013	50	40	21	53	26	1,273	1,397	877
2014	45	45	24	53	24	884	1,653	1,316
2015	–	–	–	–	–	–	1,902	1,568
2016	49	38	21	53	26	1,422	2,153	

<sup>a</sup> Izembek National Wildlife Refuge staff routinely fly winter surveys when snow conditions are good.

#### *Recommendations for Activity 1.1*

Continue.

## ACTIVITY 1.2. Conduct parturition survey to estimate pregnancy rate.

### *Data Needs*

Pregnancy rate is an indicator of productivity and is used in a computer model to predict herd size.

### *Methods*

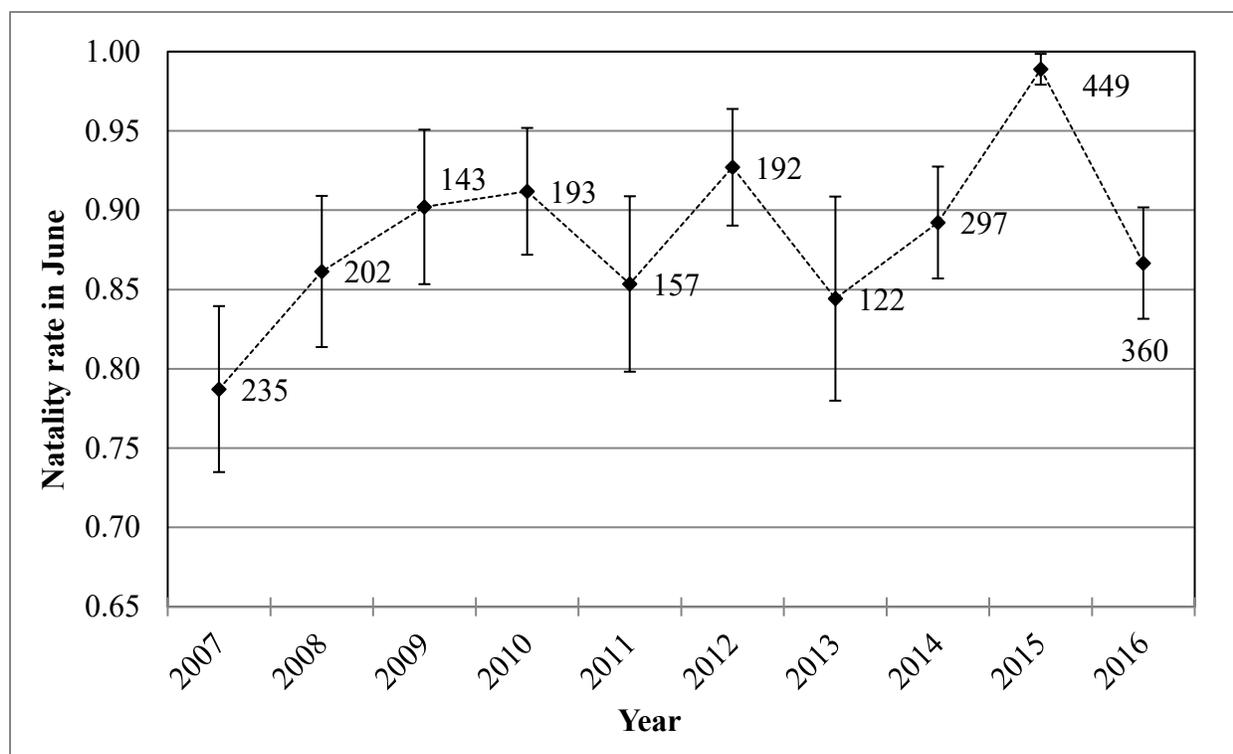
We flew parturition surveys in late May or early June, attempting to sample at least 25% of the herd. Fixed-winged aircraft pilots located caribou groups with radiotelemetry equipment, and biologists aboard a helicopter counted and determined composition and pregnancy status of each sample. We classified caribou on the calving grounds as parturient cow (with calf, 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 SAP each year of the reporting period (Fig. 2). The pregnancy rate was excellent and more than sufficient to allow continued population increase for the SAP. This is also a strong indication that the quality of nutrition available in their habitat range is good.

### *Recommendations for Activity 1.2*

Continue.



**Figure 2. Southern Alaska Peninsula caribou herd natality rate, 95% binomial confidence intervals and sample size, 2007–2016.**

ACTIVITY 1.3. Maintain a sample of 20–30 radiocollared caribou on the SAP. Capture caribou to deploy radio collars and maintain an adequate number and distribution of radiocollared animals.

#### *Data Needs*

Periodically monitor population size, composition, seasonal movements, and survival rate by radiotracking collared caribou. Maintain an adequate number of collared animals to ensure adequate sample size, and a wide sample distribution, which is particularly important when density is low.

#### *Methods*

Caribou were captured and marked with radio collars. All caribou were immobilized from an R-44 helicopter using standard techniques approved by an Animal Care and Use Committee. During each capture standard measurements and blood samples were taken as required.

#### *Results and Discussion*

In Unit 9D, we captured and collared 20 cows in April 2016, 20 in 2014, and 2 in 2012. Cows were in good to excellent body condition with low-level warble infestations. Currently there are approximately 40 active collars deployed on the SAP.

#### *Recommendations for Activity 1.3*

Continue.

ACTIVITY 1.4. Conduct calf mortality study on the SAP as needed to determine factors limiting calf survival. This is not an annual activity.

#### *Data Needs*

If developing intensive management projects becomes necessary, an assessment of calf predators is important to more aggressively manage the caribou population. Calf survival is an index of recruitment into the population and is used in a computer model to predict size and trends in the population.

#### *Methods*

In late May 2013 daily flights were conducted on the SAP using a using fixed-winged aircraft to locate post-parturient cows and to evaluate the parturition status of all previously marked 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. Our field facility was the Hoodoo Lodge conveniently located near the calving grounds at Black Hill/Trader Mountain saddle area (BHTM) and the Caribou River Flats (CRF) and near enough to Nelson Lagoon for fueling aircraft.

Calves were located via collared cows or systematic searching. Age of each calf encountered was evaluated from a R-44 helicopter and an attempt was made to catch all calves greater than 2 hours old. When a candidate was located, the helicopter hovered to drop off one or two 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 with mortality mode attached to elastic, expandable nylon collars designed to break off if the animal grows sufficiently. Radio collars weighed 0.29 lbs (134g, 1.7% of body mass on average). Weight of the calf was measured using a spring scale and cloth sling that was discarded after each use to avoid scent transfer. The calf's sex was recorded along with the condition of the umbilicus, hoof characteristics, posture, and running ability which were later used to evaluate age. Handling time averaged less than one minute. Birth mass was estimated for each calf (Adams 2005).

When a calf mortality signal was detected, biologists helicoptered to the site to evaluate 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 predators on site, wounding patterns, tracks, hair, scat, caching behavior, bone fragments, remnant hide configuration or other signs. We also examined all remains to determine if other factors contributed to death. We considered the first 15 days of life to be the neonatal period.

### *Results and Discussion*

We captured and monitored survival of 57 calves and investigated cause of death within 24 hours when possible. Of these calves, 43 (75%) were still alive after the neonatal period (birth to 2 weeks of age). Predators were responsible for all 13 mortalities investigated (54% wolves and 46% brown bears). One calf mortality that occurred on the last day of the project could not be investigated because of volcanic ash fallout and poor weather. Healthy caribou calf weights and paucity of nonpredation mortalities indicate that nutrition is not limiting SAP population growth or survival.

At time of capture, calf ages ranged from a few hours to 2 days, with mode of 1 day. Average weights for captured calves was 16.8 lbs for males (7.6 kg, n=26), and 15.7 lbs for females (7.1 kg, n=25). These were similar (within 0.9 lbs/0.4 kg) to weights of SAP calves captured previously (Riley 2011).

### *Recommendations for Activity 1.4*

Repeat when necessary.

## 2. Mortality-Harvest Monitoring and Regulations

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

### *Data Needs*

Harvest data are an important component of managing the SAP for sustained yield.

### *Methods*

Hunting has been closed on SAP caribou since 2008. With the increase in herd size the INWR implemented a limited subsistence hunt for local residents in RY12, and the Board of Game initiated a conservative Tier II hunt for resident hunters only in RY13. In RY16, the hunt moved from the Tier II hunt to a harvest ticket hunt for residents and nonresidents. We determined harvest quota with the aid of computer model simulating current population size, composition, survival rates and production, and on historical harvest levels. Hunters were required to report whether they hunted or not and whether successful or not.

### Season and Bag Limit

Hunt and effective dates	Open to	Season dates	Bag Limit
<u>RY12–present</u>			
Federal hunt FC0909	local residents	10 Aug–20 Sep and 15 Nov–31 Mar	one bull.
<u>RY13–RY15</u>			
State Tier II hunt TC506	state residents	10 Aug–30 Sep and 15 Nov–31 Mar	one bull
<u>RY16–present</u>			
State harvest ticket hunt	Residents	1 Aug–30 Sep and 15 Nov–31 Mar	one caribou
	Nonresidents	1 Aug–30 Sep	one caribou

### Results and Discussion

#### Harvest by Hunters

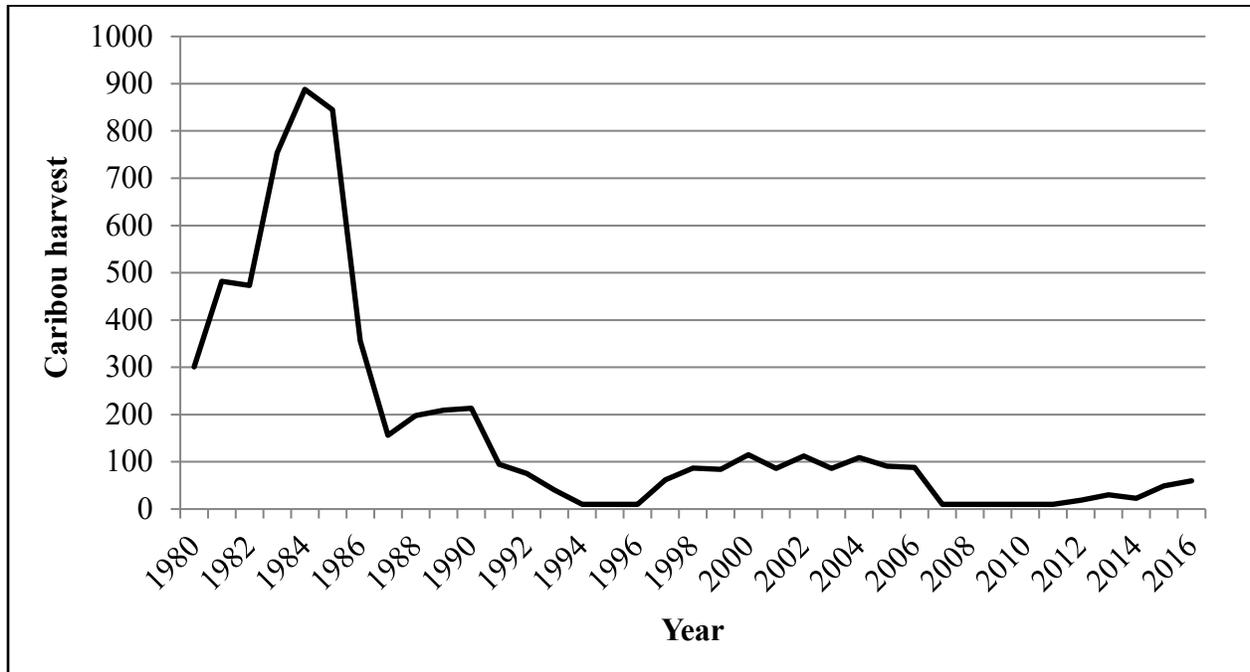
Harvest (Table 2) remained well below objective and the herd continued to grow rapidly. With continued low harvest and increasing herd size, in RY16 the hunt was made a general harvest ticket hunt with a one caribou bag limit. RY16 was the first hunt allowing nonresident harvest since 1999. Bull harvest typically exceeds 85% with an any-caribou bag limit on the SAP.

Historically, caribou harvest on the SAP has been relatively low because of few hunters and remoteness (Fig. 3). When the herd numbered approximately 10,000 caribou in the mid-1980s harvest approached 1,000, but this was not adequate to control population size at the time (Fig. 3). As the population approaches our lower management objective of 3,000 the challenge will be to ramp up harvest appropriately to control population size.

**Table 2. Unit 9D Southern Alaska Peninsula caribou harvest, regulatory years 2001–2016.**

Regulatory year	Reported harvest			Unknown sex	Total reported	Federal hunt	Estimated other <sup>a</sup>	Estimated total
	M	(%)	F					
2001	52	(93)	4	0	56	14	30	100
2002	62	(91)	6	3	71	0	30	101
2003	47	(96)	2	1	50	11	30	91
2004	68	(87)	10	1	79	6	30	115
2005	58	(95)	3	0	61	0	30	91
2006	56	(97)	2	0	58	0	30	88
2007	–	–	–	–	closed	0	10	10
2008	–	–	–	–	closed	0	10	10
2009	–	–	–	–	closed	0	10	10
2010	–	–	–	–	closed	0	10	10
2011	–	–	–	–	closed	0	10	10
2012	–	–	–	–	closed	9	10	19
2013	17	(94)	1	0	18	2	10	30
2014	11	(92)	1	0	12	1	10	23
2015	27	(93)	2	0	29	1	10	40
2016	38	(88)	5	0	43	10	10	63

<sup>a</sup> Other sources of human-caused mortality include wounding loss, unreported harvest, and illegal harvest.



**Figure 3. Historical harvest of caribou on the Southern Alaska Peninsula in Unit 9D, Alaska, 1980–2016.**

Hunter Residency and Success

In RY16, the first year of the harvest ticket hunt, 37 residents hunted (19 of which were local residents of Unit 9D), and 6 were nonresidents.

Harvest Chronology

The majority of the harvest occurred during the 2nd half of September, during the reporting period.

Transport Methods

Primary methods of transportation used by successful hunters during the reporting period were airplanes and boats.

*Other Mortality*

Not applicable.

*Alaska Board of Game Actions and Emergency Orders*

Following the wolf reduction program, when composition counts, bull-to-cow ratios, and calf survival indicated a surplus of harvestable bulls, the Board of Game established a Tier II subsistence hunt, TC506, effective fall 2013; followed by a general season hunt and increased season length effective fall 2016.

### *Recommendations for Activity 2.1*

Continue.

### 3. Habitat Assessment-Enhancement

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

#### *Data Needs*

Body condition is an index to the nutritional status of the range.

#### *Methods*

Caribou are captured and marked with radio collars. All caribou are immobilized from an R-44 helicopter using standard techniques approved by an Animal Care and Use Committee. During each capture standard measurements and blood samples are taken as required.

#### *Results and Discussion*

Body condition assessment is recorded in capture records. Captured cows have been in good to excellent condition, pregnancy rates have been in the normal range.

### *Recommendations for Activity 3.1*

Continue.

## **NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS**

### 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

Southern Alaska Peninsula Caribou Operational Plan. A joint plan of the Alaska Department of Fish and Game and the United States Fish and Wildlife Service. Effective 1 March 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 SAP indicated continued upward trend and high bull-to-cow ratio during the reporting period. Calf-to-cow ratio also remained high. Model-predicted population

abundance is expected to exceed the lower management objective of 3,000 caribou by RY19. With the continued upward trend and exceeding 35 bulls:100 cows in the population we opened a Tier II drawing hunt for residents in RY13, which we subsequently replaced with a harvest ticket hunt in RY16. Thus far reported harvest has been less than 70 caribou. Because of relatively few hunters and difficult access to Unit 9D, we recommend proactively increasing harvest opportunity and maximizing attempts to limit herd size to 4,000 caribou.

## **II. Project Review and RY15–RY19 Plan**

### **Review of Management Direction**

#### **MANAGEMENT DIRECTION**

The existing management direction for the SAP is appropriate and there are no recommended changes.

#### **GOALS**

To provide:

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

The existing goals are appropriate and there are no recommended changes. Providing a population level for sustainable harvest also provides other uses such as viewing, photography, and monitoring caribou seen near villages by local residents. 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 crash in the future so that hunting is not closed to allow population recovery. Controlling population size of the SAP is a challenge that will soon be upon the department.

#### **CODIFIED OBJECTIVES**

##### Amounts Reasonably Necessary for Subsistence

The ANS for the SAP is 100–150 caribou. This is a reasonable harvest quota given the low human population in Unit 9D.

##### Intensive Management

The intensive management population objective established by the board is 1,500–4,000 caribou, and harvest objective is 150–200 caribou annually. These are appropriate management levels for the SAP.

## Management Objectives

1. Sustain a total population with a minimum of 3,000 caribou and a maximum of 4,000 caribou.
2. Maintain a minimum fall bull-to-cow ratio of 35:100 caribou.
3. Provide limited harvest of bulls when the herd exceeds 1,000 caribou.
4. Cow harvests may be authorized when the population exceeds 2,000 caribou and population size is increasing based on 3 years of population data.

The first objective will require maximizing harvest as the population exceeds 3,000 animals. This requires a Board of Game action to increase the annual bag limit above one caribou per hunter. Based on historical harvest reports, limiting the herd to 4,000 caribou will be problematic with hunter harvest alone, even if we went to an unrestricted season and bag limit. The most likely scenario in the next decade or two will be the same as occurred during the 1980s: a continued increase to over 10,000 caribou, overbrowsing of habitat, followed by a steep decline, decades-long recovery of the range, hunting closure, and controversial predator control to conserve a remnant population. Closing a hunt because we could not adequately manage a herd is not sustainable management, although we often resort to it with caribou. The alternative, in addition to unrestricted hunter harvest, would be culling of the herd by ADF&G. Culling of ungulates for sustainability of a herd is currently not a tool in our toolbox, but perhaps we should begin a discussion.

Objectives three and four above originated as guidelines (among many others) in a joint management plan with the USFWS in 2008. The authors think that they should be considered as guidelines only and removed from the objectives.

### 1. Population Status and Trend

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

#### *Data Needs*

We use the fall composition survey to monitor bull-to-cow ratio, number, and ratio of bulls in the population determine harvest quota, provide maximum hunting opportunity, and provide input to our population simulation model. Calf parameters are also used in the model, and to monitor productivity and survival. A decline in calf-to-cow ratio to less than 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 SAP (see Activity 1.4 above); however, this is not anticipated in the next 5 years. In the absence of post-calving aggregations at low population density, composition surveys have provided a means to monitor population trend. This activity should continue.

#### *Methods*

The methods are described in the above report section, Activity 1.1. Results will be reported with 95% binomial confidence intervals as appropriate.

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

### *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 SAP. This activity should continue during the next 5 years. We will consult a biometrician to define 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 SAP parturition survey has been relatively easy.

### *Methods*

The methods are described in the above report section, Activity 1.2. Results will be reported with 95% binomial confidence intervals as appropriate.

ACTIVITY 1.3. Maintain a sample of radiocollared caribou, and an adequate number of collared animals for surveys which is critical for locating adequate sample sizes and obtaining a wide distribution during surveys, particularly when at low density for the SAP.

### *Data Needs*

This is a routine management activity for caribou populations. An issue with a growing population such as the SAP, is whether to maintain a set upper limit of marked animals, or a proportion of collared animals in the population. Given the access limitations on the peninsula, and minimal seasonal movements of SAP caribou, an upper limit of 30 marked animals may be appropriate. However, until the population increases to the management objective size, the number of marked animals required for the upper limit may be unclear. In the meantime, maintaining 20–30 marked cows in the population has been adequate for other management activities.

### *Methods*

All caribou will be immobilized from an R-44 helicopter using standard techniques approved by an Animal Care and Use Committee. Each caribou will be fitted with a VHF radio collar.

ACTIVITY 1.4. As needed, repeat calf mortality study to determine factors limiting calf survival. Given the current status of the herd, including increasing size and good calf-to-cow ratio, we do not anticipate conducting further calf mortality study in the next 5 years.

### *Data Needs*

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*

The methods are described in the Methods section above.

## 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 are an important component of managing the SAP for sustained yield. This activity should continue. An issue with the SAP is the potential difference in reporting on harvest ticket hunts versus Tier II permits, and with harvest ticket reporting in the past versus now. We should consider improving or maximizing harvest reporting on the SAP with follow-up emails or personal telephone calls to resident hunters. Nonresident hunters are usually hunting with a guide and are more reliable in reporting harvest.

### *Methods*

The methods are described in the Methods section above

## 3. Habitat Assessment-Enhancement

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

### *Data Needs*

Body condition is an index to 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 SAP every few years, this is not an annual activity.

## **NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS**

### Data Recording and Archiving

No changes are needed locally.

### Agreements

Southern Alaska Peninsula Caribou Operational Plan. A joint plan of the Alaska Department of Fish and Game and the United States Fish and Wildlife Service. Effective 1 March 2008.

### Permitting

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

## **References Cited**

- 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.
- 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. 2002. Strategic Plan. Division of Wildlife Conservation, Juneau.
- Butler, L. B. 2007. Unit 9D caribou management report. Pages 43–50 [In] P. Harper, editor. Caribou manage report of survey and inventory activities 1 July 2004–30 June 2005. Alaska Department of Fish and Game. Federal Aid in Wildlife Restoration Study 3.0. Juneau.
- Butler, L. B. 2009. Unit 9D caribou management report. Pages 43–51 [In] P. Harper, editor. Caribou manage report of survey and inventory activities 1 July 2006–30 June 2008. Alaska Department of Fish and Game. Federal Aid in Wildlife Restoration. Study 3.0, Juneau.
- Mager, K. H. 2012. Population structure and hybridization of Alaskan caribou and reindeer: integrating genetics and local knowledge. PhD Dissertation. University of Alaska Fairbanks. Fairbanks, Alaska.
- Nowacki, G., P. Spencer, T. Brock, M. Fleming, and T. Jorgenson. 2001. Unified ecoregions of Alaska and neighboring territory (map). U.S. Geological Survey, Reston, Virginia.
- Pitcher, K., C. Dau, D. Johnson, R. Sellers, R. West. 1990. Causes of low calf recruitment in the Southern Alaska Peninsula caribou herd and recent herd history. Research Progress Report. Alaska Department of Fish and Game, Juneau.
- Post, E., and D. R. Klein. 1999. Caribou calf production and seasonal range quality during a population decline. *Journal of Wildlife Management* 63(1):335–345.  
doi:10.2307/3802517
- Riley, M. D. 2011. Southern Alaska Peninsula Unit 9D caribou management report. Pages 44–52 [In] P. Harper, editor. Caribou management report of survey and inventory activities 1 July 2008–30 June 2010. Alaska Department of Fish and Game. Juneau, Alaska.
- Sellers, R. A. 1995. Unit 9D caribou management report. Pages 47–55 [In] M. V. Hicks, editor. Caribou management report of survey and inventory activities 1 July 1992–30 June 1994. Alaska Department of Fish and Game. Federal Aid in Wildlife Restoration. Study 3.0, Juneau.
- Sellers, R. A. 2005. Unit 9D caribou management report. Pages 49–56 [In] C. Brown, editor. Caribou management report of survey and inventory activities 1 July 2002–30 June 2004. Alaska Department of Fish and Game. Federal Aid in Wildlife Restoration. Study 3.0, 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. Alaska Department of Fish and Game, Division of Wildlife Conservation and U.S. Fish and Wildlife Service, Final Report, December 1999. Cooperative Agreement 99-017. Alaska Department of Fish and Game, King Salmon, Alaska.
- Skoog, R. O. 1968. Ecology of the caribou (*Rangifer tarandus granti*) in Alaska. Doctoral dissertation, University of California, Berkeley.

- 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, March 8–9, 2003. Department of Natural Resources and Environment, Government of the Northwest Territories, Manuscript No. 183, Fort Smith, Canada.



