

## Plains Bison Management Report and Plan, Game Management Unit 19:

Report Period 1 July 2013–30 June 2018, and  
Plan Period 1 July 2018–30 June 2023

**Jonathan S. Barton**



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## **Plains Bison Management Report and Plan, Game Management Unit 19:**

Report Period 1 July 2013–30 June 2018, and

Plan Period 1 July 2018–30 June 2023

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Juneau, AK 99811-5526



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 pay state hunting license and tag fees. These taxes and fees fund the federal Wildlife Restoration Program and the State of Alaska's Fish and Game Fund, which provided funding for the work reported on in this publication.

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This species management report and plan was reviewed and approved for publication by Doreen Parker McNeill, Management Coordinator for Region III for the Division of Wildlife Conservation.

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

Barton, J. S. 2021. Plains bison management report and plan, Game Management Unit 19: Report period 1 July 2013–30 June 2018, and plan period 1 July 2018–30 June 2023. Alaska Department of Fish and Game, Species Management Report and Plan ADF&G/DWC/SMR&P-2021-34, Juneau.

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## Purpose of this Report

This report provides a record of survey and inventory management activities for plains bison (*Bison bison*) in Unit 19 for the 5 regulatory years 2013–2017 and plans for survey and inventory management activities in the following 5 regulatory years, 2018–2022. A regulatory year (RY) begins 1 July and ends 30 June (e.g., RY13 = 1 July 2013–30 June 2014). This report is produced primarily to provide agency staff with data and analysis to help guide and record agency efforts but is also provided to the public to inform it 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 bison management report of survey and inventory activities that was previously produced every 2 years.

## I. RY13–RY17 Management Report

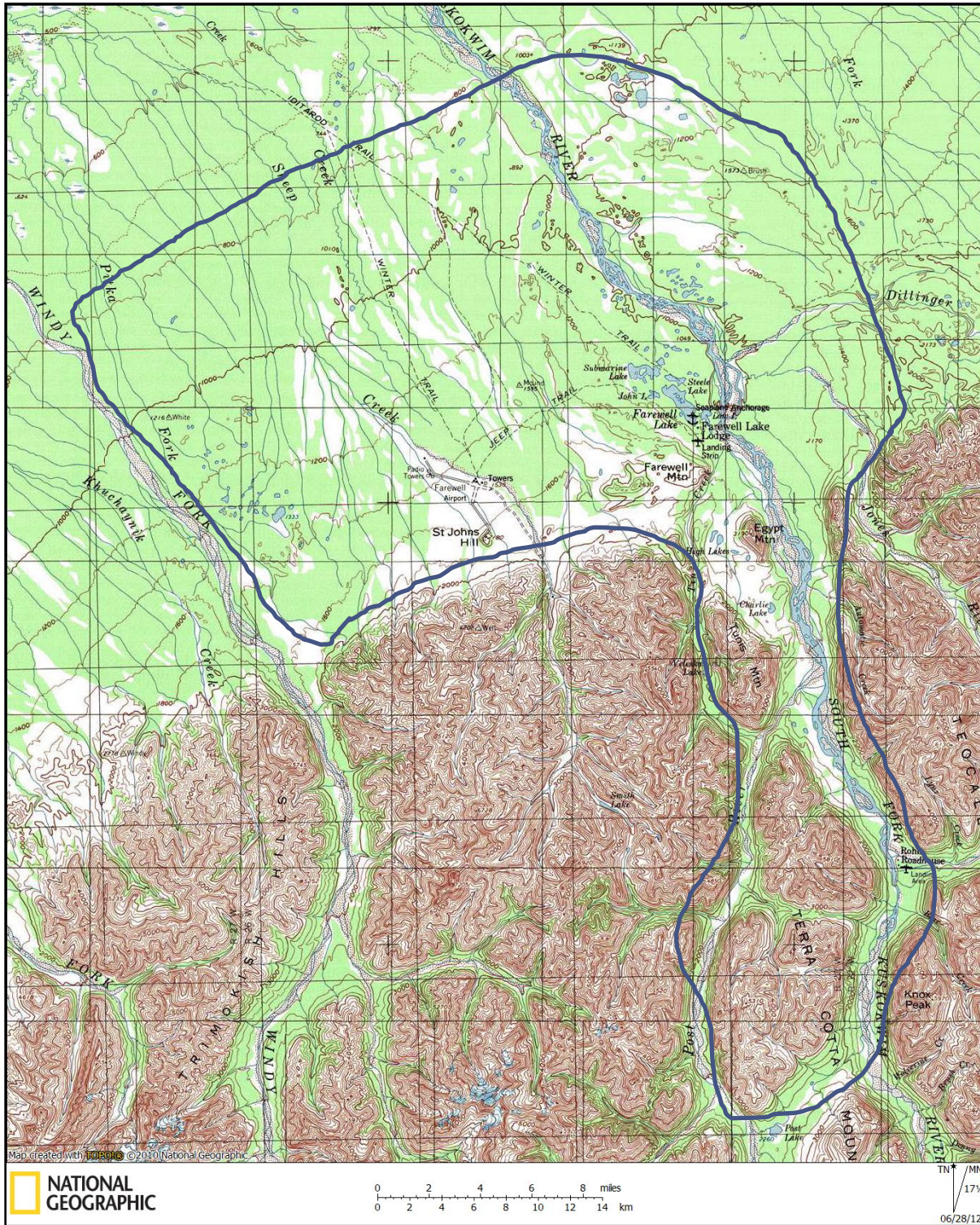
### Management Area

The management area, Game Management Unit 19, consists of 4 administrative units for wildlife management purposes: Units 19A, 19B, 19C, and 19D. Unit 19 covers approximately 36,486 mi<sup>2</sup> within Interior Alaska. It includes all drainages into the Kuskokwim River upstream from a straight line drawn between Lower Kalskag and Paimiut. Bison only inhabit areas of 19D and 19C, namely the area of Farewell. Habitat includes rugged higher elevation areas within the Alaska Range to riparian corridors flowing out of the range into lower elevated vegetated flats consisting of shrubs, brushy substrate, and small lakes.

### Summary of Status, Trend, Management Activities, and History of Bison in Unit 19

The Farewell bison herd was established in 1965 by translocating 18 bison from the Delta bison herd. The Alaska Department of Fish and Game (ADF&G) translocated an additional 20 bison from Delta in 1968 to supplement the herd. The original stock was transported to Delta Junction in 1928 from the National Bison Range in Montana (Burriss and McKnight 1973, Paul 2009). During 1968–1999, the Farewell herd flourished, reaching a population size of approximately 350 animals (Paul 2009).

The herd generally ranged over the 1977 Bear Creek burn until the early 2000s; however, as forest succession converted the post-burn area grasses and browse to trees, bison began to focus along the South Fork Kuskokwim River and Farewell area (Farewell Lake, Farewell Airport etc., Fig. 1). Summer range was investigated by Waggoner and Hinkes (1986) and bison were found primarily along the rivers and floodplains within the Alaska Range. The summer diet was 94% willow (*Salix* species); the fall diet was 60% willow, and 40% silverberry (*Elaeagnus commutata*) and buffaloberry (*Shepherdia canadensis*). While summer habitat tends to be iced over in winter, Waggoner and Hinkes (1986) believed that, in general, summer habitat was not limiting. Campbell and Hinkes (1983) investigated winter diets and habitat use after the Bear Creek burn in 1977 and found



**Figure 1. Typical search area and range of Farewell Bison, represented by the thicker solid blue line drawn on the topographic map.**



sedges to be an important component of the winter diet. The post-fire habitat was rich in this type of forage, and open sedge/grasslands hold less snow and encourage bison movements. Campbell and Hinkes (1983) estimated the preburn carrying capacity of the area to be approximately 100 animals; however, the 1977 burn expanded available winter habitat considerably. Upland sedge/grassland habitats such as the Bear Creek burn require a frequent fire regime of approximately every 10 years. By 2010 the Bear Creek burn was 33 years old and had senesced considerably. In spring 2010 the Turquoise Lake fire reburned an important portion of the Bear Creek Burn, which appears to be having a positive impact on bison numbers. The Turquoise Lake burn area has reached peak contribution to bison habitat and has likely tapered off in productivity. The Pitka Fork burn in 2017 was the most recent burn in the Farewell bison herd area. This fire was substantial and burned about 16,800 acres just east of the Windy Fork River. This burn area will be a major contribution to new bison habitat in the future.

The first hunt for Farewell bison was held in 1972. The number of drawing permits issued annually ranged 40–80 during RY72–RY05 but was reduced to 20 permits in RY06 and 10 for RY07–RY13 due to declining herd size. Drawing permits are issued through a state-sponsored lottery system, where applicants apply for the preferred hunt, pay a nonrefundable fee, and await draw results published by the state. Historically, interest in this hunt has been high, with thousands of people applying for the hunts each year, and the number of applicants greatly outnumbering the available permits.

Bison herds free of domestic cattle gene introgression are rare in North America (Halbert and Derr 2007). We collected bison genetic samples from hunters and during captures in 2008 and 2011 to confirm whether Farewell bison are genetically pure plains bison. Genetic studies found that Farewell bison are free of domestic cattle gene introgression (James Derr, Texas A&M University, personal communication, June 2011). As such, this bison population is an important consideration for conservation.

## **Management Direction**

The Farewell bison harvest is managed for optimal sustained yield of animals based on herd size and trend.

### **EXISTING WILDLIFE MANAGEMENT PLANS**

The plan section of this document outlines the current plan for bison in Unit 19. Previous management direction has been documented in the Unit 19 bison management reports of survey and inventory activities.

### **GOALS**

- G1. Maintain a population of sufficient size to reduce the genetic risks associated with small populations.
- G2. Maintain a sustainable harvest.
- G3. Maintain and enhance bison habitat in cooperation with other land management agencies.

## **CODIFIED OBJECTIVES**

### Amounts Reasonably Necessary for Subsistence Uses

The Board of Game has not made a positive customary and traditional use finding for Farewell bison.

### Intensive Management

Plains bison has not been designated as a candidate species for intensive management by the Board of Game.

## **MANAGEMENT OBJECTIVES**

- M1. Maintain a population of at least 300 bison after the March hunt and prior to calving.
- M2. Maintain a harvest of up to 40 bison.
- M3. Maintain at least 50% of the bison winter range in sedge/grasslands and shrubs.

## **MANAGEMENT ACTIVITIES**

### 1. Population Status and Trend

ACTIVITY 1.1. Deploy and maintain enough radio collars on bison to monitor the herd distribution, movements, and population size (Objective M1)

#### *Data Needs*

Radio collars provide the primary means of locating groups of bison to conduct minimum population counts, and to identify movements and distribution. Because of the grouping behavior of bison, one radiocollared individual can aid in locating other unmarked members of the herd. Department staff will deploy up to 15 radio collars every 2 years to maintain the appropriate proportion of collars in the herd. Deployment at this rate will replace collars as they become defunct, but also supplement the marked component as the herd grows.

#### *Methods*

PA-18 and similar fixed wing aircraft were used to search for bison, and Robinson R44 helicopters were used to access individual bison for immobilization and collaring.

Bison were immobilized using Pseudart™ rifle and darts. Darts were loaded with 5.1 mg carfentanil citrate (Wildnil®) and 60 mg xylazine hydrochloride (Anased®). Once immobilized, bison were fitted with radio collars, and then given intramuscular injections of naltrexone hydrochloride (Trexonil®, Wildlife Pharmaceuticals) at a dosage of 100 mg naltrexone citrate/mg carfentanil citrate to antagonize the carfentanil nitrate and tolazoline hydrochloride (ZooPharm, Windsor, Colorado) at a dosage of 1.5 mg/kg body weight to antagonize the

xylazine hydrochloride. Blood, feces, and hair samples were collected for pregnancy, disease, and genetic testing.

### *Results and Discussion*

Department staff radiocollared 10 female bison in April 2013, 20 female bison in April 2015, and 9 female bison in April 2017. As of RY17 there were 49 bison with active radio collars.

### *Recommendations for Activity 1.1*

Continue. Radiocollaring cows at 2-year intervals ensures nonfunctioning collars are replaced and that there is an adequate number of radiocollared animals in the herd to enable effective population counts and surveys.

ACTIVITY 1.2. Conduct aerial surveys of bison to assess herd distribution, population status, and herd composition (Objectives M1, M2).

### *Data Needs*

Aerial surveys allow us to estimate herd size, composition, and distribution. We rely on the results of these surveys to help to determine the number of draw permits that will be available the following regulatory year. These data are critical for making informed management decisions regarding harvest and herd health.

### *Methods*

We conducted aerial surveys annually during April–June, and in October after the fall hunt, to estimate herd size, composition, and distribution. Surveys were flown using fixed-wing aircraft (PA-18). We used radiotelemetry as the primary means of locating groups of bison and documented bison observed while radiotracking. While search intensities varied, we obtained a minimum herd size by surveying all known bison habitat in the vicinity of Farewell Station and along the South Fork of the Kuskokwim River (Fig. 1). We classified bison from an altitude at which aircraft noise did not affect bison behavior ( $\geq 500$  feet above ground level [AGL]). We classified bison as calves  $\leq 6$  months old or as adults (any bison which were not clearly calves). Counts conducted in October are done after the fall hunt season to collect data on distribution and movements.

### *Results and Discussion*

Our population objective of at least 300 bison was achieved in every year during RY13–RY17. We have seen a steady increase in population size during this period indicated by the increasing number of bison observed during our minimum population counts (Table 1.) We saw our highest overall count in spring 2017 due to high neonate counts (115 calves). Consecutive low snow years preceding spring 2017 most likely contributed to the high calf count. The winter of 2017 contained much more snow accumulation and colder weather making access to vegetation more difficult. These variables may help explain the lower calf counts in 2018.

Reviewing the high counts of bison greater than 6 months old from each year shows a stable if not a slightly increasing population of over 400 bison. We will continue to monitor minimum population counts and calf counts to help understand population trends, fluctuations, and

**Table 1. Farewell bison aerial composition surveys and total bison observed, 2008–2018.**

Survey date	Bison >6 months old	Calves ≤6 months old		Bison observed
		Number	Percent	
8/21/08	186	31	14	217
6/3/09	174	30	15	204
4/7/10	169	1	<1	170
4/6/11	177	0	0	177
6/16/11	200	61	23	261
10/7/11	–	–	–	210
4/3/12	253	2	<1	255
6/7/12	270	60	18	330
6/11/13	235	25	10	260
6/27/14	319	85	21	404
6/11/15	332	73	18	405
4/7/16	344	22	6	366
6/8/16	402	92	19	494
10/24/16	–	–	–	379
6/15/17	395	115	23	510
10/16/17	–	–	–	368
4/19/18	318	21	6	339
5/17/18	435	28	6	463
6/8/18	468	23	5	491

*Note:* An en dash in a cell indicates it was not possible to count or calculate the composition information for that survey.

recruitment. Recent data suggest that the landscape can support a herd size of greater than 400 individuals at this point in time. Future data and analysis will be used to evaluate the perpetuity of a Farewell bison herd numbering 400 and greater individuals. Covariates such as wildfire, snow conditions, predation, and winter habitat range all play important roles in affecting herd health and population trajectories.

Fall counts conducted in October 2016 and 2017 were generally lower than spring survey results due to broader herd distribution and smaller groups. October surveys provide insight into pre-winter distributions and grouping behavior. While still considered a minimum population count, these counts are more subject to sightability problems because bison are more widely distributed in smaller groups. Not all radiocollared individuals may be located which implies there are a certain number of bison that have not been counted.

#### *Recommendations for Activity 1.2*

Continue. Aerial surveys are instrumental to gathering information on bison population status, composition, and trends. These data provide the basis for informed management decisions.

## 2. Mortality, Harvest Monitoring, and Regulations

### ACTIVITY 2.1. Monitor harvest through mandatory permit reporting. (Objective M2)

#### *Data Needs*

Mandatory harvest reporting provides annual harvest data that are used in conjunction with annual survey data to manage bison in Unit 19. Harvestable surplus is determined after analyzing population survey counts, hunter harvest and effort, and calving rates within a regulatory year.

#### *Methods*

Hunters are required to report details concerning their hunt such as success, date of kill, days hunted, transportation, sex, and general location. We estimate annual harvest, hunter success, methods and other metrics of the bison hunt of bison from data collected on these hunt reports and housed in ADF&G's Wildlife Information Network (WinfoNet) server (<http://winfonet.alaska.gov/index.cfm>) to assess and analyze harvest information. Data metrics are compiled and analyzed to assess future harvest opportunity.

#### *Seasons and Bag Limit*

<u>Unit 19 Bag limit</u>	<u>Resident seasons</u>	<u>Nonresident seasons</u>
<u>RY13</u> 1 bison every 10 regulatory years by drawing permit only.	1 Sep–30 Sep (DI351) or 1 Mar–31 Mar (DI352)	1 Sep–30 Sep (DI351) or 1 Mar–31 Mar (DI352)
<u>RY14–RY16</u> Residents 1 bison every 10 regulatory years by drawing permit only. Nonresidents 1 bison per life by drawing permit only.	1 Sep–30 Sep (DI351) or 1 Mar–31 Mar (DI352)	1 Sep–30 Sep (DI351) or 1 Mar–31 Mar (DI352)
<u>RY17</u> Residents 1 bison every 10 regulatory years by drawing permit only. Nonresidents 1 bison per life by drawing permit only.	22 Aug–10 Oct (DI351) or 1 Mar–31 Mar (DI352)	22 Aug–10 Oct (DI351) or 1 Mar–31 Mar (DI352)

#### *Results and Discussion*

##### Harvest by Hunters

Annual harvest ranged 6–32 bison during RY13–RY17 (Table 2). The large range of harvest is primarily due to the increase in available permits over the reporting period. In fall hunts (DI351), 57–100% of all bison taken were bulls compared to 33–81% in the spring hunt (DI352). Cow harvest in the fall was 10–43%, compared to 19–67% in the spring (Table 2). Hunters prefer to

**Table 2. Farewell bison harvest data by permit hunt, regulatory years 2013–2017.**

Hunt number	Regulatory year	Permits issued	Did not hunt (%)	Unsuccessful hunters <sup>a</sup> (%)	Successful hunters <sup>a</sup> (%)	Bulls (%)	Cows (%)	Unk	Total harvest
DI351 (Fall)	2013	5	1 (20)	1 (25)	3 (75)	3 (100)	0 (0)	0	3
	2014	10	2 (20)	1 (13)	7 (87)	5 (71)	2 (29)	0	7
	2015	10	1 (10)	2 (22)	7 (78)	4 (57)	3 (43)	0	7
	2016	20	7 (35)	3 (23)	10 (77)	9 (90)	1 (10)	0	10
	2017	20	2 (10)	2 (11)	16 (89)	12 (75)	4 (25)	0	16
DI352 (Spring)	2013	5	2 (40)	0 (0)	3 (100)	1 (33)	2 (67)	0	3
	2014	10	4 (40)	2 (33)	4 (67)	2 (50)	2 (50)	0	4
	2015	10	5 (50)	1 (20)	4 (80)	2 (50)	2 (50)	0	4
	2016	20	3 (15)	3 (18)	14 (82)	8 (57)	6 (43)	0	14
	2017	20	3 (15)	1 (6)	16 (94)	13 (81)	3 (19)	0	16

<sup>a</sup> Successful and unsuccessful hunter information includes only those permittees who hunted.

take bulls because they are larger and have both more meat and trophy potential. However, misidentification and low numbers of bison sighted per hunter can result in female harvest. Higher female harvest in the spring may be due to the sparser grouping and higher dispersal of bison that time of year.

### Governor's Permits

The first Governor's Permit was issued in 1998. The sportsmen's group awarded the permit kept 10% of the proceeds, and returned the remainder of the money to ADF&G. Only three additional Governor's permits (SI352) have been issued since then. Those hunts occurred in spring 2004, 2006, and 2018.

### Harvest Chronology

Bison harvest data were organized into roughly 10-day increments in both the spring and fall hunt periods (Table 3). The fall hunt season was extended by discretionary permit authority in RY17 to begin 10 August and end 10 October. Most of the fall harvest took place within the first 10 days of September, while most of the spring harvest occurred within the first 20 days, weighted slightly toward the first 10 days of the hunt.

Since the fall hunt was extended in RY17, most fall harvest has taken place within the first 10 days of the season in late August. Two hunters took bison in the later part of the extension during October. Overall, the hunt date extensions in the fall seem to have spread the harvest out over a wider range of dates.

### Hunter Residency and Success

Historically, and during RY13–RY17, the vast majority of permittees for the Farewell bison hunts were Alaska residents (Table 4). Of the permit winners who hunted during this report period, 3 were nonresidents, 5 were local residents, and 92 were nonlocal residents (Table 4).

The average annual success rate during RY13–RY17 was 81% for the fall hunt (DI351) and 85% for the spring hunt (DI352; Table 2). The slightly higher success rate in spring is likely to be due to better access using snowmachines and ski-equipped airplanes. Overall, 23% of all permit winners did not hunt during RY13–RY17 and 84% of permit winners who hunted were successful (Table 4).

### Transport Methods

This hunt is in a remote area that can be difficult to access. Airplanes were the primary means of transport (Table 5) with snowmachines, which are used during the spring hunt, the second most common means of transport. Boats are used primarily on float trips within select drainages in the Farewell area.

**Table 3. Farewell bison harvest chronology by season and month/day, regulatory years 2013–2017.**

Regulatory Year	Harvest chronology by season and by month/day								
	Fall					Spring			
	8/22–31	9/1–10	9/11–20	9/21–30	10/1–10	3/1–10	3/11–20	3/21–31	
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	
2013	0 (0)	1 (33)	2 (67)	0 (0)	0 (0)	1 (33)	0 (0)	2 (67)	
2014	0 (0)	3 (42)	2 (29)	2 (29)	0 (0)	2 (50)	2 (50)	0 (0)	
2015	0 (0)	5 (71)	1 (14)	1 (14)	0 (0)	1 (25)	2 (50)	1 (25)	
2016	0 (0)	6 (60)	1 (10)	3 (30)	0 (0)	5 (36)	7 (50)	2 (14)	
2017 <sup>a</sup>	7 (44)	2 (12)	3 (19)	2 (12)	2 (12)	8 (50)	5 (31)	3 (18)	

<sup>a</sup> Hunt season was amended to begin 22 August and end 10 October.

**Table 4. Farewell bison hunter residency and success, regulatory years 2013–2017.**

Regulatory year	Successful					Unsuccessful					Total hunters
	Local <sup>a</sup> resident	Nonlocal resident	Non resident	Unk	Total (%)	Local <sup>a</sup> resident	Nonlocal resident	Non resident	Unk	Total (%)	
2013	0	6	0	0	6 (86)	0	1	0	0	1 (14)	7
2014	0	11	0	0	11 (79)	0	3	0	0	3 (21)	14
2015	2	8	1	0	11 (79)	0	3	0	0	3 (21)	14
2016	3	19	2	0	24 (80)	0	6	0	0	6 (20)	30
2017	0	32	0	0	32 (91)	0	3	0	0	3 (9)	35

<sup>a</sup> Local residents are hunters who live in Unit 19.

**Table 5. Farewell bison harvest by primary transport method, regulatory years 2013–2017.**

Regulatory year	Harvest by transport method				<i>n</i>
	Airplane (%)	4-wheeler (%)	Snowmachine (%)	Boat (%)	
2013	4 (57)	3 (43)	0 (0)	0 (0)	7
2014	8 (57)	2 <sup>a</sup> (14)	3 (21)	1 (7)	14
2015	9 (64)	2 (14)	3 (21)	0 (0)	14
2016	13 (43)	3 (10)	13 (43)	1 (3)	30
2017	20 (57)	3 (9)	10 (28)	2 (6)	35

<sup>a</sup> Includes one hunter who used an off-road vehicle



### *Other Mortality*

Based on anecdotal information from pilots and hunters and information gathered during telemetry flights for bison, it appears wolf and grizzly bear predation on the Farewell bison herd remains low; this is consistent with previous reports (Whitman 1998).

Heavy snowfall and prolonged winters can influence bison body condition and recruitment, contributing to natural mortality.

### *Alaska Board of Game Actions and Emergency Orders*

There were no actions taken by the Board of Game and no Emergency Orders issued during RY13–RY17.

### *Recommendations for Activity 2.1*

Continue. Issuing drawing permits and evaluating results of harvest reporting has been a successful way to monitor and manage harvest. This practice helps to provide maximum hunting opportunity and quality experiences for hunters.

ACTIVITY 2.2. Adjust the number of drawing permits and sex ratio of the harvest using discretionary permit authority to achieve a harvest lower than recruitment until the population objective is achieved (Objectives M1, M2).

### *Data Needs*

Fluctuations in population numbers and calving require flexibility in permit distribution to ensure overharvest does not occur. Yearly adjustments to permit availability and conditions may be necessary to keep the bison harvest lower than recruitment. If cow harvest becomes too high, permit conditions may be changed to allow for bull-only harvest.

### *Methods*

We adjust the number of drawing permits issued each year based on herd size, calving, hunter success, effort, and bison recruitment. Harvest reporting, minimum population counts, and calving data are used to analyze herd health and demographics to make these decisions.

### *Results and Discussion*

As the herd size and recruitment increased during RY13–RY17, the number of permits issued increased from 5 to 20 during both the spring and fall hunts. No necessary sex restrictions were placed on the hunts as herd demographics were stable and seemed to be improving. The total number of permits issued increased to 20 in RY14–RY15, and 40 permits during RY16–RY17. Approximately 4,600 drawing permit applications were received for the combined fall and spring hunts in RY17, indicating continued strong hunter interest in pursuing these bison. Interest in bison hunting greatly exceeds the number of permits available.

### *Recommendations for Activity 2.2*

We will modify this activity for RY18–RY22 to manage for optimum harvest levels as the population objective of at least 300 bison has been achieved.

### 3. Habitat Assessment and Enhancement

ACTIVITY 3.1. In the absence of natural fires, conduct a controlled burn in cooperation with other agencies to reset bison habitat to an early successional stage every 5 to 10 years. (Objective M3).

#### *Data Needs*

Burns are vital to bison health as they provide new successional growth for consumption. Supplementing naturally occurring fires with controlled burns will help to ensure adequate habitat is available for the Farewell bison herd.

#### *Methods*

Habitat in need of revitalization from controlled burns is assessed and analyzed throughout the year. Coordination with state and federal government land managers occurs to assess the feasibility of controlled burns in selected habitat. Coordinating agencies contribute resources to help ensure the burn is conducted in a controlled environment and permitting requirements are met.

#### *Results and Discussion*

There were no controlled burns conducted within the reporting period. Agency priorities, funding, and resources are variables within the planning process that must be contended with before resources can be allocated to controlled burns for purposes of bison habitat restoration and expansion. Interagency support is present, and progress is being made towards the future implementation of a cooperative controlled burn within the Farewell bison range.

In RY16 the Pitka Fork and the Sheep Creek wildfires burned about 16,800 acres and 32 acres, respectively, east of the Windy Fork River. The Pitka Fork burn will likely be a substantial contributor to bison habitat by providing early successional plant growth for bison forage.

#### *Recommendations for Activity 3.1*

Regional wildlife management staff will continue to collaborate with other land management agencies and the Division of Wildlife Conservation's fire management coordinator, Sue Rodman, to plan and accomplish controlled burns within the range of the Farewell herd.

ACTIVITY 3.2. Assess habitat during aerial surveys (Objective 3).

#### *Data Needs*

Assessing habitat quality and availability helps us to monitor carrying capacity, an important component of understanding herd health and population limitations. Understanding habitat-induced limitations is also important for assessing future herd distribution and growth potential, which impact the allowable harvest of bison.

#### *Methods*

Minimum population and recruitment counts conducted in the spring and fall provide us with the opportunity to examine and evaluate bison habitat. From our aerial surveys and telemetry flights,

we can locate major areas of utilization and winter ranges. Body condition is noted to further supplement vegetative succession data and browse availability.

### *Results and Discussion*

We observed an increase in shrubby vegetation and young trees diminishing viable bison habitat within portion of the Farewell herd range. There seems to be adequate habitat and forage to sustain the population at current levels for a limited time, but an increase in this succession without the revitalization of habitat through burns, either natural or anthropogenic, may impede herd growth and sustainability in the future.

### *Recommendations for Activity 3.2*

We will continue to assess habitat during aerial surveys and field operations to help monitor bison carrying capacity, habitat-induced limitations, future herd distribution, and growth potential, which all impact the allowable harvest of bison.

## **NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS**

### Data Recording and Archiving

- Harvest, capture, and survey data will be stored on an internal database housed on ADF&G's Wildlife Information Network (WinfoNet) server (<http://winfonet.alaska.gov/index.cfm>) and archived in WinfoNet under Harvest Information and Survey and Inventory Tools.
- All hard copy data sheets, paper files, etc. are found in the file cabinet in the McGrath regional office.
- Capture records, survey memorandums, reports, and other pertinent electronic survey and inventory information will be archived in WinfoNet-Data Archive. Project Title: McGrath Area Office

### Agreements

There are no agreements.

### Permitting

None.

## **Conclusions and Management Recommendations**

Based on aerial surveys conducted during RY13–RY17 it appears bison numbers increased during the report period. We achieved population objective M1 of 300 post hunt, precalving bison during the report period (Table 1). We had 49 radiocollared animals at the end of the report period and planned to deploy 15 additional radio collars in April 2019. This will help maintain a sufficient sample to monitor herd distribution and population size.

We met objective M2, to maintain a harvest of up to 40 bison during RY13–RY17. We will continue to issue 40 permits per year based on the minimum population estimate of 491 bison obtained at the end of RY17. It is unclear if objective M3, to maintain at least 50% of the bison winter range in sedge/grasslands and shrubs, was met. Little is known about the current carrying capacity, but controlled burns will likely be necessary in the near future to promote new successional growth to provide adequate winter forage. In 2010 the Turquoise Lake fire burned almost 92,000 acres, and the Dillinger River fire in 2009 burned approximately 24,000 acres. Both burns were utilized by bison during RY13–RY17, but they are reaching their peak productivity, and habitat quality for bison will begin to decline. The June 2017 Pitka Fork Fire burned about 16,800 acres east of the Windy Fork, generally considered the western boundary of Farewell bison distribution. This fire will likely contribute substantially to new bison habitat and herd health and increase herd presence in this area.

By RY17 the herd appeared to number more than 400 bison with potentially more than 500 individuals. However, it is unclear how long current habitat availability will support these larger herd numbers and promote growth. Prior to RY13, it was unclear if habitat constraints would prohibit a minimum viable population of bison reaching a high of 400 individuals (Peirce 2012). With this threshold now exceeded, future monitoring and data will be used to assess if these numbers can persist in conjunction with specific density dependent and independent covariates including but not limited to habitat, predation, and climate.

The minimum population of 300 bison may be ideal for genetic conservation, because smaller populations have lower heterozygosity and fitness and are at greater risk of inbreeding depression and genetic drift (Gross et al. 2006). Therefore, maintaining a minimum population of at least 300 animals may be important not only for harvestable surplus, but also to maintain the genetic viability of the population. We recognize that improving habitat using controlled burns may be necessary to maintain a herd of this size, and that a population of 400 may fluctuate due to habitat constraints.

We recommend continued herd monitoring for the next reporting period, as well as deployment of additional radio collars. The Department will continue to manage for optimum harvest levels and increased harvest opportunity. Additional restrictions are not suggested at this time as herd demographics seem to be improving. This herd is important not only because of the unique hunting opportunity it provides, but also because of its importance to bison conservation.

## **II. Project Review and RY18–RY22 Plan**

### **Review of Management Direction**

#### **MANAGEMENT DIRECTION**

The management direction for bison in Unit 19 will largely go unchanged. We will modify our previous management objective to issue permits on the sustained yield principle, as opposed to just 40 permits. The department has the authority to issue up to 100 permits when the population can support such harvest levels.

## **GOALS**

The current goals for Unit 19 bison are appropriate and will remain unchanged. Specifically, the goals will remain as follows:

- G1. Maintain a population of sufficient size to reduce the genetic risks associated with small populations.
- G2. Maintain a sustainable harvest.
- G3. Maintain and enhance bison habitat in cooperation with land management agencies.

## **CODIFIED OBJECTIVES**

### Amounts Reasonably Necessary for Subsistence Uses

The Board of Game has not made a positive customary and traditional use finding for Farewell bison.

### Intensive Management

Plains bison has not been designated as a candidate species for intensive management by the Board of Game.

## **MANAGEMENT OBJECTIVES**

The RY13–RY17 objectives for Unit 19 bison were appropriate and will remain largely unchanged. However, objectives will be changed slightly to reflect the intent of these objectives as follows:

- M1. Maintain a population of at least 300 bison after the March hunt and precalving (G1).
- M2. Issue a number of hunting permits to maintain a harvest that is within the sustained yield principle (G1, G2).
- M3. Maintain at least 50% of the bison winter range in sedge/grasslands and shrubs (G3).

## **REVIEW OF MANAGEMENT ACTIVITIES**

### 1. Population Status and Trend

ACTIVITY 1.1. Deploy and maintain up to 20 radio collars on bison every other year to monitor herd distribution, movements, and population size (Objectives M1, M2).

### *Data Needs*

Radio collars provide the primary means to locate bison to conduct minimum population counts, calving counts, and distribution. Because of the grouping behavior of bison, one radiocollared individual can aid in locating other unmarked members of the herd.

### *Methods*

We will use PA-18 and similar fixed wing aircraft to search for bison, and Robinson R44 helicopters to access individual animals to immobilize and collar them. Bison will be immobilized using Pseudart™ rifle and darts. Because carfentanil will no longer be available, darts will be loaded with thiafentanil (Thianil®, Wildlife Pharmaceuticals), administered at 6.0mg with 40mg of xylazine. Once immobilized, bison will be fitted with radio collars, and then given intramuscular injections of naltrexone hydrochloride (Trexonil®, Wildlife Pharmaceuticals) at a dosage of 10 mg naltrexone citrate/mg thiafentanil to antagonize the thiafentanil and tolazoline hydrochloride (ZooPharm, Windsor, Colorado) at a dosage of 0.1 mg/mg xylazine to antagonize the xylazine hydrochloride. All bison will be given oxytetracycline at 4.5 ml/100 lbs. Blood, feces, and hair samples may be collected for pregnancy, disease, and genetic testing. This activity should be accomplished at regular intervals to keep up with a growing herd and replace older, non-functioning radio collars which may have exceeded battery life or received damage. We will try to accomplish this every 2 years and collar up to 20 female bison.

ACTIVITY 1.2. Conduct aerial surveys of bison to assess herd distribution, population status, and herd composition (Objectives M1, M2).

### *Data Needs*

These data are critical for making informed management decisions regarding harvest and herd health. Aerial surveys allow us to estimate herd size, composition, and distribution. Results of these surveys help determine the number of draw permits to make available the following regulatory year.

### *Methods*

We will conduct surveys during April–June and October. Spring surveys provide the percent calves in the population, an indicator of possible recruitment into the reproductive segment of the population, and minimum population counts. October surveys provide minimum population counts before monitoring efforts taper off for the winter. Surveys are conducted in April after the spring hunt, and after the fall hunt ending early October. Surveys will be flown using fixed-wing aircraft (PA-18 or similar). We will continue to use radiotelemetry as the primary means of locating groups of bison.

## 2. Mortality, Harvest Monitoring, and Regulations

ACTIVITY 2.1 Monitor harvest through mandatory permit reporting (Objectives M1, M2).

### *Data Needs*

Mandatory harvest reporting provides harvest, sex, location, effort in field, and transportation information. These data are used in conjunction with survey data to help manage bison in Unit

19. Through comparisons of calving counts, minimum population counts, and harvest mortality, draw permits can be adjusted to adhere to sustained yield principles.

#### *Methods*

Hunters are required to report details concerning their hunt such as success, date of kill, days hunted, transportation, sex, and general location. We estimate annual harvest, hunter success, methods and other metrics of the bison hunt of bison from data collected on these hunt reports and housed in ADF&G's Wildlife Information Network (WinfoNet) server (<http://winfonet.alaska.gov/index.cfm>) to assess and analyze harvest information. Data metrics are compiled and analyzed to assess future harvest opportunity on the herd.

ACTIVITY 2.2. Adjust the number of drawing permits to maintain sustainable harvest (Objective M2).

#### *Data Needs*

It is necessary to make adjustments to permit availability to ensure overharvest does not occur and provide optimal harvest opportunity.

#### *Methods*

The number of draw permits available for issue will be adjusted to ensure we achieve optimal harvest levels. Population size, recruitment, and sex composition data are used to assess harvestable surplus in the Farewell bison herd.

### 3. Habitat Assessment and Enhancement

ACTIVITY 3.1. Conduct a controlled burn in cooperation with other agencies to reset bison habitat to an early successional stage every 5 to 10 years (Objective M3).

#### *Data Needs*

Controlled burns are important in promoting new early successional growth for bison forage such as sedges and grasses. Conducting burns every 5 to 10 years ensures early stages of successive vegetation are available to the Farewell bison at regular intervals to maintain healthy herd populations and growth.

#### *Methods*

In cooperation with land management agencies, mature vegetation in areas that are important summer and winter foraging habitat will be selected for controlled burns every 5 to 10 years as funding and resources allow.

ACTIVITY 3.2. Assess habitat during aerial surveys (Objective M3).

#### *Data Needs*

Assessing habitat during surveys will provide data on herd health and growth capacity. Information gathered from these surveys will help determine management decisions regarding controlled burns and habitat manipulation.

### *Methods*

We will assess habitat during aerial surveys conducted in the spring and fall. Habitat such as new and old burn areas, old growth vegetation, high elevation disturbance, and extended area occupancy or absence, can provide an informal index of habitat use and preference.

ACTIVITY 4.1. Prepare information and data for and write a 5-year Farewell Bison management report and plan (Objectives M1, M2, and M3).

### *Data Needs*

It is important to collect, compile, and store data needed to manage the Farewell herd in order to assess progress toward meeting objectives to manage population size, harvest, and habitat.

### *Methods*

We will collect, compile, and store data needed to manage Farewell bison and record this information in a written 5-year management report and plans.

ACTIVITY 4.2. Provide information to state and federal regulatory processes and the public on management of the Farewell bison herd.

### *Data Needs*

In order for regulatory bodies and the public who engage in regulatory processes to understand management and biology of Farewell bison, it is important for staff to communicate and coordinate with Fish and Game Advisory Committees, the Alaska Board of Game, and federal regulatory bodies about Farewell bison management and biology and review and analyze regulation proposals for the Alaska Board of Game and Federal Subsistence Board.

Increasing public awareness of Farewell bison management directions through newsletters, brochures, news releases, and other documents may also be implemented. These will provide the public with valuable information to make informed decisions when participating in these regulatory processes.

### *Methods*

We will attend meetings of Fish and Game Advisory Committees and the Alaska Board of Game, to provide information about Farewell bison biology and management and review and analyze regulation proposals for the Alaska Board of Game and the Federal Subsistence Board.

## **NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS**

### Data Recording and Archiving

- Harvest, capture, and survey data will be stored on an internal database housed on ADF&G's Wildlife Information Network (WinfoNet) server (<http://winfonet.alaska.gov/index.cfm>) and archived in WinfoNet under Harvest Information and Survey and Inventory Tools.



- All hard copy data sheets, paper files, etc. are found in the file cabinet in the McGrath regional office.
- Capture records, survey memorandums, unpublished reports, and other pertinent electronic survey and inventory information will be archived in WinfoNet Data Archive. Project Title: McGrath Area Office.

### Agreements

There are no agreements.

### Permitting

None.

## References Cited

- Burris, O. E., and D. E. McKnight. 1973. Game transplants in Alaska. Alaska Department of Fish and Game, Division of Game, Wildlife Technical Bulletin 4, Juneau.
- Campbell, B. H., and M. Hinkes. 1983. Winter diets and habitat use of Alaska bison after wildfire. *Wildlife Society Bulletin* 11(1):16–21.
- Gross, J. E., G. Wang, N. D. Halbert, P. A. Gogan, J. N. Derr, and J. W. Templeton. 2006. Effects of population control strategies on retention of genetic diversity in National Park Service bison (*Bison bison*) herds. Revised final research report submitted to Yellowstone Research Group USGS-BRD. Montana State University, Bozeman.
- Halbert, N. D., and J. N. Derr. 2007. A comprehensive evaluation of cattle introgression into US federal bison herds. *Journal of Heredity* 98(1):1–12.
- Paul, T. W. 2009. Game transplants in Alaska. Alaska Department of Fish and Game, Division of Wildlife Conservation, Technical Bulletin No. 4, 2nd edition, Juneau.
- Peirce, J. M. 2012. Unit 19 bison. Pages 16–27 [In] Alaska Department of Fish and Game, P. Harper, editor, Bison management report of survey and inventory activities 1 July 2009 through 30 June 2011, Species Management Report ADF&G/DWC/SMR-2012-1, Juneau, Alaska.
- Seavoy, R. J. 2014. Unit 19 bison. Pages 17–29 [In] P. Harper and L. A. McCarthy, editors. Bison management report of survey and inventory activities 1 July 2011–30 June 2013, Alaska Department of Fish and Game, Species Management Report ADF&G/DWC/SMR-2014-2, Juneau.
- Waggoner, V., and M. Hinkes. 1986. Summer and fall browse utilization by an Alaskan bison herd. *Journal of Wildlife Management* 50(2):322–324.
- Whitman, J. S. 1998. Unit 19 bison. Pages 16–24 [In] M. Hicks, editor. Bison management report of survey and inventory activities 1 July 1995 through 30 June 1997. Alaska Department of Fish and Game, Division of Wildlife Conservation, Federal Aid in Wildlife Restoration Project 9.0, Juneau.





