Species Management Report, ADF&G/DWC/SMR-2012-1

# Bison management report of survey-inventory activities, 1 July 2009–30 June 2011

**Patricia Harper, editor**



2012

Alaska Department of Fish and Game Division of Wildlife Conservation

Species Management Report, ADF&G/DWC/SMR-2012-1

# Bison management report of survey-inventory activities, 1 July 2009–30 June 2011



Alaska Department of Fish and Game
Division of Wildlife Conservation
P.O. Box 115526
Juneau, Alaska 99811-5526

Many of the activities referenced in this report were funded in part by the Federal Aid in Wildlife Restoration Program, Grants W-33-8 and W-33-9, Project 9.0.

Species management reports provide information about species that are hunted or trapped and management actions, goals, and recommendations for those species. Detailed information is prepared for each species every two or three years, depending on the species, by the area management biologist for game management units in their areas. Reports are not produced for species that are not managed for hunting or trapping or for areas where there is no current or anticipated activity. The individual unit reports are compiled in this statewide report. Unit reports are reviewed and approved for publication by regional management coordinators.

Any information taken from this report should be cited with credit given to authors and the Alaska Department of Fish and Game. Authors are identified at the end of each unit section.

If this report is referenced in its entirety, please reference as follows:

Alaska Department of Fish and Game. 2012. Bison management report of survey-inventory activities 1 July 2009–30 June 2011, P. Harper, editor. Species Management Report ADF&G/DWC/SMR-2012-1, Juneau, Alaska.

Please note that this report was released as a complete set in 2013, but is part of the 2012 set of species management reports. We encourage referencing this report as a 2012 report to maintain understanding of when reports were written and ease of locating this particular set of reports.

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

---



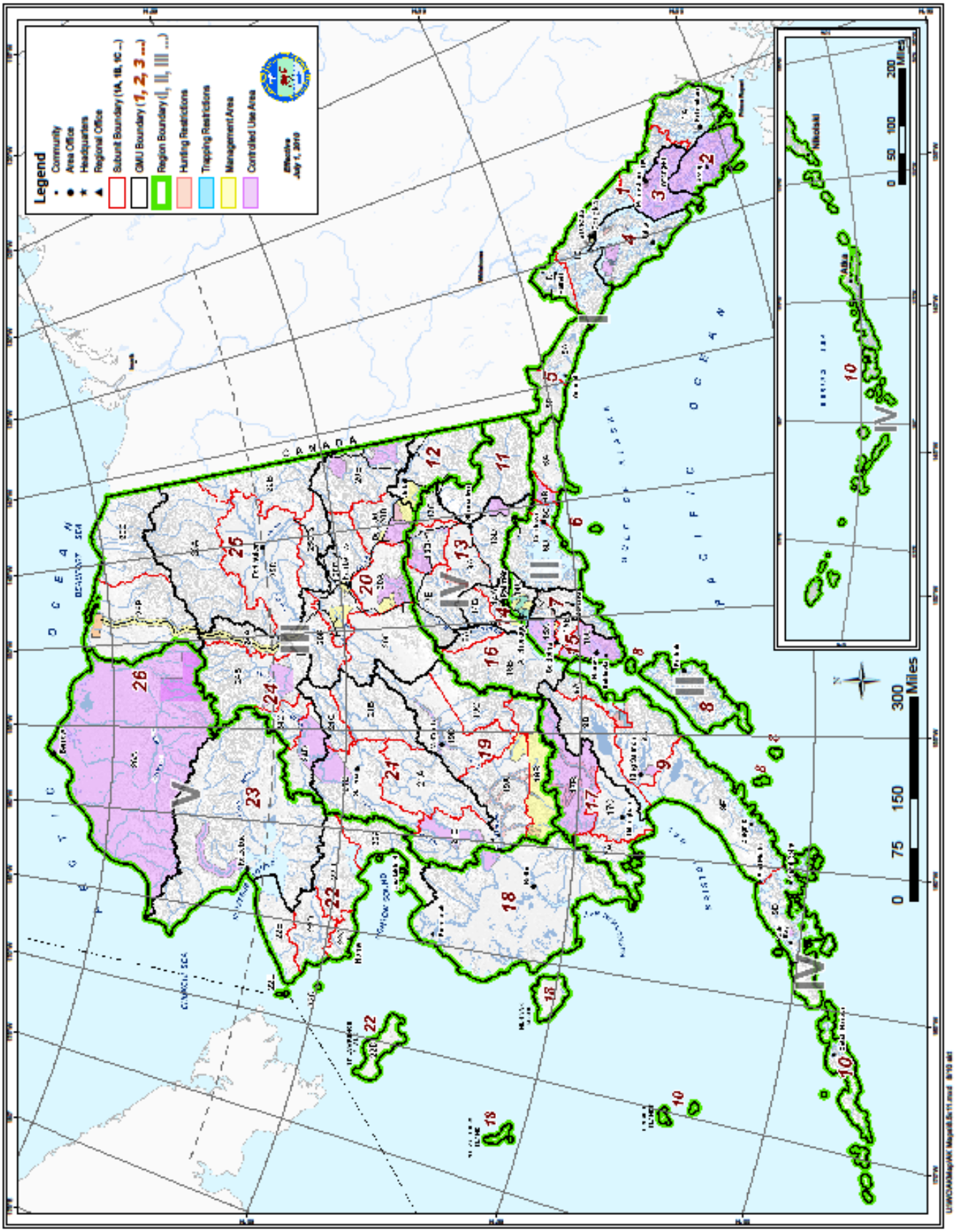
---

**Cover Photo**: Bison cross the upper Chitina River, about 40 miles southeast of McCarthy, Alaska. ©2010 Dave Crowley.

# BISON MANAGEMENT REPORT

From: 1 July 2009
To: 30 June 2011

## TABLE OF CONTENTS


Legend
Community
Area Office
Headquarters
Regional Office
Subunit Boundary (1A, 1B, 1C ...)
GMU Boundary (1, 2, 3 ...)
Region Boundary (I, II, III ...)
Hunting Restrictions
Trapping Restrictions
Management Area
Controlled Use Area
Effective July 1, 2010
CANADA
PACIFIC OCEAN
Miles
0 75 150 300
0 50 100 200
Nikolski
Unalaska

**WILDLIFE**

**MANAGEMENT REPORT**

**Alaska Department of Fish and Game**
**Division of Wildlife Conservation**
**907-465-4190 PO BOX 115526**
**JUNEAU, AK 99811-5526**

# BISON MANAGEMENT REPORT

From: 1 July 2009
To: 30 June 2011

## LOCATION

**GAME MANAGEMENT UNIT:** 11 (12,784 $mi^2$)

**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, 5 bulls and 12 cows were moved from the Delta herd to the Nabesna Road in northern 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 143 in 2009. 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. The 2009 count of 143 total bison increased 14% from the 2005 count of 125, and included 118 adults and 25 calves. (Table 1). Surveys could not be completed in 2010 and 2011.

### *Population Composition*

Calf production has averaged 22 calves a year over the last 10 years surveyed (range = 14–32), with the count of 32 calves in 2008 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.

Board of Game Actions and Emergency Orders. During the March 2009 Board of Game meeting the board expanded the hunt area by moving the northern border from the Nadina River to the Klawasi River.

Hunter Harvest. Hunters took 9 bison (4 bulls and 5 cows) during the RY09 season and 13 bison (8 bulls and 5 cows) during the RY10 season (Table 2).

Permit Hunts. The Copper River bison hunt is administered through a drawing hunt (DI 454) with a limit of up to 24 permits that can be issued annually (Table 2). There were 24 permits issued each year between RY04 and 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 has been relatively stable in recent years with 1,462 applications received in RY10. Permittees were required to notify the department prior to 1 September if they would hunt. If not, an alternate applicant was chosen. Permittees reported to the Glennallen office to pick up their permits and received detailed maps of the hunt area, including land ownership patterns. This gave us the opportunity to identify private property and emphasize the need to respect private property rights. 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 permit system where a fee is charged. Most of the bison are on this private land and permittee success is higher if an access permit is purchased.

Hunter Residency and Success. Nonlocal residents reported taking 9 bison in RY09 and 7 in RY10 (Table 3), and local residents reported the harvest of 3 bison in RY10. 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. Only 6 nonresidents have hunted since 1999; 5 successfully harvested a bison.

Harvest Chronology. During RY10, hunters took 13 bison (5 in September, 4 in October, 1 in January, and 3 in March) (Table 4). During the last 10 regulatory years, September has been the most important harvest period, accounting for 33 reported kills (40%). March was second with 25 reported kills (30%).

Transport Methods. Boats continue to be the most important method of transportation for successful hunters, followed by snowmachines and aircraft (Table 5). Snowmachines can only be used 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. The last winter classified as severe was recorded in 1994, the year before the population bottomed out. Snowfall in 1996 was deep enough for the winter to be classified as moderate, but every winter since has been mild. 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. Mild winters undoubtedly have been a factor in the herd increase observed over the past decade.

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, but we have not researched 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 mid-1990s, reaching a 30-year high with a minimum of 143 bison in 2009 even with a 10-year harvest of 72 bison, including 21 cows. Calf production and survival the last 5 years surveyed has been high, ranging 18–32 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 143 in 2009 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. Herd expansion has not been limited by predation. Current harvest levels range from 5–10% 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 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 researched. 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.

| **PREPARED BY:** | **SUBMITTED BY:** |
|---|---|
| W. Frank Robbins | Lem Butler |
| Wildlife Biologist II | Management Coordinator |

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

Robbins, W.F. 2012. Unit 11 Copper River herd bison management report, Pages 1–7 *in* Alaska Department of Fish and Game, P. Harper, editor. Bison management report of survey and inventory activities 1 July 2009–30 June 2011, Species Management Report ADF&G/DWC/SMR-2012-1, Juneau, Alaska.

Table 1. Copper River bison composition and population size based on June surveys, calendar years 2007 through 2011.

| Calendar Year | Adults | Calves | (%) | Bison Observed | Minimum Population Size |
|---|---|---|---|---|---|
| 2007 | 92 | 18 | (16) | 110 | 110 |
| 2008 | 103 | 32 | (24) | 135 | 135 |
| 2009 | 118 | 25 | (17) | 143 | 143 |
| 2010[a] | - | - | - | - | - |
| 2011[a] | - | - | - | - | - |

[a] Surveys were not completed in 2010 or 2011

Table 2. Copper River bison harvest data by permit hunt (DI454), regulatory years 2006 through 2010.

| Regulatory Year | Permits Issued | Applications | Percent Did not Hunt | Percent Unsuccessful Hunters | Percent Successful Hunters | Bulls | (%) | Cows | (%) | Unk. | Total Harvest |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2006 | 24 | 1058 | 13 | 45 | 55 | 8 | (73) | 3 | (27) | 0 | 11 |
| 2007 | 24 | 1021 | 25 | 39 | 61 | 6 | (55) | 5 | (45) | 0 | 11 |
| 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 |

Table 3. Copper River bison hunter residency and success, regulatory years 2006 through 2010.

| | Successful | | | | | Unsuccessful | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Regulatory Year | Local[a] Resident | Nonlocal Resident | Nonresident | Total | (%) | Resident | Nonresident | Total | (%) | Total hunters |
| 2006 | 3 | 8 | 0 | 11 | (58) | 8 | 0 | 8 | (42) | 19 |
| 2007 | 3 | 8 | 0 | 11 | (61) | 6 | 1 | 7 | (39) | 18 |
| 2008 | 1 | 3 | 0 | 4 | (36) | 7 | 0 | 7 | (64) | 11 |
| 2009 | 0 | 9 | 0 | 9 | (50) | 9 | 0 | 9 | (50) | 18 |
| 2010 | 3 | 7 | 3 | 13 | (72) | 5 | 0 | 5 | (28) | 18 |

[a] Local means resident of Unit 11 or 13.

Table 4. Copper River bison harvest chronology, regulatory years 2006 through 2010.

| Regulatory | Harvest Period | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Year | Sept | Oct | Nov | Dec | Jan | Feb | Mar | *n* |
| 2006 | 6 | 0 | 1 | 0 | 0 | 1 | 3 | 11 |
| 2007 | 2 | 3 | 0 | 0 | 0 | 0 | 6 | 11 |
| 2008 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 4 |
| 2009 | 3 | 1 | 1 | 0 | 0 | 1 | 3 | 9 |
| 2010 | 5 | 4 | 0 | 0 | 1 | 0 | 3 | 13 |

Table 5. Copper River bison harvest percent by transport method, regulatory years 2006 through 2010[a].

| | Percent (%) of harvest | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Regulatory year | Airplane | Horse | Boat | 3- or 4-wheeler | Snow-machine | ORV | Highway Vehicle | Unknown | *n* |
| 2006 | 0 | 0 | 55 | 0 | 45 | 0 | 0 | 0 | 11 |
| 2007 | 45 | 0 | 45 | 9 | 0 | 0 | 0 | 0 | 11 |
| 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 |

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

**Alaska Department of Fish and Game**
**Division of Wildlife Conservation**
**907-465-4190 PO BOX 115526**
**JUNEAU, AK 99811-5526**

# BISON MANAGEMENT REPORT

From: 1 July 2009
To: 30 June 2011

## LOCATION

**GAME MANAGEMENT UNIT:** 11 (12,784 $mi^2$)

**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 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.

## 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 that, 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.

### *Population Composition*

For consistency, surveys are flown in June each year. In 2011, 32 adults and 4 calves were observed during an aerial survey of the Chitina herd (Table 1). Seven calves were observed in 2010.

### *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 is 6 September–30 November. The bag limit is 1 bison every 10 regulatory years by drawing permit. 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 season (Table 2). In RY10, 2 bulls were harvested. A total of 15 bulls have been harvested since the season reopened in RY99.

Permit Hunts. Chitina bison are hunted under a drawing permit hunt (DI 450); up to 2 permits are authorized annually (Table 3). For the RY11 season, 492 hunters applied for the available permits.

Hunter Residency and Success. The hunter success rate was 50% for this reporting period (Table 3). The two successful permittees were nonlocal Alaska residents, and the two unsuccessful permittees were local Alaska residents (Table 4). The number of days hunted in order to take a bison has been highly variable, with successful hunts lasting 1–8 days.

Transportation Methods. Most successful hunters report the use of aircraft, however one hunter in RY07 reported the use of a boat (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 1997–98, 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 2003–04, 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 is 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 2003–04 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 32 adults and 4 calves still falls below the minimum objective of 50 adult bison, but is likely biased low because of poor sightability of some animals during the survey. Minimum population estimates of 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 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 class 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.

## LITERATURE 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. 112pp.

**PREPARED BY:** **SUBMITTED BY:**

W. Frank Robbins Lem Butler
Wildlife Biologist II Management Coordinator

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

Robbins, W. F. 2012. Unit 11 Chitina River herd bison management report. Pages 8–15 *in* Alaska Department of Fish and Game, P. Harper, editor, Bison management report of survey and inventory activities 1 July 2009–30 June 2011, Species Management Report ADF&G/DWC/SMR-2012-1, Juneau, Alaska.

Table 1. Chitina bison spring aerial composition counts and estimated population size, calendar years 2007 through 2011

| Calendar Year | Adults | Calves | (%) | Bison observed | Minimum population size |
|---|---|---|---|---|---|
| 2007 | 32 | 4 | (11) | 36 | 36 |
| 2008 | 32 | 7 | (18) | 39 | 39 |
| 2009 | 36 | 5 | (12) | 41 | 41 |
| 2010 | 39 | 7 | (15) | 46 | 46 |
| 2011 | 32 | 4 | (11) | 36 | 36 |

Table 2. Chitina bison harvest and accidental death, regulatory years 2006 through2011

| | Hunter Harvest Reported | | | | | | Estimated | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Regulatory year | M | (%) | F | (%) | Unk. | Total | Unreported | Illegal | Total | Accidental death | Total |
| 2006–2007 | 2 | (100) | 0 | (0) | 0 | 2 | 0 | 0 | 0 | 0 | 2 |
| 2007–2008 | 2 | (100) | 0 | (0) | 0 | 2 | 0 | 0 | 0 | 0 | 2 |
| 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 |

Table 3. Chitina bison harvest data by permit hunt (DI450), 2006–2011.

| Regulatory year | Permits issued | Applications | Percent did not hunt | Percent unsuccessful Hunters | Percent successful hunters | Bulls | (%) | Cows | Harvest |
|---|---|---|---|---|---|---|---|---|---|
| 2006–2007 | 2 | 431 | 0 | 0 | 100 | 2 | (100) | 0 | 2 |
| 2007–2008 | 2 | 366 | 0 | 0 | 100 | 2 | (100) | 0 | 2 |
| 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 |

* In 2007-2008, only one permit was issued through the drawing application process; one permit was offered by the state for auction.

Table 4. Chitina bison hunter residency and success, 2006–2011.

| | Successful | | | | | Unsuccessful | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Regulatory year | Local[a] resident | Nonlocal resident | Non-resident | Total | (%) | Local[a] resident | Nonlocal resident | Non-resident | Total | (%) | Hunters |
| 2006–2007 | 0 | 2 | 0 | 2 | (100) | 0 | 0 | 0 | 0 | (0) | 2 |
| 2007–2008 | 1 | 1 | 0 | 2 | (100) | 0 | 0 | 0 | 0 | (0) | 2 |
| 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 |

[a] Local means Unit 11 or 13 resident.

Table 5. Chitina bison harvest percent by transport method, 2006–2011.

| Regulatory year | Percent of harvest | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Airplane | Horse | Boat | 3- or 4-wheeler | Snowmachine | ORV | Highway vehicle | Unknown | *n* |
| 2006–2007 | 100 | -- | -- | -- | -- | -- | -- | -- | 2 |
| 2007–2008 | 50 | -- | 50 | -- | -- | -- | -- | -- | 2 |
| 2008–2009 | 100 | -- | -- | -- | -- | -- | -- | -- | 2 |
| 2009–2010 | -- | -- | -- | -- | -- | -- | -- | -- | 0 |
| 2010–2011 | 100 | -- | -- | -- | -- | -- | -- | -- | 2 |

**WILDLIFE MANAGEMENT REPORT**

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

# BISON MANAGEMENT REPORT

From: 1 July 2009
To: 30 June 2011[1]

## LOCATION

**GAME MANAGEMENT UNIT:** 19 **(**36,486 mi$^2$**)**

**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. Approximately 1,500 drawing permit applications were received for the combined fall and spring hunts in RY10, indicating continued strong hunter interest in pursuing these bison.

## MANAGEMENT DIRECTION

The Farewell bison harvest is managed for optimal sustained yield of animals based on herd size and trend, while providing uncrowded and aesthetic hunting conditions.

### 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 contains 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.

*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*

- 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–October in 2009–2011 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 (Figure 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 and 16 adult (≥5 years old) cows (1 recaptured from 2008) in April 2011 using helicopter-supported darting techniques. Bison were immobilized using Cap-Chur™ rifle and darts in 2008 and Pneudart™ rifle and darts in 2011. 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.

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 the Farewell bison herd may be important for bison conservation in North America. The Farewell bison genome appears to be free of domestic cattle gene introgression, which is rare in bison herds in North America (Halbert and Derr 2007). To assist these researchers in further investigation of this issue, we collected bison genetic samples from hunters, as well as during captures in 2008 and 2011.

#### *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 and 2011, we located 261 bison in June 2011, and 330 in June 2012, the highest numbers since May 2000 (Table 1). Radio collars placed on bison in 2003 are no longer active and 10 additional radio collars are scheduled to be deployed in 2013.

#### *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, and 18% in 2012. Blood tests from bison captured in 2008 showed 7 of 16 females (44%) were pregnant. This is likely biased low because we specifically targeted younger females which exhibited lower pregnancy rates. Of 6 captured females at least 5 years old, 5 (83%) were pregnant. We also captured 1 two-year-old, 3 three-year-old and 6 four-year-old females. Of those younger animals, only 2 of the 6 four-year-olds were pregnant. In 2011, 14 of 16 (88%) five-year-olds 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.

**MORTALITY**

*Harvest*

Seasons and Bag Limits.

| Unit and Bag limit | Resident seasons | Nonresident seasons |
|---|---|---|
| RY09 | | |
| 1 bison every 5 regulatory years by drawing permit only. | 1 Sep–30 Sep (DI351) or 1 Mar–31 Mar (DI352) | 1 Sep–30 Sep (DI351) or 1 Mar–31 Mar (DI352) |
| RY10 | | |
| Residents 1 bison every 10 regulatory years by drawing permit only. Nonresidents 1 bison per life by drawing permit only. | 1 Sep–30 Sep (DI351) or 1 Mar–31 Mar (DI352) | 1 Sep–30 Sep (DI351) or 1 Mar–31 Mar (DI352) |

Alaska Board of Game Actions and Emergency Orders. In January 2008 the Board of Game changed the frequency at which an individual could draw a bison permit to once every 10 years for residents and once per lifetime for nonresidents. It was not until March 2010 that the bag limit was changed, and beginning in RY10 the bag limit for residents also became 1 every 10 years and nonresidents 1 per life. No emergency orders were issued during RY09–RY10.

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–RY10 only 10 permits were issued each year (5 fall, 5 spring).

Harvest by Hunters. Annual harvest was 4–11 bison during RY06–RY10 (Table 2), with 43–88% bulls harvested (Table 2). In fall hunts (DI351), 50–75% 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 substantial female harvest during some years.

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 permit, $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 RY06–RY10, the vast majority of permittees for the Farewell bison hunts were Alaska residents (Table 4). Of the permit winners who hunted during RY06–RY10, 5 were nonresidents, 1 was a local resident (a permittee who resided in Unit 19) and 44 were nonlocal residents (Table 4).

The average success rate during RY06–RY10 was 65% for the September hunt (DI351) and 81% 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, 17% of all permit winners did not hunt during RY06–RY10 and a mean of 74% of permit winners who hunted were successful (Table 4).

Transport Methods. This hunt is in a remote area that is difficult to access. During RY06–RY10 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. Previous information indicates that predation was not a significant source of mortality in the past (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 Farwell Station area (Figure 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 the spring of 2010 the Turquoise Lake fire reburned an important portion of the Bear Creek Burn, which will likely have 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) the 2010 Turquoise Lake fire should help this situation.

## 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, it appears bison numbers are increasing. For the first time in many years we met our first objective, to maintain a minimum population of 300 bison. Noteworthy factors that have changed since RY07–RY08 include reduced cow harvest (especially in the spring) and improved habitat after the Turquoise Lake burn. We currently have 28 radiocollared animals and plan to deploy 10 additional radio collars in April 2013. 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 during RY09–RY10. 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, and we have documented more calves than in June 2011 and 2012 surveys. However, no habitat surveys have been done.

We recommend continued herd monitoring during RY11–RY12, as well as deployment of additional radio collars. We will continue to evaluate the effects of issuing fewer permits, which began in RY06 (20 permits) and continued through RY10 (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.

For the next reporting period our first objective will be refined, while other objectives remain the same, as follows:

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

## LITERATURE CITED


Campbell, B. H., and M. Hinkes. 1983. Winter diets and habitat use of Alaska bison after wildfire. Wildlife Society Bulletin 11(1):16–21.

Gross, J.E., G. Wang, N.D. Halbert, P.A. Gogan, J.N. Derr and J.W. Templeton. 2006. Effects of population control strategies on retention of genetic diversity in National Park Service bison (Bison bison) herds. Revised final research report submitted to Yellowstone Research Group USGS-BRD. Montana State University. Bozeman Montana.

Halbert, N. D., and J. N. Derr. 2007. A comprehensive evaluation of cattle introgression into US federal bison herds. Journal of Heredity 98(1):1–12.

Waggoner, V., and M. Hinkes. 1986. Summer and fall browse utilization by an Alaskan bison herd. Journal of Wildlife Management 50(2):322–324.

Peirce, J. M. and R. J. Seavoy. 2008. Unit 19 bison. Pages 17–29 *in* P. Harper, editor. Bison management report of survey and inventory activities 1 July 2005 through 30 June 2007. Project 9.0. Juneau, Alaska.

Whitman, J. S. 1998. Unit 19 bison. Pages 16–24 *in* M. Hicks, editor. Bison management report of survey and inventory activities 1 July 1995 through 30 June 1997.



**PREPARED BY:**

Joshua M. Peirce
Wildlife Biologist II

**REVIEWED AND SUBMITTED BY:**

Doreen I. Parker McNeill
Assistant Management Coordinator

**REVIEWED BY:**

Tom Seaton
Wildlife Biologist III


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

Peirce, J. M. 2012. Unit 19 bison. Pages 16–27 *in* Alaska Department of Fish and Game, P. Harper, editor, Bison management report of survey and inventory activities 1 July 2009 through 30 June 2011, Species Management Report ADF&G/DWC/SMR-2012-1, Juneau, Alaska.

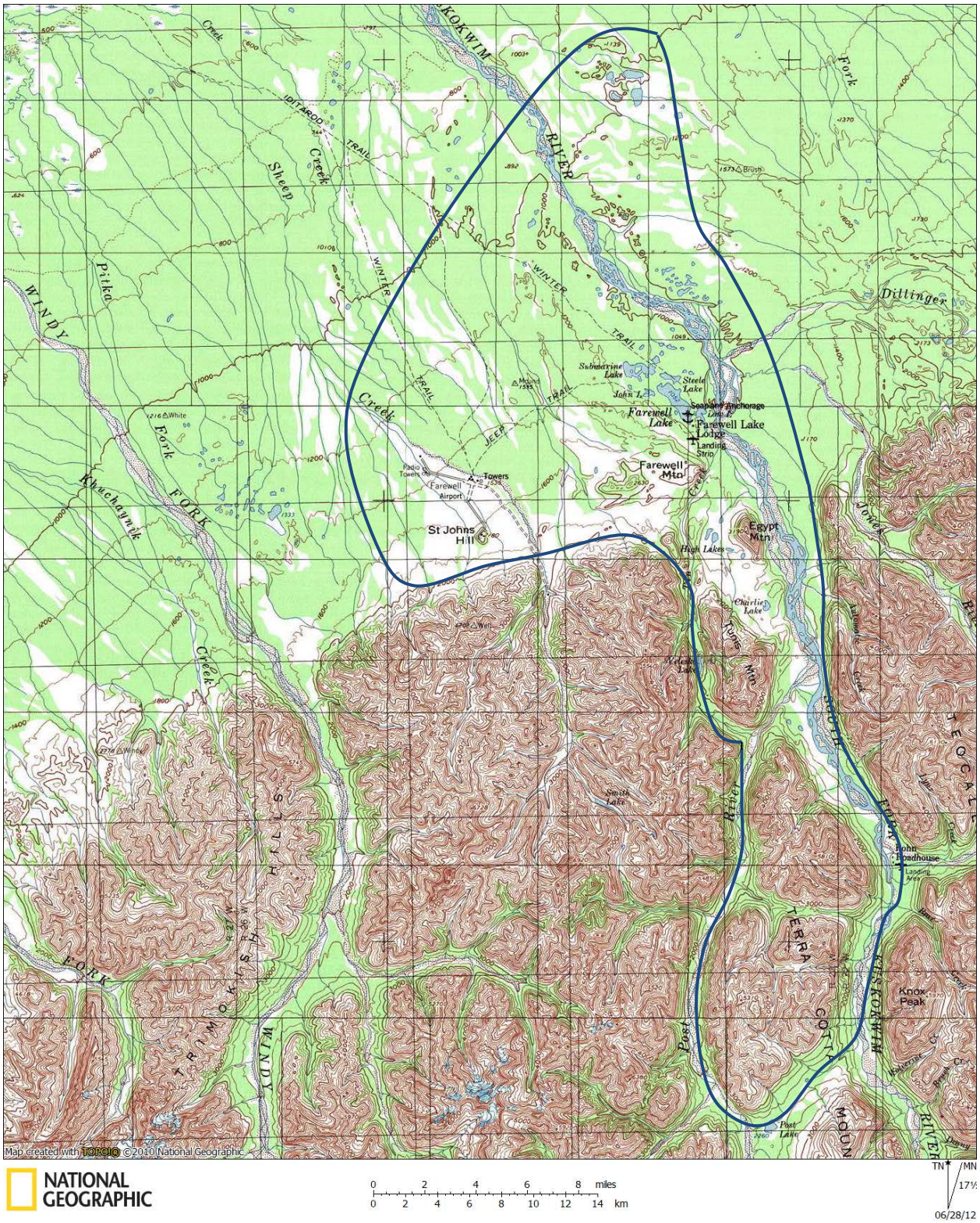



Figure 1. Typical search area and range of Farewell Bison.

Table 1. Farewell bison aerial composition surveys and total bison observed, 2000–2012.

| Survey date | Bison >6 months old | calves ≤6 months old | | Bison observed |
|---|---|---|---|---|
| | | number | percent | |
| 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 |

Table 2. Farewell bison harvest data by permit hunt, regulatory years 2006–2007 through 2010–2011.

| Hunt number | Regulatory year | Permits issued | Did not hunt (%) | Unsuccessful hunters[a] (%) | Successful hunters[a] (%) | Bulls (%) | Cows (%) | Unk | Total harvest |
|---|---|---|---|---|---|---|---|---|---|
| DI351 | 2006–2007 | 10 | 3 (30) | 3 (43) | 4 (57) | 3 (75) | 1 (25) | 0 | 4 |
| (Fall) | 2007–2008 | 5 | 1 (20) | 1 (25) | 3 (75) | 2 (67) | 1 (33) | 0 | 3 |
| | 2008–2009 | 5 | 1 (20) | 1 (25) | 3 (75) | 2 (67) | 1 (33) | 0 | 3 |
| | 2009–2010 | 5 | 0 (0) | 3 (60) | 2 (40) | 1 (50) | 1 (50) | 0 | 2 |
| | 2010–2011 | 5 | 2 (40) | 0 (0) | 3 (100) | 2 (67) | 1 (33) | 0 | 3 |
| DI352 | 2006–2007 | 10 | 1 (10) | 2 (22) | 7 (78) | 4 (57) | 3 (43) | 0 | 7 |
| (Spring) | 2007–2008 | 5 | 0 (0) | 1 (20) | 4 (80) | 1 (25) | 3 (75) | 0 | 4 |
| | 2008–2009 | 5 | 1 (20) | 0 (0) | 4 (100) | 3 (75) | 1 (25) | 0 | 4 |
| | 2009–2010 | 5 | 1 (20) | 2 (50) | 2 (50) | 1 (50) | 1 (50) | 0 | 2 |
| | 2010–2011 | 5 | 0 (0) | 0 (0) | 5 (100) | 5 (100) | 0 (0) | 0 | 5 |

[a] Successful/Unsuccessful hunter information includes only those permittees who hunted.

Table 3. Farewell bison harvest chronology by month/day, regulatory years 2006–2007 through 2010–2011.

| Regulatory year | Harvest chronology by month/day | | | | | |
|---|---|---|---|---|---|---|
| | Fall | | | Spring | | |
| | 9/1–10 | 9/11–20 | 9/21–30 | 3/1–10 | 3/11–20 | 3/21–31 |
| | *n* (%) | *n* (%) | *n* (%) | *n* (%) | *n* (%) | *n* (%) |
| 2006–2007 | 0 (0) | 2 (50) | 2 (50) | 1 (14) | 3 (43) | 3 (43) |
| 2007–2008 | 0 (0) | 1 (33) | 2 (67) | 0 (0) | 0 (0) | 4 (100) |
| 2008–2009 | 1 (33) | 1 (33) | 1 (33) | 0 (0) | 4 (100) | 0 (0) |
| 2009–2010 | 0 (0) | 1 (50) | 1 (50) | 0 (0) | 2 (100) | 0 (0) |
| 2010–2011[a] | 1 (33) | 1 (33) | 1 (33) | 1 (25) | 0 (0) | 3 (75) |

[a] Unknown date of kill in spring for 1 bison harvested in Regulatory Year 2010–2011.

Table 4. Farewell bison hunter residency and success, regulatory years 2006–2007 through 2010–2011.

| Regulatory year | Successful | | | | | | Unsuccessful | | | | | | Total hunters |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Local[a] resident | Nonlocal resident | Non resident | Unk | Total | (%) | Local[a] resident | Nonlocal resident | Non resident | Unk | Total | (%) | |
| 2006–2007 | 1 | 9 | 1 | 0 | 11 | (69) | 0 | 5 | 0 | 0 | 5 | (31) | 16 |
| 2007–2008 | 0 | 6 | 1 | 0 | 7 | (78) | 0 | 1 | 1 | 0 | 2 | (22) | 9 |
| 2008–2009 | 0 | 6 | 1 | 0 | 7 | (88) | 0 | 1 | 0 | 0 | 1 | (13) | 8 |
| 2009–2010 | 0 | 3 | 1 | 0 | 4 | (44) | 0 | 5 | 0 | 0 | 5 | (56) | 9 |
| 2010–2011 | 0 | 8 | 0 | 0 | 8 | (100) | 0 | 0 | 0 | 0 | 0 | (0) | 8 |

[a] Local residents are hunters who live in Unit 19.

Table 5. Farewell bison harvest by primary transport method, regulatory years 2006–2007 through 2010–2011.

| Regulatory year | Harvest by transport method | | | | |
|---|---|---|---|---|---|
| | Airplane (%) | 3- or 4-wheeler (%) | Snowmachine (%) | Unknown or other (%) | *n* |
| 2006–2007 | 13 (81) | 0 (0) | 3 (19) | 0 (0) | 16 |
| 2007–2008 | 7 (78) | 0 (0) | 2 (22) | 0 (0) | 9 |
| 2008–2009 | 3 (38) | 1 (13) | 4 (50) | 0 (0) | 8 |
| 2009–2010 | 5 (56) | 0 (0) | 3 (33) | 1 (11) | 9 |
| 2010–2011 | 5 (63) | 0 (0) | 2 (25) | 1 (13) | 8 |

**WILDLIFE MANAGEMENT REPORT**

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

# BISON MANAGEMENT REPORT

From: 1 July 2009
To: 30 June 2011[1]

## LOCATION

**GAME MANAGEMENT UNIT:** 20D (5,637 mi$^2$)

**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 athabascae*) 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 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). Wood bison probably lived along the Delta River near Delta Junction before their extirpation from Alaska (D. Guthrie, University of Alaska Fairbanks, personal communication with S. DuBois [Alaska Department of Fish and Game, retired]).

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, the Delta bison herd (DBH) began to include hay and cereal grains in their fall and winter diets. In 1976 the State of Alaska made agricultural development a priority within the established range of the DBH, and large-scale agricultural land disposals began in 1978. Eventually, bison began to negatively impact agricultural harvests by consuming or damaging crops in the fall before harvest.

[1] At the discretion of the reporting biologist, this unit report contains data collected outside the report period.

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 the DJBR was to perpetuate free-ranging bison by providing adequate winter range and altering 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 the DJBR in the Panoramic and Gerstle Field complexes. Bison damage to farms in the DAP was significantly reduced in 1985 with the first substantial forage production on the DJBR. The DJBR forage development and management continued through this reporting 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 the DJBR. This drawing permit hunt was implemented to reduce the impact of moose hunting on bison and bison forage management on the 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 the winter of 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 *In prep*).

## MANAGEMENT DIRECTION

### MANAGEMENT GOAL

Manage the 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 the DBH to maintain a herd size of approximately 360 bison at the precalving count.
- Manage the 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 2000–2005 Delta Bison Management Plan (DuBois and Rogers 2000) remains the current management plan for Delta bison herd management, and includes the following goals and objectives, which were treated as activities during RY09–RY10.

*Herd Health Management Goal:*

Ensure that the DBH remains healthy and free of any diseases that might threaten the herd or other wildlife species.

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

Objective 2 — Prevent the transmission of diseases between livestock and the DBH.

Objective 3 — If diseases are transmitted from livestock to the DBH, prevent the spread of diseases from bison to other wildlife species or to other livestock.

*Herd Size and Composition Goal*

Manage the 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 the DBH to attempt to delay the herd's migration towards the DJBR and private agricultural lands.

Objective 3 — Manage the 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 the 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 the 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 radio telemetry 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 8–10×40 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, photographs were taken when possible 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., RY09 = 1 July 2009–30 June 2010).

*Distribution and Movements*

We monitored bison movements by locating radiocollared 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 Piper PA-18 Supercub aircraft to observe all agricultural areas with grain crops north of the Alaska Highway in the 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 50mm 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.

To attach radio collars, we usually captured bison in April from a Robinson R-44 helicopter by immobilizing them with darts from a Cap-Chur™ rifle or short-range pistol. Occasionally, bison were darted from the ground after approaching them closely. Darts were loaded with 5 mg carfentanil citrate (Wildnil®, Wildlife Pharmaceuticals, Fort Collins, Colorado, USA) and 60 mg xylazine hydrochloride (Anased®, Lloyd Laboratories, Shenandoah, Iowa, USA). 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, USA) at a dosage of 1.5 mg/kg body weight to antagonize the xylazine hydrochloride.

*Disease Management*

No disease management activities were conducted during RY09–RY10.

*Harvest Management*

During RY09, bison hunters were assigned a beginning hunt date starting 1 October and new groups of hunters were eligible to begin hunting every 5 days. Once hunters were eligible to start hunting, they had until the end of the season on 31 March to hunt. Beginning in RY09, bison hunters had the option of either attending a prehunt orientation, or reviewing an online orientation course. 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.

In RY10, ADF&G initiated the bison hunt north of the Alaska Highway in GMU 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 the DAP back to the DJBR. Permit holders who did not hunt in the early season (26 July–30 September) were assigned a beginning hunt date starting 1 October, and new groups of hunters were eligible to begin hunting every 5 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, biological samples, 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. We sent teeth to Matson Laboratories (PO Box 308, Milltown, Montana, USA) for aging. Horns were measured according to the Boone and Crockett Club scoring system and photographed. 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 the DJBR in RY09 with N100-P29-KO-S14 at the rate of 300 lb/acre. In

RY10, grasses were fertilized 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, and 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*

RY09. The prehunt population size for RY09 was 435 bison (Table 1). The precalving population was 366 in spring 2010 (Table 1).

RY10. The prehunt herd size was 412 bison (Table 1). The precalving population in spring 2011 was 342 bison.

*Population Composition*

RY09. Sex and age composition was estimated from a sample of 179 bison counted on 21 September 2009 (Table 2). Calf survival was 44 calves:100 cows and calves composed 22% of the sample. Adult and yearling cows composed 50% of the sample.

The bull:cow ratio was 57:100, which met the objective, with a yearling bull:cow ratio of 24:100 cows. We observed 51 bulls during composition surveys and classified 50 based on horn size and shape. The sample consisted of 42% yearlings, 10% small bulls, 36% medium bulls, and 12% large bulls (Table 3).

RY10. Sex and age composition surveys were not conducted in RY10.

*Distribution and Movement*

RY09. The first bison observed on the DJBR in RY09 numbered 50 and were seen on 28 July 2009. During an 11 August aerial survey, we located 390 bison on the DJBR, and 45 bison on private agricultural lands. During a 20 August aerial survey, 257 bison were located on DJBR Gerstle Fields, and 166 were located on private agricultural lands.

During a 14 September aerial survey, all bison were located north of the Alaska Highway on private agricultural lands. I conducted a ground based composition survey on 21 September and located 92 bison on agricultural land and 89 bison on the DJBR Panoramic Fields. During an aerial survey on 24 September, 218 bison were located on the DJBR, and 184 were on private agricultural lands. An aerial survey on 30 September located 223 bison on the DJBR.

Aerial surveys were conducted on 21 and 27 March 2010 to estimate the posthunting (precalving) population. We observed 13 bison on the Tanana River north of the DAP on 21 March. The survey on 27 March located 332 bison within the floodplain of the Delta River between Donnelly Training Area East (north) and McGinnis Creek (south).

An aerial survey on 4 June 2010 located 304 adults and 70 calves within and proximate to the Delta River floodplain between Big Lake (north) and Pillsbury Flats (south). A 9 June 2010 survey located 337 bison on Donnelly Training Area East and within the Delta River floodplain as far south as McGinnis Creek. A report from the public of 1 bison observed on the DJBR Gerstle Fields was received on 5 June 2010.

Three aerial surveys were conducted during 9–28 June 2010, and all bison observed were located on Fort Greely military land proximate to the Delta River. The highest number of bison observed in these 3 surveys was 404 on 28 June 2010.

On 29 June 2010, an estimated 110–120 bison were observed on the DJBR. These bison were observed from the ground by ADF&G personnel.

No bison were radiocollared during RY09.

RY10. An aerial survey along the Delta River on 12 July 2010 located 353 bison in the Fort Greely Texas Range and Buffalo Dome flats. An aerial survey on 19 July located 342 adults and 70 calves on the Fort Greely Washington Impact Area. A 20 July survey located 329 adults and 79 calves in Fort Greely's Washington Impact Area, Texas Range, and Buffalo Dome areas proximate to the Delta River. An aerial survey of the Delta River and proximate Fort Greely military lands on 27 July located 234 adults and 45 calves. The DJBR was also surveyed on 12 July, 19–20 July, and 27 July. No bison were observed on the DJBR during the surveys. The first bison on the DJBR in RY10 were observed from the ground on 29 July.

Aerial surveys on 1 and 11–12 August located bison on the Delta River and the DJBR, with greater numbers on the DJBR. During the 12 August survey, the DAP was searched and no bison were observed. The first bison on the DAP were observed from the ground on 15 August.

During an aerial survey on 17 August, 383 bison were observed. Two hundred forty-six were located on the DJBR Gerstle fields and 137 were located north of the Alaska Highway on private agricultural lands. The final aerial survey for early RY10 was on 28 August. We located 44 bison on the DJBR and 185 bison on the DAP. The highest population estimate (fall prehunt) in early RY10 occurred during an aerial survey on 19 July when 412 bison were counted in the Delta River floodplain.

Bison Presence and DAP Crop Field Assessment surveys were conducted on 19 August and 12 September. These surveys were a coordinated effort between ADF&G and the Alaska Division

of Agriculture to document bison presence on the DAP and assess damage to field crops. Bison presence on DAP crop fields was documented during both surveys.

An aerial survey on 11 April located 229 bison on Fort Greely land proximate to the Delta River and in the Delta River floodplain. Fifty-one bison were observed on private and public lands north of the Alaska Highway and west of the Gerstle River during this survey.

On 11 April 2011, we radiocollared 11 female bison by darting from a helicpter. Ten bison were darted and radiocollared on the Texas Range of Fort Greely Donnelly Training Area East, and 1 was darted and radiocollared on the DAP. The average time from initial darting to complete recovery for the 11 animals was 6 minutes.

During a 26 April aerial survey, we located 169 bison on Fort Greely military lands proximate to the Delta River. An aerial survey on 4 May located 291 adults and 44 calves on Fort Greely lands and on the Delta River floodplain south of Fort Greely, 1 adult and 1 calf on the DAP, and 24 adults and 3 calves on public land north of the Tanana River. Bison located during aerial surveys on 19, 26, and 29 June were all observed on the Delta River floodplain and on Fort Greely lands near the Delta River floodplain. We located 407 bison during the 19 June aerial survey, 306 during the 26 June survey, and 350 during the 29 June survey.

## MORTALITY

*Harvest*

Season and Bag Limit. The resident and nonresident bison hunting season was 20 July–31 March during the RY09 hunting season and 1 July–30 June during the RY10 hunting season. However, through ADF&G's discretionary permit hunt authority, hunting does not routinely begin until 1 October each year so that farmers in the DAP can finish harvesting their crops before the hunt starts, when bison being pursued by hunters could damage crops. During RY10, hunting began on 26 July north of the Alaska Highway for bulls only.

Hunters participated in the hunt by drawing permit. In RY09, hunt DI403 was for either-sex bison. In RY10, 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 designated as SI405. 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 in RY09 (3 in October and 1 in March) and 3 were conducted in October during RY10.

- 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 26 February–7 March 2010 Board of Game meeting, the board passed 3 proposals pertaining to Delta bison. Proposal 74 extended the season in Unit 20D to allow ADF&G to issue permits year round (1 July–30 June). Proposal 76 allowed the use of radio communications, including cell phones and satellite phones, between hunters on the ground while hunting bison in Unit 20D. Proposal 77 prohibited shooting specific radiocollared bison identified by ADF&G. The board also considered and did not adopt Proposal 75 to allow take of Delta bison the same day a hunter was airborne.

Human-Induced Mortality.

*RY09* — Estimated human-induced mortality was 79 bison (Table 4) during the general drawing permit hunt DI403, and special permit hunt SI405, with an estimated wounding loss of 10 (7% of permits issued). Hunters killed 68 bison (39 bulls and 29 cows) during the DI403 hunt, 1 bull bison during the SI405 hunt (Table 5). DI403 was an either-sex hunt in an effort to increase hunter success to meet the population objective.

Successful hunters hunted a mean of 5.0 days and unsuccessful hunters hunted a mean of 10.4 days (Table 6).

*RY10* — Estimated human-induced mortality was 81 bison (Table 4) from the drawing permit hunts DI403 and DI404, special permit hunt SI405, motor vehicle collisions, and an estimated wounding loss of 8 (7% of the number of permits issued). Hunters killed 69 bison (43 bulls and 26 cows) during DI403 and DI404, and 1 bull bison during the SI405 hunt. Hunters with bull permits (DI403) killed 41 bulls and 1 cow. Hunters with cow-only permits (DI404) killed 25 cows and 2 bulls (Table 5). Three bison (a bull, cow, and calf) were killed by motor vehicle collision on the Alaska Highway near Sawmill Creek.

Successful hunters with bull permits (DI403) hunted a mean of 7.4 days and unsuccessful hunters hunted a mean of 10.0 days. Successful hunters with cow permits (DI404) hunted a mean of 7.1 days and unsuccessful hunters hunted a mean of 8.3 days (Table 6).

Permit Hunts.

*RY09* — The department received 11,026 applications for DI403 permits (Table 7).

*RY10* — The department received 20,711 applications for DI403 and DI404 permits (Table 7).

Hunter Residency and Success.

*RY09* — Most Delta bison hunters were nonlocal Alaska residents (98%). Permit holders in DI403 who reported hunting had a 79% overall success rate (Table 8).

*RY10* — Most Delta bison hunters were nonlocal Alaska residents (97%). Permit holders for hunts DI403 and DI404 who reported hunting had an overall success rate of 63% (Table 8).

Harvest Chronology.

*RY09* — Harvest chronology was similar to chronology in previous years, with most harvest (59%) in October–November, the harvest rate slowing during December–January and then increasing during February–March (Table 9).

*RY10* — Seventeen percent of the harvest occurred in the earlier hunt period of 26 July–30 September. Harvest increased (25%) in October. The harvest rate was low during November–February, and increased again (24%) during March (Table 9).

Transport Methods.

Highway vehicles and snowmachines continued to be the most common transport methods (Table 10). 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.

*RY09* — Most successful bison hunters used highway vehicles (73%), and 15% used snowmachines (Table 10).

*RY10* — Seventy-five percent of successful bison hunters used highway vehicles for their hunts. Snowmachines were the second most common mode of transportation and were used by 20% of successful hunters (Table 10).

Harvest Locations.

*RY09* — Most bison (56%) were killed on private agricultural lands in the DAP (Table 11). Thirty-eight percent were killed on the DJBR and 6% were killed in other areas.

*RY10* — Most bison (55%) were killed on private agricultural lands in the DAP (Table 11). Thirty-two percent were killed on the DJBR and 13% were killed in other areas.

*Other Mortality*

Two radiocollared bison were found dead in May 2011. The causes of these mortalities are unknown but are likely associated with calving. Natural mortality is rarely documented for the DBH. Humans caused most nonhunting mortality through wounding loss, motor vehicle collisions, and trapper snares.

*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 [ADF&G, retired], 2008).

**HABITAT**

*RY09* — Approximately 700 acres of nugget bluegrass were fertilized on the Panoramic and Gerstle Fields at a cost of $43,299. We fertilized 500 acres at a rate of 200 lb/acre and 200 acres at 300 lb/acre. The grass acreage was fertilized during 25 May–30 June 2009.

Approximately 600 acres (475 acres Panoramic Fields, 125 acres Gerstle Fields) of Derby oats were planted during 5 June–3 July. The following oat plantings were tested for relative feed value (RFV):

| Planting Date | Location/Acres | RFV |
|---|---|---|
| 5 Jun | Panoramic Fields, 80 acres | 04 |
| 6 Jun | Panoramic Fields, 35 acres | 3 |
| 15 Jun | Panoramic Fields, 80 acres | 2 |
| 21 Jun | Panoramic Fields, 80 acres | 8 |
| 25 Jun | Panoramic Fields, 40 acres | 42 |
| 1 Jul | Gerstle Fields, 125 acres | 48 |

Bluegrass was sampled from both the Panoramic (n = 2) and Gerstle Fields (n = 1) on 30–31 August. The Panoramic samples had a RFV of 101 (200 lb/acre fertilizer rate) and 107 (300 lb/acre fertilizer rate). The Gerstle sample had a RFV of 106.

Two turnip samples were collected from the Panoramic Fields on 22–23 June and tested for RFV. The RFV for the samples was 366 and 278.

Approximately 100 acres were disked and left fallow in the Panoramic Fields to control bluejoint reedgrass and woody vegetation. Approximately 600 acres were mowed on the Panoramic and Gerstle Fields to kill undesirable grasses and trees. Twenty-five acres of oats were swathed to cure for winter forage.

We pumped 14,055 gallons of water into stock tanks on the DJBR during late July–September. Rainfall measurements on the DJBR totaled 9.60 inches on the Panoramic Fields and 8.15 inches on the Gerstle Fields.

*RY10* — Approximately 700 acres of nugget bluegrass were fertilized during 24 May–29 June at a cost of $28,133.

Approximately 400 acres (300 acres Panoramic Fields, 100 acres Gerstle Fields) of Mustang oats were planted from 13 June–29 June. The following oat plantings were tested for relative feed value (RFV):

| Date | Location/Acres | RFV |
|---|---|---|
| 13 Jun | Panoramic Fields, 50 acres | 14 |
| 16 Jun | Panoramic Fields, 80 acres | 76 |
| 21 Jun | Panoramic Fields, 80 acres | 11 |
| 23 Jun | Panoramic Fields, 60 acres | 07 |
| 25 Jun | Panoramic Fields, 80 acres | 11 |
| 28 Jun | Gerstle Fields, 100 acres | 02 |

Approximately 50 acres of Appin forage turnips were planted in the Panoramic Fields. Turnips sampled in 2 areas of the Panoramic Fields on 29 August had RFV values of 457 and 259.

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 12,232 gallons of water were pumped into stock tanks on the DJBR during late July–September. Rainfall measurements on the DJBR totaled 9.60 inches on the Panoramic Fields and 8.15 inches on the Gerstle Fields. The rainfall for the area was above average during bison migration from the Delta River floodplain to the DJBR.

During RY10, the U.S. Army fertilized the 35-acre bison food plot on Donnelly Training Area East, located south of Big Lake. The U.S. Army also conducted a prescribed burn of 100 acres on the Texas Range, and fertilized the Buffalo Dome Flats bison summer range on the west side of the Delta River.

### DELTA BISON WORKING GROUP ACTIVITIES

The Delta Bison Working Group (DBWG) held a series of meetings during RY09–RY10 to work toward updating the 2000–2005 Delta Bison Management Plan. The meetings were well attended by the DBWG members; agency representatives including ADF&G, Alaska Department of Natural Resources Division of Agriculture, and the Delta Chapter of the Alaska Farm Bureau; as well as numerous members of the public. Minutes of these meetings are on file at the ADF&G offices in Delta Junction and Fairbanks. The planning process was ongoing at the end of this reporting period (30 June 2011).

## CONCLUSIONS AND RECOMMENDATIONS

We met our population objective of approximately 360 bison during RY09–RY10. Estimated herd size was 6 animals above the population objective in RY09 and was 18 below the population objective in RY10. Numbers of drawing permits were decreased in RY09 and RY10; however, either-sex permits were issued in RY09 as a method to potentially increase hunter success. Herd productivity and calf survival continued within the normal range, with the calf:cow ratio of 44:100 and 22% calves in the herd during RY09. The bull:cow ratio objective was met in RY09 with a ratio of 57 bulls:100 cows.

Population composition surveys were not conducted in RY10 due to the early season bison hunt. The early hunt affected the typical fall behavior of the bison, and they became difficult to locate and approach for collecting sex and age composition data. Attempts to collect composition data were unsuccessful.

Herd movements showed no major changes, with the majority of the DBH moving from the Delta River to the DJBR in mid to late July and moving into private agricultural lands in mid-August. Based on anecdotal observations, we believe the Bison Range Youth Hunt Management Area, which regulates moose hunting activity, continues to contribute to extending the length of time bison use the DJBR in the late summer and early fall.

We observed 25 adults and 4 calves north of the Alaska Highway during an aerial survey on 4 May 2010; 27 on public land on and north of the Tanana River, and 2 on the DAP. In past years, some DAP producers and landowners expressed concerns about bison calving and bison presence on the DAP in the spring. However, no reports of bison on the DAP were received from the public or DAP producers during 1 May 2010–30 June 2010.

In RY10 we had one of the highest levels of funding for bison management since the DJBR was established. Consequently, additional bison management activities were accomplished, including: increased forage management on the DJBR; increased forage management on Fort Greely; an early bison hunting season; and bison presence and crop field assessment aerial surveys of the DAP. However, the cumulative funding and management activity in RY10 did not significantly delay Delta bison movement to the DJBR or to the DAP. The early season hunt did not cause bison to move from the DAP to the DJBR, nor did it result in prolonged presence of bison on the DJBR. The effects the increased management activities had on DAP crop damage is unknown because the DAP bison presence and crop field assessment information has not been quantified for RY09–RY10. Increased forage management within the Delta bison herd range likely benefitted individual bison by augmenting forage availability and nutrition.

The 4 bison conflict management objectives in the Delta Bison Management Plan were met. The 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 the 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 67% during RY09–RY10 and has averaged 68% for the past 13 years (Table 5). The issuance of either-sex permits in RY09 did not result in a significant increase in hunter success. Bison harvest in RY09–RY10 was sufficient to meet the population objective. 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 the 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.

## LITERATURE CITED

Alaska Department of Fish and Game. *In prep*. Delta bison interim management plan. Fairbanks.

DuBois. S. D and R. R. Rogers. 2000. Delta Bison Management Plan 2000–2005, Alaska Department of Fish and Game, Division of Wildlife Conservation. <http://www.adfg.alaska.gov/static/lands/protectedareas/_management_plans/dbplan.pdf>. Accessed 22 Jul 2011.

Guthrie, R. D. 1990. Frozen fauna of the Mammoth Steppe: the story of Blue Babe. The University of Chicago Press, Chicago, Illinois, USA.

Reynolds, H. W., R. D. Glaholt, and A. W. L. Hawley. 1982. Bison. Pages 972–1007 *in* J. A. Chapman and G. A. Feldhammer, editors. Wild Mammals of North America: Biology, Management, and Economics. The Johns Hopkins University Press, Baltimore, Maryland, USA.

Skinner, M., and O. Kaisen. 1947. Fossil bison of Alaska and preliminary revision of the genus. Bulletin of the American Museum of Natural History 89:127–156.

Stephenson, R. O, S. C. Gerlach, R. D. Guthrie, C. R. Harington, R. O. Mills, and G. Hare. 2001. Wood Bison in Late Holocene Alaska and Adjacent Canada: Paleontological, Archaeological and Historical Records. Pages 124–158 *in* S. C. Gerlach and M. S. Murray, editors. Wildlife and People in Northern North America. Essays in honor of R. Dale Guthrie. British Archaeological Reports, International Series 944.

**PREPARED BY:**

Darren L. Bruning
Wildlife Biologist III

**REVIEWED AND SUBMITTED BY:**

Doreen I. Parker McNeill
Assistant Management Coordinator

**REVIEWED BY:**

C. Tom Seaton
Wildlife Biologist III

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

Bruning, D. L. 2012. Unit 20D bison. Pages 28–54 *in* Alaska Department of Fish and Game, P. Harper, editor, Bison management report of survey and inventory activities, 1 July 2009–30 June 2011, Species Management Report ADF&G/DWC/SMR-2012-1, Juneau, Alaska.

Table 1. Delta bison precalving and postcalving population estimates, 1983–2011.

| Calendar Year | Spring precalving population estimate | Fall prehunt population estimate |
|---|---|---|
| 1983 | 355 | 360 |
| 1984 | 300 | 356 |
| 1985 | 285 | 378 |
| 1986 | 300 | 361 |
| 1987 | 275 | 396 |
| 1988 | 337 | 426 |
| 1989 | 366 | 432 |
| 1990 | 373 | 440 |
| 1991 | 378 | 484[a] |
| 1992 | 384 | 482 |
| 1993 | 392 | 465 |
| 1994 | 340 | 446[b] |
| 1995 | 397 | 485 |
| 1996 | 375 | 496 |
| 1997 | 381[c] | 474 |
| 1998 | 349 | 414–471 |
| 1999 | 335–393 | 434 |
| 2000 | 359 | 453 |
| 2001 | 361 | 471 |
| 2002 | 373 | 476 |
| 2003 | 365 | 407 |
| 2004 | 327[d] | 421 |
| 2005 | 332[e] | 402 |
| 2006 | 353 | 430 |
| 2007 | 397[d] | 516 |
| 2008 | 412 | 494 |
| 2009 | 370 | 435 |
| 2010 | 366 | 412 |
| 2011 | 342 | 407 |

[a] Includes 17 domestic bison that escaped and were incorporated into the herd.
[b] Includes 15 domestic bison that escaped and were incorporated into the herd in May 1994.
[c] Includes 6 domestic bison that escaped and were incorporated into the herd in Apr 1997.
[d] Calculated based on maximum number of non-neonatal bison seen during late Mar through early May surveys.

Table 2. Delta bison fall ground composition count data and estimated population size, regulatory years 1992–1993 through 2007–2011.

| 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[a] | | | | |
| 1992–1993 | 87 | 14 | 46 | 31 | 43 | 6 | 20 | 381 | 482 |
| 1993–1994 | 67 | 21 | 62 | 20 | 44 | 9 | 27 | 308 | 465 |
| 1994–1995 | 70 | 21 | 53 | 24 | 45 | 7 | 24 | 172 | 446[b] |
| 1995–1996 | 87 | 22 | 52 | 27 | 42 | 9 | 22 | 231 | 485 |
| 1996–1997 | 65 | 13 | 54 | 24 | 46 | 6 | 25 | 279 | 496[c] |
| 1997–1998 | 53 | 3 | 47 | 25 | 50 | 2 | 24 | 200 | 474 |
| 1998–1999 | 48 | 9 | 53 | 19 | 50 | 5 | 27 | 354 | 414–471 |
| 1999–2000 | 54 | 8 | 43 | 22 | 51 | 4 | 22 | 270 | 434 |
| 2000–2001 | 63 | 18 | 58 | 14 | 48 | 9 | 28 | 272 | 453 |
| 2001–2002 | 68 | 11 | 57 | 23 | 45 | 5 | 25 | 278 | 471 |
| 2002–2003 | 87 | 19 | 59 | 27 | 41 | 8 | 24 | 229 | 476 |
| 2003–2004 | 60 | 26 | 45 | 16 | 49 | 13 | 22 | 266 | 407 |
| 2004–2005 | 61 | 10 | 42 | 23 | 51 | 5 | 21 | 251 | 421 |
| 2005–2006 | 71 | 20 | 47 | 23 | 46 | 9 | 22 | 321 | 402 |
| 2006–2007 | 63 | 13 | 59 | 27 | 43 | 5 | 25 | 241 | 430 |
| 2007–2008 | 55 | 13 | 55 | 20 | 48 | 6 | 26 | 214 | 494 |
| 2008–2009 | 73 | 36 | 54 | 16 | 44 | 16 | 24 | 168 | 435 |
| 2009–2010 | 57 | 24 | 44 | 16 | 50 | 12 | 22 | 179 | 412 |
| 2010–2011 | -- | -- | -- | -- | -- | -- | -- | -- | -- |

[a] Includes yearlings and adult cows.
[b] Includes 15 domestic bison that escaped and were incorporated into the herd.
[c] Includes 6 domestic bison that escaped and were incorporated into the herd.

Table 3. Percent[a] Delta bison bulls with different horn categories based on horn morphology, 1997–2011.

| | Yearling | Horn Category (%) | | | |
|---|---|---|---|---|---|
| Month/Year | (%) | Small | Medium | Large | *N* |
| Sep 1997 | 6 | 45 | 37 | 12 | 49 |
| Sep 1999 | 19 | 44 | 27 | 10 | 59 |
| Sep 2000 | 36 | 12 | 25 | 28 | 61 |
| Sep 2001 | 18 | 26 | 39 | 18 | 78 |
| Sep 2002 | 23 | 23 | 34 | 20 | 79 |
| Sep 2003 | 44 | 29 | 17 | 10 | 77 |
| Sep 2004 | 19 | 22 | 49 | 10 | 69 |
| Sep 2005 | 29 | 16 | 46 | 10 | 103 |
| Sep 2006 | 30 | 28 | 14 | 28 | 43 |
| Sep 2007 | 27 | 29 | 33 | 10 | 48 |
| Sep 2008 | 50 | 9 | 31 | 9 | 54 |
| Sep 2009 | 42 | 10 | 36 | 12 | 50 |
| Sep 2010 | -- | -- | -- | -- | -- |

[a] Percentages may not total 100% due to rounding.

Table 4. Delta bison harvest and accidental death, regulatory years 1986–1987 through 2010–2011.

| Regulatory Year | Hunter harvest | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Reported | | | | | Estimated | | | Other | |
| | M | (%) | F | (%) | Total | Unreported[a] | Illegal | Total | mortality | Total |
| 1986–1987 | 15 | (24) | 47 | (76) | 62 | 5 | 0 | 5 | 0 | 67 |
| 1987–1988 | 35 | (76) | 11 | (24) | 46 | 4 | 0 | 4 | 0 | 50 |
| 1988–1989 | 21 | (47) | 24 | (53) | 45 | 4 | 0 | 4 | 0 | 49 |
| 1989–1990 | 22 | (37) | 38 | (63) | 60 | 5 | 0 | 5 | 0 | 65 |
| 1990–1991 | 59 | (69)[b] | 27 | (31) | 86 | 6 | 0 | 6 | 2 | 94 |
| 1991–1992 | 50 | (54) | 43 | (46) | 93 | 7 | 0 | 7 | 0 | 100 |
| 1992–1993 | 62 | (65) | 33 | (35) | 96[c] | 7 | 0 | 7 | 3 | 106 |
| 1993–1994 | 51 | (47) | 58 | (53) | 109 | 8 | 0 | 8 | 0 | 117 |
| 1994–1995 | 20 | (53) | 18 | (47) | 38 | 3 | 0 | 3 | 4 | 45 |
| 1995–1996 | 60 | (57)[b] | 46 | (43) | 106 | 8 | 0 | 8 | 0 | 114 |
| 1996–1997 | 56 | (54) | 47 | (46) | 103 | 8 | 0 | 8 | 6 | 117 |
| 1997–1998 | 57 | (48) | 61 | (52) | 118 | 9 | 0 | 9 | 8 | 135 |
| 1998–1999 | 27 | (38)[b] | 44 | (62)[d] | 72[c] | 7 | 0 | 7 | 4 | 83 |
| 1999–2000 | 30 | (45)[b] | 37 | (55) | 67 | 7 | 0 | 7 | 3 | 77 |
| 2000–2001 | 36 | (51) | 35 | (49) | 72[c] | 7 | 0 | 7 | 0 | 79 |
| 2001–2002 | 51 | (52) | 47 | (48) | 98 | 9 | 0 | 9 | 0 | 107 |
| 2002–2003 | 54 | (51) | 51 | (49) | 105 | 9 | 0 | 9 | 0 | 114 |
| 2003–2004 | 43 | (56) | 34 | (44) | 77 | 9 | 0 | 9 | 0 | 86 |
| 2004–2005 | 33 | (72) | 13 | (28) | 46 | 5 | 0 | 5 | 2 | 53 |
| 2005–2006 | 27 | (60) | 18 | (40) | 45 | 5 | 0 | 5 | 2 | 52 |
| 2006–2007 | 48 | (80) | 12 | (20) | 60 | 6 | 0 | 6 | 0 | 66 |
| 2007–2008 | 49 | (49) | 51 | (51) | 100 | 11 | 0 | 11 | 0 | 111 |
| 2008–2009 | 41 | (36) | 72 | (64) | 113 | 12 | 0 | 12 | 0 | 125 |
| 2009–2010 | 40 | (58) | 29 | (42) | 69 | 10 | 0 | 10 | 0 | 79 |
| 2010–2011 | 44 | (63) | 26 | (37) | 70 | 8 | 0 | 8 | 3 | 81 |

[a] Estimated wounding loss equal to 7% of the permits issued.
[b] One bull was harvested via the Alaska Wildlife Safeguard raffle.
[c] One bison of unknown sex was included in the total.
[d] One cow was harvested via a Governor's permit.

Table 5. Reported Delta bison harvest data by permit hunt, regulatory years 1994–1995 through 2010–2011.

| Hunt no. | Regulatory year | Permits issued | Percent did not hunt | Percent unsuccessful permittees | Percent successful permittees | Bulls (%) | | Cows (%) | | Unk | Total harvest |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DI403 | 1994–1995 | 20 | 5 | 0 | 95 | 19 | (100) | 0 | (0) | 0 | 19 |
| | 1995–1996 | 70 | 6 | 10 | 85 | 58 | (97) | 2 | (3) | 0 | 60 |
| | 1996–1997 | 70 | 4 | 9 | 86 | 53 | (88) | 7 | (12) | 0 | 60 |
| | 1997–1998 | 60 | 3 | 8 | 88 | 51 | (96) | 2 | (4) | 0 | 53 |
| | 1998–1999 | 45 | 2 | 29 | 69 | 26 | (87) | 4 | (13) | 1 | 31 |
| | 1999–2000 | 50 | 2 | 34 | 64 | 29 | (91) | 3 | (9) | 0 | 32 |
| | 2000–2001 | 50 | 10 | 16 | 74 | 35 | (95) | 2 | (5) | 0 | 37 |
| | 2001–2002 | 70 | 1 | 30 | 70 | 47 | (96) | 2 | (4) | 0 | 49 |
| | 2002–2003 | 70 | 3 | 23 | 74 | 51 | (98) | 1 | (2) | 0 | 52 |
| | 2003–2004 | 70 | 7 | 34 | 59 | 40 | (98) | 1 | (2) | 0 | 41 |
| | 2004–2005 | 50 | 10 | 26 | 64 | 32 | (100) | 0 | (0) | 0 | 32 |
| | 2005–2006 | 35 | 9 | 22 | 69 | 24 | (100) | 0 | (0) | 0 | 24 |
| | 2006–2007 | 65 | 2 | 18 | 80 | 47 | (90) | 5 | (10) | 0 | 52 |
| | 2007–2008 | 80 | 11 | 33 | 56 | 43 | (96) | 2 | (4) | 0 | 45 |
| | 2008–2009[a] | 100 | 7 | 19 | 74 | 38 | (51) | 36 | (49) | 0 | 74 |
| | 2009–2010[a] | 90 | 4 | 20 | 76 | 39 | (57) | 29 | (43) | 0 | 68 |
| | 2010–2011 | 70 | 3 | 37 | 60 | 41 | (98) | 1 | (2) | 0 | 42 |
| DI404 | 1994–1995 | 20 | 0 | 5 | 95 | 1 | (5) | 18 | (95) | 0 | 19 |
| | 1995–1996 | 50 | 2 | 6 | 92 | 2 | (4) | 44 | (96) | 0 | 46 |
| | 1996–1997 | 50 | 0 | 12 | 86 | 3 | (7) | 40 | (93) | 0 | 43 |
| | 1997–1998 | 70 | 3 | 4 | 93 | 6 | (9) | 59 | (91) | 0 | 65 |
| | 1998–1999 | 55 | 5 | 24 | 71 | 0 | (0) | 39 | (100) | 0 | 39 |
| | 1999–2000 | 50 | 6 | 26 | 68 | 0 | (0) | 34 | (100) | 0 | 34 |
| | 2000–2001 | 50 | 8 | 20 | 70 | 1 | (3) | 33 | (97) | 1 | 35 |
| | 2001–2002 | 60 | 2 | 17 | 82 | 4 | (8) | 45 | (92) | 0 | 49 |
| | 2002–2003 | 65 | 3 | 15 | 82 | 3 | (6) | 50 | (94) | 0 | 53 |
| | 2003–2004 | 60 | 3 | 37 | 60 | 3 | (8) | 33 | (92) | 0 | 36 |
| | 2004–2005 | 25 | 12 | 32 | 56 | 1 | (7) | 13 | (93) | 0 | 14 |
| | 2005–2006 | 30 | 0 | 30 | 70 | 3 | (14) | 18 | (86) | 0 | 21 |
| | 2006–2007 | 15[b] | 7 | 36 | 57 | 1 | (13) | 7 | (88) | 0 | 8 |

| Hunt no. | Regulatory year | Permits issued | Percent did not hunt | Percent unsuccessful permittees | Percent successful permittees | Bulls | (%) | Cows | (%) | Unk | Total harvest |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DI404 | 2007–2008 | 75 | 4 | 24 | 72 | 5 | (9) | 49 | (91) | 0 | 54 |
| | 2008–2009 | 70 | 4 | 40 | 56 | 3 | (8) | 36 | (92) | 0 | 39 |
| | 2009–2010[c] | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2010–2011 | 50 | 16 | 30 | 54 | 2 | (7) | 25 | (93) | 0 | 27 |
| SI405 | 1998–1999 | 2[d,e] | 0 | 0 | 100 | 1 | (50) | 1 | (50) | 0 | 2 |
| | 1999–2000 | 1[d] | 0 | 0 | 100 | 1 | (100) | 0 | (0) | 0 | 1 |
| | 2000–2001 | 2[d,e] | 0 | 0 | 100 | 2 | (100) | 0 | (0) | 0 | 2 |
| | 2001–2002 | 1[d] | 0 | 0 | 100 | 1 | (100) | 0 | (0) | 0 | 1 |
| | 2002–2003 | 0 | 0 | 0 | 0 | 0 | (0) | 0 | (0) | 0 | 0 |
| | 2003–2004 | 1[d] | 0 | 0 | 100 | 0 | (0) | 1 | (100) | 0 | 1 |
| | 2004–2005 | 0 | 0 | 0 | 0 | 0 | (0) | 0 | (0) | 0 | 0 |
| | 2005–2006 | 0 | 0 | 0 | 0 | 0 | (0) | 0 | (0) | 0 | 0 |
| | 2006–2007 | 0 | 0 | 0 | 0 | 0 | (0) | 0 | (0) | 0 | 0 |
| | 2007–2008 | 1 | 0 | 0 | 100 | 1 | (0) | 0 | (0) | 0 | 1 |
| | 2008–2009 | 2 | 0 | 50 | 50 | 1 | (100) | 0 | (0) | 0 | 1 |
| | 2009–2010 | 1 | 0 | 0 | 100 | 1 | (100) | 0 | (0) | 0 | 1 |
| | 2010–2011 | 1 | 0 | 0 | 100 | 1 | (100) | 0 | (0) | 0 | 1 |
| Totals for all permit hunts | 1994–1995 | 40 | 3 | 3 | 95 | 20 | (53) | 18 | (47) | 0 | 38 |
| | 1995–1996 | 120 | 4 | 8 | 88 | 60 | (57) | 46 | (43) | 0 | 106 |
| | 1996–1997 | 120 | 3 | 10 | 86 | 56 | (54) | 47 | (46) | 0 | 103 |
| | 1997–1998 | 130 | 3 | 6 | 91 | 57 | (48) | 61 | (52) | 0 | 118 |
| | 1998–1999 | 102 | 4 | 26 | 71 | 27 | (38) | 44 | (62) | 1 | 72 |
| | 1999–2000 | 101 | 4 | 30 | 66 | 30 | (45) | 37 | (55) | 0 | 67 |
| | 2000–2001 | 102 | 7 | 18 | 73 | 38 | (52) | 35 | (48) | 1 | 74 |
| | 2001–2002 | 131 | 2 | 23 | 75 | 51 | (52) | 47 | (48) | 0 | 98 |
| | 2002–2003 | 135 | 4 | 19 | 78 | 54 | (51) | 51 | (49) | 0 | 105 |
| | 2003–2004 | 130 | 5 | 36 | 59 | 43 | (56) | 34 | (44) | 0 | 77 |
| | 2004–2005 | 75 | 11 | 28 | 61 | 33 | (72) | 13 | (28) | 0 | 46 |
| | 2005–2006 | 65 | 5 | 26 | 69 | 27 | (60) | 18 | (40) | 0 | 45 |
| | 2006–2007[d] | 80 | 3 | 22 | 76 | 48 | (80) | 12 | (20) | 0 | 60 |

| Hunt no. | Regulatory year | Permits issued | Percent did not hunt | Percent unsuccessful permittees | Percent successful permittees | Bulls (%) | | Cows (%) | | Unk | Total harvest |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2007–2008 | 156 | 8 | 28 | 64 | 49 | (49) | 51 | (51) | 0 | 100 |
| | 2008–2009 | 172 | 6 | 28 | 66 | 42 | (37) | 72 | (63) | 0 | 114 |
| | 2009–2010 | 91 | 4 | 20 | 76 | 40 | (58) | 29 | (42) | 0 | 69 |
| | 2010–2011 | 121 | 12 | 30 | 58 | 44 | (63) | 26 | (37) | 0 | 70 |

[a] The DI403 hunt was for either sex bison.
[b] One hunter did not report.
[c] There was no DI404 hunt in RY09.
[d] One permit was issued for an Alaska Fish and Wildlife Safeguard raffle.
[e] One permit was issued for a Governor's permit.

Table 6. Delta bison mean number of days hunted for hunts DI403 and DI404, regulatory years 1991–1992 through 2010–2011.

| Regulatory Year | Mean number of days hunted | | | |
|---|---|---|---|---|
| | Hunt DI403 | | Hunt DI404 | |
| | Successful | Unsuccessful | Successful | Unsuccessful |
| 1991–1992 | 3.8 | 4.3 | 3.5 | 15.6 |
| 1992–1993 | 2.2 | 1.0 | 1.9 | 0.0[a] |
| 1993–1994 | 4.3 | 7.2 | 3.5 | 5.0 |
| 1994–1995 | 3.0 | 0.0[a] | 3.0 | 2.0 |
| 1995–1996 | 5.1 | 10.1 | 3.8 | 5.0 |
| 1996–1997 | 6.1 | 14.8 | 4.3 | 6.8 |
| 1997–1998 | 5.6 | 9.0 | 4.4 | 9.7 |
| 1998–1999 | 6.0 | 9.4 | 7.0 | 10.4 |
| 1999–2000 | 7.0 | 14.1 | 6.7 | 22.8 |
| 2000–2001 | 4.2 | 9.5 | 7.7 | 19.0 |
| 2001–2002 | 7.6 | 14.6 | 5.9 | 7.7 |
| 2002–2003 | 5.2 | 11.3 | 5.8 | 11.1 |
| 2003–2004 | 4.7 | 11.1 | 8.1 | 10.5 |
| 2004–2005 | 7.2 | 13.2 | 5.6 | 6.9 |
| 2005–2006 | 6.9 | 21.7 | 11.2 | 13.6 |
| 2006–2007 | 5.5 | 10.6 | 5.1 | 8.2 |
| 2007–2008 | 10.8 | 12.6 | 7.5 | 3.4 |
| 2008–2009 | 6.4 | 10.8 | 6.8 | 12.4 |
| 2009–2010[b] | 5.0 | 10.4 | -- | -- |
| 2010–2011 | 7.4 | 10.0 | 7.1 | 8.3 |

[a] Zero days hunted indicates there were no unsuccessful hunters.
[a] There was not a DI404 hunt in RY09.

Table 7. Delta bison hunts DI403 and DI404 applications received and permits issued, 1977–2010.

| Year | Applications received | Permits issued |
|---|---|---|
| 1977 | 2,121 | 20 |
| 1978 | 3,555 | 15 |
| 1979 | 3,970 | 25 |
| 1980 | 4,561 | 35 |
| 1981 | 5,237 | 55 |
| 1982 | 8,105 | 75 |
| 1983 | 7,889 | 75 |
| 1984 | 11,276 | 55 |
| 1985 | 666[a] | 55 |
| 1986 | 6,585 | 65 |
| 1987 | 6,434 | 50 |
| 1988 | 9,705 | 50 |
| 1989 | 10,151 | 65 |
| 1990 | 11,822 | 90 |
| 1991 | 11,057 | 100 |
| 1992 | 12,387 | 100 |
| 1993 | 13,654 | 120 |
| 1994 | 13,977 | 40 |
| 1995 | 15,257 | 120 |
| 1996 | 17,895 | 120 |
| 1997 | 15,479 | 130 |
| 1998 | 16,188 | 100 |
| 1999 | 15,443 | 100 |
| 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[b] | 80[b] |
| 2007 | 15,397 | 130 |
| 2008 | 16,597 | 170 |
| 2009 | 11,026 | 90 |
| 2010 | 20,711 | 120 |

[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 8. Delta bison hunter reported residency and success for drawing permit hunts DI403 and DI404, regulatory years 1986–1987 through 2010–2011.

| | Successful | | | | | Unsuccessful | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Regulatory year | Local[a] resident | Nonlocal resident | Nonres | Unk | Total (%) | Local[a] resident | Nonlocal resident | Nonres | Unk | Total (%) | Total hunters |
| 1986–1987 | 4 | 57 | 0 | 1 | 62 (100) | 0 | 0 | 0 | 0 | 0 (0) | 62 |
| 1987–1988 | 1 | 44 | 0 | 1 | 46 (100) | 0 | 0 | 0 | 0 | 0 (0) | 46 |
| 1988–1989 | 2 | 40 | 1 | 2 | 45 (94) | 0 | 3 | 0 | 0 | 3 (6) | 48 |
| 1989–1990 | 3 | 57 | 0 | 0 | 60 (98) | 0 | 1 | 0 | 0 | 1 (2) | 61 |
| 1990–1991 | 4 | 31 | 0 | 0 | 35 (92) | 0 | 3 | 0 | 0 | 3 (8) | 38 |
| 1991–1992 | 3 | 86 | 2 | 0 | 91 (91) | 2 | 7 | 0 | 0 | 9 (9) | 100 |
| 1992–1993 | 6 | 87 | 1 | 2 | 96 (99) | 0 | 1 | 0 | 0 | 1 (1) | 97 |
| 1993–1994 | 5 | 103 | 1 | 0 | 109 (92) | 0 | 9 | 0 | 0 | 9 (8) | 118 |
| 1994–1995 | 0 | 38 | 0 | 0 | 38 (97) | 0 | 1 | 0 | 0 | 1 (3) | 39 |
| 1995–1996 | 3 | 103 | 0 | 0 | 106 (91) | 0 | 10 | 0 | 0 | 10 (9) | 116 |
| 1996–1997 | 2 | 97 | 1 | 3 | 103 (90) | 0 | 11 | 0 | 1 | 12 (10) | 115 |
| 1997–1998 | 5 | 101 | 12 | 0 | 118 (94) | 0 | 6 | 2 | 0 | 8 (6) | 126 |
| 1998–1999 | 0 | 72 | 0 | 0 | 72 (73) | 0 | 25 | 1 | 0 | 26 (27) | 98 |
| 1999–2000 | 0 | 67 | 0 | 0 | 67 (69) | 2 | 27 | 1 | 0 | 30 (31) | 97 |
| 2000–2001 | 5 | 67 | 0 | 0 | 72 (80) | 0 | 18 | 0 | 0 | 18 (20) | 90 |
| 2001–2002 | 4 | 93 | 1 | 0 | 98 (76) | 1 | 30 | 0 | 0 | 31 (24) | 129 |
| 2002–2003 | 3 | 102 | 0 | 0 | 105 (80) | 0 | 24 | 2 | 0 | 26 (20) | 131 |
| 2003–2004 | 0 | 76 | 1 | 0 | 77 (63) | 0 | 46 | 0 | 0 | 46 (37) | 123 |
| 2004–2005 | 1 | 46 | 0 | 0 | 47 (69) | 0 | 21 | 0 | 0 | 21 (31) | 68 |
| 2005–2006 | 2 | 42 | 0 | 0 | 44 (76) | 0 | 14 | 0 | 0 | 14 (24) | 58 |
| 2006–2007 | 2 | 57 | 1 | 0 | 60 (78) | 0 | 17 | 0 | 0 | 17 (22) | 77 |
| 2007–2008 | 8 | 90 | 1 | 0 | 99 (69) | 2 | 42 | 0 | 0 | 44 (31) | 143 |
| 2008–2009 | 4 | 108 | 1 | 0 | 113 (71) | 3 | 44 | 0 | 0 | 47 (29) | 160 |
| 2009–2010 | 1 | 66 | 1 | 0 | 68 (79) | 0 | 18 | 0 | 0 | 18 (21) | 86 |
| 2010–2011 | 3 | 66 | 0 | 0 | 69 (63) | 0 | 41 | 0 | 0 | 41 (37) | 110 |

[a] Local residents reside in Unit 20D.

Table 9. Delta bison percent harvest[a] by month, regulatory years 1994–1995 through 2010–2011.

| Regulatory Year | Percent harvest by month | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | *N* |
| 1994–1995[b] | | | | 61 | 11 | 8 | 0 | 5 | 16 | 0 | 38 |
| 1995–1996[b] | | | | 42 | 25 | 8 | 5 | 8 | 14 | 0 | 106 |
| 1996–1997[b,c] | | | | 23 | 34 | 3 | 6 | 11 | 13 | 11 | 103 |
| 1997–1998 | | | | 46 | 26 | 6 | 0 | 8 | 14 | 0 | 118 |
| 1998–1999 | | | | 45 | 16 | 4 | 1 | 13 | 21 | 0 | 71 |
| 1999–2000[d] | | | | 39 | 19 | 2 | 5 | 14 | 14 | 9 | 65 |
| 2000–2001 | | | | 55 | 23 | 3 | 1 | 10 | 8 | 0 | 74 |
| 2001–2002 | | | | 37 | 24 | 8 | 3 | 10 | 16 | 0 | 98 |
| 2002–2003 | | | | 44 | 22 | 5 | 2 | 9 | 19 | 0 | 105 |
| 2003–2004 | | | | 31 | 30 | 8 | 4 | 8 | 20 | 0 | 77 |
| 2004–2005 | | | | 52 | 15 | 2 | 7 | 13 | 11 | 0 | 46 |
| 2005–2006 | | | | 44 | 20 | 4 | 9 | 9 | 13 | 0 | 45 |
| 2006–2007 | | | | 47 | 19 | 5 | 5 | 10 | 12 | 2 | 60 |
| 2007–2008 | | | | 32 | 17 | 3 | 12 | 13 | 22 | 0 | 99 |
| 2008–2009 | | | | 29 | 23 | 3 | 1 | 19 | 26 | 0 | 113 |
| 2009–2010 | | | | 46 | 15 | 10 | 6 | 10 | 13 | 0 | 68 |
| 2010–2011[e] | 0 | 4 | 13 | 26 | 7 | 9 | 9 | 7 | 24 | 0 | 68 |

[a] Percentages may not total 100% due to rounding.
[b] The hunting season opened on 7 Oct versus 1 Oct.
[c] The hunting season was extended by emergency order to include 1–30 Apr 1997.
[d] The hunting season was extended by emergency order to include 1–15 Apr 2000.
[e] The hunting season opened on 26 Jul.

Table 10. Delta bison harvest percent[a] by transport method for Hunts DI403 and DI404, regulatory years 1991–1992 through 2010–2011.

| Regulatory year | Harvest percent by transport method | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Airplane | Horse/ Dog team | Boat | 3- or 4-wheeler | Snowmachine | Other ORV | Highway vehicle | Unknown | *n* |
| 1991–1992 | 1 | 0 | 0 | 1 | 14 | 3 | 67 | 14 | 93 |
| 1992–1993 | 0 | 0 | 0 | 4 | 49 | 1 | 41 | 5 | 96 |
| 1993–1994 | 0 | 2 | 0 | 5 | 24 | 4 | 66 | 0 | 109 |
| 1994–1995 | 0 | 0 | 0 | 0 | 39 | 3 | 56 | 0 | 39 |
| 1995–1996 | 0 | 0 | 0 | 3 | 16 | 2 | 78 | 0 | 116 |
| 1996–1997 | 0 | 0 | 0 | 2 | 13 | 4 | 78 | 3 | 100 |
| 1997–1998 | 0 | 0 | 1 | 3 | 33 | 3 | 59 | 2 | 118 |
| 1998–1999 | 0 | 0 | 0 | 1 | 19 | 1 | 74 | 4 | 72 |
| 1999–2000 | 0 | 0 | 0 | 9 | 33 | 0 | 58 | 0 | 67 |
| 2000–2001 | 0 | 0 | 0 | 4 | 11 | 6 | 79 | 0 | 72 |
| 2001–2002 | 0 | 0 | 0 | 1 | 13 | 4 | 79 | 2 | 131 |
| 2002–2003 | 0 | 0 | 0 | 4 | 0 | 2 | 90 | 4 | 135 |
| 2003–2004 | 0 | 0 | 0 | 0 | 22 | 3 | 75 | 0 | 77 |
| 2004–2005 | 0 | 0 | 0 | 6 | 18 | 3 | 72 | 0 | 65 |
| 2005–2006 | 0 | 0 | 0 | 11 | 6 | 7 | 74 | 2 | 54 |
| 2006–2007 | 0 | 0 | 0 | 3 | 12 | 2 | 82 | 2 | 60 |
| 2007–2008 | 0 | 0 | 0 | 2 | 7 | 5 | 85 | 1 | 100 |
| 2008–2009 | 1 | 0 | 0 | 2 | 21 | 3 | 70 | 3 | 114 |
| 2009–2010 | 0 | 0 | 0 | 7 | 15 | 2 | 73 | 2 | 86 |
| 2010–2011 | 0 | 1 | 0 | 3 | 20 | 0 | 75 | 2 | 110 |

[a] Percentages may not total 100% due to rounding.

Table 11. Delta bison harvest percent[a] by kill location during permit hunts DI403 and DI404, regulatory years 1989–1990 through 2010–2011.

| Regulatory year | Location of kill | | | |
|---|---|---|---|---|
| | Delta Agriculture Project | Delta Junction Bison Range | Other | Unknown |
| 1989–1990 | 95 | 5 | 0 | 0 |
| 1990–1991 | 91 | 9 | 0 | 0 |
| 1991–1992 | 77 | 23 | 0 | 0 |
| 1992–1993 | 78 | 17 | 5 | 0 |
| 1993–1994 | 75 | 24 | 1 | 0 |
| 1994–1995 | 86 | 14 | 0 | 0 |
| 1995–1996 | 68 | 26 | 6 | 0 |
| 1996–1997 | 56 | 32 | 12 | 0 |
| 1997–1998 | 70 | 21 | 4 | 4 |
| 1998–1999[b] | -- | -- | -- | -- |
| 1999–2000 | 51 | 29 | 19 | 2 |
| 2000–2001 | 77 | 13 | 10 | 0 |
| 2001–2002 | 65 | 25 | 10 | 0 |
| 2002–2003 | 78 | 21 | 1 | 0 |
| 2003–2004 | 71 | 21 | 8 | 0 |
| 2004–2005 | 76 | 11 | 13 | 0 |
| 2005–2006 | 63 | 26 | 12 | 0 |
| 2006–2007 | 81 | 14 | 0 | 5 |
| 2007–2008 | 72 | 16 | 11 | 1 |
| 2008–2009 | 73 | 23 | 4 | 0 |
| 2009–2010 | 56 | 38 | 6 | 0 |
| 2010–2011 | 55 | 32 | 13 | 0 |

[a] Percentages may not total 100% due to rounding.
[b] Data not available.


ALASKA
DEPARTMENT OF FISH AND GAME