

Plains Bison Management Report of Survey-Inventory Activities, 1 July 2011–30 June 2013

Patricia Harper and Laura A. McCarthy, editors



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Plains Bison Management Report of Survey- Inventory Activities, 1 July 2011–30 June 2013

Alaska Department of Fish and Game
Division of Wildlife Conservation
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Juneau, Alaska 99811-5526



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PLAINS BISON MANAGEMENT REPORT

From: 1 July 2011

To: 30 June 2013

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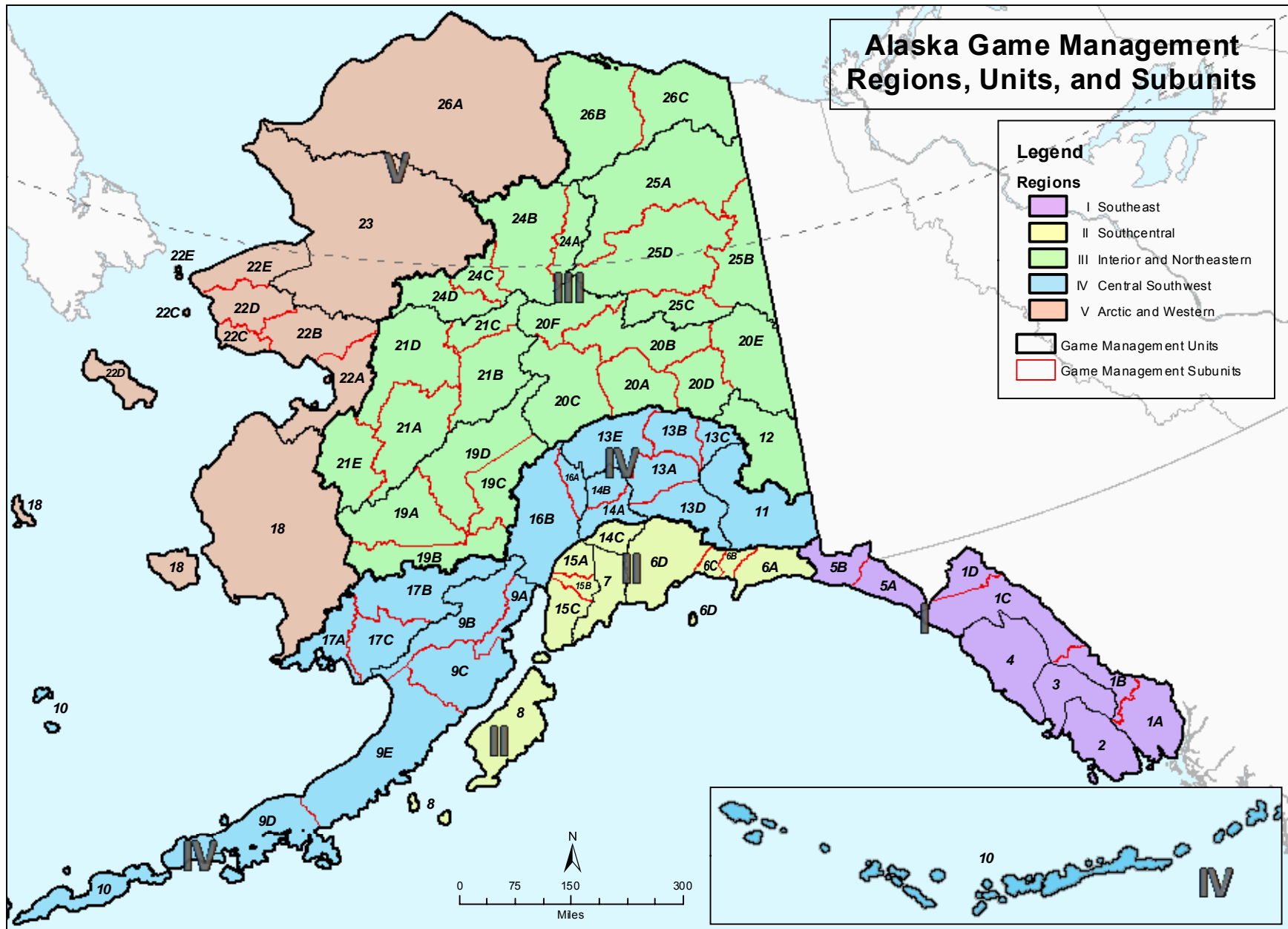
Alaska Game Management Regions, Units, and Subunits

Legend

Regions

- I Southeast
- II Southcentral
- III Interior and Northeastern
- IV Central Southwest
- V Arctic and Western

- Game Management Units
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SPECIES
MANAGEMENT REPORT

Alaska Department of Fish and Game
Division of Wildlife Conservation
(907) 465-4190 – PO Box 115526
Juneau, AK 99811-5526

PLAINS BISON MANAGEMENT REPORT

From: 1 July 2011
To: 30 June 2013

LOCATION

GAME MANAGEMENT UNIT: 11 (12,784 mi²)

HERD: Copper River Herd

GEOGRAPHIC DESCRIPTION: Klawasi River to the Kotsina River

BACKGROUND

The Copper River bison herd originated from animals relocated to Delta Junction, Alaska, from the National Bison Range in Moise, Montana, in 1928. In 1950, five bulls and 12 cows were moved from the Delta herd to Slana in the northern portion of Game Management Unit 11. These bison moved away from the release site, and by 1961 they had relocated down the Copper River to the Dadina and Chetaslina river drainages, where they remained. Throughout the years, herd estimates have varied from a low of 51 bison in 1967 to a high of 156 in 2013. The most important known factors controlling herd size are snow depth and hunter harvest.

The department held the first hunt, by registration permit, for Copper River bison in regulatory year (RY) 1964 (RY64 = 1 July 1964 through 30 June 1965). Between RY64 and RY88, hunters harvested 217 bison from this herd. The hunt was closed in RY89 by emergency order because of a decline in herd size after a winter with extremely deep snowpack. Hunting remained closed until RY99, when herd size and productivity increased enough to resume annual harvests. Harvests since RY99 have been under a drawing permit hunt.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

- Maintain the herd at a minimum of 60 overwintering adults by controlling the number of bison taken by hunters.

METHODS

Aerial surveys were conducted to estimate the minimum population size of the herd and evaluate its composition following the spring calving period. Between 1984 and 1992, radio collars were used to help locate the herd during spring surveys. Currently, there are no radio collars in this herd. Surveys are conducted in early June, when bison are most aggregated in open areas along the Copper or Dadina Rivers. Hunter harvest is monitored by drawing permit.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

Following a period of growth in the 1950s, the Copper River bison herd was relatively stable during the late 1960s and 1970s. Numbers declined appreciably in the late 1980s and remained low until the mid-1990s. The herd began increasing again from an estimated 64 animals in 1995. In 2012, the herd numbered 111. The count the next year, 2013, was 40% higher, at 156 bison; this was the highest count ever recorded, and included 34 calves and 122 adults (Table 1).

Population Composition

Calf production has averaged 24 calves a year over the last 10 years surveyed (range = 18–34), with the count of 34 calves in 2013 being the highest ever observed in this herd. The number of adults in the herd has exceeded the overwintering minimum population objective of 60 adults since 1997.

Distribution and Movements

The Copper River bison herd inhabits a home range bounded by the Klawasi River on the north, the Copper River on the west, the Kotsina River to the south, and the Wrangell Mountains to the east. Bison or bison sign was seldom observed north of the Dadina River until recently, coinciding with the increase in herd size. The herd's seasonal distribution includes intensive use of the floodplain and bluffs along the Copper River and sedge swamps above the river during winter and spring. During summer, the bison move to higher elevations along the Dadina and Chetaslina rivers to feed on vegetation as it greens up later in the season. During the late 1970s and the 1980s, there were only occasional reports of bison along the western bank of the Copper River in Unit 13. It was surmised that human disturbance in the Kenny Lake area and hunting pressure would prevent range expansion to the west, but bison were reported grazing in hay and crop fields in the Kenny Lake area during the 1990s. Most of these bison were harvested during subsequent hunts, which reduced crop damage on farms in the Kenny Lake area.

MORTALITY

Harvest

Season and Bag Limit. The hunting season for residents and nonresidents in Unit 11 and Subunit 13D is 1 September through 31 March. The hunt area includes that portion of Unit 11 east of the Copper River, south of the Klawasi River and Sanford Glacier, west of a line from Mount Sanford to Mount Wrangell to Long Glacier, and west of the Kotsina River and that portion of Subunit 13D north of the Edgerton Highway. The bag limit is one bison every 10 regulatory years for residents while nonresidents are allowed only one bison permit per lifetime.

Board of Game Actions and Emergency Orders. There were no Board of Game actions or Emergency Orders issued during this reporting period.

Hunter Harvest. In RY11, hunters harvested 9 bulls and 4 cows (Table 2). The harvest dropped in RY12 to 6 animals. Since RY11, 19 animals have been harvested.

Permit Hunts. The Copper River bison hunt is administered through a drawing hunt (DI454) with a limit of up to 24 permits that can be issued annually (Table 2). There were 24 permits issued each year RY04–RY07, but only 18 were issued in RY08 because of the decline in the annual minimum count. The number of permits issued was increased to 24 in RY09. Interest in this hunt continues to remain stable with an average of 1,559 applications between RY11 and RY12. In RY12, a single governor's tag was awarded for the Copper River hunt. Permittees were required to notify the department prior to 1 September if they would hunt. Permittees were required to report to the Glennallen office to pick up their permits and detailed maps of the hunt area, including land ownership patterns. Successful hunters were also required to report to the Glennallen office within one day of leaving the field.

Access to the Copper River herd was limited to public lands along the Copper River and private farms along the Edgerton Highway for many years. A large portion of the herd's range includes private property which was recently opened to hunters in RY06 under a private permit system where a fee is charged by the landowner. Most of the bison are on this private land and permittee success is higher if an access permit is purchased.

Hunter Residency and Success. In RY11, all 13 bison harvested were taken by nonlocal Alaska residents. Nonlocal residents and local residents harvested 3 and 2 bison, respectively during RY12 (Table 3). Additionally, the only nonresident that hunted in RY12 was successful. Since RY99, 7 nonresidents have hunted with 6 successfully harvesting a bison from this herd.

Historically, the hunt was popular with local residents. In RY88, 40% of the hunters were local-residents. When the hunt was converted from a registration hunt to a drawing hunt, local opportunity to participate in the hunt was reduced.

Harvest Chronology. During RY11, hunters took 13 bison. Most of the animals were harvested during September (38%), March (31%), and October (23%). In contrast, 60% of the harvest occurred in February the following regulatory year (Table 4.) Since RY99, September has been the most important harvest period, accounting for 43 reported kills (53%), March was second with 32 reported kills (40%), and October was third with 23 reported kills or 28% of the harvest.

Transport Methods. Boats continue to be the most important method of transportation for successful hunters, followed by snowmachines and aircraft (Table 5). Snowmachines can be used only once the Copper River freezes. Aircraft are used only during years of low snow cover, when some bison remain east of the Copper River in the flats near Dadina Lake.

Other Mortality. We monitored winter severity and the potential for winter starvation by recording snow depths at the Dadina Lake snow station. This station is near the bluffs along the Copper River where the herd winters. Snow depth appears to be a critical factor in overwinter bison survival. In years with deep snow, bison mortality increases and calf production and survival declines. The last winter classified as severe was recorded in 1994, the year before the population bottomed out. The snowfall in 2012 was the highest seen since 1994, but did not appear to have any impact on the population the following year as the 2013 spring counts indicated an increase in herd numbers.

Field observations of the Copper River herd suggest accidental death may be an important source of natural mortality to bison. Sources of accidental mortality include falling off steep bluffs that border the Copper River and drowning in the river. During winter, bison use the bluffs extensively for feeding. These slopes have predominantly clay soils, which hold moisture and freeze. The frozen clay creates a steep slide with little, if any, secure footing for the bison. Drowning mortality is difficult to document because dead bison are swept downriver.

Wolves, black bears, and brown bears are relatively abundant on the Copper River bison range. These predators are certainly capable of killing bison; however, no data are available to assess predation rates on Copper River bison.

HABITAT

Assessment

Habitat conditions have not been studied on the Copper River bison range. Most of the range is black spruce forest. Bison frequent swamps, sedge openings, grassy bluffs, and river bars of the Copper, Dadina, and Chetaslina rivers. Field observations of these preferred feeding locations, such as the Copper River bluffs, show evidence of heavy use and limited forage production.

CONCLUSIONS AND RECOMMENDATIONS

The Copper River bison herd has doubled in size since the 1990s, reaching a 25-year high with a minimum of 156 bison in 2013, even with a 10-year harvest of 86 bison, including 33 cows. Calf production and survival the last 5 years surveyed has been high, ranging 18–34 calves observed a year. The number of adult bison has exceeded the minimum management objective of 60 overwintering bison for the last 13 years, and the minimum count of 156 in 2013 is the highest ever observed.

The herd has extended its range north, using the sandbars and bluffs along the Copper River, and swamps and meadows, for feeding. Current harvest levels range from 5% to 10% of the herd.

Factors regulating herd growth could include snow depth, hunter harvests, habitat, accidental deaths, and possibly predation. In years with good calf production and survival, hunter harvests have been sustainable and have been used to help control the herd growth when necessary. In years with deep snow, survival and production declined and hunter harvests were limited. Accidental deaths from falls from the bluffs and drowning while crossing thin ice have been observed frequently enough to be considered an important cause of mortality. Wolves and bears are relatively abundant on the home range of the Copper River herd, but their impacts have not been studied. Predation by wolves and black bears probably focuses on calves, as adults are more aggressive and difficult to kill.

We recommend maintaining the either sex bag limit to help stabilize this herd.

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Please cite any information taken from this section, and reference as:

Stantorf, C. 2014. Unit 11 Copper River herd plains bison management report. Pages 1–8 [*In*] P. Harper and Laura A. McCarthy, editors. Plains 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.

Table 1. Copper River bison composition and population size based on June surveys, calendar years 2009 through 2013.

Calendar Year	Adults	Calves	(%)	Bison Observed	Minimum Population Size
2009	118	25	(17)	143	143
2010 ^a	-	-	-	-	-
2011 ^a	-	-	-	-	-
2012	88	23	(21)	111	111
2013	122	34	(22)	156	156

^a Surveys were not completed in 2010 or 2011.

Table 2. Copper River bison harvest data by permit hunt (DI454), regulatory years 2008 through 2012.

Regulatory Year	Permits Issued	Applications	Percent Did not Hunt	Percent Unsuccessful Hunters	Percent Successful Hunters	Bulls	(%)	Cows	(%)	Unk	Total Harvest
2008	18	940	39	64	36	2	(50)	2	(50)	0	4
2009	24	1236	25	50	50	4	(44)	5	(56)	0	9
2010	24	1462	25	28	72	8	(62)	5	(38)	0	13
2011	24	1560	25	28	72	9	(69)	4	(31)	0	13
2012*	16	1557	13	57	43	4	(67)	2	(33)	0	6

*1 permit offered by auction

Table 3. Copper River bison hunter residency and success, regulatory years 2008 through 2012.

Regulatory Year	Successful					Unsuccessful					Total hunters
	Local ^a Resident	Nonlocal Resident	Nonresident	Total	(%)	Local ^a Resident	Nonlocal Resident	Nonresident	Total	(%)	
2008	1	3	0	4	(36)	1	6	0	7	(64)	11
2009	0	9	0	9	(50)	0	9	0	9	(50)	18
2010	3	7	3	13	(72)	0	5	0	5	(28)	18
2011	0	13	0	13	(72)	0	5	0	5	(28)	18
2012	2	3	1	6	(40)	2	7	0	9	(60)	15

^aLocal means resident of Unit 11 or 13.

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Table 4. Copper River bison harvest chronology, regulatory years 2008 through 2012.

Regulatory Year	Harvest Period							<i>n</i>
	Sept	Oct	Nov	Dec	Jan	Feb	Mar	
2008	1 (25%)	1 (25%)	0 (0%)	0 (0%)	0 (0%)	1 (25%)	1 (25%)	4
2009	3 (33%)	1 (11%)	1 (11%)	0 (0%)	0 (0%)	1 (11%)	3 (33%)	9
2010	5 (38%)	4 (31%)	0 (0%)	0 (0%)	1 (8%)	0 (0%)	3 (23%)	13
2011	5 (38%)	3 (23%)	0 (0%)	0 (0%)	0 (0%)	1 (8%)	4 (31%)	13
2012	1 (20%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	3 (60%)	1 (20%)	5

Table 5. Copper River bison harvest percent by transport method, regulatory years 2008 through 2012^a.

Regulatory year	Percent (%) of harvest								<i>n</i>
	Airplane	Horse	Boat	3- or 4-wheeler	Snow- machine	ORV	Highway Vehicle	Unknown	
2008	25	0	50	0	25	0	0	0	4
2009	11	0	44	0	44	0	0	0	9
2010	0	0	69	0	31	0	0	0	13
2011	0	0	62	0	38	0	0	0	13
2012	40	0	20	0	40	0	0	0	5

^a Due to rounding, total percentages may not equal 100%.

SPECIES
MANAGEMENT REPORT

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PLAINS BISON MANAGEMENT REPORT

From: 1 July 2011
To: 30 June 2013

LOCATION

GAME MANAGEMENT UNIT: 11 (12,784 mi²)

HERD: Chitina River herd

GEOGRAPHIC DESCRIPTION: The Chitina River from the confluence of the Tana River and Chitina Glacier

BACKGROUND

The Chitina bison herd originated from animals relocated to Delta Junction, Alaska, from the National Bison Range in Moiese, Montana, in 1928. In 1962, 29 cows and 6 bulls were moved from Delta Junction to May Creek. The herd increased to as many as 56 bison in 1985, then declined to a low of 25 in 2004 as a result of increased mortality during winters with deep snowpack. The population rebounded starting in 2008 and has continued to grow, reaching 51 animals in 2013, the highest minimum population seen since 2003.

The first Chitina bison hunt was held by drawing permit in September of regulatory year (RY) 1976 (RY76 = 1 July 1976 through 30 June 1977). Permit hunts were held for 13 years, during which hunters took 58 bison (average harvest of 4 animals each year). The hunt was closed in RY89 because of a decline in herd size. Hunting resumed in RY99 with drawing permits for bulls only and has remained open except for RY04 and RY05, when the season was closed due to a decline in the herd. Since RY06 drawing permits have allowed the take of either sex and a total of 10 bison were harvested RY06–RY12.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

- Maintain the herd at a minimum of 50 overwintering adults by increasing or decreasing human harvests when bison numbers exceed or fail to reach the objective.

METHODS

Aerial surveys to determine composition of the herd are conducted in June each year, after the calving period. Survey techniques included flying transects throughout all bison habitat within the Chitina Valley to obtain a minimum count. Hunter harvest is monitored by drawing permit.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

The Chitina bison herd was relatively stable for the 12 years between 1976 and 1987; the average herd size was 48 based on minimum population counts. Starting in 1988, the herd declined, and the counts generally ranged from 30 to 35 bison through 1999. The herd increased over the next 4 years, peaking at a minimum of 50 animals in 2003. A large die-off occurred during the spring of 2004 due to deep snow conditions, and only 25 bison were observed that summer. The herd increased slowly after, with 46 bison counted in 2010 (Table 1). In 2011, the minimum count decreased to 36 bison, but a significant portion of the herd was observed in thickly timbered habitat, which likely obscured some bison and biased the count low. Since 2011, the herd has continued to recover from the 2004 die-off, peaking at a minimum of 51 animals in 2013.

Population Composition

For consistency, surveys are flown in June each year. In the spring of 2013, 46 adults and 5 calves were observed during an aerial survey of the Chitina herd (Table 1).

Distribution and Movements

The Chitina bison herd ranges throughout the riparian and upland habitat below 2,000 ft elevation along a 40-mile portion of the upper Chitina Valley. Although movements vary considerably, the traditional range of the herd has been between the Tana River and Barnard Glacier. During the 1990s, biologists observed especially heavy use of the riparian zone between Bryson Bar and Bear Island on the north side of the Chitina River. Changes in the flow of the Chitina River during the last 20 years caused considerable erosion of bars and banks on the north side of the river. During the last 5 or 6 years, bison use on the south side of the river has increased as animals sought new feeding areas to replace those lost to erosion.

MORTALITY

Harvest

Season and Bag Limit. The hunting season for residents and nonresidents in Unit 11 runs from 6 September to 30 November. The resident bag limit is one bison every 10 regulatory years by drawing permit. The nonresident bag limit is one bison permit per lifetime. The hunt area is that portion of the Chitina River east of the Chakina River and south and east of the Nizina River in Unit 11.

Board of Game Actions and Emergency Orders. There were no Board of Game actions or Emergency Orders issued during this reporting period.

Hunter Harvest. Hunters were unsuccessful in harvesting bison during the RY09 and RY12 season (Table 2). In each of RY10 and RY11, 2 bison were harvested. Since reopening in RY99, 16 total bulls have been harvested from this hunt.

Permit Hunts. Chitina bison are hunted under a drawing permit hunt (DI450); up to 2 permits are authorized annually (Table 3). Since RY11 an average of 427 hunters applied for the available

permits, with 363 applicants for the RY12 permits. In RY08 and RY11 a governor's tag was awarded in addition to drawing tags.

Hunter Residency and Success. The success rate was 50% for this reporting period (Table 3). Both of the 2 successful hunters were nonlocal Alaska residents while the 2 unsuccessful permittees were local Alaska residents (Table 4). Successful hunters averaged 3 days in the field during this reporting period.

Transportation Methods. Since RY08, all successful hunters reported using aircraft to access the hunt area (Table 5).

Predation. Given the consistent herd size and small range of these bison, it is not likely that predation has much effect on this herd. Wolf predation has been reported by trappers and local residents. Brown bears also have been observed feeding on bison carcasses, but it is not known if they killed the bison or were scavenging.

Other Mortality. Deep snow over a prolonged period is an important cause of overwinter mortality and reduced productivity in the Chitina bison herd. Deep snow was considered an important factor in the herd decline in the late 1980s and poor recruitment during the 1990s. Deep snow was also recorded for the Upper Chitina valley in the winter of 1997, which resulted in a similar decline in both population size and productivity. In the spring of 1998, 6 adult bison were found dead; the deaths were attributed to starvation because all the examined bison were emaciated and had low bone marrow fat, and there was no sign of predation. The Chitina bison herd was subjected to another severe winter in 2003–2004, and field necropsies on 3 dead bison again resulted in a diagnosis of starvation.

The effect of deep snow on survival is probably density independent, because increased mortality and a decline in productivity have been observed at various stocking levels. Examination of winter-killed bison indicates very old bison are especially susceptible. Calves of the year also probably have high mortality rates, but they are not found because they die earlier in the winter and are more easily scavenged. The magnitude of a die-off in a deep snow year will depend on the calf production and number of older-age bison in the population.

Poaching was documented on the Chitina bison herd during the 1980s. Because of the remoteness of this herd, apprehending poachers is difficult. The extent or impact of poaching on this herd is unknown.

HABITAT

Assessment

In 1984 the National Park Service studied the range in the upper Chitina Valley (Miquele 1985). This study indicated grazing by ungulates on the Chitina bison range had not caused recent plant deterioration. The range was recovering from earlier overuse, when horses were abundant on grazing leases. Miquele (1985) also found that a bison herd of 50 animals had not damaged the habitat, and the management objective at the time of 30 overwintering bison could be increased; however, he concluded the range could not support a very large bison herd.

Appreciable vegetation loss occurred on the Chitina bison range during the early 1990s. This was a result of re-channelization of the Chitina River toward the north bank. The first area affected was the floodplain northeast of Bear Island. This was a heavily used riparian area before 1991, when flooding first occurred and more than 50% of the vegetation washed away. Since 1991, flooding has occurred east of Bear Island, near Bryson Bar, and has extended upriver toward Hubert's Landing. Bison mortality associated with deep snow in the winter of 2003-2004 suggests this loss of critical river bar habitat may have reduced the carrying capacity until vegetation can be reestablished on the newly exposed bars. Habitat on the south side of the river is improving as vegetation is growing on bars that have dried out over the last 10 years.

The 2009 Chakina Fire burned more than 52,000 acres just west of the current bison range south of the Chitina River. This fire may provide additional range for the bison in coming years. While early successional deciduous vegetation may take some time to develop, beneficial sedges, grasses, and forbs may now be available to bison.

CONCLUSIONS AND RECOMMENDATIONS

Population size of the Chitna River herd has increased slowly since 2005. The current herd estimate of 51 adults and 5 calves falls above the minimum objective of 50 adult bison. Minimum population estimates in the Chitina herd are based on a single yearly survey of all known bison habitat. Because bison can be missed during a survey, some fluctuations in count data between years probably reflect survey technique rather than actual changes in bison numbers. Solitary bulls are especially difficult to find on aerial surveys.

Other than RY09 and RY12 when no hunters were successful, 2 bison have been taken each year since RY06. Future management should focus on reducing the effect of severe winters by lowering the number of old bison in the herd. Harvests are managed to remove a limited number of adults each year, depending on herd size, thus reducing the number of animals in older-age classes that are more susceptible to overwinter mortality. To avoid a negative harvest effect, cow harvests should be instituted only when the herd consists of at least 40 total bison and when 4 or more calves are recruited. When the herd contains fewer than 40 bison, the harvest should be limited to bulls only. While this limited harvest will not prevent winter mortality, it should provide continued sustainable human use of the Chitina bison herd. To date, all harvested bison have been old, trophy bulls.

We recommend issuing 2 either-sex permits annually if overwinter survival remains at the current level. Given recent stable population trends and the limited availability of traditional habitat, we also recommend reducing the management objective to a minimum of 30 overwintering adults.

REFERENCES CITED

Miquele, Dale. 1985. Food habits and range conditions of bison and sympatric ungulates on the Upper Chitina River, Wrangell-St. Elias National Park and Preserve. U.S. Department of Interior. National Park Service, Alaska, Region Research/Resources Management Report AR-8, Anchorage.

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Table 1. Chitina bison spring aerial composition counts and estimated population size, calendar years 2009 through 2013

Calendar Year	Adults	Calves	(%)	Bison observed	Minimum population size
2009	36	5	(12)	41	41
2010	39	7	(15)	46	46
2011	32	4	(11)	36	36
2012	39	4	(9)	43	43
2013	46	5	(10)	51	51

Table 2. Chitina bison harvest and accidental death, regulatory years 2008 through 2012

Regulatory Year	Hunter Harvest						Estimated			Accidental	
	Reported									death	Total
	M	(%)	F	(%)	Unk	Total	Unreported	Illegal	Total		
2008–2009	2	(100)	0	(0)	0	2	0	0	0	0	2
2009–2010	0	(0)	0	(0)	0	0	0	0	0	0	0
2010–2011	2	(100)	0	(0)	0	2	0	0	0	0	2
2011–2012	1	(50)	1	(50)	0	2	0	0	0	0	2
2012–2013	0	(0)	0	(0)	0	0	0	0	0	0	0

Table 3. Chitina bison harvest data by permit hunt (DI450), 2008–2013.

Regulatory year	Permits issued	Applications	Percent did not hunt	Percent unsuccessful Hunters	Percent successful hunters	Bulls	(%)	Cows	Harvest
2008–2009	2*	302	0	0	100	2	(100)	0	2
2009–2010	2	534	0	2	0	0	(0)	0	0
2010–2011	2	464	0	0	100	2	(100)	0	2
2011–2012	3*	492	0	33	67	1	(50)	1	2
2012–2013	1	363	0	100	0	0	(0)	0	0

* One permit was offered by the state for auction.

Table 4. Chitina bison hunter residency and success, 2008–2013.

Regulatory year	Successful					Unsuccessful					
	Local ^a resident	Nonlocal resident	Non-resident	Total	(%)	Local ^a resident	Nonlocal resident	Non-resident	Total	(%)	Hunters
2008–2009	0	1	1	2	(100)	0	0	0	0	(0)	2
2009–2010	0	0	0	0	(0)	2	0	0	2	(100)	2
2010–2011	0	2	0	2	(100)	0	0	0	0	(0)	2
2011–2012	0	2	0	2	(67)	0	1	0	1	(33)	3
2012–2013	0	0	0	0	(0)	0	1	0	1	(100)	1

^a Local means Unit 11 or 13 resident.

Table 5. Chitina bison harvest percent by transport method, 2008–2013.

Regulatory year	Percent of harvest								<i>n</i>
	Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Unknown	
2008–2009	100	--	--	--	--	--	--	--	2
2009–2010	--	--	--	--	--	--	--	--	0
2010–2011	100	--	--	--	--	--	--	--	2
2011–2012	100	--	--	--	--	--	--	--	2
2012–2013	--	--	--	--	--	--	--	--	0

SPECIES
MANAGEMENT REPORT

Alaska Department of Fish and Game
Division of Wildlife Conservation
(907) 465-4190 – PO Box 115526
Juneau, AK 99811-5526

PLAINS BISON MANAGEMENT REPORT

From: 1 July 2011
To: 30 June 2013¹

LOCATION

GAME MANAGEMENT UNIT: 19 (36,486 mi²)

HERD: Farewell

GEOGRAPHIC DESCRIPTION: All of the drainages into the Kuskokwim River upstream from Lower Kalskag. Bison inhabit only the Farewell area in Units 19C and 19D

BACKGROUND

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. During 1968–1999, the Farewell herd flourished, reaching a population size of approximately 350 animals. The herd went through a period of decline in the early 2000s but we observed 330 bison during the June 2012 survey. The first hunt for Farewell bison was held in 1972. The number of drawing permits issued annually ranged 40–80 during regulatory year (RY) 1972 (RY72 = 1 July 1972 through 30 June 1973) through RY05, but was reduced to 20 permits in RY06 and 10 in RY07 due to declining herd size. Interest in bison hunting greatly exceeds the number of permits available.

MANAGEMENT DIRECTION

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

MANAGEMENT GOALS

GOAL 1: Maintain a population of sufficient size to reduce the genetic risks associated with small populations.

GOAL 2: Maintain a sustainable harvest.

¹ At the discretion of the reporting biologist, this unit report may contain data collected outside the report period.

GOAL 3: Maintain and enhance bison habitat in cooperation with other land management agencies.

MANAGEMENT OBJECTIVES AND ACTIVITIES

- OBJECTIVE 1: Maintain a population of at least 300 bison after the March hunt and prior to calving.

Activities

- ❖ Deploy and maintain enough radio collars on bison to monitor the herd distribution, movements, and population size.
- ❖ Conduct aerial surveys of bison to assess herd distribution, population status, and herd composition.

- OBJECTIVE 2: Maintain a harvest of up to 40 bison.

Activity

- ❖ Issue up to 40 drawing permits, distributed during fall and/or spring hunts.
- ❖ 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.

- OBJECTIVE 3: Maintain at least 50% of the bison winter range in sedge/grasslands and shrubs.

Activity

- ❖ 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.
- ❖ Assess habitat during aerial surveys.

METHODS

We conducted aerial surveys during April–June in 2012 and 2013 to estimate herd size and composition. 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 Kuskokwim River (Fig. 1). We classified bison from an altitude at which aircraft noise did not affect bison behavior (≥ 500 feet AGL). Therefore, we classified bison as calves ≤ 6 months old or as adults (any bison which were not clearly calves).

To assist in locating groups of bison, we radiocollared 16 cows and 4 bulls in April 2008; 16 adult (≥ 5 years old) cows (1 recaptured from 2008) in April 2011; and 10 cows in April 2013 using PA-18 or similar airplanes to search and helicopter-supported darting techniques. Bison were immobilized using Cap-Chur™ rifle and darts in 2008 and Pseudart™ rifle and darts in 2011 and 2013. Darts were loaded with 5.1 mg carfentanil citrate (Wildnil®) and 60 mg xylazine

hydrochloride (Anased®). Blood, feces, and hair samples were collected for pregnancy, disease, and genetic testing. 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.

Bison herds free of domestic cattle gene introgression are rare in North America (Halbert and Derr 2007). We collected bison genetic samples from hunters, as well as during captures, in 2008 and 2011 to confirm whether Farewell bison are genetically pure plains bison.

We estimated annual harvest statistics and hunter demographic data from the mandatory harvest reports of drawing permits. We summarized data on hunter residency and success, harvest chronology, and transport methods. Harvest data were summarized by regulatory year.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Estimated annual herd growth between 1968 (when aerial surveys were initiated) and 1988 was about 10%. Herd size began to decline in 2001 (Table 1), possibly due to hunting, habitat senescence, and weather. We reduced the number of permits from 40 in RY05 to 20 in RY06 and 10 in RY07 due to concern over the low number of bison observed in surveys.

Recent genetics studies found that Farewell bison are free of domestic cattle gene introgression (James Derr, Texas A&M University, personal communication, June 2011). As such, they may be important for bison conservation.

Population Size

The highest number of bison counted during 2000–2003 was 265 on 30 May 2000. At that time, and as late as 2003, the Farewell bison herd was thought to contain 350 bison. Repeated attempts to accurately determine herd size during 2003–2008 were not successful because bison groups were scattered and few bison were radiocollared. Using telemetry to locate bison radiocollared in 2008, 2011, and 2013 we located 261 bison in June 2011; 330 in June 2012, the highest numbers since May 2000; and 280 in May 2013 (Table 1).

We believe the herd is growing slowly despite finding fewer bison in 2013 than were found in 2012. Sightability is largely affected by the patchiness of snow and bison distribution, which is affected by the concentration of green up in the spring and these conditions were less favorable in 2013. Furthermore, we relied on collars almost exclusively to find bison and radio collars placed on bison in 2008 became too weak to be useful. Therefore, we believe we missed more bison in 2013 than in 2012.

Population Composition

During June calving surveys we found that calves ≤ 6 months old composed 18% of the population in 2008, 15% in 2009, 23% in 2011, 18% in 2012, and 10% in 2013. Blood tests from

bison captured in 2008 showed 7 of 16 females (44%) were pregnant. In 2011, 14 of 16 (88%) adults were pregnant and in 2013, 3 of 10 (30%) adult females were pregnant.

Distribution and Movements

During winter the herd was typically scattered in small groups (10–40 animals) on the 1977 Bear Creek burn (also known as the Farewell burn) and surrounding habitats, taking advantage of windswept grass and sedge forage. This burn was over 30 years old and had senesced in terms of habitat quality for bison. The Turquoise Lake fire in 2010 burned part of the same area, creating additional grass and sedge forage, and will likely affect future bison movements. Small groups of bison now also use a large burn caused by lightning in 1991 on the east side of the South Fork Kuskokwim River and a burn that occurred in 2009 along the Dillinger River. The Farewell herd also uses the South Fork Kuskokwim River floodplain, as well as mountainous areas to the south near the headwaters of the South Fork. Bison have been seen as far upriver as Sled Pass (Hartman River and Stony River headwaters) and into Ptarmigan Valley (South Fork Kuskokwim River and Happy River headwaters). Bison also were reported as far west as the Windy Fork and north to within 12 miles of Nikolai on the South Fork Kuskokwim River. Surveys since 2008 have not detected bison in these fringe areas.

Bison concentrate in areas that green up first and our spring surveys are intended to take advantage of that. These areas include the large area of sedge north of the Farewell landing strip; the windswept ridges of the moraine between the Farewell landing strip and Submarine Lake; and along the South Fork Kuskokwim, particularly the western bank between Egypt Mountain and 10–15 miles north of Farewell Lake in the area which burned in the 2010 Turquoise Lake fire.

MORTALITY

Harvest

Seasons and Bag Limits (RY11 and RY12).

<u>Unit and Bag limit</u>	<u>Resident Seasons</u>	<u>Nonresident Seasons</u>
<i>Unit 19</i>		
RESIDENTS HUNTERS: 1 bison every 10 regulatory years by drawing permit only.	1 Sep–30 Sep (DI351) or 1 Mar–31 Mar (DI352)	
NONRESIDENT HUNTERS: 1 bison per life by drawing permit only.		1 Sep–30 Sep (DI351) or 1 Mar–31 Mar (DI352)

Alaska Board of Game Actions and Emergency Orders. No regulatory changes were made during RY11–RY12.

Hunt History. The first legal harvest from the Farewell herd occurred in RY72 after aerial surveys revealed that it could sustain small harvests. Since then hunts have been held every year except RY73. The Farewell bison hunt was generally administered as a drawing permit hunt, although in RY79 it was a registration hunt and in RY84 it was a Tier II subsistence hunt. During RY80–RY83, we issued 20 permits each year and during RY85–RY88 we issued 40 permits

annually. The first spring bison hunt was held in March 1990 (RY89). During RY89–RY90, 70 drawing permits were awarded annually, 40 for fall (September) hunts and 30 for spring (March) hunts. In RY91, 80 permits were awarded (40 fall, 40 spring). In RY92–RY94, 50 permits were awarded (30 fall, 20 spring), and in RY95–RY99, 40 permits were issued (20 fall, 20 spring). In RY99, hunt conditions that confined hunters to a 10- or 15-day period during the season were changed to allow permittees to hunt any time during the fall or spring seasons. There were no changes in the seasons or bag limits during RY99–RY06, except that in RY06 only 20 permits were issued (10 fall, 10 spring) and during RY07–RY12 only 10 permits were issued each year (5 fall, 5 spring).

Harvest by Hunters. Annual harvest was 4–8 bison during RY08–RY12 (Table 2), with 50–88% bulls harvested (Table 2). In fall hunts (DI351), 50–100% of all bison taken were bulls. Hunters prefer to 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 with 1–2 cows taken each year.

Governor's Permits. The first Governor's Permit was issued in 1998. The sportsman's group awarded the permit kept 10% of the proceeds, and returned the remainder of the money to ADF&G. Permits were sold to the highest bidder and went for \$8,100 in RY98, \$7,500 in RY99, \$5,500 in RY01, \$3,500 in RY03, \$1,300 in RY04, and \$2,500 in RY06. We stopped offering the Governor's permit in RY07 and will not issue these permits again until we reach our population objective.

Harvest Chronology. Harvest chronology prior to RY99 was managed by limiting hunting by fall and spring permittees to different parts of the fall or spring seasons. However, beginning in RY99, permittees were allowed to choose when to hunt during each season. In general, there is no peak harvest period during either season and no increase in hunter conflict (Table 3).

Hunter Residency and Success. Historically, and during RY08–RY12, the vast majority of permittees for the Farewell bison hunts were Alaska residents (Table 4). Of the permit winners who hunted during RY08–RY12, 4 were nonresidents, none were local residents (a permittee who resided in Unit 19) and 37 were nonlocal residents (Table 4).

The average success rate during RY08–RY12 was 76% for the September hunt (DI351) and 90% for the March hunt (DI352; Table 2). The higher hunter success rate in March is likely due to better access using snowmachines and ski-equipped airplanes. Overall, 20% of all permit winners did not hunt during RY08–RY12 and a mean of 81% of permit winners who hunted were successful (Table 4).

Transport Methods. This hunt is in a remote area that is difficult to access. During RY08–RY12 most hunters used airplanes or snowmachines (Table 5).

Natural 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 consistent with previous reports (Whitman 1998).

HABITAT

The herd generally ranged over the 1977 Bear Creek burn until the mid-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 Station area (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), and the fall diet was 60% willow, and 40% silverberry (*Elaeagnus commutata*) and buffalo-berry (*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 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.

Although no current estimate of carrying capacity is available, a cursory examination of selected areas in summer 1995 by University of Alaska graduate student Maria Berger (M. Berger, University of Alaska Fairbanks, Alaska Cooperative Fisheries and Wildlife Resources Unit, 1995 unpublished report, Fairbanks), and an additional aerial evaluation by Robert Stephenson (ADF&G, unpublished report, Fairbanks) in spring 1998, indicated adequate summer forage availability and unused range to the north, east, and west. While winter habitat may still be a factor limiting this population (M. Berger, 1995 unpublished report) recent fires, particularly the 2010 Turquoise Lake fire, should improve forage quality and quantity.

CONCLUSIONS AND RECOMMENDATIONS

The Farewell bison herd declined from an estimated high of 350 bison in the late 1990s to an unknown low in the early to mid-2000s. Based on 2012 surveys and our belief that we underestimated bison numbers in 2013, it appears bison numbers are increasing. However, we did not achieve our population objective of 300 posthunt, precalving bison in 2013. We currently have 22 radiocollared animals and plan to deploy 10–19 additional radio collars in April 2015. This will help us maintain a sufficient sample to monitor herd distribution and population size.

We met our second objective, to maintain a harvest of ≤ 40 bison in RY11 and RY12. At the current population size it is prudent to continue with 10 permits per year. It is unclear if our third objective, to maintain at least 50% of the bison winter range in sedge/grasslands and shrubs, was met. 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 are being utilized by bison, but no habitat surveys have been done.

We recommend continued herd monitoring in RY13 and RY14, as well as deployment of additional radio collars. We will continue to evaluate the effects of issuing fewer permits, beginning in RY06 (20 permits) and RY07 through RY12 (10 permits annually). 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. A minimum viable population for bison may be as high as 400 individuals (Gross et al. 2006), with smaller populations having lower heterozygosity and fitness as well as being at greater risk of inbreeding depression and genetic drift. Therefore, maintaining a minimum population of at least 300 animals may be important not only to allow a harvestable surplus, but also to maintain the genetic viability of the population. We recognize however, that improving habitat using controlled burns may be necessary to maintain a herd of this size, and that a population of 400 may not be possible due to habitat constraints.

The Alaska Department of Natural Resources has converted state land to private ownership through their land disposal program within the range of the Farewell herd. As these lands are developed, controlled burns will become more difficult and costly and natural fire suppression may be necessary to protect private properties. Prior to the 2010 Turquoise Lake fire, we saw bison numbers fall below levels recommended for genetic viability, and they did not begin to recover until after this fire. Without regular fires, this herd is at risk and we strongly recommend opposing further land disposals in this area.

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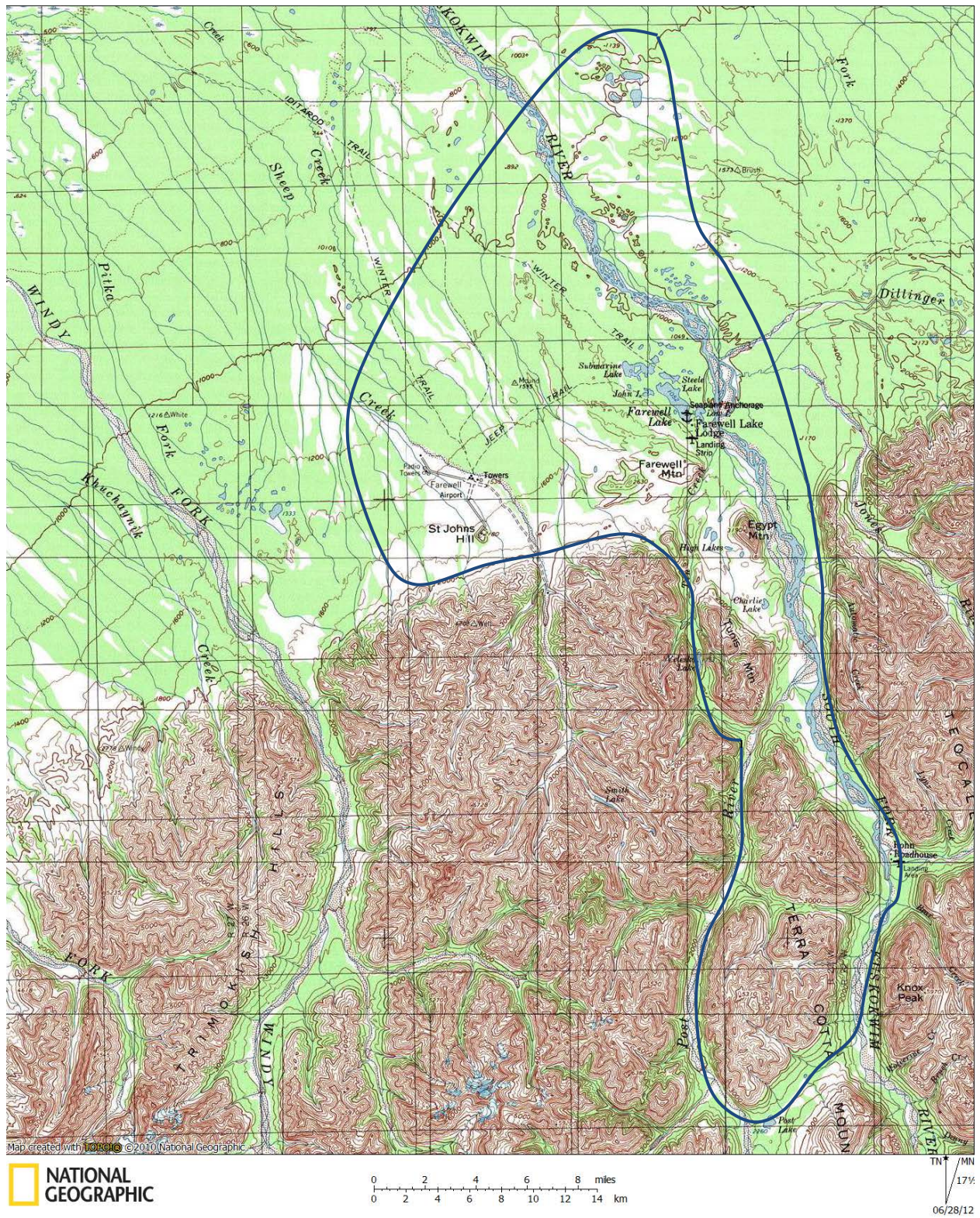


Figure 1. Typical search area and range of Farewell bison.

Table 1. Farewell bison aerial composition surveys and total bison observed, 2000–2013.

Survey date (m/d/yr)	Bison >6 months old	Calves $\leq$ 6 months old (%)	Bison observed
5/30/00	234	31 (12)	265
6/18/01	157	31 (16)	188
1/30/02	34	1 (3)	35
9/3/02	32	6 (16)	38
5/7/03	130	15 (10)	145
11/16/03	109		109
8/05			163
4/6–7/06	82	12 (13)	94
4/25/07	68	11 (14)	79
4/20/08	187	8 (4)	195
6/19/08	144	31 (18)	175
8/21/08	186	31 (14)	217
4/5/09	149	0 (0)	149
6/3/09	174	30 (15)	204
7/9/09	138	26 (16)	164
8/12/09	164	15 (8)	179
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
5/2/13	258	22 (8)	280
6/11/13	235	25 (10)	260

Table 2. Farewell bison harvest data by permit hunt, regulatory years^a 2008–2012.

Hunt number	Regulatory year	Permits issued	Did not hunt (%)	Unsuccessful hunters ^b (%)	Successful hunters ^b (%)	Harvest			
						Bulls (%)	Cows (%)	Unk	Total
DI351 (Fall)	2008	5	1 (20)	1 (25)	3 (75)	2 (67)	1 (33)	0	3
	2009	5	0 (0)	3 (60)	2 (40)	1 (50)	1 (50)	0	2
	2010	5	2 (40)	0 (0)	3 (100)	2 (67)	1 (33)	0	3
	2011	5	1 (20)	0 (0)	4 (100)	3 (75)	1 (25)	0	4
	2012	5	2 (40)	1 (33)	2 (67)	2 (100)	0 (0)	0	2
DI352 (Spring)	2008	5	1 (20)	0 (0)	4 (100)	3 (75)	1 (25)	0	4
	2009	5	1 (20)	2 (50)	2 (50)	1 (50)	1 (50)	0	2
	2010	5	0 (0)	0 (0)	5 (100)	5 (100)	0 (0)	0	5
	2011	5	1 (20)	0 (0)	4 (100)	3 (75)	1 (25)	0	4
	2012	5	1 (20)	0 (0)	4 (100)	3 (75)	1 (25)	0	4

^a Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2008 = 1 July 2008–30 June 2009).

^b Successful and unsuccessful hunter information includes only those permittees who hunted.

Table 3. Farewell bison harvest chronology by month/day, regulatory years^a 2008–2012.

Regulatory year	Harvest chronology by month/day						Unk	Total harvest
	Fall			Spring				
	9/1–10	9/11–20	9/21–30	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> (%)		
2008	1 (33)	1 (33)	1 (33)	0 (0)	4 (100)	0 (0)		7
2009	0 (0)	1 (50)	1 (50)	0 (0)	2 (100)	0 (0)		4
2010	1 (33)	1 (33)	1 (33)	1 (25)	0 (0)	3 (75)	1 ^b	8
2011	1 (25)	0 (0)	3 (75)	0 (0)	3 (75)	1 (25)		8
2012	1 (50)	1 (50)	0 (0)	1 (25)	3 (75)	0 (0)		6

^a Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2008 = 1 July 2008–30 June 2009).

^b Unknown date of kill in spring for 1 bison harvested in regulatory year 2010.

Table 4. Farewell bison hunter residency and success, regulatory years^a 2008–2012.

Regulatory year	Successful					Unsuccessful					Total hunters
	Local ^b resident	Nonlocal resident	Nonresident	Unk	Total (%)	Local ^b resident	Nonlocal resident	Nonresident	Unk	Total (%)	
2008	0	6	1	0	7 (88)	0	1	0	0	1 (13)	8
2009	0	3	1	0	4 (44)	0	5	0	0	5 (56)	9
2010	0	8	0	0	8 (100)	0	0	0	0	0 (0)	8
2011	0	8	0	0	8 (100)	0	0	0	0	0 (0)	8
2012	0	4	2	0	6 (75)	0	2	0	0	2 (25)	8

^a Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2008 = 1 July 2008–30 June 2009).

^b Local residents are hunters who live in Unit 19.

Table 5. Farewell bison harvest by primary transport method, regulatory years^a 2008–2012.

Regulatory year	Harvest by transport method				<i>n</i>
	Airplane (%)	3- or 4-wheeler (%)	Snowmachine (%)	Unknown or other (%)	
2008	3 (38)	1 (13)	4 (50)	0 (0)	8
2009	5 (56)	0 (0)	3 (33)	1 (11)	9
2010	5 (63)	0 (0)	2 (25)	1 (13)	8
2011	5 (63)	0 (0)	3 (38)	0 (0)	8
2012	3 (38)	0 (0)	5 (63)	0 (0)	8

^a Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2008 = 1 July 2008–30 June 2009).

SPECIES
MANAGEMENT REPORT

Alaska Department of Fish and Game
Division of Wildlife Conservation
(907) 465-4190 – PO Box 115526
Juneau, AK 99811-5526

PLAINS BISON MANAGEMENT REPORT

From: 1 July 2011
To: 30 June 2013¹

LOCATION

GAME MANAGEMENT UNIT: 20D (5,637 mi²)

HERD: Delta

GEOGRAPHIC DESCRIPTION: Central Tanana Valley near Delta Junction

BACKGROUND

The ancestors of modern bison first colonized North America after migrating from Asia to Alaska over the Bering Land Bridge a few hundred thousand years ago (Reynolds et al. 1982). During the last 10,000 years 2 modern subspecies developed: wood bison (*Bison bison athabasca*) in Alaska and parts of Canada, and plains bison (*B. b. bison*) in Canada and the contiguous United States. Bison were once the most abundant large land mammal in Alaska, but were largely extirpated about 200–300 years ago, probably due to a combination of changing habitat and unregulated hunting (Skinner and Kaisen 1947, Guthrie 1990, Stephenson et al. 2001).

In 1928, 23 plains bison were translocated from the National Bison Range in Montana to the Delta River. At the time, biologists were unaware of the existence of wood bison in Canada. By 1947 the herd had increased to 400 animals. Hunting of the Delta bison began in 1950 and is now one of the most popular permit drawing hunts in the state. Delta bison have been translocated to other parts of Alaska, and 3 other populations have been established. These are the Farewell, Chitina River, and Copper River herds.

As agriculture developed on their established range, movements of the Delta bison herd (DBH) began to intersect with hay and cereal grain fields. In 1976 the State of Alaska made agricultural development a priority within the established range of DBH, and large-scale agricultural land disposals began in 1978. Eventually, bison began to negatively impact agricultural harvests by damaging crops in the fall before harvest.

In 1979 the Alaska legislature established the 90,000-acre Delta Junction Bison Range (DJBR) south of the Alaska Highway and adjacent to the Delta Agricultural Project (DAP). The purpose of DJBR was to perpetuate free-ranging bison by providing adequate winter range and altering

¹ At the discretion of the reporting biologist, this unit report may contain data collected outside the report period.

seasonal movements of bison to diminish damage to agriculturally-developed land. In 1984 the legislature appropriated \$1.54 million for DJBR development and increased the Delta bison permit hunt application fee from \$5 to \$10, with the intent that \$5 from each application be used for DJBR management. Since 1984 the appropriated funds have been used to hire personnel, purchase equipment for use in forage management, and develop 2,800 acres of bison forage on DJBR in the Panoramic and Gerstle field complexes. Bison damage to farms in DAP was significantly reduced in 1985 with the first substantial forage production on DJBR. DJBR forage development and management continued through this report period, reducing conflicts between bison and agriculture.

The Bison Range Youth Hunt management area was created in 2002 to regulate moose hunting in the fields of DJBR. This drawing permit hunt was implemented to reduce the impact of moose hunting on bison and bison forage management on DJBR.

From the mid-1980s through 2007, the public, including DAP producers, did not express unusually high concern about conflicts between bison and agriculture. When the effort to update the 2000–2005 Delta Bison Management Plan proceeded during winter 2008–2009, some members of the Delta agricultural community expressed an elevated level of concern about conflicts between bison and agricultural production. In response, ADF&G expanded the planning process to fully evaluate issues involving conflicts between DBH and agricultural operations and consider options to minimize these conflicts (ADF&G 2012).

Beginning in 2009, bison hunters had the option of either attending a prehunt orientation, or reviewing an online orientation course as a condition of eligibility to participate in a hunt. The purpose of the orientation was to teach hunters to differentiate between bulls and cows, to discuss land status in the hunt area, and to give hunters supplies and instructions for collecting biological samples.

During summer 2009 and 2010, ADF&G began collecting data for a bison presence and DAP crop damage assessment program in cooperation with the Alaska Department of Natural Resources-Division of Agriculture (ADF&G 2012). Each year, ADF&G staff flew several aerial surveys over all grain and potato crops north of the Alaska Highway prior to crop harvest and photographed fields exhibiting evidence of bison presence. The Division of Agriculture analyzed the aerial photos, conducted ground surveys of fields, and produced monetary estimates of crop damage.

In 2010, ADF&G initiated a bison hunt north of the Alaska Highway in Unit 20D on 26 July for hunting of bulls only. A bison hunter telephone information line was created to inform permit holders when bison were observed or reported to be in the designated hunt area. This hunt was an effort to test whether early hunting pressure north of the Alaska Highway would cause bison to move from DAP back to DJBR. The early season hunt did not cause bison to move from DAP to DJBR, nor did it result in prolonged presence of bison on DJBR, and was not continued the following year.

MANAGEMENT DIRECTION

MANAGEMENT GOAL

Manage DBH to accomplish a reasonable balance between providing the greatest opportunity to hunt and view bison while keeping negative impacts to private property to a minimum.

MANAGEMENT OBJECTIVES

- Manage DBH to maintain a herd size of approximately 360 bison at the precalving count.
- Manage DBH to maintain a sex ratio of no less than 50 bulls (≥1-year old):100 cows.

In addition to the management objectives above, the following goals and objectives were included as management activities during RY11–RY12.

Herd Health Management Goal

Monitor the health of the Delta bison herd.

Objective 1 — Monitor DBH to determine if any diseases are present that might threaten the health of the herd or other wildlife species.

Objective 2 — Minimize the potential for transmission of diseases between livestock and DBH.

Objective 3 — Work through the Division of Wildlife Conservation Wildlife Veterinarian and other animal health officials to determine appropriate steps to prevent spread of diseases from bison to other wildlife species if diseases are transmitted from livestock to DBH.

Herd Size and Composition Goal

Manage DBH to accomplish a reasonable balance between providing the greatest opportunity to hunt and view bison while keeping negative impacts to private property to a minimum.

Bison Conflict Management Goal

Minimize conflicts between bison and the public, including, but not limited to, agriculture interests in the Delta Junction area.

Objective 1 — Administer the Delta bison hunt to minimize landowner-hunter conflicts in order to help maintain bison and hunter access to private agricultural land to the greatest extent possible.

Objective 2 — Enhance bison summer range west of the Richardson Highway to increase its attractiveness to DBH to attempt to delay the herd's migration towards DJBR and private agricultural lands.

Objective 3 — Manage DJBR to encourage the DBH to remain south of the Alaska Highway, and out of private agricultural land as late in the fall as possible, and to attract more bison to DJBR in the winter and provide greater accessibility to the herd for bison hunters.

Objective 4 — Provide assistance to the public regarding bison conflicts.

Bison Viewing Management Goal

Provide opportunities for nonconsumptive enjoyment of DBH, such as bison viewing, interpretation, and education.

Objective 1 — Investigate methods and funding sources other than bison permit fees to improve bison viewing opportunities for the public.

METHODS

HERD MANAGEMENT

Population Status and Trend

We used aerial censuses to monitor herd size. A Piper Super Cub (PA-18) fixed-wing aircraft was used to conduct visual and radiotelemetry searches to locate aggregations of bison during March–September. Bison aggregations were counted visually when possible, and groups that were difficult to count directly were photographed with a digital single lens reflex camera and counted from the photographs. We conducted replicate censuses each year and considered the prehunt population size to be the maximum number of bison counted during a single census.

A precalving population estimate was obtained by subtracting hunting mortality, estimates of wounding loss, and other known and estimated sources of mortality from the prehunt population count for the previous fall. Since 2002, precalving population estimates were also verified at times by flying aerial surveys in late March, near the end of the hunting season, and during early May before the peak of calving (excluding neonates). If these aerial surveys resulted in a higher precalving population count it was used rather than the estimate.

Population Composition

Sex and age composition surveys were conducted from the ground by locating groups containing radiocollared bison. To obtain the best composition data we attempted to locate and count bison groups annually during the end of rut in August or September, when the entire herd tends to be aggregated together. We usually conducted multiple surveys and the survey that resulted in the largest sample size was used to calculate composition data. We determined the sex and age of bison by observing them with 10×42 binoculars or a 15–60 power spotting scope. Bulls were differentiated from cows by body size, head size and shape, pelage, circumference of horn bases, horn shape, and presence of a penis sheath. Bulls were further classified into 4 different horn categories to estimate age structure for the bull segment of the population based on horn morphology. Yearlings were bulls with straight horns without any upward curvature. “Small bulls” were bulls with horn tips that were starting to curve upward (vertically relative to the horn base) but were not pointing straight up. “Medium bulls” were bulls with horn tips turned 90° vertical, relative to the horn bases. “Large bulls” had horns with tips curved inward toward the center of the skull. To aid in the classification of age relative to horn shape, when possible, photographs were taken of bison killed by hunters. Horn morphology relative to age will be evaluated by comparing horn shape to age based on tooth eruption and wear and reported in a future management report. We summarized composition data by regulatory year (RY), which begins 1 July and ends 30 June (e.g., RY11 = 1 July 2011–30 June 2012).

Distribution and Movements

We monitored bison movements by locating radiocollared and nonradiocollared bison and from reports by people who observed and reported bison moving through the area. Most bison locations were obtained from fixed-wing aircraft; however, we also obtained some locations by ground tracking.

Bison presence and crop field assessment surveys were conducted using a photographic technique. We conducted surveys using a PA-18 to observe all agricultural areas with grain crops north of the Alaska Highway in DAP. Grain crop fields with bison present and/or grain fields exhibiting sign of bison presence during the growing season prior to the surveys were photographed. Photographic images were captured from an altitude of 1,000 feet above ground level (AGL) at a focal length of approximately 50 mm through an open window in the aircraft to give adequate coverage and perspective of the damage. I took the photographs to overlap, if necessary, to show the entire damaged area. In a few cases, I took photographs from an altitude higher than 1,000 feet AGL to give an overview of the area. File size for the photographs was large jpg on a Canon 1DMark3 digital single lens reflex camera. Bison presence was identified by locating trails through grain that appeared to be made by numerous animals and that showed other evidence of bison, such as wallows, beds, dung, or the presence of bison. I recorded latitude and longitude of each damaged area and made a visual estimate of the total proportion of each field impacted by bison presence.

Disease Management

Health monitoring was based on extensive observational effort. DBH was observed through a combination of air and ground methods for more than 100 hours per year during RY11–RY12. In addition, 94 hunters in RY11 and 70 hunters in RY12 observed DBH during the hunting season and a number of carcasses from bison harvested each year were given a gross visual inspection for signs of disease or poor body condition at hunter check-out.

Harvest Management

During RY11–RY12, bison hunters were assigned a beginning hunt date starting 1 October and new groups of hunters were eligible to begin hunting every 5–7 days. Once hunters were eligible to start hunting, they had until the end of the season on 31 March to hunt.

Bison hunters were required to check out within 24 hours after killing a bison. They completed a questionnaire including date and location of kill, number of days afield, number of shots required, weight of bullet, and caliber of firearm. If hunters checked out after normal office hours, they put the questionnaire and the distal end of the lower jaw in a drop box at the Delta Junction ADF&G office. If hunters checked out during working hours, we examined the carcass to record tooth eruption and to extract an I1 tooth from bison that had all permanent teeth. An I1 tooth was also extracted from all lower jaws collected during after-hours check out. We sent teeth to Matson Laboratories (Milltown, Montana) for aging. Harvest was monitored using permit harvest reports and questionnaires. Harvest data were summarized by regulatory year.

DJBR MANAGEMENT

The perennial grasses, nugget bluegrass (*Poa pratensis*) and arctared fescue (*Festuca rubra*), were fertilized on DJBR in RY11 and RY12 with N60-P20-K0-S10 at the rate of 200 lb/acre.

Fertilizer was applied with an 8-ton capacity broadcast spreader pulled by a John Deere 4250 tractor.

Oats were planted each year on acreage being treated to control bluejoint reedgrass (*Calamagrostis canadensis*). Prior to planting, fields were fertilized with about 200 lb/acre of N60-P20-K0-S10 by broadcasting fertilizer onto the fallow soil with a broadcast spreader. Approximately 100 lb/acre of oat seed were spread using the broadcast spreader and the field was disked to incorporate the fertilizer and seed into the soil.

We analyzed forage quality by collecting forage subsamples and pooling them into one composite sample by forage type and location. Samples were sent to the University of Alaska Plant and Soils Lab in Palmer, Alaska for analysis. Samples were analyzed moisture-free and as-fed for relative feed value (RFV), dry matter, crude protein, phosphorus, potassium, calcium, acid-detergent fiber, in vitro dry matter disappearance, total digestible nutrients, metabolizable energy, and net energy–lactation. Generally, RFV was reported to compare forage quality.

We provided trace element mineral blocks for the bison in the Panoramic and Gerstle fields of DJBR, and on U.S. Army lands proximate to the Delta River. Water in stock water tanks was supplied by a well in the Panoramic fields. We monitored rain gauges in both the Panoramic and Gerstle fields.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

RY11. The prehunt population size for fall 2011 was 407 bison (Table 1). The precalving population was 344 in spring 2012 (Table 1).

RY12. The prehunt herd size for fall 2012 was 461 bison (Table 1). The precalving population in spring 2013 was 394 bison.

Population Composition

RY11. Sex and age composition was estimated from a sample of 266 bison counted on 24 and 26 September 2011 (Table 2). Calf survival was 53 calves:100 cows and calves composed 27% of the sample. Adult and yearling cows composed 52% of the sample.

The bull:cow ratio was 40:100, with a yearling bull:cow ratio of 7:100 cows. We observed and classified 55 bulls during composition surveys based on horn size and shape. The sample consisted of 16% yearlings, 33% small bulls, 27% medium bulls, and 24% large bulls (Table 2).

RY12. Sex and age composition was estimated from a sample of 359 bison counted on 25 September 2013 (Table 2). Calf survival was 38 calves:100 cows and calves composed 20% of the sample. Adult and yearling cows composed 52% of the sample.

The bull:cow ratio was 53:100, which met the objective, with a yearling bull:cow ratio of 11:100 cows. We observed and classified 100 bulls during composition surveys based on horn size and

shape. The sample consisted of 20% yearlings, 40% small bulls, 34% medium bulls, and 6% large bulls (Table 2).

Distribution and Movement

RY11. An aerial survey along the Delta River on 14 July 2011 located 326 adults and 79 calves in the Donnelly Training Area Texas Range and in the river floodplain south of Buffalo Dome flats. During a 20 July aerial survey, we located 239 adults and 53 calves on the Donnelly Training Area Texas Range and on Buffalo Dome Flats. The survey on 28 July located 380 bison within the floodplain of the Delta River between Buffalo Dome Flats (north) and Darling Creek (south).

The first bison observed on DJBR in RY11 numbered 55 and were seen on 31 July 2011. During an 11 August aerial survey, we located 150 bison on the Delta River and 184 bison on DJBR.

The final aerial survey for early RY11 was on 30 August. We located 150 bison on DJBR and 253 bison on DAP. The highest population estimate (fall prehunt) in early RY11 occurred during an aerial survey on 14 July when 405 bison were counted in the Delta River floodplain and proximate military lands.

Bison presence and DAP crop field assessment surveys were conducted on 17 and 24 September 2011. These surveys were a coordinated effort between ADF&G and the Division of Agriculture to document bison presence on DAP and assess damage to field crops. Bison presence on DAP crop fields was documented during both surveys.

An aerial survey on 5 May 2012 located 323 adults and 44 calves within and proximate to the Delta River floodplain between Big Lake (north) and McGinnis Creek (south). During an aerial survey of the Delta River on 20 May 2012, 336 adults and 74 calves were observed. An aerial survey along the Delta River on 22 May 2012 located 359 adults and 102 calves in Donnelly Training Area East and on Buffalo Dome flats. A 25 May 2012 survey located 338 adults and 78 calves on Donnelly Training Area East and within the Delta River floodplain as far south as McGinnis Creek.

RY12. The first bison on DJBR in RY12 were observed from the ground on 29 July. On 31 July 2012, 185 bison were observed on the west side of the Delta River (west of Bolio Lake), and an estimated 275 bison were observed on DJBR.

Bison presence and DAP crop field assessment surveys were conducted on 25 July and 13 and 24 August 2012. Neither bison nor signs of bison presence were observed during the 25 July survey. Signs of bison presence in oat and barley fields were documented on Tract 4A of DAP and 24 bison were observed on grass on Tract N during the 13 August survey. No other bison or signs of bison presence were observed in oat, barley, or potato fields during this survey. During the 24 August 2012 crop field assessment survey, sign of bison presence was observed on Tract 4A.

Aerial surveys on 10 and 12–13 August located bison on the Delta River, DJBR, and DAP, with greater numbers on DJBR. On 13 August, we estimated 130 bison were on Donnelly Training Area East, and <100 bison were observed on DAP.

An aerial survey on 27 May 2013 located 352 adults and 80 calves on Donnelly Training Area East proximate to the Delta River and in the Delta River floodplain. During a 5 June 2013 survey, we located 48 adults and 8 calves on Donnelly Training Area East, and no bison on DJBR or DAP.

During an 11 June 2013 aerial survey, we located 394 adults and 82 calves on the Delta River between Buffalo Dome (north) and Black Rapids Creek (south). An aerial survey of the Delta River between Buffalo Dome Flats (north) and Pillsbury Creek (south) on 21 June 2013 located an estimated 200 bison.

MORTALITY

Harvest

Season and Bag Limit. The resident and nonresident bison hunting season was 1 July–30 June during the RY11 and RY12 hunting seasons. Residents may take 1 bison every 10 regulatory years by drawing permit only. Nonresidents may take 1 bison per life by drawing permit only. However, through ADF&G’s discretionary permit hunt authority, hunting does not routinely begin until 1 October each year so that farmers in DAP can finish harvesting their crops before the hunt starts, when bison being pursued by hunters could damage crops.

Hunters participated in the hunt by drawing permit. In RY11 and RY12, hunt DI403 was for bulls only and hunt DI404 was for cows only. Some years, ADF&G and the governor’s office also issue special permits for any Delta bison, designated as SI405. One SI405 permit was issued each year in RY11 and RY12. Recipients of DI403, DI404, and SI405 permits were required to follow all regulations and permit conditions that applied to the drawing permits. The following conditions applied to the permits:

- Permittees were required to attend an orientation course or review an online orientation course before hunting. Four in-person hunter orientations were conducted each year in RY11 and RY12 (1 in September and 3 in October).
- Permittees for the DI403 and DI404 hunts were assigned specified periods to begin hunting that were determined by the order permits were drawn.
- Permittees for the SI405 hunt were assigned a hunting period of 1 October–31 March.
- Permittees were required to use a rifle capable of shooting a 200-grain bullet with 2,000 ft/lb of retained energy at 100 yards. Bows had to comply with 5 AAC 92.075(4) to be a legal means of harvest. Crossbows were prohibited. Certain muzzleloading firearms qualified.

Alaska Board of Game Actions and Emergency Orders. At the 2–9 March 2012 Board of Game meeting, the board considered and did not adopt proposal 202 to allow take of Delta bison the same day a hunter was airborne.

Harvest Mortality.

RY11 — Estimated harvest mortality was 63 bison (Table 3) during the drawing permit hunts DI403 and DI404, and special permit hunt SI405, with an estimated wounding loss of 7 (7% of permits issued). Hunters killed 56 bison (29 bulls and 27 cows) during the *RY11* hunts, including 1 bull bison during the SI405 hunt (Table 4).

RY12 — Estimated harvest mortality was 65 bison (Table 3) from the drawing permit hunts DI403 and DI404, special permit hunt SI405, and wounding loss. Hunters killed 59 bison (37 bulls and 22 cows) during DI403 and DI404, and 1 bull bison during the SI405 hunt. Hunters with bull permits (DI403) killed 33 bulls and 2 cows. Hunters with cow-only permits (DI404) killed 20 cows and 4 bulls (Table 4). Estimated wounding loss was 5 (7% of the number of permits issued).

Number of Days Hunted.

RY11 — Successful hunters with bull permits (DI403) hunted a mean of 7.0 days and unsuccessful hunters hunted a mean of 13.1 days. Successful hunters with cow permits (DI404) hunted a mean of 6.5 days and unsuccessful hunters hunted a mean of 7.7 days (Table 5). The holder of the SI405 permit hunted 6 days.

RY12 — Successful and unsuccessful hunters with bull permits (DI403) hunted a mean of 6.5 days. Successful hunters with cow permits (DI404) hunted a mean of 5.3 days and unsuccessful hunters hunted a mean of 10.9 days (Table 5). The SI405 permit holder hunted 1 day.

Permit Hunts.

RY11 — The department received 19,535 applications for DI403 and DI404 permits (Table 6).

RY12 — The department received 19,080 applications for DI403 and DI404 permits (Table 6).

Hunter Residency and Success.

RY11 — Most Delta bison hunters were nonlocal Alaska residents (96%). Permit holders in DI403 and DI404 who reported hunting had a 55% overall success rate (Table 7).

RY12 — Most Delta bison hunters were nonlocal Alaska residents (96%). Permit holders for hunts DI403 and DI404 who reported hunting had an overall success rate of 59% (Table 7).

Harvest Chronology.

RY11 — Most of the harvest (54%) occurred in October–November. The harvest rate slowed during December–January and then increased during February–March (Table 8).

RY12 — Harvest chronology was similar to chronology in *RY11*, with most harvest occurring in October–November (68%). The harvest rate was low during December–February, and increased again (14%) during March (Table 8).

Transport Methods.

Highway vehicles and snowmachines continued to be the most common transport methods (Table 9). Hunters typically use highway vehicles in the early portion of the season before snow depth prohibits their use. Hunters use snowmachines more commonly once snow makes highway vehicles more difficult to use.

RY11 — Most successful bison hunters used highway vehicles (69%) and snowmachines (15%) (Table 9).

RY12 — Eighty-seven percent of successful bison hunters used highway vehicles for their hunts. Snowmachines were the second most common mode of transportation and were used by 11% of successful hunters (Table 9).

Harvest Locations.

RY11 — Most bison (65%) were killed on private agricultural lands in DAP (Table 10). Twenty-four percent were killed on DJBR and 11% were killed on other public land and military land.

RY12 — Most bison (90%) were killed on private agricultural lands in the DAP (Table 10). Seven percent were killed on DJBR and 3% were killed in other areas.

Non-hunting Mortality Factors

One cow bison was killed by motor vehicle collision on Cummings Road near the Gerstle River. During an aerial survey in May 2012, the carcass of an adult bull bison was observed in the Tanana River. Cause of mortality is unknown (Table 11).

The primary nonhunting mortality factor for DBH is motor vehicle collisions. Anecdotal reports and observations suggest snares are another nonhunting cause of mortality. An adult cow bison was removed alive from a snare by an Alaska Wildlife Trooper and ADF&G personnel in November 2012. The location of ensnarement was DAP near the Gerstle River. Predation from wolf and grizzly bear likely occurs, but is rarely documented. Table 11 represents total reported and estimated mortality for DBH.

Disease Management

Disease transmission from domestic livestock in the Delta Junction area was the greatest potential source of morbidity and nonhunting mortality for bison. Cattle in the area have had infectious bovine rhinotracheitis, bovine viral diarrhea, bovine respiratory syncytial virus, infectious bovine kerato conjunctivitis, parainfluenza 3 (PI3), Johne's disease (present in Alaska livestock but not verified from Delta Junction), and *Neospora caninum* (D. Quarberg and C. Crusberg, local domestic livestock producers, personal communication with S. DuBois, 2008).

HABITAT

RY11 — Approximately 700 acres of nugget bluegrass were fertilized on the Panoramic and Gerstle fields at a cost of \$28,133. Fertilizer was applied at a rate of 200 lb/acre. The grass acreage was fertilized during 24 May–29 June 2011.

Approximately 400 acres (300 acres Panoramic fields, 100 acres Gerstle fields) of Mustang oats were planted during 13 June–29 June. The planting dates were approximately 1 week later than recent previous years to accommodate later bison arrival dates. The following oat plantings were sampled during August and tested for relative feed value (RFV):

Planting date	Location/Acres	RFV
13 June	Panoramic fields, 50 acres	114
16 June	Panoramic fields, 80 acres	176
21 June	Panoramic fields, 80 acres	111
23 June	Panoramic fields, 60 acres	107
25 June	Panoramic fields, 80 acres	111
28 June	Gerstle fields, 100 acres	102

Two turnip samples (25 June planting date) were collected from the Panoramic fields and tested for RFV. RFV for the samples was 259 and 457.

Approximately 100 acres in the Panoramic fields and 100 acres in the Gerstle fields were disked and left fallow to control bluejoint reedgrass and woody vegetation. Approximately 400 acres were mowed on the Panoramic and Gerstle fields to kill undesirable grasses and trees.

We pumped 12,232 gallons of water into stock tanks on DJBR during late July–September. Rainfall measurements on DJBR totaled 9.60 inches on the Panoramic fields and 8.15 inches on the Gerstle fields. We placed trace mineral blocks at multiple locations on DJBR in July and removed them 1 week prior to the 1 September opening date of the bison range youth moose hunt.

RY12 — Approximately 700 acres of nugget bluegrass were fertilized during 22 May–1 July at a cost of \$32,117.

Approximately 360 acres (300 acres Panoramic fields, 60 acres Gerstle fields) of Athabaskan oats were planted from 8 June to 1 July. The following oat plantings were sampled during August and tested for relative feed value (RFV):

Planting date	Location/Acres	RFV
13 June	Panoramic fields, 50 acres	133
16 June	Panoramic fields, 80 acres	161
21 June	Panoramic fields, 80 acres	147
23 June	Panoramic fields, 60 acres	137
25 June	Panoramic fields, 80 acres	149
28 June	Gerstle fields, 60 acres	150

Approximately 50 acres of Pasja forage turnips were planted in the Panoramic fields. Turnips sampled during August from the Panoramic fields had an RFV value of 496.

Approximately 200 acres were disked and left fallow on the Panoramic and Gerstle fields to control bluejoint reedgrass and trees. Approximately 400 acres were mowed on the Panoramic and Gerstle fields to control woody vegetation.

We pumped 14,961 gallons of water into stock tanks on DJBR during late July–September. Rainfall for the area was slightly below average during bison migration from the Delta River floodplain to DJBR. We placed trace mineral blocks at multiple locations on DJBR in July and removed them 1 week prior to the 1 September opening date of the bison range youth moose hunt.

We conducted a prescription burn on approximately 40 acres on the Panoramic side of DJBR. This burn was accomplished as a cooperative effort with the Department of Forestry. Grass sampled from the area post-burn had an RFV of 103.

During RY11–RY12, the U.S. Army fertilized the 35-acre bison food plot on Donnelly Training Area East, located south of Big Lake, and fertilized the Buffalo Dome Flats bison summer range on the west side of the Delta River.

DELTA BISON MANAGEMENT PLAN

In summer 2011, ADF&G staff prepared an update to the Delta bison management plan based on input from the public, recommendations of the Delta Bison Working Group, and best professional judgment, including considerations of the department’s present legal authorities and funding capabilities. The updated plan was designated interim in 2012 pending resolution of the issue of fencing (ADF&G 2012).

CONCLUSIONS AND RECOMMENDATIONS

We met our population objective of approximately 360 bison during RY11, but precalving herd size was above the objective in RY12. Estimated herd size was 16 animals below the population objective in RY11 and was 34 above the population objective in RY12. Numbers of drawing permits were decreased in RY11 compared to RY10, and were decreased again in RY12. The decrease in permits was in response to the stabilization of the herd size at or near the population objective during RY09–RY10. Additional permit reductions are not suggested at this time as the estimated herd size was above the population objective in RY12.

Herd productivity and calf survival continued within the normal range, with calf:cow ratios ranging 38–53:100 and 20–27% calves during RY11–RY12. The bull:cow ratio was below the objective in RY11 with a ratio of 40 bulls:100 cows. I suggest it is possible the RY11 bull:cow ratio was lower due to the sample used to calculate composition data rather than selective harvest or other mortality. Based on observations of all-bull bison groups post-composition survey, it is likely the bull subset of the population was not fully represented in the sample used to calculate composition data. Bison arrived at DJBR and DAP later compared to previous years, and were difficult to locate for the fall 2011 composition surveys. The bull:cow ratio objective was met in RY12 with a ratio of 53 bulls:100 cows.

Herd movements were different during RY11–RY12, with the majority of DBH moving from summer range to DJBR approximately 10–15 days later than the previous reporting period and moving into private agricultural lands in late August. Habitat improvement on Donnelly Training Area East (U.S. Army lands) possibly had an influence on bison movement and distribution in July. Also, based on anecdotal observations, we believe the Bison Range Youth Hunt

management area, which is intended to regulate moose hunting activity, continues to contribute to extending the length of time bison use DJBR in the late summer and early fall.

The 4 bison conflict management objectives in the Delta bison management plan were met. DJBR met the legislative intent to reduce conflicts between bison and agriculture and continued to benefit farmers by delaying and/or reducing bison movements into DAP; however, we continue to strive to improve the situation. The bison hunt was administered in a manner that minimized conflicts with private landowners. Bison habitat was enhanced west of the Richardson Highway. The department responded to all calls from the public with questions or concerns about bison presence and behavior.

Hunter success averaged 72% during RY11–RY12 and has averaged 69% for the past 10 years (Table 7). This is a lower success rate as compared to success rates (>90%) of the 1970s through the 1990s. Some of the hunting public and Delta agricultural producers have expressed concern about the decline, however it appears harvest rate has settled into its current average rate (10 years at approximately 70%) and I do not foresee the rate significantly changing with the current hunt structure. The current hunt structure allows unrestricted access to DJBR during the entire season, and hunting parties often interfere with each other, possibly limiting success. In addition, hunters who seek bison in DAP often wait for access permission on certain tracts of land rather than seeking hunting opportunities elsewhere. This may contribute to slowing the rate of active hunting and potentially could be impacting harvest rate. Further, Delta bison behavior has changed over the past 2 decades (S. DuBois, personal communication). Anecdotally, it appears bison are exhibiting increased nocturnal activity and have increased their utilization of forested areas during diurnal hours. Bison harvest has been adequate for maintaining the herd at or near the population objective in 4 out of the past 5 years, and I do not recommend changes to the hunt structure at this time. However, hunting access on DJBR and its effect on bison harvest rate should be evaluated. Hunt administration will continue to be important in management of the Delta bison herd.

The greatest challenges to DJBR management continued to be 1) controlling the native grass, bluejoint reedgrass, and woody regrowth with nonherbicidal techniques; 2) developing more cost-effective forage management techniques; and 3) holding bison on DJBR as late in the fall as possible. Controlling bluejoint reedgrass and woody regrowth is a particular challenge in the Gerstle fields given current funding and staffing levels. We will continue work to improve these aspects of DJBR management.

The bison presence and DAP crop field assessment surveys were received with mixed acceptance by DAP producers. Some producers are in favor of the surveys while others have requested to not be included in the survey. Bison presence on DAP oats, barley, and potato fields prior to crop harvest was minimal in RY12, but one producer received most of the damage. It is unclear if the Division of Agriculture intends to continue this survey.

I reported the observation of an adult bull bison carcass in the Tanana River during RY11 and designated it as mortality from unknown cause. It is possible this was wounding loss mortality from the hunting season. Based on anecdotal reports and observations, I believe snares to be a factor in bison injury and mortality. In addition to the removal of live bison from snares by ADF&G and Department of Public Safety (DPS) personnel over the past 15 years

(A. Cummings, DPS, personal communication, 2013), bison skeletons have been observed by ADF&G and DPS personnel in the vicinity of snares that were not removed (as per regulation) after trapping seasons. I also have observed bison with leg injuries consistent with the type of injuries caused by snares.

Based on past specific disease testing and current level of health monitoring, I believe there are no major health risks to the herd at this time. However, during annual DBH movements, the herd comes into proximity of domestic livestock in the Delta Junction area. Several diseases are known to occur in domestic livestock in the Delta Junction area. ADF&G has no control over domestic livestock health and limited control over the consequences of contact between free-ranging bison and livestock. These consequences include negative impacts to the health of DBH and other wildlife species.

Health monitoring of DBH will continue to rely on extensive observation efforts by ADF&G staff, bison hunters, and the public. Animals deemed of high enough interest regarding their health status may be immobilized or euthanized for further examination and testing. Since specific disease testing has not been done for approximately 10 years, I recommend developing a health monitoring guide that identifies tests, sample sizes, and needed funding sources. I also recommend collection of genetic samples and conducting tests to document the genetic makeup of DBH.

The objective to investigate methods and funding sources to improve bison viewing opportunities for the public was not accomplished.

MANAGEMENT GOALS AND OBJECTIVES

Herd Health Management Goal

Monitor the health of the Delta bison herd.

Objective 1 — Monitor DBH to determine if any diseases are present that might threaten the health of the herd or other wildlife species.

Objective 2 — Minimize the potential for transmission of diseases between livestock and DBH.

Objective 3 — Work through Division of Wildlife Conservation's Wildlife Veterinarian and other animal health officials to determine appropriate steps to prevent spread of diseases from bison to other wildlife species if diseases are transmitted from livestock to DBH.

Herd Size and Composition Goal

Manage DBH to accomplish a reasonable balance between providing the greatest opportunity to hunt and view bison while keeping negative impacts to private property to a minimum.

Objective 1 — Maintain a herd size of approximately 360 bison at the precalving count.

Objective 2 — Maintain a sex ratio of no less than 50 bulls (≥ 1 year old):100 cows.

Bison Conflict Management Goal

Minimize conflicts between bison and the public, including, but not limited to, agriculture interests in the Delta Junction area.

Objective 1 — Administer the Delta bison hunt to minimize landowner–hunter conflicts in order to help maintain bison and hunter access to private agricultural land to the greatest extent possible.

Objective 2 — Enhance bison summer range west of the Richardson Highway to increase its attractiveness to DBH to attempt to delay the herd’s migration towards DJBR and private agricultural lands.

Objective 3 — Manage DJBR to encourage DBH to remain south of the Alaska Highway, and out of private agricultural land as late in the fall as possible, and to attract more bison to DJBR in the winter and provide greater accessibility to the herd for bison hunters.

Objective 4 — Provide assistance to the public regarding bison conflicts.

In addition to the management objectives above, the following objective will be included under the Herd Health Management Goal for the next reporting period:

Objective 1 — Monitor the genetics of the Delta bison herd by periodically collecting genetic samples and conducting tests to further document the genetic makeup of the herd.

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Table 1. Delta bison precalving and postcalving population estimates, 2000–2013.

Year	Spring precalving population estimate	Fall prehunt population estimate
2000	359	453
2001	361	471
2002	373	476
2003	365	407
2004	327 ^a	421
2005	332 ^a	402
2006	353	430
2007	397 ^a	516
2008	412	494
2009	370	435
2010	366	412
2011	342	407
2012	344	461 ^b
2013	394	— ^c

^a Calculated based on maximum number of non-neonatal bison seen during late March through early May surveys.

^b Minimum population size based on highest count during May through August surveys.

^c The fall 2013 prehunt population estimate will be calculated in the next reporting period.

Table 2. Delta bison fall ground composition count data and estimated population size, regulatory years^a 2000–2012.

Regulatory year	Bulls:100 cows	Yrlg bulls: 100 cows	Calves:100 cows	Adults		Percent yrlg bulls	Percent calves	Total sample size	Estimated prehunt population size
				% Bulls	% Cows ^b				
2000	63	18	58	14	48	9	28	272	453
2001	68	11	57	23	45	5	25	278	471
2002	87	19	59	27	41	8	24	229	476
2003	60	26	45	16	49	13	22	266	407
2004	61	10	42	23	51	5	21	251	421
2005	71	20	47	23	46	9	22	321	402
2006	63	13	59	27	43	5	25	241	430
2007	55	13	55	20	48	6	26	214	494
2008	73	36	54	16	44	16	24	168	435
2009	57	24	44	16	50	12	22	179	412
2010									407
2011	40	7	53	17	52	3	27	266	461
2012	53	11	38	22	52	6	20	359	— ^c

^a Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2000 = 1 July 2000–30 June 2001).

^b Includes yearlings and adult cows.

^c The 2013 prehunt population estimate will be calculated in the next reporting period.

Table 3. Delta bison hunting mortality, regulatory years^a 2000–2012.

Regulatory year	Reported harvest			Wounding	
	M (%)	F (%)	Total	loss ^b	Total
2000	36 (51)	35 (49)	72 ^c	7	79
2001	51 (52)	47 (48)	98	9	107
2002	54 (51)	51 (49)	105	9	114
2003	43 (56)	34 (44)	77	9	86
2004	33 (72)	13 (28)	46	5	51
2005	27 (60)	18 (40)	45	5	50
2006	48 (80)	12 (20)	60	6	66
2007	49 (49)	51 (51)	100	11	111
2008	41 (36)	72 (64)	113	12	125
2009	40 (58)	29 (42)	69	10	79
2010	44 (63)	26 (37)	70	8	78
2011	29 (52)	27 (49)	56	7	63
2012	38 (63)	22 (37)	60	5	65

^a Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2000 = 1 July 2000–30 June 2001).

^b Estimated wounding loss equal to 7% of the permits issued.

^c One bison of unknown sex was included in the total.

Table 4. Reported Delta bison harvest data by permit hunt, regulatory years^a 2000–2012.

Hunt no.	Regulatory year	Permits issued	Reported no. of hunters	No. hunters did not hunt	Percent unsuccessful permittees	Percent successful permittees	Harvest					
							Bulls (%)		Cows (%)		Unk	Total
DI403	2000	50	48	3	16	74	35	(95)	2	(5)	0	37
	2001	70	70	1	30	70	47	(96)	2	(4)	0	49
	2002	70	70	2	23	74	51	(98)	1	(2)	0	52
	2003	70	67	1	34	59	40	(98)	1	(2)	0	41
	2004	50	48	1	26	64	32	(100)	0	(0)	0	32
	2005	35	35	3	22	69	24	(100)	0	(0)	0	24
	2006	65	65	1	18	80	47	(90)	5	(10)	0	52
	2007	80	80	9	33	56	43	(96)	2	(4)	0	45
	2008 ^b	100	100	7	19	74	38	(51)	36	(49)	0	74
	2009 ^b	90	90	4	20	76	39	(57)	29	(43)	0	68
	2010	70	70	2	37	60	41	(98)	1	(2)	0	42
	2011 ^c	55	55	8	43	57	24	(89)	3	(11)	0	27
	2012 ^c	40	40	3	5	95	33	(94)	2	(6)	0	35
DI404	2000	50	49	4	20	70	1	(3)	33	(97)	1	35
	2001	60	60	1	17	82	4	(8)	45	(92)	0	49
	2002	65	65	2	15	82	3	(6)	50	(94)	0	53
	2003	60	60	2	37	60	3	(8)	33	(92)	0	36
	2004	25	24	2	32	56	1	(7)	13	(93)	0	14
	2005	30	30	0	30	70	3	(14)	18	(86)	0	21
	2006	15	14	1	36	57	1	(13)	7	(88)	0	8
	2007	75	75	3	24	72	5	(9)	49	(91)	0	54
	2008	70	70	3	40	56	3	(8)	36	(92)	0	39
	2009 ^d											
	2010	50	50	8	30	54	2	(7)	25	(93)	0	27
	2011 ^c	50	50	3	40	60	4	(14)	24	(86)	0	28
	2012 ^c	35	35	2	27	73	4	(17)	20	(83)	0	24
SI405	2000	2 ^{e,f}	2	0	0	100	2	(100)	0	(0)	0	2
	2001	1 ^f	1	0	0	100	1	(100)	0	(0)	0	1

Hunt no.	Regulatory year	Permits issued	Reported no. of hunters	No. hunters did not hunt	Percent unsuccessful permittees	Percent successful permittees	Harvest					
							Bulls (%)		Cows (%)		Unk	Total
	2002	0	2	0	0	0	0	(0)	0	(0)	0	0
	2003	1	1	0	0	100	0	(0)	1	(100)	0	1
	2004	0	0	0	0	0	0	(0)	0	(0)	0	0
	2005	0	0	0	0	0	0	(0)	0	(0)	0	0
	2006	0	0	0	0	0	0	(0)	0	(0)	0	0
	2007	1	1	0	0	100	1	(0)	0	(0)	0	1
	2008	2	2	0	50	50	1	(100)	0	(0)	0	1
	2009	1	1	0	0	100	1	(100)	0	(0)	0	1
	2010	1	1	0	0	100	1	(100)	0	(0)	0	1
	2011 ^c	1	1	0	0	100	1	(100)	0	(0)	0	1
	2012 ^c	1	1	0	0	100	1	(100)	0	(0)	0	1
Totals for all permit hunts	2000	102	99	7	18	73	38	(52)	35	(48)	1	74
	2001	131	131	2	23	75	52	(52)	47	(48)	0	98
	2002	135	137	4	19	78	54	(51)	51	(49)	0	105
	2003	131	128	3	36	59	43	(56)	35	(44)	0	77
	2004	75	72	3	28	61	33	(72)	13	(28)	0	46
	2005	65	65	3	26	69	27	(60)	18	(40)	0	45
	2006 ^e	80	79	2	22	76	48	(80)	12	(20)	0	60
	2007	156	156	12	28	64	49	(49)	51	(51)	0	100
	2008	172	172	10	28	66	42	(37)	72	(63)	0	114
	2009	91	91	4	20	76	40	(58)	29	(42)	0	69
	2010	121	121	10	30	58	44	(63)	26	(37)	0	70
	2011 ^c	106	106	11	41	59	29	(52)	27	(49)	0	56
2012 ^c	76	76	5	15	85	38	(63)	22	(37)	0	60	

^a Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2000 = 1 July 2000–30 June 2001).

^b The DI403 hunt was for either sex bison.

^c Prior to 2011 the percent successful and unsuccessful included those who did not hunt and was calculated based on the total number of permits. Post 2011 percent success was calculated on the number of successful hunters compared to the number who actually hunted.

^d There was no DI404 hunt in regulatory year 2009–2010.

^e One permit was issued for an Alaska Fish and Wildlife Safeguard raffle.

^f One permit was issued for a Governor's permit.

Table 5. Delta bison mean number of days hunted for hunts DI403 and DI404, regulatory years^a 2000–2012.

Regulatory year	Mean number of days hunted			
	Hunt DI403		Hunt DI404	
	Successful	Unsuccessful	Successful	Unsuccessful
2000	4.2	9.5	7.7	19.0
2001	7.6	14.6	5.9	7.7
2002	5.2	11.3	5.8	11.1
2003	4.7	11.1	8.1	10.5
2004	7.2	13.2	5.6	6.9
2005	6.9	21.7	11.2	13.6
2006	5.5	10.6	5.1	8.2
2007	10.8	12.6	7.5	3.4
2008	6.4	10.8	6.8	12.4
2009 ^b	5.0	10.4		
2010	7.4	10.0	7.1	8.3
2011	7.0	13.1	6.5	7.7
2012	6.5	6.5	5.3	10.9

^a Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2000 = 1 July 2000–30 June 2001).

^b There was not a DI404 hunt in regulatory year 2009.

Table 6. Delta bison hunts DI403 and DI404 applications received and permits issued, 2000–2012.

Year	Applications received	Permits issued
2000	16,178	100
2001	15,470	130
2002	15,817	135
2003	16,286	130
2004	14,519	75
2005	13,952	65
2006	8,762 ^a	80 ^b
2007	15,397	130
2008	16,597	170
2009	11,026	90
2010	20,711	120
2011	19,535	105
2012	19,080	75

^a Eight thousand nine hundred thirty-one applications were received before Tier II regulations were implemented and applications were returned.

^b Only 65 DI403 bull permits were announced in the permit drawing supplement. After the drawing an additional 15 DI404 cow permits were drawn from the pool of DI403 applicants.

Table 7. Delta bison hunter reported residency and success for drawing permit hunts DI403 and DI404, regulatory years^a 2000–2012.

Regulatory year	Successful					Unsuccessful					Total hunters
	Local ^b resident	Nonlocal resident	Nonres	Unk	Total (%)	Local ^b resident	Nonlocal resident	Nonres	Unk	Total (%)	
2000	5	67	0	0	72 (80)	0	18	0	0	18 (20)	90
2001	4	93	1	0	98 (76)	1	30	0	0	31 (24)	129
2002	3	102	0	0	105 (80)	0	24	2	0	26 (20)	131
2003	0	76	1	0	77 (63)	0	46	0	0	46 (37)	123
2004	1	46	0	0	47 (69)	0	21	0	0	21 (31)	68
2005	2	42	0	0	44 (76)	0	14	0	0	14 (24)	58
2006	2	57	1	0	60 (78)	0	17	0	0	17 (22)	77
2007	8	90	1	0	99 (69)	2	42	0	0	44 (31)	143
2008	4	108	1	0	113 (71)	3	44	0	0	47 (29)	160
2009	1	66	1	0	68 (79)	0	18	0	0	18 (21)	86
2010	3	66	0	0	69 (63)	0	41	0	0	41 (37)	110
2011	2	53	0	0	55 (59)	2	37	0	0	39 (41)	94
2012	1	57	1	0	59 (84)	1	10	0	0	11 (16)	70

^a Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2000 = 1 July 2000–30 June 2001).^b Local residents reside in Unit 20D.

Table 8. Delta bison percent harvest by month, regulatory years^a 2000–2012.

Regulatory year	Percent harvest by month											<i>n</i>
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Unk	
2000				55	23	3	1	10	8	0		74
2001				37	24	8	3	10	16	0		98
2002				44	22	5	2	9	19	0		105
2003				31	30	8	4	8	20	0		77
2004				52	15	2	7	13	11	0		46
2005				44	20	4	9	9	13	0		45
2006				47	19	5	5	10	12	2		60
2007				32	17	3	12	13	22	0		99
2008				29	23	3	1	19	26	0		113
2009				46	15	10	6	10	13	0		68
2010 ^b	0	4	13	26	7	9	9	12	20	0		69
2011				38	16	2	5	9	27	0	2	55
2012				53	15	5	5	8	14	0		59

^a Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2000 = 1 July 2000–30 June 2001).

^b The hunting season opened on 26 July.

Table 9. Delta bison harvest percent by transport method for hunts DI403 and DI404, regulatory years^a 2000–2012.

Regulatory year	Harvest percent by transport method								<i>n</i>
	Airplane	Horse/ Dog team	Boat	3- or 4-wheeler	Snowmachine	Other ORV	Highway vehicle	Unknown	
2000	0	0	0	4	11	6	79	0	72
2001	0	0	0	1	13	4	79	2	131
2002	0	0	0	4	0	2	90	4	135
2003	0	0	0	0	22	3	75	0	77
2004	0	0	0	6	18	3	72	0	65
2005	0	0	0	11	6	7	74	2	54
2006	0	0	0	3	12	2	82	2	60
2007	0	0	0	2	7	5	85	1	100
2008	1	0	0	2	21	3	70	3	114
2009	0	0	0	7	15	2	73	2	86
2010	0	1	0	3	20	0	75	2	110
2011	0	0	0	10	15	2	69	4	94
2012	0	0	0	1	11	0	87	0	70

^a Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2000 = 1 July 2000–30 June 2001).

Table 10. Delta bison harvest percent by kill location during permit hunts DI403 and DI404, regulatory years^a 2000–2012.

Regulatory year	Harvest percent by kill location				<i>n</i>
	Delta Agriculture Project	Delta Junction Bison Range	Other	Unknown	
2000	77	13	10	0	72
2001	65	25	10	0	131
2002	78	21	1	0	135
2003	71	21	8	0	77
2004	76	11	13	0	65
2005	63	26	12	0	54
2006	81	14	0	5	60
2007	72	16	11	1	100
2008	73	23	4	0	114
2009	56	38	6	0	86
2010	55	32	13	0	110
2011	65	24	11	0	94
2012	90	7	3	0	70

^a Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2000 = 1 July 2000–30 June 2001).

Table 11. Total reported and estimated Delta bison mortalities, regulatory years^a 2000–2012.

Regulatory year	Illegal take ^b	Other known mortality	Reported harvest and wounding loss	Total
2000	0	0	79	79
2001	0	0	107	107
2002	0	0	114	114
2003	0	0	86	86
2004	0	2	51	53
2005	0	2	50	52
2006	0	0	66	66
2007	0	0	111	111
2008	0	0	125	125
2009	0	0	79	79
2010	0	5 ^c	78	83
2011	0	0	63	63
2012	0	2 ^d	65	67

^a Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2000 = 1 July 2000–30 June 2001).

^b Bison killed outside of regulated and permitted hunting.

^c Two radiocollared bison found dead and 3 vehicle collision mortalities.

^d One bull carcass observed in Tanana river and 1 vehicle collision mortality.

