

RC3

**State of Alaska
Department of Fish and Game**

Supplemental Materials



**Board of Game Meeting
February 26th-March 7th, 2010**

**Westmark Hotel
Fairbanks, AK**

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GAME MANAGEMENT UNITS 12 AND 20E

TOK AREA OFFICE

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DESCRIPTION

GAME MANAGEMENT UNIT 12

Game Management Unit 12 is located along the Yukon, Canada border in eastern Interior Alaska. It measures approximately 10,000 mi², of which 9,000 mi² is wildlife habitat.

LAND OWNERSHIP: Over 80% of the land is managed by the National Park Service (Wrangell–St. Elias National Park and Preserve), the U.S. Fish and Wildlife Service (Tetlin National Wildlife Refuge) or is privately owned by Native corporations or villages. The Tok Management Area (TMA) is the only state special management area in Unit 12 and there are no controlled use areas. Approximately 2,000 people live in 6 communities and villages within the unit.

ACCESS: The Glenn and Alaska Highways, Nabesna Road, and the Tanana, Tok, and Nabesna Rivers are primary access routes into Unit 12. There are few trails suitable for off-road vehicles. Due to the combination of limited access and land owner policies, hunting pressure is low in most of the unit.

HUMAN USE: The Dall sheep population in Unit 12 is the most intensively hunted in the state. Guided nonresident Dall sheep hunting is common, but most moose hunting is by local residents (>70% of the hunters) who take >40% of the harvest. Trapping, primarily for marten and lynx is economically important.

ADVISORY COMMITTEES: Upper Tanana–Fortymile and Nabesna Advisory Committees.

SPECIAL MANAGEMENT AREAS:

TOK MANAGEMENT AREA: The TMA was created in 1974 to provide sheep hunters with the opportunity to hunt large-horned Dall sheep under uncrowded conditions. It is one of the top three areas in Alaska in terms of Dall sheep horn growth, and hunt objectives were designed to enhance horn growth potential. The TMA is the only sheep hunting area in Alaska specifically established for trophy sheep management. It is very

popular among sheep hunters and is one of the most sought-after sheep permits in the state.

GAME MANAGEMENT UNIT 20E

Unit 20E is located north of Unit 12 along the Yukon, Canada border. It encompasses about 11,000 mi² of diverse wildlife habitat.

LAND OWNERSHIP: Most of the land in Unit 20E is in state (about 50%) or Native corporation (30%) ownership. State special management areas include the Ladue River and Glacier Mountain Controlled Use Areas. The remaining land is under federal management either within the Yukon-Charley Rivers National Preserve (National Park Service) or the Fortymile National Wild and Scenic River System (Bureau of Land Management.) About 220 people reside in the 3 communities in Unit 20E.

ACCESS: The Taylor Highway, several extensive off-road vehicle trails, and the Yukon, Charley, and Fortymile Rivers are the primary access routes in Unit 20E. Portions of central Unit 20E can be accessed by float plane. Most of western, eastern, and northern Unit 20E are inaccessible, except from a small number of landing areas.

HUMAN USE: Caribou in the Fortymile herd are the most sought-after wildlife species in Unit 20E. Moose hunting participation and harvest increased significantly between 2001 and 2003, exceeding historic records, but has since declined to levels observed during the 1990s. Trapping, primarily for marten and lynx is economically important. Grizzly bear hunting regulations have been liberal since 1981 in an attempt to reduce grizzly bear predation on moose and caribou calves.

ADVISORY COMMITTEES: Eagle and the Upper Tanana-Fortymile Advisory Committees.

CONTROLLED USE AREAS:

Glacier Mountain Controlled Use Area (CUA). The Glacier Mountain CUA encompasses about 600 mi² and was formed in 1971 to afford greater protection for the Dall sheep population on Glacier Mountain. Methods of access are restricted during August 5–September 20. Access was originally limited to walk-in hunters only. In 1981, the restriction on use of pack animals was eliminated. This CUA continues to provide needed protection for the Dall sheep population as originally intended, and more recently, has provided opportunity for walk-in hunters to hunt Fortymile caribou for a large portion of the fall season.

Ladue River CUA. The Ladue River CUA encompasses about 1,375 mi² and was formed in 1994 to afford greater protection to the moose population. Motorized access is limited to designated trails and airstrips during August 20–September 30. The area has achieved its purpose.

BLACK BEAR

STATUS: Black bears are present in all suitable habitats in Units 12 and 20E. Based on limited radiotelemetry data collected in Unit 12 and other units with comparable habitats, the estimated black bear density is 1 bear/4–7 mi² of black bear habitat. The estimated number of black bears in Units 12 and 20E combined is 2,000–2,500. The black bear population is productive and the reproductive interval is similar to other Interior Alaska black bear populations. Historically, black bear harvest has been low in both units. The primary users in Unit 12 are local residents (>70% of the harvest) and primary users in Unit 20E are Alaska residents (>50% of the harvest). Local residents take black bears primarily during the spring for meat.

MANAGEMENT/RESEARCH ACTIVITIES: Harvest data are obtained through mandatory sealing of hunter-harvested bears and bears killed in defense of life or property. The impact of hunting black bears over bait is monitored through mandatory registration of all bait stations in combination with the sealing requirements.

ISSUES: There are no biological or social issues at this time. Units 12 and 20E black bear populations exist at densities considered natural for Interior Alaska black bear populations and harvest and habitat are not limiting.

GRIZZLY BEARS

STATUS: Grizzly bear populations are estimated to be stable at 350–425 (46.6–56.7 bears of all ages/1000 mi²) in Unit 20E and 320–394 bears (29.9–36.9 bears of all ages/1000 mi²) in Unit 12. These estimates are based on the department's DNA-based mark-recapture surveys and extrapolations from point estimate surveys our staff conducted in Unit 20E and other units with similar type habitats, radiotelemetry data, and harvest statistics. Hunting regulations have been liberal since 1981 to allow hunters to take more grizzly bears in an attempt to reduce grizzly bear predation on moose calves. Strategies we have used to increase grizzly bear harvest and grizzlies killed in predation control programs include: 1) a public awareness campaign; 2) increased bag limit to one bear per regulatory year (1 July through 30 June) in Unit 12 and two bears per regulatory year in Unit 20E since regulatory year 2004–2005 (RY04; e.g., RY04 = 1 Jul 2004 through 30 Jun 2005); 3) lengthened seasons; 4) waived resident tag fee in Unit 20E during RY84–RY90 and RY02–RY09 outside the Yukon-Charley Preserve and 5) a grizzly bear predation control program in southern Unit 20E during RY05–RY08 that included baiting and sale of untanned hides with claws attached and skulls as a method for bear control permittees and sale of hides as an incentive to participate in the program. In Unit 12, harvest declined in 1989 and remained stable (avg.=17 bears annually during RY89–RY08). In Unit 20E, grizzly bear take remained low (avg.=15 bears annually) during RY81–RY08 despite liberal harvest regulations and predator control efforts, and the population has not been reduced to levels adequate to increase moose calf survival. The grizzly bear hunter-harvest combined with predation control kills in Units 12 and 20E has been below maximum sustainable levels. Grizzly bears are a significant factor in

moose calf mortality in Unit 12 and are an important factor limiting the Unit 20E moose population.

MANAGEMENT ACTIVITIES: Management activities include implementing the Unit 20E grizzly bear predation control program during RY04–RY08, monitoring grizzly bears killed, and evaluating data to track changes in bear numbers. A total of 14 bears were harvested under this control program during the 5 years it was active and were sealed in the Alaska Department of Fish and Game (ADF&G) office in Tok. In 2006, our research staff conducted a grizzly bear population survey in a 2,005-mi² area in southern Unit 20E. In February 2009, we analyzed grizzly bear and moose population data in Unit 20E to evaluate the effects of bear densities on moose calf survival. No statistical relationship was found at current bear densities. The grizzly bear portion of the predation control program was suspended on July 1, 2009 because it was ineffective at reducing bear numbers.

ISSUES: The Board of Game designated the Fortymile caribou herd and the moose populations in Units 12 and 20E as important for high levels of human consumptive use under the Intensive Management Law (AS 16.05.255(e)–(g)). This designation means that the board must consider intensive management if regulatory action to significantly reduce harvest becomes necessary because the population is depleted or has reduced productivity. Past research has shown that grizzly bear predation is the primary cause of moose calf mortality in Unit 20E and would have to be reduced before the moose population could meet its population goals. Liberal grizzly bear harvest regulations since 1981 and the recent grizzly bear predation control program in Unit 20E have been ineffective at reducing the grizzly bear population enough to allow for increased moose calf survival.

CARIBOU

FORTY MILE CARIBOU HERD

STATUS: Historically, the Fortymile herd was one of the largest herds in Alaska. For over 70 years, it ranged between the White Mountains north of Fairbanks to central Yukon, Canada. Like most other herds in Alaska, it underwent changes in abundance and distribution throughout this period but maintained its use of Yukon, Canada and habitats near the Steese Highway. Due to a combination of factors, the Fortymile herd underwent a major decline in size during 1963–1973 to about 6,000 caribou. Following the decline the herd used less than 25% of its traditional range, stopped migrating across the Steese Highway, and rarely traveled into Yukon. Primarily due to favorable weather conditions, the Fortymile herd increased during the late 1970s and 1980s, but much slower than adjacent herds despite similar weather patterns. Range use did not increase during this period. Between 1990 and 1995, herd growth stabilized due to adverse weather conditions and predation, primarily by wolves. The herd increased 119% between 1995 and 2003, primarily due to favorable environmental conditions, wolf trapping, and nonlethal wolf predation control. During 2000–2009, the herd increased the size of its range, using historic range west of the Steese Highway during the fall and historic range

in Yukon, Canada during fall and winter. During 2004 and 2005, the herd declined slightly, likely due to increased wolf predation and adverse weather conditions during both years. In 2006, good calf survival rates to autumn (34 calves:100 cows in early October 2006) and mild winter conditions allowed the herd to increase. Following a June photocensus in 2007, the herd was estimated at approximately 38,400 caribou.

Good calf survival to fall (37 and 33 calves:100 cows in early October 2007 and 2008) and mild winter conditions in 2007 allowed the herd to continue to grow. Following a July 2009 photocensus, the herd was estimated at approximately 46,500 caribou. Preliminary data from the fall 2009 composition survey indicate the herd likely experience similar calf survival to fall as observed in 2006–2008.

MANAGEMENT/RESEARCH ACTIVITIES: During 1996–2000, the herd was managed under the Fortymile Caribou Herd Management Plan that was developed through a public planning process. This management plan included reduced harvest, nonlethal wolf control conducted by ADF&G and public wolf trapping. During 2001–2006, harvest was guided by the Harvest Management Plan developed by a coalition of 5 Fish and Game Advisory Committees (Central, Delta Junction, Eagle, Fairbanks and Upper Tanana/Fortymile) and endorsed by the board in spring 2000. The primary goal of this plan was to manage for herd growth and secondarily to provide for increased harvest. During 2005–2006, these advisory committees developed a revised Harvest Management Plan that the board endorsed in March 2006 to guide harvest from fall 2006 through spring 2013. In spring 2006, the Board of Game added the Fortymile Caribou Herd to the Upper Yukon–Tanana Predator Control Program. In spring of 2009, the Board of Game reauthorized this predation control program for another 5 years.

ISSUES: Since 1995, Fortymile caribou management has been successful because agencies and the public have worked together to develop and implement management and harvests plans to encourage herd growth. Herd growth, predator control and caribou harvest will all be important issues for years to come.

CHISANA CARIBOU HERD

STATUS: The Chisana herd is a small, mostly nonmigratory caribou herd. Its primary range encompasses the Nutzotin and northern Wrangell Mountains between the Nabesna River in Alaska and the Generec River in Yukon, Canada. During the 1980s, the Chisana herd grew from an estimated 1,000 to about 1,900 caribou in 1988. The herd was estimated to have declined from 1,800 in 1989 to 315 by 2002. However, in fall 2003, the U.S. Geological Survey (USGS) completed a more intensive census than had been done previously, which resulted in 603 caribou observed and a population estimate of 720 caribou. In addition, the adult bull:cow ratio was estimated to be 37:100 in 2003 versus 25:100 in 2002, indicating that previous surveys may have underestimated these population parameters. The USGS census in 2005 yielded a population estimate of 656–733. In the 2007 USGS census, 719 caribou were observed, with 13 calves:100 cows and 50 bulls:100 cows. A census was not attempted in 2008 and 2009; however, 21

calves:100 cows and 35 bulls:100 cows were observed in the fall 2008 composition survey.

Habitat and harvest do not appear to be limiting herd growth. Based on percent lichen in the diet of these caribou, winter range conditions are adequate in most of the herd's range. Pregnancy rates (>80% per year) and median calving date indicate nutritional status is adequate. During 1950–1993, harvest was limited to bulls, and the annual harvest rate (<2.5%) did not limit the herd's ability to increase. In 1994 harvest of Chisana caribou in Alaska was stopped. Herd management is currently being reviewed by an international working group comprised of members from Government of Yukon, ADF&G, White River First Nation, Kluane First Nation, U. S. National Parks Service (NPS), and the U. S. Fish and Wildlife Service. The working group developed a draft management plan which should be completed in 2010.

MANAGEMENT ACTIVITIES: Between 2003 and 2008, the USGS lead a cooperative research effort with the NPS, ADF&G, and Yukon Department of Renewable Resources to evaluate various population parameters to determine why this herd declined by more than 60% since the late 1980s. In 2003–2006, 20–50 adult caribou cows were captured in Yukon by the Yukon Department of Renewable Resources and placed in a pen during late winter through early June to provide protection from predators during and immediately following calving. ADF&G maintained a cooperative technical role in these efforts. In fall of 2008, ADF&G, in cooperation with the NPS and Yukon Department of Environment, conducted a herd composition survey. This data is being used in the current effort to develop a Chisana Herd management plan.

ISSUES: The main issue is to improve accuracy of the population estimates and develop methods to maintain accurate counts. In addition, the herd management plan is currently being developed to determine if a limited harvest of bulls is justified.

FURBEARERS

STATUS: Marten and lynx are the most economically important furbearers in Units 12 and 20E. During population highs, muskrats are also economically and socially important in Unit 12. Little intentional trapping effort is expended on coyote, red fox, mink, otter, beaver, ermine, or wolverine (except in a portion of southern Unit 12) because of low pelt prices or low abundance. Furbearer populations are primarily monitored using trapper questionnaire reports. The snowshoe hare and lynx populations appear to be at or just past a high in their population cycles. During early winter 2009, hares were reported to be declining or absent in many parts of Units 12 and 20E; however, sightings of lynx kitten tracks are still being reported by area trappers in many areas with high densities of hares. Marten numbers increased between 2002 and 2005, but declined in 2006–2008 in most of Units 12 and 20E. However, marten appear to be plentiful in portions of the areas burned in Unit 20E during 2004 and 2005. Wolverine numbers appear to be increasing, possibly in response to large numbers of caribou wintering in Units 12 and 20E.

MANAGEMENT ACTIVITIES: Wolverine, lynx, and otter harvest are monitored through mandatory sealing and harvest reporting. A trapper questionnaire is sent to area trappers each year to assess their impression of population trends. This information, along with trapper interviews, field observations and sealing records is used to develop management direction for furbearers in Units 12 and 20E.

ISSUES: No biological concerns currently exist for furbearer populations in Units 12 and 20E.

MOOSE

UNIT 12

STATUS: The moose population in Unit 12 increased slowly from 1982 to 1989, remained relatively stable during 1989–1993, and due primarily to increased calf survival, grew slightly between 1994 and 1997. The most substantial increase was in northwestern Unit 12 within the area affected by the 1990 Tok wildfire (155 mi²). This area supported 0.19 moose/mi² in 1989, 0.6 moose/mi² in 1994, and 0.8–1.0 moose/mi² during 1997–2008.

Moose densities currently range from 0.03 moose/mi² in the Northway Flats to >2.0 moose/mi² along the north side of the Nutzotin Mountains. Between 1997 and 2000, calf and yearling bull recruitment declined and the population remained stable or declined slightly. Based on fall moose surveys in 2003, the Unit 12 population was estimated at 2,900–5,100 moose (0.6–0.7 moose/mi² of suitable moose habitat). From 2003 to 2006, we conducted surveys only in northwestern Unit 12 and unitwide estimates were not developed. Surveys in northwestern Unit 12 were conducted in 2004–2006 to monitor the moose population within the Tok River drainage due to concerns about declining bull:cow ratios, and to monitor moose populations north of the Alaska highway within the Upper Yukon–Tanana Predation Control Area. No surveys were conducted in 2007 due to poor snow conditions and budget constraints. The most recent Unit 12 population estimate of 4,300–5,600 moose (0.6–0.7 moose/mi² of suitable moose habitat) was developed from fall 2008 surveys.

Past research indicated that predation was the primary factor maintaining the Unit 12 moose population at low density. However, land ownership patterns preclude the use of predator control in most of the unit. Moose numbers are expected to remain stable at low densities (0.3–1.0 moose/mi²) in most of the unit.

Hunter participation and moose harvest in Unit 12 remained stable during 2002–2008, with an average of 564 hunters (range = 520–615) harvesting an average of 132 (range = 118–159) moose annually.

Most of Unit 12 is difficult to access and harvest has little effect on the bull population. The unitwide bull:cow ratio exceeds the population objective of 40 bulls:100 cows. Most moose are harvested along the Tok, Little Tok and Tanana Rivers in western Unit 12.

where access is easiest. In these areas, bull:cow ratios have declined to 20–40 bulls:100 cows. In response, regulations that limit hunters to bulls with spike, fork, or 50-inch antlers, or antlers with 56 brow tines on at least 1 side were enacted in the Little Tok River drainage in 1993 and a portion of the main stem of the Tok River drainage in 2006. Bull:cow ratios have improved in these areas and hunters support these restrictions. There is little local interest in antler restrictions as a form of harvest management in other areas of Unit 12.

MANAGEMENT ACTIVITIES: In 2005 and 2006, we conducted moose surveys in northwestern Unit 12, primarily to monitor bull:cow ratios within the Upper Tok River drainage and the population status north of the Alaska Highway, within the portion of Unit 12 included in the Upper Yukon–Tanana Predation Control Area. In cooperation with Tetlin National Wildlife Refuge, we conducted a Geospatial Population Estimation survey in 2008 to estimate population size, and sex and age composition of moose in more than 90% of the moose habitat in Unit 12. This information was extrapolated to develop a unitwide population estimate.

Signs are posted along area roads and primary trails to inform hunters about hunting regulations and boundaries. Greater enforcement effort occurs in the Little Tok River area to ensure hunters comply with antler restrictions.

Use and availability of browse is periodically monitored within important wintering areas along the Tok and Tanana Rivers. Habitat enhancement has been conducted in Unit 12 since 1982. Since 1982, over 1800 acres of decadent willows have been intentionally disturbed to stimulate crown sprouting of new leaders. This has produced more than 2 million pounds of additional browse each year for wintering moose. In 2003, a 40,000-acre wildfire burned in the Black Hills on the Tetlin Refuge National Wildlife Refuge. In 1998, we mechanically crushed 275 acres of decadent willow and aspen within the Tok River Valley. We recently cooperated with Department of Natural Resources, Division of Forestry to develop a 1000-acre timber sale in the Tok River Valley to enhance moose habitat. Cut areas were planned based on number of marketable trees, historic winter use by moose, and potential to regenerate quality moose browse species. This project began the implementation phase in 2008. In addition, we are assisting in designing and implementing site-specific scarification techniques that will promote willow and aspen regeneration following logging. Cut areas will be 80–200 acres in size.

In 2004, the Upper Yukon–Tanana Predation Control Program was implemented in an effort to reduce mortality in the southern Unit 20E moose population by providing conditions to allow the Unit 20E moose population to increase to meet Intensive Management Objectives. A small portion of northwestern Unit 12 was included in the wolf portion of the predation control program in 2004–2006. In May 2006, the board modified the Upper Yukon–Tanana Predation Control Program to include all of Unit 12 north of the Alaska Highway in the wolf predation control program. The grizzly bear predation control portion of the program was suspended on July 1, 2009 because it was ineffective at reducing grizzly bear predation on moose calves. The wolf predation control program is still in place.

ISSUES: The primary management challenge for Unit 12 moose is managing this predator-limited, low density moose population that is subject to high harvest near roads and rivers, within sustainable levels.

The Board of Game has identified the moose population within Unit 12 as important for high levels of human consumptive use under the Intensive Management Law (AS 16.05.255(e)-(g)). This designation means that the board must consider intensive management if regulatory action to significantly reduce harvest becomes necessary because the population is depleted or has reduced productivity. Currently, we estimate that the Unit 12 moose population is at the lower end of the board's population objective. Population densities remain low near villages and roads, while remote portions of the unit have good moose densities relative to available habitat.

Research we conducted in Unit 12 in the mid 1980s identified wolves as the primary predator on moose. Wolf control in most of the unit is not an option because of land ownership. Prescribed burns are the best option for intensively managing for moose in areas where predation control is not possible, but in northwestern Unit 12 the moose population can be intensively managed with a combination of predation control and habitat enhancement.

Taking moose for funerary or mortuary potlatches is difficult to quantify. Most potlatch harvest occurs near villages roads. Harvest reporting has improved in recent years, but is not always consistent. Therefore it remains difficult to determine the effects of this harvest. We are currently working with local villages to improve reporting.

UNIT 20E

STATUS: Between 1981 and 1988, the moose population in Unit 20E increased 5-9% annually, reaching a density of 0.3-0.5 moose/mi². Between 1988 and 2000, the population stabilized at an estimated 0.5-0.6 moose/mi². Between 2001 and 2004, the moose population experienced the lowest calf and yearling recruitment in 25-30 years. In 2004, the estimated density of moose in Unit 20E was 0.4-0.5 moose/mi². Our analysis of 2004-2008 fall moose survey data from the 4,630-mi² moose survey area in southern Unit 20E indicates this moose population increased. The fall 2008 density estimate in southern Unit 20E was 0.6-0.8 moose/mi².

ADF&G research has shown that predation by wolves and grizzly bears is the primary factor maintaining the Unit 20E moose population at low densities (0.2-1.0 moose/mi²) and that hunting and habitat quality are minor limiting factors. Moose densities vary, ranging from approximately 1.0 moose/mi² in southcentral and southwestern Unit 20E, associated with several large 30-year-old burns (500,000 acres), to 0.2 moose/mi² in northern Unit 20E along the Yukon River. During 2005-2008, bull:cow ratios observed during fall surveys were above management objectives (≥ 40 bulls:100 cows).

Hunter participation rate and harvest increased in Unit 20E between 1993 and 2002 and reached a peak of 944 hunters who harvested 170 moose in 2002. Beginning in 2003, hunter numbers and harvest declined through 2006 when 695 hunters harvested 130 moose. In 2007 and 2008 hunter numbers and harvest increased, with 749 and 770 hunters harvesting 144 and 179 moose in each of these years. Preliminary data indicates this increase in hunters and moose harvest may have continued in 2009, with an estimated 732 hunters harvesting 176 moose.

MANAGEMENT ACTIVITIES: We monitor population trends and composition annually. Survey areas are primarily in southern Unit 20E, but occasionally the National Park Service (NPS) conducts surveys in the Yukon-Charley Rivers National Preserve in northern Unit 20E. Every 2-3 years ADF&G samples browse availability and use in important wintering areas and prescribed burn sites.

Since 2001, moose hunting in most of Unit 20E has been under a registration permit that requires the hunter to select either moose or caribou. The moose hunting season in most of the unit is separated into a 5-day hunt in August and a 10-day hunt in September.

During 2004 and 2005, over a million acres of moose habitat burned in Unit 20E. This burn varied widely in severity and left significant unburned inclusions. It will provide exceptional improvements in moose habitat for many years.

In 2004, the Upper Yukon-Tanana Predation Control Program was implemented in an effort to reduce moose mortality from predation in southern Unit 20E and thereby stimulate an increase toward meeting Intensive Management population objectives. In May 2006, the Board of Game expanded the control program to include all of Unit 20E, although the NPS does not allow predation control within the Yukon-Charley Rivers National Preserve. The grizzly bear portion of the control program was suspended on July 1, 2009 because it was ineffective at reducing grizzly bear numbers and predation on moose. The wolf control portion of the program is still in place.

ISSUES: The greatest challenge in Unit 20E is to manage for an increase in moose numbers in this predator-limited population that is also subject to high harvest along roads and rivers.

Currently, much of Unit 20E is inaccessible because there are few trails or suitable aircraft landing sites. However, hunters using all-terrain and off-highway-vehicles are increasingly pioneering new trails from the Taylor Highway. We expect this proliferation of trails to new areas to increase as moose numbers increase. This increased hunter access is likely to cause the bull component of the population to decline below 40 bulls:100 cows in portions of the unit; however, we expect the unitwide bull:cow ratio to remain above the minimum management objective of 40 bulls:100 cows. The split hunting season and the requirement that hunters choose either to hunt moose or caribou appears to have stabilized harvest in most areas but this may not be sufficient as hunter numbers and off-road vehicle use increases in key areas.

The Board of Game has identified the moose population within Unit 20E as important for high levels of human consumptive use under the Intensive Management Law (AS 16.05.255(e)-(g)). This designation means that the board must consider intensive management if regulatory action to significantly reduce harvest becomes necessary because the population is depleted or has reduced productivity. The Upper Yukon-Tanana Predation Control Program in Unit 20E began in January, 2005 and was reauthorized for 5 years in March of 2009. Moose population data is currently being collected and will be evaluated prior to the March 2010 Board of Game meeting.

DALL SHEEP

STATUS: There are three distinct sheep areas in Units 12 and 20E: 1) northern Wrangell, Mentasta, and Nutzotin Mountains; 2) Tok Management Area (TMA); and 3) Tanana Hills.

The sheep population in Wrangell, Mentasta, and Nutzotin Mountains traditionally exists at relatively high densities in typically rugged, glaciated habitats. This area produces rams with horns below average size, compared with other sheep populations in Alaska. The consumptive use management goal in this area is to provide the greatest opportunity to participate in sheep hunting. This population grew throughout the 1980s, declined during the early 1990s, and appeared to be stable or growing slowly during 1994-1998. Unfavorable winter weather occurred in 1999 and 2000, and lamb recruitment was low. The number of legal rams increased during 2001-2005 due to favorable weather conditions in the mid 1990s, but declined in 2006-2008. This area receives some of the highest harvest in the state; 131-152 rams per year during 2002-2006. In 2007 and 2008, harvest was lower with 128 and 118 rams harvested.

Sheep in the TMA exist at low to moderate densities but produce large-horned rams. This population grew during the 1980s until 1992. Due to adverse weather, the sheep population declined during 1992 and 1993. Weather conditions were mild to average from 1994 to 1998, and based on lamb and yearling survival data, the population increased slowly. Winters 1999-2000 and 2000-2001 had greater than average snow depths and lamb survival was low. During 2001-2004, mild winters and moderate snow depth allowed good lamb production and recruitment. The number of legal rams increased between 2001 and 2004 due to favorable weather conditions in the mid 1990s and good survival of rams to 7-8 years of age. During winter 2004-2005, portions of the TMA experienced deep snow with layers of ice from early winter rains, resulting in die-offs in the eastern portions. Mild weather during winters 2005-2006 to 2008-2009 allowed good lamb recruitment. Currently, the TMA supports an adequate number of legal rams to meet management objectives and ADF&G plans to maintain the number of permits at 101.

The TMA is designated for trophy sheep management. The primary consumptive use goal is to provide the opportunity to pursue large-horned trophy rams under uncrowded hunting conditions. This goal is attained through a limited number of drawing permits. Maintaining low hunter density has increased the number of large trophy rams and

created high quality hunting experiences. All harvest objectives were met in the TMA during 2003–2007. In 2008, all harvest objectives were met except the percentage of harvested rams with horns 40-inch or greater. The objective is to maintain an average of 7–10% harvested rams with 40-inch or greater horns. In 2008, five percent of rams harvested had horns 40-inches or greater. Harvest increased and exceeded the harvest objective, of 30–45 rams annually, three times in the mid to late 1990s, but has remained within the harvest objectives since the number of permits was reduced to 100 in 2002. The TMA permit is the most sought-after sheep permit in the state, with over 4,500 applicants applying for DS102 and DS103 permits in 2009.

The Tanana Hills sheep population occurs at low density and is disjunct due to the physical geography of the Tanana Hills, which is atypical sheep habitat. The Tanana Hills were not glaciated during the most recent glacial advance and underwent little uplift. Overall elevations are low, and the range has a rolling rather than rugged physiography. The sheep population has remained at low densities, but maintains enough legal rams to provide adequate opportunity for hunters who access the area from a few small landing strips. The management objective is for uncrowded hunting conditions. Most of this area is very difficult to access, and due to sheep distribution, is very difficult to hunt. The portion of the area accessible from the Taylor Highway was designated the Glacier Mountain Controlled Use Area, and the most accessible fly-in area (Mount Harper) is managed by drawing permit. Annual harvest has ranged from 3 to 10 full-curl rams annually during the 2002–2008 seasons, and the management objective is being met.

MANAGEMENT ACTIVITIES: Status of the sheep population and quality of hunting experience in Units 12 and 20E are evaluated by analyses of harvest reports, periodic aerial and mineral lick surveys and interviews with area guides and hunters. During 2008 and 2009, aerial surveys were conducted in portions of the TMA and in 2009, surveys were conducted in the portion of the Mentasta Mountains, in central Unit 12. During the 2004–2009 seasons, 45–66 rams were sealed annually in the Tok ADF&G office.

ISSUES: There are currently no biological issues with the sheep populations in Units 12 and 20E.

SMALL GAME

STATUS: The status of the small game populations in Units 12 and 20E are not rigorously monitored. Most information is collected from incidental sightings made during surveys for other animals and from discussions with hunters, trappers, hikers, and other outdoors enthusiasts. Overall, it appears that the 3 grouse species (spruce, ruffed and sharp-tailed) and ptarmigan increased during 2003–2006, but declined during 2007–2009. Hares increased between 2003 and 2008, but appear to be declining in portions of Units 12 and 20E in 2009.

MANAGEMENT ACTIVITIES: We continue to survey area hunters, trappers, hikers and other outdoors enthusiasts concerning numbers and locations of grouse, ptarmigan and hares.

ISSUES: No biological concerns currently exist for small game populations in Units 12 and 20E.

WOLVES

STATUS: The wolf population in Unit 20E numbered at least 227–238 wolves in 1996. The population remained relatively stable between fall 1997 and fall 1998, but declined slightly by fall 1999 due to a combination of nonlethal wolf control and public trapping. The wolf population increased slightly during 2000, except in western and central Unit 20E where effects of nonlethal wolf control continued. By 2004, most of the effects of the nonlethal control program had subsided as the sterilized pairs died and their territories were overtaken by unsterilized wolves. Recovery of sterilized packs, increased numbers of Fortymile caribou throughout most of Unit 20E, and increased numbers of wintering Nelchina caribou in southern Unit 20E resulted in an overall increase in the number of wolves in Unit 20E during 2001–2004. The Unit 20E wolf population was estimated to be 250–310 wolves in August 2004.

Models indicate the current estimated population in Unit 20E is below 2004 levels, primarily due to ongoing lethal wolf control and an increase in efforts by several trappers in southcentral Unit 20E during 2005–2008.

Historically, the Unit 20E wolf population has been lightly harvested. The fur market primarily affects wolf trapping intensity. Most wolf harvest in northwestern Unit 12 and southern Unit 20E is associated with the predator control program and efforts of 3–4 area trappers, while traditional trapping efforts are the primary source of human harvest in the remainder of these units. Demand for wolf pelts has been moderate to low during the past few years, resulting in light trapper efforts for wolves. Most wolves trapped in these units were taken incidental to other furbearer species and harvest by trappers remains moderate to low.

Unit 12 wolf numbers increased by an estimated 27% between 1988 and 1992 in response to increased food base as the Nelchina caribou herd wintered within the unit. Autumn pack size and number of packs increased, indicating improved recruitment and possibly adult survival. The population appeared to decline in 1993 following an estimated 36% harvest rate and remained stable until 1995 due to moderate harvest rates. Area trappers selected for wolves during this period because wolf pelt prices were high. Fur prices declined during 1995–2008 and wolf trapping declined. During this period, wolf numbers increased by an estimated 33% to 245–260 wolves in fall 2002. No further estimate has been developed, but with light harvest and a similar food base as in 2002, the current population is likely similar to 2002 levels except within the portion of northern Unit 12 included in the Upper Yukon–Tanana Predation Control Program. The current wolf population estimate is under development, but the preliminary estimate is 250–350 wolves within the 18,750-mi² Upper Yukon–Tanana Predation Control Program control area in Unit 20E and northern Unit 12. This estimate will be further refined prior to the March 2010 Board of Game meeting.

MANAGEMENT/RESEARCH ACTIVITIES: Population trends are monitored by aerial surveys and hunter and trapper reports in both Units 12 and 20E, and by predator control permittees in the Upper Yukon–Tanana Predation Control Program. Harvest is monitored from mandatory sealing and harvest reporting in both units and by closely monitoring wolves killed in the predator control program. In addition, ADF&G personnel conducted aerial wolf control from helicopters in March of 2009, resulting in 84 wolves killed within the Upper Yukon–Tanana Wolf Predation Control Area, 38 of which were killed in Units 12 and 20E.

ISSUES: Lethal wolf control within the Upper Yukon–Tanana Predation Control Area in Unit 20E and a portion of Unit 12 continues to be monitored and evaluated by Tok ADF&G staff. A report on the status of the wolf control program will be provided to the board at this meeting.

GAME MANAGEMENT UNIT 20D

DELTA JUNCTION AREA OFFICE

Area Biologist: Steve DuBois
Seasonal Wildlife Technician IV:
(Manager, Delta Junction Bison Range): Ron Riesgaard
Seasonal Fish and Wildlife Technician III (Public Information):
Dave Davenport

DESCRIPTION

Game Management Unit 20D is located in the mid-Tanana River Valley of Interior Alaska, approximately 100 miles east of Fairbanks, and is approximately 5,633 mi². Most land is in state or private ownership, with some federal land in the Ft. Greely Military Reservation and Ft. Wainwright Donnelly Training Area.

The Tanana River bisects Unit 20D into southern and northern portions (Fig. 1). Both the Richardson and Alaska Highways pass through southern Unit 20D, along with numerous other roads and trails. The Richardson Highway traverses the western portion of northern Unit 20D, otherwise there is no road access.

South of the Tanana River, Unit 20D consists of the lowlands of the Tanana River valley and the foothills and mountains of the eastern Alaska Range. North of the Tanana River the unit consists of lowlands along several major rivers and the uplands of the Tanana Hills.

Communities in Unit 20D (Fig. 1) and their approximate populations include the following:

- Delta Junction (840)
- Big Delta, Deltana area (2,320)
- Ft. Greely Military Reservation (500)
- Dry Creek (100)
- Dot Lake (80)
- Healy Lake (25)

Special use areas in Unit 20D (Fig. 2) include the following:

- Delta Junction Bison Range (DJBR): The DJBR is 90,000 acres located in southern Unit 20D, east of Delta Junction. It was created in 1979 by the Alaska Legislature to perpetuate free-ranging bison and diminish bison damage to private agricultural crops. ADF&G produces bison forage on 2,700 acres of the DJBR to attract the Delta bison

herd away from private agricultural land. ADF&G is the primary land manager for the DJBR, which is managed as a multiple use area for activities ranging from hunting and fishing to timber sales and watershed protection. The DJBR is successfully reducing bison damage to private agricultural crops by delaying fall bison migration to private lands. However, it is not completely reducing crop damage and work is continuing to improve its efficacy.

- **Bison Range Youth Hunt Management Area (BRYHMA):** The BRYHMA is 6,380 acres located within the DJBR boundaries and encompasses the two DJBR fields of bison forage. The BRYHMA was created in 2002 to improve ADF&G's ability to meet DJBR legislative mandates and goals and objectives of the Delta Bison Management Plan by: 1) reducing the number of moose hunters in DJBR fields thus reducing the level of human activity and disturbance to bison in the DJBR fields prior to and during the moose hunting season, 2) reducing damage to bison forage crops by large numbers of moose hunters, and 3) providing a safer work site for ADF&G staff conducting DJBR field operations during the moose hunting season by reducing the threat of a hunting accident. The BRYHMA is meeting all of its objectives by reducing moose hunting activity via a drawing permit youth hunt. A secondary benefit of the hunt is to introduce a limited number of youth to moose hunting.
- **Delta Controlled Use Area (DCUA):** The DCUA was created in 1971 and encompasses 1,680 mi² primarily in southern Unit 20D with smaller portions in Units 13B and 20A. It was established to meet sheep hunter demand for uncrowded hunting conditions and for a walk-in hunting opportunity free of motorized vehicles. The goals are met by conducting 2 drawing permits hunts. The first hunt is August 10–25 with no motorized vehicles. The second hunt is August 26–September 20 with unrestricted access. Seventy-five permits are issued for each hunt.
- **Delta Junction Management Area (DJMA):** The DJMA is a 278-mi² area surrounding Delta Junction that was created as a moose hunting closed area in 1974 at the request of the Delta Fish and Game Advisory Committee. The area was reduced in size in 1991. Hunting was reestablished in the DJMA in 1996 with a drawing limited to 5 permits and in 1997 the number of permits was increased to 10. The Delta Advisory Committee is satisfied with current DJMA management.
- **Macomb Plateau Controlled Use Area (MPCUA):** The MPCUA covers 304 mi² in southeast Unit 20D and was created in 1974 to protect a small area of critical caribou habitat on the Macomb Plateau for the small Macomb caribou herd and to regulate hunting. MPCUA regulations restrict motorized vehicles from the area during August 10–September 30. The Macomb Plateau is the core calving grounds for the Macomb caribou herd and the MPCUA is successfully meeting its objective to protect important caribou habitat and to help provide a sustainable harvest for this small road-accessible herd.

Communities in Unit 20D are represented by two Fish and Game Advisory Committees. Delta Junction, Dry Creek, and Ft. Greely are represented by the Delta Fish and Game Advisory Committee. Dot Lake and Healy Lake are represented by the Upper Tanana–Fortymile Fish and Game Advisory Committee.

BISON

STATUS: Bison utilize the southwestern portion of Unit 20D with summer range including federal land on the Ft. Wainwright Donnelly Training Area and winter range primarily on private agricultural land and state land in the DJBR. The Delta bison herd numbered approximately 435 bison in fall 2009.

The Delta bison herd is managed based on goals and objectives in a 5-year management plan that was developed with public input from the Delta Bison Working Group and approved by the Board of Game. Management goals include maintaining a healthy, free-ranging herd; reducing conflicts between bison and the public; and providing the greatest opportunity to hunt and view bison. The Department began a planning process in winter 2008 to update the Delta Bison Management Plan. As recently as December 2009, the Delta Bison Working group had reached consensus on several recommendations to the department, however, there was no consensus on a herd size recommendation at that time. There was agreement that the a permanent solution to bison-agricultural conflicts was fencing, and although the Working Group discussed several fencing options, no consensus or recommendation was made.

The Delta bison hunt is one of the most popular permit drawing hunts in the state, with approximately 15,000 people applying in recent years for about 60–155 permits. Hunters must complete a mandatory orientation to learn how to identify bulls and cows, to review land status, and to be informed about other issues. The required orientation was placed online for the 2009 hunting season. The hunting season opens July 20, but actual hunting does not begin until October 1 when local farmers have completed the fall harvest. The July opening date is to allow the Department to use hunting as a tool to reduce bison damage in agricultural areas if necessary. The season closes March 31. The bag limit is 1 bison every 10 years.

MANAGEMENT ACTIVITIES: We conduct aerial population estimates annually to determine herd size. Ground-based sex and age composition surveys are used to determine herd composition. Active radio collars are kept on 8–12 bison to facilitate locating the herd for surveys. A drawing permit hunt is conducted to manage herd size. Most years we conduct a serologic survey of hunter-killed bison to allow monitoring of the herd's exposure to livestock diseases. Tissue and blood samples are collected to investigate genetic diversity.

Bison forage is managed on the DJBR to attract bison away from private agricultural land until fall harvest of crops is completed. Forage management activities include planting annual crops, managing perennial crops, prescribed fires, controlling noxious vegetation, and providing water and mineral supplements for bison.

ISSUES: The highest priority long-term bison management issue is to prevent bison damage to private agricultural crops while maintaining a free-ranging bison herd. This task is accomplished by managing the DJBR to produce bison forage to attract bison

away from private land and maintaining herd size by hunting. The DJBR delays bison movement onto private agricultural lands but does not prevent it. In recent years, bison have moved onto agricultural lands approximately mid-August.

Other bison management issues include 1) cooperating with U.S. Army planners to minimize impacts to critical bison range as the Army expands training facilities on the Ft. Wainwright portion of the bison herd's summer range along the Delta River, 2) dealing with bison delaying their spring migration from private agricultural lands to their Delta River calving grounds; if substantial numbers of bison show a tendency for a delayed migration, it may be desirable to harvest them to eliminate those bison that may develop a year-round use of private agricultural lands, 3) managing the bison hunt in a manner that retains hunter access to private land to ensure long-term success at managing the bison population through hunting, 4) working with owners of domestic bison to reduce the chance of domestic bison escaping and joining the wild herd, 5) cooperating with State agencies and livestock owners to prevent the transfer of livestock diseases to bison when they have close contact, and 7) cooperating with the National Resource Conservation Service to develop flood control on the DJBR to protect downstream fisheries.

BLACK BEAR

STATUS: Accurate estimates of black bear population size and trends are not available for Unit 20D due to the difficulty of enumerating black bears. However, black bears appear to be numerous in the forested portions of the unit. A Unit 20D black bear population estimate was extrapolated using research data from adjacent Unit 20A and resulted in a Unit 20D estimate of 750. Hunting black bears is popular in Unit 20D, and bait stations are commonly used in the spring. The current hunting season is open year-round with a bag limit of 3 bears/year. Harvest averages about 17 bears/year.

MANAGEMENT ACTIVITIES: Harvest is monitored by harvest tickets and requiring black bear hunters to have their bears sealed and bait stations registered. A few bears become nuisance problems around Delta Junction, and staff is commonly asked to resolve the resulting problems.

ISSUES: No current black bear issues.

GRIZZLY BEAR

STATUS: Accurate estimates of grizzly bear population size and trends are not available for Unit 20D because it is difficult to survey them. A Unit 20D grizzly bear population estimate has been extrapolated using research data from adjacent and similar portions of Units 20A and 20E. This calculation produced a Unit 20D population estimate of 181–210 bears.

As part of the Unit 20D intensive management program, the Board of Game adopted an annual harvest goal of 5–15 grizzly bears/year and liberalized seasons and bag limits. No population size goal has been established.

Since intensive management was adopted for Unit 20D in 1995, the grizzly bear hunting season and bag limit has been liberalized to August 10–June 30 with a bag limit of one bear/year and no resident tag fee.

Prior to implementation of intensive management in Unit 20D, grizzly bear mortality averaged 8 bears/year. Grizzly bear mortality increased after hunting regulations were liberalized. Mortality (hunting, defense of life and property, nuisance bears killed on a hunting license, etc.) is meeting the Board's goal, with a mean annual kill of 12 bears/year.

MANAGEMENT ACTIVITIES: Harvest is monitored by requiring grizzly bear hunters to have their bears sealed. Occasionally nuisance grizzly bears threaten life and property around Delta Junction and staff is asked to address these issues.

ISSUES: Grizzly bears are an important predator on moose and caribou calves, therefore, their role in the Unit 20D intensive management program should be continually evaluated.

CARIBOU

Macomb Caribou Herd

STATUS: The Macomb caribou herd is small and ranges primarily in the Alaska Range foothills of southern Unit 20D. In the 1980s the herd size was 700–800. Herd size decreased in the early 1990s to a low of 458 in 1993, due to severe summer and winter weather and poor calf survival. Hunting was discontinued in 1992 but resumed in 1997.

In December 1994 the Board determined that human use of the Macomb caribou herd is the preferred use and adopted intensive management for Unit 20D. In March 1995 the Board adopted a Macomb caribou herd population goal of 600–800 caribou with a harvest goal of 30–50/year.

When intensive management was adopted in 1995, the fall herd size was estimated to be 477, with 10 calves:100 cows and 39 bulls:100 cows. In fall 2009, Macomb caribou herd size was meeting the population goal with an estimate of at least 1,000 caribou, and a composition of 26 calves:100 cows and 32 bulls:100 cows.

When intensive management was adopted in 1995, the Macomb caribou hunting season had been closed since 1992 and remained closed through 1996. A registration permit hunt resumed in 1997, and from 1997–2003 harvest averaged 30 caribou/year but the season had to be closed by emergency order most years. Regulatory changes in 2004 resulted in a

registration permit with the current season of August 15–25 and a harvest quota of 25, with motorized access restricted in the MPCUA and DCUA portions of the herds range. As herd size has increased in recent years, the hunting season dates were extended to August 10–27 in 2008, which allows two days of motorized hunting on August 26–27 after Delta Controlled Use Area restrictions end, and the harvest quota was increased to 50 caribou/year which meets the intensive management harvest objective. Harvest the last two years was 48 in 2008 and 56 in 2009.

MANAGEMENT ACTIVITIES: An annual aerial population estimate and composition survey is conducted in the fall. Active radio collars are kept on 8–12 caribou to facilitate locating the herd for population estimates. Harvest is managed by registration permits.

ISSUES: The primary management issue with the Macomb caribou herd is meeting intensive management harvest goals without overharvesting a small, road accessible herd.

FURBEARER

STATUS: Furbearers present in Unit 20D include all species endemic to Interior Alaska. Species of most importance include beaver, coyote, lynx, marten, red fox, and wolverine. Intensive trapping occurs along the road system in southern Unit 20D from a combination of part-time and full-time trappers. Trapping in northern Unit 20D is mostly by commercial trappers. Lynx numbers are high due to an abundance of snowshoe hares.

MANAGEMENT ACTIVITIES: Trappers are required to seal lynx, otter, and wolverine. Harvest data are analyzed. A questionnaire is sent to trappers annually to assess their impression of population trends. An annual snowshoe hare population trend survey is also conducted.

ISSUES: Working with trappers to improve techniques to avoid capturing nontarget species is especially important for inexperienced trappers.

MOOSE

STATUS: Moose are distributed throughout about 4,400 mi² of moose habitat in Unit 20D. The Board of Game has determined that human use of moose is the preferred use and adopted intensive management with a moose population objective of 8,000–10,000 and a harvest objective of 500–700 moose/year. The Unit 20D population estimate was 5,606 (3.0 moose/mi²) south of the Tanana River in 2009 and 2,411 north of the Tanana River in 2004 (0.8 moose/mi²) (corrected for sightability). Preliminary harvest for 2009 was 350 moose, with 76 being cows taken in antlerless moose hunts. The majority of the moose and harvest occur in southern Unit 20D.

Antlerless moose hunting was initiated in southwestern Unit 20D when southern Unit 20D was estimated to have 7,406 moose (3.9 moose/mi²) in fall 2006. Density of moose

was highest west of the Johnson River and estimated at 5.6 moose/mi². Moose calf survival was 41 calves:100 cows in fall 2006 and the bull:cow ratio was 21:100. An abundance of good habitat has been created in southwest Unit 20D in the last 15–30 years from land clearing and several large wildfires which produced an abundance of high quality moose forage, thus stimulating growth in the moose population. Moose browse surveys conducted in spring 2007 indicated that moose were removing 25% of the current annual growth over the winter. Moose twinning rates were moderately low at 24% for the previous two years. Consequently, antlerless moose hunts for cows without calves were initiated in southwest Unit 20D from 2006–2009. The area was subdivided into three hunt zones which have been managed with a combination of drawing and registration permit hunts. No antlerless moose hunts are planned for 2010.

The general hunting season in southern Unit 20D is currently September 1–15, with a bag limit east of the Johnson River of 1 bull and a bag limit west of the Johnson River of one bull with spike/fork or 50-inch antlers or at least 4 brow tines on one side. A 278-mi² area surrounding Delta Junction is managed as the DJMA where hunting is by drawing permit, with a maximum of 30 permits authorized. Ten drawing permits are also issued for a 6,380-acre portion of the DJBR that is managed as the Bison Range Youth Hunt Management Area (BRYHMA) to reduce disturbance from moose hunters to the Delta bison herd and DJBR management activities. Each BRYHMA hunter is assigned a 4-day hunt period centered on the first 3 weekends in September. The bag limit is one per lifetime for 1 bull with spike/fork or 50-inch antlers or at least 4 brow tines on one side, or 1 cow without a calf.

Northern Unit 20D was estimated to have 2,411 moose (0.8 moose/mi²) in fall 2004, which was the last population estimate for this area. Moose calf survival was 31 calves: 100 cows and the bull:cow ratio was 47:100. Large wildfires burned in northern Unit 20D in 2003 and 2004 and the number of moose in this area will likely be increasing in the future, providing increased harvest. Access for hunters is good along the Richardson Highway and several major rivers, but poor away from them. The general hunting season is September 1–15 for one bull west of the Volkmar River drainage and September 1–20 from the Volkmar River drainage east. During the 2009 hunting season, 259 hunters reported killing 82 moose in northern Unit 20D. The Healy River drainage has an additional hunting season of August 15–28 for a bull with spike-fork antlers to allow residents of Healy Lake village additional opportunity to harvest moose to meet their community needs before the waterfowl hunting season opens in the area.

MANAGEMENT ACTIVITIES: Annual aerial surveys are used to estimate population size and composition. Aerial twinning surveys are flown in the spring to estimate twinning rates in southwest Unit 20D where moose densities are highest. A research project was begun in southwest Unit 20D in October 2009 during which approximately 90 moose will be radiocollared allowing collection of data on moose movements in relation to surveys, weights of short yearlings, and sightability of moose in Unit 20D during aerial surveys. Periodic evaluations of browse use are conducted in southwest Unit 20D. Public meetings are held to gather public comments about moose management and

regulations. Signs are posted along the road system to help hunters with moose hunting regulations. Assisting the public with nuisance moose around Delta Junction is common in fall and winter. Coordinating wildfire activities with Alaska Division of Forestry to help improve moose habitat also occurs.

ISSUES: The primary issue is managing a high density moose population in southern Unit 20D west of the Johnson River, while much of the excellent habitat created in the last 30 years is aging and will decline in quality in coming years. Therefore, antlerless moose hunts have been conducted in this area as part of the intensive management program, and additional hunts will likely be conducted in the future. An antlerless moose hunt will also help meet the harvest objective. There is some hunter dissatisfaction with the antler restriction regulations in southwest Unit 20D.

SHEEP

Eastern Alaska Range: Delta Controlled Use Area

STATUS: The Delta Controlled Use Area (DCUA) is 1,495 mi² in Units 20D, 13B, and 20A. It was established in 1971 to provide a walk-in hunting opportunity and uncrowded conditions for Dall sheep hunters. Objectives for the DCUA are to manage for a population of 1,800 sheep, with a mean annual harvest of 35 full-curl rams with a mean horn length of 36 inches and mean age exceeding 8 years.

The Dall sheep population in the DCUA was estimated at 1,674 sheep in 2008 and 2009 which is below the population objective. The DCUA hunt is split into two drawing permit hunts. The first season, during August 10–25 is for nonmotorized access. The second season, during August 26–September 20 allows motorized access. Seventy-five permits are issued for each season. Hunters have killed an average of 52 sheep/year the last 3 years, exceeding the harvest objective.

MANAGEMENT ACTIVITIES: Two drawing permit hunts are administered for Dall sheep hunters in the DCUA. A questionnaire is mailed to all permit recipients periodically to assess hunter satisfaction with management goals and objectives.

ISSUES: Protecting Dall sheep habitat from development and preventing the transmission of diseases from livestock to the Dall sheep population are the primary issues.

Mt. Harper–Goodpaster River

STATUS: The Mt. Harper–Goodpaster River sheep population in northern Unit 20D is a small population that occupies about 240 mi² of sheep habitat in the Tanana Hills on the boundaries of Unit 20D with Unit 20B on the north and Unit 20E on the west. These sheep comprise several small subpopulations that persist at low density, separated by areas of unsuitable habitat because the physical geography of the area provides relatively

low-quality Dall sheep habitat. Hunting this area is limited by issuing only four drawing permits annually for one ram with full-curl horns or larger. Only one sheep has been killed by hunters in the last three years. During June 2009, 108 sheep were counted during aerial surveys with 34 lambs: 100 ewe-like sheep and 74 rams: 100 ewe-like sheep.

MANAGEMENT ACTIVITIES: Aerial surveys are flown to collect data on the number of sheep and their sex and age composition. Hunting is regulated in most of the area by drawing permit, and harvest outside of the drawing permit area is monitored by harvest tickets.

ISSUES: Managing a sustainable harvest for this small population of sheep.

SMALL GAME

STATUS: Small game species of most importance include ruffed grouse, sharp-tailed grouse, spruce grouse, and snowshoe hares. Unit 20D is a popular small game hunting destination for grouse hunters from throughout the state. Although ptarmigan are present they are of lesser importance. Development of the private agricultural lands and recent wildfires in southern Unit 20D have improved habitat for ruffed and sharp-tailed grouse.

MANAGEMENT ACTIVITIES: Periodically, we conduct ruffed grouse drumming counts and visit sharp-tailed grouse dancing grounds to estimate population trends. A ruffed grouse habitat management area is being developed on the DJBR and other locations are being investigated for habitat projects.

ISSUES: Developing habitat improvement techniques for ruffed and sharp-tailed grouse to replace the natural wildfire regime in southern Unit 20D is an important issue.

WOLF

STATUS: Wolves are present throughout Unit 20D. The fall 2008 population estimate was 117 wolves in 12 packs. Sixty-five wolves were taken during winter 2008–2009 through a combination of trapping and aerial shooting as part of the Upper Yukon–Tanana predation control program to benefit the Fortymile caribou herd. The resulting spring 2009 population was estimated to be 52 wolves.

The Board of Game has determined that human consumption of moose and caribou is the preferred use for these species and has implemented intensive management in Unit 20D. In March 1995, the Board of Game established a population goal of 15–125 wolves in Unit 20D. The broad range was necessary to allow temporary reduction of the wolf population to low levels if needed to stimulate prey population increases. The Board also extended the wolf trapping season. In October 1995, the Board adopted a wolf predation control implementation plan for Unit 20D which was in effect until July 1, 2009.

The current wolf hunting season is August 10–April 30 with a bag limit of 5 wolves. The trapping season is October 15–April 30 with no bag limit. Harvest of wolves varies annually and has averaged 47 wolves/year during the last 3 years, with most being taken by trapping.

MANAGEMENT ACTIVITIES: Trappers and hunters are required to have wolves sealed to monitor harvest. Population size is estimated from aerial surveys and from trapper interviews.

ISSUES: Wolves are an important predator on moose and caribou and thus their role in the Unit 20D intensive management program and in the Fortymile Caribou Recovery Program will be monitored closely.

OTHER ISSUES

Forestry: Delta staff cooperates with Alaska Division of Forestry to implement timber sales, wildland fire policies and wildfire management practices to benefit wildlife to improve wildlife habitat.

Mining: A major gold mine, the Pogo Mine, has been developed in the Goodpaster River drainage of northern Unit 20D. Road access has been developed to the mine in this previously roadless area. Although the road is currently closed to the public, some hunters have been using it primarily to hunt Fortymile caribou. Department staff will monitor the improved access into this roadless area and any changes in wildlife resource use that may result.

Big Game Ranching: Interest in big game ranching is increasing in the Delta Junction area, with bison, elk, yak, and reindeer currently being raised in the area. Minimizing the potential negative impacts of big game ranching on wildlife populations is important.

Domestic Livestock Production: Domestic livestock being raised in the Delta Junction area include cattle, horses, sheep, and hogs, with smaller numbers of other livestock such as goats and domestic fowl. These domestic livestock come into close contact with various wildlife species including moose, bison, foxes, coyotes, ravens. There is a great potential for the transmission of domestic livestock diseases to wildlife.

Military Activity: The National Missile Defense Site is being developed on Ft. Greely Military Reservation, and the Army is developing a Stryker force training area on the Ft. Wainwright Donnelly Training area. The influx of people associated with these projects will place an increasing demand on wildlife resources. Continuing expansion of military training facilities is encroaching on wildlife resources and particularly bison migratory routes. Ft. Greely currently is located within an area of high quality moose habitat with a high density of moose. Ft. Greely staff refuses to close many security gates and moose that enter the compound through open gates have a high mortality rate probably due to dehydration.

Enforcement: There is a perception by the public that the influx of people into the Delta Junction area is resulting in a high level of moose and bison poaching.



Game Management Unit 20D

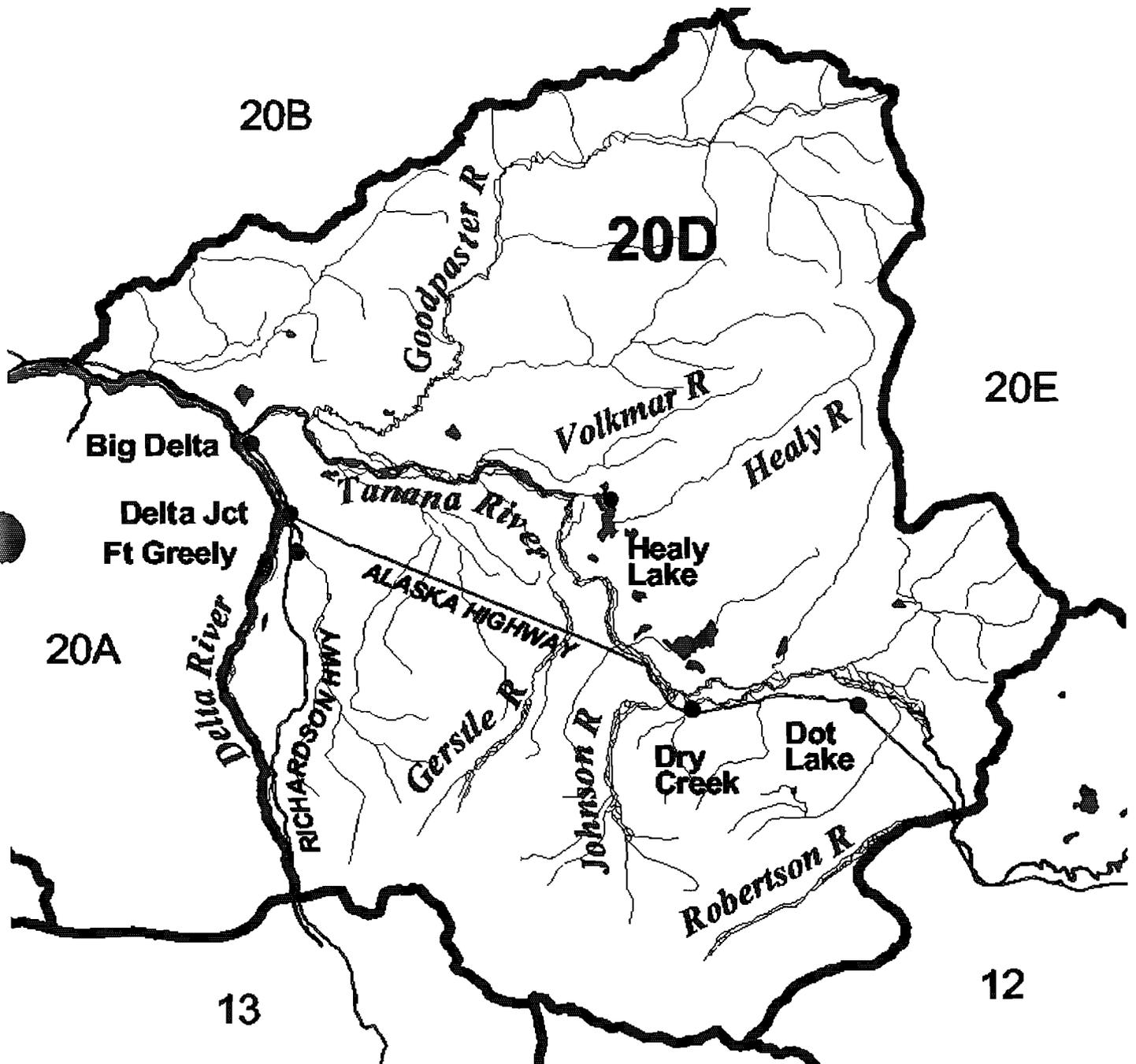


Figure 1. Game Management Unit 20D.



GMU 20D Special Use Areas

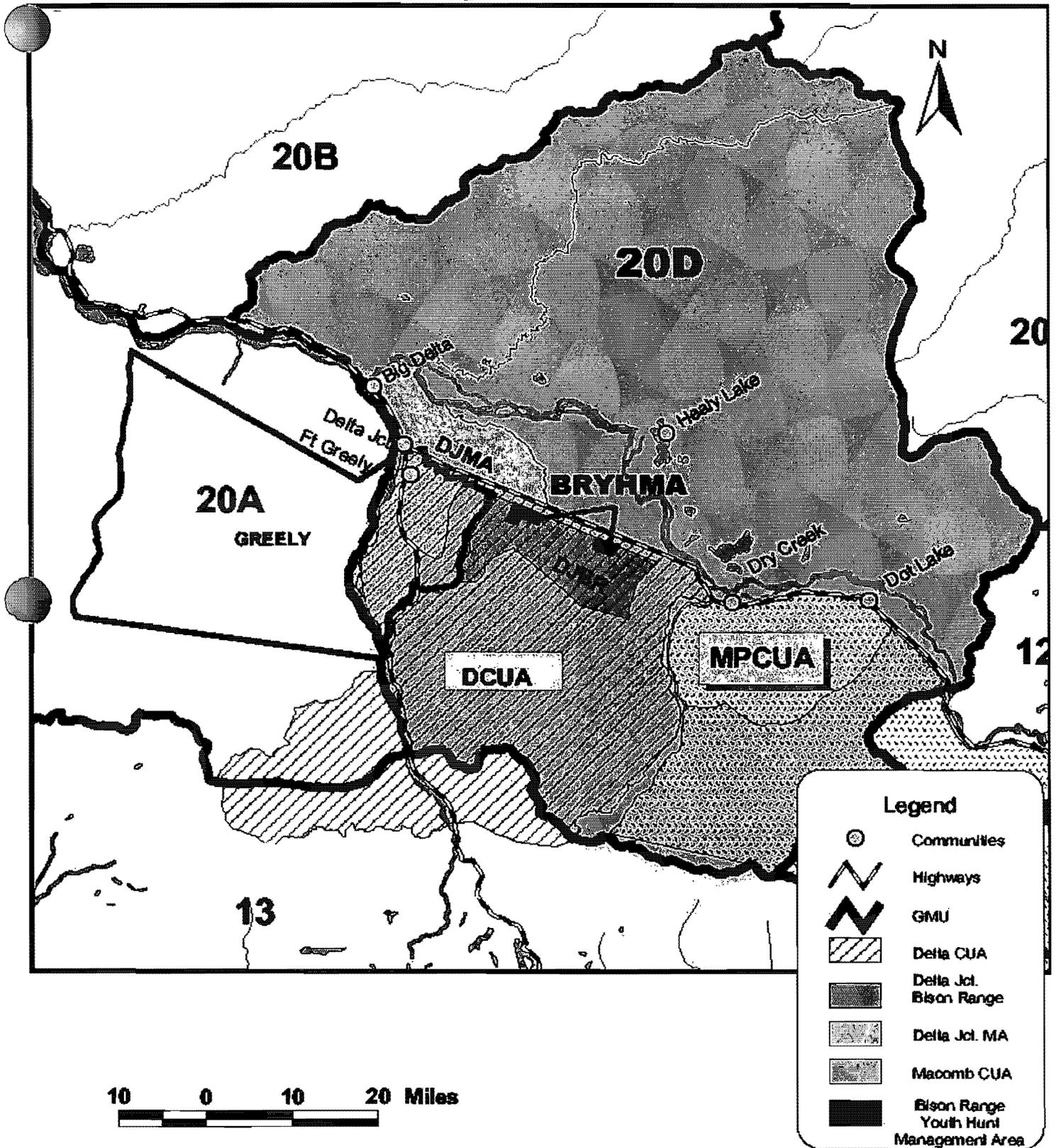


Figure 2. Game Management Unit 20D special use areas.



GAME MANAGEMENT UNITS 20A, 20B, 20C, 20F AND 25C

FAIRBANKS AREA OFFICE

Area Biologist: Don Young
Assistant Area Biologists: Tom Seaton, Tony Hollis

DESCRIPTION

The Fairbanks Area includes approximately 40,000 mi² in central Interior Alaska. The area is roughly bordered by the Yukon River and Ray Mountains on the north and the Alaska Range to the south. It includes the Tanana drainages as far east as the Salcha and Delta Rivers, and Tanana and Yukon drainages as far west as the Tozitna and Cosna Rivers. Game Management Unit 20C, and large portions of Units 20F and 25C are remote, roadless areas. Units 20A and 20B surround Fairbanks and include neighboring communities linked by the road system.

Communities (approximate size)

Healy-Ferry-Lignite-McKinley Park (1200)
Anderson (500)
Central (125)
Nenana (500)
Fairbanks North Star Borough (95,000)
Manly Hot Springs (75)
Rampart (50)
Minto (250)
Tanana (300)

Conservation Units

Administered by Bureau of Land Management

Steese National Conservation Area

White Mountains National Recreation Area

Administered by the National Park Service

Denali National Park and Preserve

Administered by the Alaska Department of Fish and Game

Minto Flats State Game Refuge

Creamers Field Migratory Waterfowl Refuge

Active Advisory Committees

Tanana–Rampart–Manley

Fairbanks

Minto–Nenana

Middle Nenana River

Central

Special Areas

<u>Unit</u>	<u>Areas</u>	<u>Restriction</u>	<u>When Enacted</u>	<u>Purpose</u>	<u>Meeting Objectives</u>
20A, 20D	Delta CUA ¹	No motorized vehicles or pack animals for big game hunting ²	1971	Provide for aesthetically pleasing hunt conditions	Yes
20A	Wood River CUA ¹	No motorized vehicles except aircraft for big game ³	1976	Address conflicts between ATV and airplane/horse hunters	Yes
20A	Yanert CUA ¹	No motorized vehicles except aircraft for big game	1973	Address conflicts between ATV and airplane/horse hunters	Yes
20A	Ferry Trail MA ⁴	Caribou hunting by permit; antler restrictions for moose hunting	1990	Address caribou/moose management issues	Yes
20A	Healy-Lignite MA ⁴	Hunting by bow and arrow only	1990	Address safety concerns (closed 1973 – 1989)	Yes
20A	Stampede CA ⁵	Closed to the taking of wolves	2001	Address conflicts between wolf viewers and trappers	?
20A	Nenana Canyon CA ⁵	Closed to the taking of wolves	2003	Address conflicts between wolf viewers and trappers	?
20B	Minto Flats MA ⁴	Moose hunting by permit; No aircraft or airboats for moose hunting; no aircraft for beaver trapping prior to March 1.	1979 1996	Address moose management and user conflict issues	Yes
20B	Fairbanks MA ⁴	Moose hunting by bow and arrow only	1982	Address moose management issues	Yes
20B	Creamer's Field MWR ⁶	Hunting and trapping by registration only	1966	Address management issues	Yes

20B	Lost Lake CA	Closed to taking of big game w/ firearms and crossbows within 1/2 mile of lake	≤1962	Address safety concerns	Yes
20B	Birch Lake CA	Closed to taking of big game within 1/2 mile of lake	≤1962	Address safety concerns	Yes
20B	Harding Lake CA	Closed to taking of big game within 1/2 mile of lake	≤1962	Address safety concerns	Yes

¹CUA = Controlled Use Area

²Aug. 5–Aug. 25

³Aug. 1–Sep. 30

⁴MA = Management Area

⁵CA = Closed Area

⁶MWR = Migratory Waterfowl Refuge

BLACK BEAR

STATUS: Black bears are common in all units. Harvest peaked in the late 1990s, but has since shown moderate declines. Average annual harvest rates are below the estimated maximum sustainable exploitation rate in all units, except possibly the central portion of Unit 20B. We do not believe the high harvest of black bears in central Unit 20B is of biological concern because surrounding units receive relatively little hunting pressure and provide reservoir areas that serve to repopulate potentially over-harvested areas. The continued high harvest of black bears in the heavily hunted central Unit 20B supports this hypothesis. Spring bear hunting at bait stations is especially popular in Unit 20B. High hunter effort and harvest near Fairbanks likely reduces black bears nuisance problems.

MANAGEMENT ACTIVITIES: Bait station registration, sealing, tooth aging, and responding to complaints about nuisance bears are the primary management activities. Sealing data provides the sex and age composition and location of harvest.

ISSUES: Regulations requiring the salvage of the hide and meat have been the subject of many proposals in recent years. Arguments generally revolve around the palatability of black bear meat during the fall when bears feed on fish. This concern does not pertain to black bears in the Interior, where they generally do not feed on fish. Another issue involves conflicts between bear baiters and the general public, particularly landowners in areas surrounding Fairbanks. Bear baiting has also become an issue within the Chena Recreation Area (CRA) where the CRA Citizens Advisory Board has lobbied Fish and Game to eliminate bear baiting in the CRA due to perceived conflicts. This issue is currently being addressed through education (i.e., bear baiting clinics required prior to registering a bait station) and, within the CRA, by working cooperatively with Department of Natural Resources, Parks and Recreation Division, CRA staff.

GRIZZLY BEAR

STATUS: Grizzly bears are present in all units, but are most numerous in the mountainous portions of Units 20A and 20C followed by the higher elevations in Units 20B, 20F and 25C. Harvest is generally low except for portions of Units 20A and 20B. High harvests resulted in reduced numbers of bears in Unit 20A during the 1980s. We estimated that the grizzly bear population had recovered by 2000 following a reduction in season length (10 September–31 May) beginning in regulatory year 1994 (RY94; RY begins 1 July and ends 30 June, e.g., RY94 = 1 July 1994 through 30 June 1995). The season was increased by 5 days in RY02 (5 September–31 May) and the bag limit liberalized in RY04 from 1 bear every 4 years to 1 bear every year.

MANAGEMENT ACTIVITIES: Sealing, tooth aging, and responding to complaints about nuisance bears are the primary management activities. Sealing data provides sex and age composition and location of the harvest.

ISSUES: Management issues typically relate to tag fees and season length, especially in Unit 20A, where predator management remains an issue because of Intensive Management. Generally, hunters feel that grizzly bears tag fees should be waived and seasons further liberalized to reduce predation on ungulates.

CARIBOU

DELTA CARIBOU HERD

STATUS: This herd declined dramatically in the early 1990s from about 11,000 to 4,000 caribou, prompting closure of a popular hunting season and implementation of a ground-based wolf control program (1993–1995). After termination of the wolf control program, the herd continued to decline slowly to an estimated 2000 caribou in 2005. Herd size is currently estimated at approximately 3000 animals. The Board authorized a small drawing permit hunt (up to 100 permits) for bull caribou in 1996. Bull:cow ratios remain high and large bull:cow ratios continue to exceed objectives. Between 1996 and 2003, annual harvest averaged 35 bulls (range 22–50). In 2004 the Board authorized up to 150 permits be issued and mean harvest has since increased to 42 (range 25–58; RY04–RY09). Between 2006 and 2010 the Delta herd has been mixing with the Nelchina herd along the western Denali Highway in Unit 13. This presents difficulty in standard population and composition surveys, and puts members of the Delta herd at risk of harvest under the seasons and bag limits of the Nelchina herd.

MANAGEMENT ACTIVITIES: Standard population and composition surveys are conducted annually. A small number of radiocollared animals are maintained to facilitate surveys.

ISSUES: This has long been a very popular caribou hunt. Issues include the number of permits issued in the drawing hunt and the lack of intensive management efforts to

increase the size of the herd. Mixing with the Nelchina herd in Unit 13 puts the Delta herd at risk of overharvest under the seasons and bag limits (State and Federal) for the Nelchina Herd.

WHITE MOUNTAINS CARIBOU HERD

STATUS: This small herd numbers roughly 600 caribou and primarily inhabits western Unit 25C. It receives little harvest because of poor access. The general fall season is limited to bulls, while caribou of either sex may be taken during a winter registration permit hunt (1 Dec–31 Mar). Herd numbers appear stable. Mixing with the Fortymile herd along the Steese Highway during 2000–2001 and again in 2008 has complicated harvest management.

MANAGEMENT ACTIVITIES: Standard population and composition surveys are conducted annually in cooperation with the Bureau of Land Management. A small number of radiocollared animals are maintained to facilitate surveys.

ISSUES: Annual harvest has traditionally been within sustainable limits, and often low. About 20 caribou were taken per year between 1990 and 2007. Harvest rose sharply in 1999–2001 because of the presence of Fortymile herd animals in the White Mountains herd hunt area, and because White Mountains caribou became more accessible due to their distribution. Average annual harvest for these 3 years was 47. Harvest returned to historic levels in 2002–2008.

DENALI CARIBOU HERD

STATUS: This herd currently numbers roughly 2000 animals and primarily inhabits Unit 20C within Denali National Park. The herd was closed to harvest after a decline in the early 1970s and it remains closed even under federal subsistence regulations. Intensive long-term research by the National Park Service and the U.S. Geological Survey enhance the herd's value as a control population for management and research efforts on other Interior herds.

MANAGEMENT ACTIVITIES: The National Park Service and U.S. Geological Survey annually conduct population estimation and composition surveys along with numerous research investigations.

ISSUES: There is local interest in opening the Denali caribou herd to limited harvest of bulls. The department has opposed such a hunt because herd numbers and bull:cow ratios are below management objectives and because of the herd's value as a control population.

FURBEARER

STATUS: Beaver are abundant in the Fairbanks area. Marten numbers appear to be at a moderate level. Hare numbers appeared to have reached their peak in 2009. Lynx

numbers are up, but will likely soon follow the hares in a declining cycle. Marten, lynx, and wolf are the more commercially important species in the Interior. Trapping effort near road-accessible areas is moderately high, but trapline densities are low away from the road system.

MANAGEMENT ACTIVITIES: Sealing provides harvest data for lynx, wolf, wolverine, and otter. Beaver cache surveys are conducted annually in the lower Chena River drainage as part of a management program designed to manage beaver in this area for viewing and education opportunities while minimizing property damage.

ISSUES: Lack of demand for beaver pelts and high beaver survival had increased property damage caused by beaver from flooding and tree cutting along roadways and near residential areas in past years. An extended beaver season since 2004 has alleviated many of those problems and sparked more interest in harvesting beaver in the Fairbanks area.

MOOSE

STATUS: In Unit 20A, moose are found at moderate to high densities (2.5–3 moose/mi²) Liberal antlerless hunts in RY04–RY08 reduced moose densities from an estimated 3.0–3.5 moose/mi² in 2003. Unit 20A has the lowest productivity of any wild moose population studied in North America and, despite reductions in moose densities, improvements in productivity have not yet been observed. Thus, habitat conditions remain a concern as high moose densities over the past decade resulted in heavy browsing. Despite the low productivity, calf survival is relatively high, likely due to high harvest rates of predators. In Unit 20B, moose are found at moderate densities (~2.0 moose/mi²), but densities vary widely from greater than 2 moose/mi² in the Minto Flats Management Area to less than 1 moose/mi² in the eastern portion of the unit. Moose populations in most of Units 20C, 20F, and 25C are low and no trends in population parameters are apparent from harvest data or anecdotal information.

The Fairbanks area accounts for approximately 25–30% of the statewide moose harvest with most (80%) of that harvest coming from Units 20A and 20B. The Board approved the harvest of antlerless moose by drawing permit in portions of Unit 20A and 20B in the mid 1990s and these hunts have been reauthorized annually. In 2002 the Board approved drawing permit hunts for calf moose in Unit 20A to help meet Intensive Management (IM) harvest objectives. In 2004 the Board approved a registration hunt for antlerless moose with a September 1–December 10 season to substantially increase the harvest of female moose to reduce moose numbers from an estimated 16,000 to the IM population objective of 10,000–12,000 moose. The season was extended (Aug. 25–Feb. 28) in 2006 to meet IM objectives, especially in the more remote portions of the unit. Over 1,700 hunters reported hunting for antlerless moose in Unit 20A in RY04, RY05 and RY06. On average, 2,074 hunters harvested 613 antlerless moose RY04–RY06.

Unit 20B is the most heavily hunted unit in the Fairbanks Area during the general hunt, with 2,500–3,000 hunters reporting, followed by Unit 20A with 1,200–1,600 hunters reporting.

MANAGEMENT ACTIVITIES: An intensive moose research project is ongoing in Unit 20A. Population estimation and composition surveys are conducted in Units 20A and 20B on an annual basis. The National Park Service periodically conducts surveys within Denali National Park in Unit 20C. Population estimation surveys were conducted in Unit 25C in 1997 and 2007 with funding from the Bureau of Land Management. In addition, the Bureau of Land Management has radiocollared moose to investigate moose movements and habitat use in Unit 25C.

A large (75,000 acre) prescribed fire has been planned for over 10 years in western Unit 20A to improve wildlife habitat. That project has not been completed due to difficulty in realizing acceptable burning conditions. However, approximately 200,000 acres burned in 2 separate fires in the western and central Tanana Flats in 2001, 120,000 acres in 2006, and 220,000 acres in 2 separate fires in 2009. Therefore, the disposition of the planned 75,000 acre prescribed burn will be reevaluated. We conducted intensive moose surveys of the 2001 Fish Creek and Survey Line fires in 2003 and 2008 as the initial and early phases of monitoring the potential changes in moose density and composition over time. These intensive surveys are planned at 5-year intervals to monitor potential changes in population trends in the burns. Smaller scale habitat improvement projects have been completed in the Fairbanks Area, primarily along Nenana Ridge in Unit 20B to improve ruffed grouse habitat, which also improved moose habitat.

We have conducted browse surveys in various Units in the Interior since 2000. Central Unit 20A showed the highest browse removal rate of any survey area during 2000–2008, indicating that moose in Unit 20A are heavily using their forage resources. Twinning rates and short-yearling calf weights during that period also show that moose in central Unit 20A are experiencing the lowest nutritional level of any moose population we know of in Alaska.

ISSUES: Past regulatory changes in Unit 20A, which were designed to reduce the harvest of bulls to sustainable levels and increase the harvest of cows and calves, have been controversial, but successful. Regulatory changes included a shorter, then longer, general season, unitwide antler restrictions for residents and nonresidents, registration hunts and longer antlerless seasons.

Antlerless moose hunts remain controversial and divisive and public opposition tends to wax and wane. The take of calf moose in antlerless hunts has been a highly volatile issue. During RY04–RY08 thousands of hunters acquired registration permits and hunted antlerless moose in Unit 20A.

The Minto Flats Management Area in Unit 20B is unique in terms of moose management in that a limited registration hunt with an either sex bag limit runs concurrent with a 15-

day, antler-restricted general season. In 2004, the Board rescinded the Tier II hunt that was in place during 1996–2003 and replaced it with the registration hunt. The distribution of permits for the limited registration hunt has been fraught with problems and no solution has yet been identified.

Access restrictions for moose hunting are also controversial. Aircraft and airboats are not permitted for moose hunting in the Minto Flats Management Area. Motorized vehicles other than aircraft are not permitted in the Wood River and Yanert Controlled Use Areas in Unit 20A.

Finally, entry to some military land is prohibited. This is especially controversial in a portion of Unit 20A with excellent moose habitat.

SHEEP

ALASKA RANGE (UNIT 20A)

STATUS: Sheep numbers in Unit 20A declined in the early 1990s from 5,000 to about 2000 sheep, as estimated in an extensive survey in 1994. No clear trend in sheep population dynamics is apparent from subsequent trend area surveys. We believe that productivity has improved and that the population may be increasing. However, data from the small trend area have been variable.

MANAGEMENT ACTIVITIES: A small trend area is surveyed annually in the drainages of the upper West Fork of the Little Delta River, Dry Creek, and Wood River located in the central mountains of Unit 20A.

ISSUES: The primary issue among sheep hunters seems to be the apparent high harvest of sub-legal rams (i.e., primarily 7/8 curl) which lead to the Board adopting regulations to seal sheep horns to curb this apparent illegal harvest. Predator management to enhance sheep populations remains an issue. The department investigated coyote–Dall sheep predator–prey dynamics in the central mountains of Unit 20A and those results are currently being prepared for publication.

TANANA UPLANDS AND WHITE MOUNTAINS

STATUS: Approximately 600–750 sheep are found in relatively isolated areas of suitable habitat. There is no evidence that severe winters of the early 1990s affected the status of sheep in these areas.

MANAGEMENT ACTIVITIES: Trend areas encompassing a large portion of suitable sheep habitat are surveyed annually in conjunction with Bureau of Land Management and U.S. Fish and Wildlife Service.

ISSUES: Horn breakage found in mature rams in portions of the White Mountains is of interest and concern to hunters pursuing sheep there.

WOLF

STATUS: Wolf numbers increased in Unit 20A following a wolf reduction in 1993-1994, and appear to be stable to slightly increasing at moderately high levels. Conversely, wolf numbers began to decline in Denali National Park by 1995 (Unit 20C) following an abrupt increase and peak in numbers concurrent with harsh winters in the early 1990s. Data on wolf abundance in Units 20B, 20F and 25C is lacking, but anecdotal information suggests wolf numbers are stable in these units.

MANAGEMENT ACTIVITIES: Sporadic surveys, including radiotelemetry surveys, incidental observations, and sealing constitute recent management activities. Research in Unit 20A provided considerable information on the status of wolves in that area through 2000. Research on dog lice in wolves is ongoing and radiocollared wolf packs assist in estimating wolf numbers and pack dynamics.

ISSUES: Wolf control continues to be controversial. The Board has identified Unit 20A for Intensive Management. A ground-based wolf control program to reverse the decline of the Delta caribou herd was implemented in 1993, but wolf control was suspended in early 1994. Since then, there have been no intensive management efforts to increase the size of the Delta caribou herd.

SMALL GAME

STATUS: The overall status of small game populations is largely unknown. Anecdotal information and spring hare surveys suggests hare numbers peaked in 2008 or 2009. Based on drumming count surveys at Clear and along the Tanana River near Fairbanks, grouse numbers are currently low and likely at or near the bottom of the cycle. Ptarmigan numbers still appear to be increasing from a long term low. Hunting small game is popular along road-accessible areas.

MANAGEMENT ACTIVITIES: Ruffed grouse drumming counts are conducted annually in Units 20A and 20B. Grouse wings are collected from hunters in the most popular grouse hunting areas. The wings provide an index to annual juvenile recruitment into the grouse populations and proportions of the 3 grouse species in the harvest.

ISSUES: None.

OTHER ISSUES

Other issues potentially affecting wildlife or wildlife users include forestry, fire management, oil and gas exploration in the Minto Flats State Game Refuge and Healy Basin, military activities, Eielson AFB to Ft. Greely railroad extension. As communities

in the area grow and expand, nuisance wildlife management activities and urban wildlife issues are expected to increase.

GAME MANAGEMENT UNITS 21B, 21C, 21D & 24

GALENA AREA OFFICE

Area Biologist: Glenn Stout
Assistant Area Biologist: Tony Hollis
Wildlife Technician: Nate Pamperin

DESCRIPTION

The Galena Area office with management responsibilities for Units 21B, 21C, 21D and 24 (totaling approximately 51,134 mi²) is located in Galena. One Area Management Biologist is currently stationed in Fairbanks, both the Assistant Area Management Biologist and Wildlife Technician, shared with the Regional Office, are also located in Fairbanks. The only road access into the Galena Management Area is the Dalton Highway in Unit 24A. Access to other parts of the area is limited to travel by boat on the rivers, aircraft, and snowmachine during the winter. Moose, caribou, and bears are important food sources for local rural residents and provide hunting opportunity for numerous nonlocal hunters. Fur trapping is an important traditional and economic activity.

Game Management Unit 21B contains approximately 9,311 mi². It consists of the Yukon River corridor between Tanana and Ruby, including the Nowitna River. The Nowitna National Wildlife Refuge occupies most of the unit south of the Yukon River. Ruby is the only village within Unit 21B.

Unit 21C contains approximately 3,670 mi². It consists of the Melozitna River drainage upstream from "the rapids" near the mouth, and the Dulbi River drainage upstream from Cottonwood Creek. There are no villages or year-round residents in Unit 21C.

Unit 21D contains approximately 12,110 mi². It consists of the Yukon River drainage from Blackburn upstream to Ruby, and the Koyukuk River drainage downstream from Dubin Point. Part of the Koyukuk Controlled Use Area is included within Unit 21D. Federal conservation areas in Unit 21D include parts of Koyukuk National Wildlife Refuge and parts of Innoko National Wildlife Refuge. Villages within Unit 21D include Galena, Koyukuk, Nulato, and Kaltag.

Unit 24 contains approximately 26,060 mi², and it is divided into 4 subunits: 24A, 24B, 24C, and 24D. It consists of the Koyukuk River drainage, from the headwaters in the Brooks Range and east of the Dalton Highway, downstream to Dubin Point. The Kanuti Controlled Use Area, part of the Dalton Highway Corridor Management Area, and part of the Koyukuk Controlled Use Area are included within Unit 24. Federal conservation units include parts of Koyukuk National Wildlife Refuge, parts of Gates of the Arctic National Park and Preserve, and Kanuti National Wildlife Refuge. Bureau of Land

Management oversees some other federal lands in Unit 24. Villages within Unit 24 include Coldfoot, Wiseman, Bettles, Evansville, Anaktuvuk Pass, Alatna, Allakaket, Hughes and Huslia.

BLACK BEAR

STATUS: Black bears are numerous in most of Units 21B, 21C, 21D, and 24. No population estimation surveys have been conducted. There is no closed season for black bears in any of these units, and they are an important species taken for food by local residents. Household surveys indicate local harvest is approximately 30–45 bears annually in Units 21B, 21D, and 24. Nonlocal hunters take an unknown, but probably small number of black bears, usually incidental to other hunting activities.

MANAGEMENT/RESEARCH ACTIVITIES: There is no requirement for sealing black bears. Subsistence household surveys and anecdotal information are used to monitor population status.

ISSUES: There is no efficient and cost effective way to monitor black bear population dynamics in this area. During years of low berry abundance, reports of black bears frequenting village dumps and fish camps are common. Bears taken in "Defense of Life or Property" (DLP) are usually not reported. Black bears are significant predators of moose calves, and poor moose calf survival is the primary reason for moose population declines in the Galena Management Area.

GRIZZLY BEAR

STATUS: The grizzly bear populations in Units 21B, 21C, 21D and 24 are believed to have been slowly increasing during the past 10 years, based on field observations, nuisance reports, and hunter sightings. Historically, grizzly bears were an important source of food and hides for local residents. Despite liberal seasons, hunting pressure by both local and nonlocal hunters is low. Annual harvests from Units 21B, 21C, and 21D usually total less than 10 bears. Annual harvests from Unit 24 are usually less than 20 bears.

MANAGEMENT/RESEARCH ACTIVITIES: Management activities involve monitoring harvests and administering hunts. No surveys have been conducted. Units 21D and 24 have a subsistence registration permit hunt in which grizzly bears taken do not have to be sealed unless the hides are transported out of the units.

ISSUES: Management objectives for grizzly bears within Units 21B, 21C, 21D and 24 are to maintain these populations at levels that will sustain a minimum annual reported harvest of 25 and 35, respectively. Present harvest levels are well below that. Unreported harvest numbers are estimated to be approximately 10 bears per year in Units 21B, 21C, and 21D and 5 bears each year in Unit 24. The combined reported and unreported 5-year average harvest for Units 21B, 21C, 21D was estimated to be 18 bears. The combined

reported and unreported five-year average harvest for Unit 24 was estimated to be 21 bears.

Local residents report concerns about substantially increased numbers of grizzly bears. Residents of Huslia, who rely on black bears as a subsistence food source, report that grizzly bears are occupying traditional black bear dens. Some local residents believe that grizzly predation on black bears has substantially reduced the availability of black bears. More importantly, those residents believe black bear hunting has become a riskier endeavor due to the likelihood of encountering a grizzly bear at den sites. Grizzly bears are significant predators of moose calves, and poor moose calf survival may be the primary reason for moose population declines in this area.

CARIBOU

STATUS: Four caribou herds are resident in the Kokrines Hills (Units 21B and 21C), Ray Mountains (Units 20F, 24A and 24B), and Hodzana Hills (Units 24A and 25A). Each herd is associated with and named for a mountain peak within the range of mountains where they calve. The Ray Mountains herd numbers approximately 1,500–1,800 caribou, The Hodzana herd is approximately 800–1,200 caribou, the Wolf Mountain herd is approximately 350–550 caribou, and the Galena Mountain herd is 80–100 caribou. Total annual harvest from the 4 herds seldom exceeds 20. The Western Arctic caribou herd is frequently found in northern Unit 24, and occasionally travels into the western-most portions of Units 21D and 24. In the winter of 2003–2004, up to 200,000 Western Arctic Herd caribou wintered in northern Unit 24, but have numbered only 20,000–30,000 each winter since then in the Zane Hills and Purcell Mountains of 24C and 24D.

MANAGEMENT/RESEARCH ACTIVITIES: Harvest monitoring is accomplished through the statewide general harvest ticket system. Information on caribou numbers and distribution of the 4 resident herds was obtained through cooperative studies involving ADF&G, US Fish and Wildlife Service (FWS), and Bureau of Land Management (BLM). Between 1992 and 2009, 145 caribou were radiocollared; however only about 40 of those are still active. Periodic radiotracking flights provide information on seasonal distribution. Annual composition flights using both fixed-wing and helicopter are conducted in July and October. Surveys of the Ray and Wolf Mountain herds have included aerial photography from fixed-wing aircraft during post-calving aggregations. Typically however, surveys of the 4 herds are conducted opportunistically. ADF&G staff in Region 5 oversees management of the Western Arctic caribou herd.

ISSUES: Due to limited access, hunters take few caribou from the 4 resident herds. The management objectives for these caribou herds are to maintain harvest at a level that allows the herds to grow. However, harvest is largely self-limiting at this time because of difficult access. Also, it appears that predation is likely restricting herd growth; lichen ranges are lush, and the early calving date and large body size of both calves and adults indicate good nutrition. The Galena Mountain Herd has experienced a sharp decline in estimated herd size over the past three years from over 300 animals to less than 100 in

recent surveys. The Department uses emergency orders to announce season openings in a portion of the Unit 21D to allow winter harvest of the Western Arctic Caribou Herd east of the Koyukuk River, while providing adequate protection for the Galena Mountain and Wolf Mountain herds. Apparent shifts in migratory patterns of the Western Arctic Herd in northern Unit 24 has occasionally made it difficult for Anaktuvuk Pass residents to obtain caribou in early fall.

MOOSE

STATUS: Moose were reported in Units 21B and 21C historically, but are relatively new additions to Units 21D and 24. Local residents reported first observing moose tracks in those units during the 1930s. Colonization of moose in those areas was slow until federal predator control efforts in the 1950s allowed rapid expansion of local populations. Moose densities range from low to moderate over most of the area, with very high densities in localized areas of high quality habitat. Generally, trend count area surveys conducted in 1998–2003 showed declining calf:cow and bull:cow ratios. Aerial surveys demonstrated declines on the order of 16–25% from 1994 to 2001 in Unit 21D and 30–50% in Unit 24 from 1993 to 2004. Populations have apparently stabilized since the early 2000s, due primarily to excellent productivity during 2003–2006. However, record snow accumulations in the lower Koyukuk and Middle Yukon during winter 2008–2009 may negatively impact moose numbers in those areas.

MANAGEMENT/RESEARCH ACTIVITIES: The Galena management staff conducts fall sex and age composition surveys, hunter contacts in the fall, and spring twinning surveys. Population estimation surveys were conducted in portions of Unit 21D during 1987, 1997, 2001 and 2004; in Unit 21B in 2001 and 2008; and in Unit 24 during 1999, 2004, 2005, 2007 and 2008. Hunter check stations are operated during September near the mouth of the Nowitna River, and 15 miles upstream from the village of Koyukuk on the Koyukuk River. The area of the lower Koyukuk River drainage in Units 21D and 24 downstream from Hughes is within the Koyukuk Controlled Use Area (KCUA), and hunts are managed by drawing and registration permits. Surrounding the KCUA within 21D are five other drawing/registration permit areas and in Unit 21B there are four drawing/registration permit areas. Harvest monitoring for the rest of the Galena area is by harvest report cards and door-to-door subsistence surveys.

A 1997 browse quality assessment in the Three Day Slough area of Unit 21D conducted in by a researcher from the University of Alaska suggests that browse quality was very high compared to other similar willow species in the Interior. The department's spring 2006 browse removal rate index was 5.3% (95% CL: 4.3%–6.3%). Extrapolated to shrub counts and species composition in Unit 24B yielded an index of 8.8% (6.8%–10.8%). To date, both these browse removal indices are the lowest values estimated in Interior Alaska and are statistically similar to removal rates in adjacent Unit 24C (5.5% and 8.5%, respectively).

A cooperative moose management project was initiated by ADF&G, FWS, NPS and BLM in March 2008 with the deployment of 58 VHF and GPS radio collars. By the end

of 2009, an additional 30 radio collars were deployed to replace mortalities and increase sample size to 68 total moose. In addition to monthly relocations to provide distribution information, other benefits that will result from this study include twinning surveys, survival rates, and sightability estimates. The Department has also participated in the Koyukuk NWR and NPS in moose research project which is helping us to understand calf weight dynamics, survival rates, and moose distribution on the lower Koyukuk and Middle Yukon River areas.

ISSUES: The key issues for moose management in the Galena Management Area are 1) increasing hunter effort required to harvest a moose due to warm fall weather, and increasing cost of fuel 2) harvest of cow moose, 3) low numbers of moose in 24B, and 4) predator-caused mortality. The hunter check station on the lower Koyukuk River has been operated since the early 1980's, but wasn't mandatory until 1990. Both hunter numbers and moose harvest increased steadily in the area through 1999. Concern about increasing harvest was raised when declining bull:cow ratios in the Three Day Slough trend count areas were first observed during fall 1995. To address the concerns about increasing harvest, the Board of Game established registration hunts for general and subsistence hunters in the lower Koyukuk River and temporarily on the Nowitna River. Further restrictions for the registration hunts were enacted in 1997. In 1997, hunter and harvest numbers decreased temporarily in the lower Koyukuk River area, though hunter success remained high. Moose hunter and harvest numbers then continued to increase through 1999. A drawing permit hunt was implemented in 2000 within the KCUA to replace the general registration hunt (RM830). This reversed the trend of increasing hunter numbers in the lower Koyukuk River drainage. In the Three Day Slough trend count area bull:cow ratios have begun to increase due to improving recruitment and restrictive harvest strategies. Calf:cow and yearling bull:cow ratios improved in 2003 and 2004, suggesting barely stable population levels. These indicators were mixed from 2005 through 2008. Recruitment ratios and population estimates during 1995–2001 confirmed that the moose population decline in the lower Koyukuk River drainage was due primarily to poor calf survival and yearling recruitment. As anticipated, with the more restrictive regulations in the KCUA, moose hunters were displaced to other drainages in the Galena Management Area, particularly the Bear Creek, Kateel, Huslia, Hogatza, and Nowitna river drainages, but regulatory measures adopted at the 2004 board meeting were very successful in managing those issues. Further details regarding moose hunting concerns as they relate to the KCUA, are discussed in the Controlled Use Areas section of this overview.

Bull:cow ratios in the heavily hunted Nowitna River portion of Unit 21B have increased from 15–20 bulls:100 cows with approximately $\frac{1}{3}$ of the bulls being yearlings during 2000–2003, to nearly 30 bulls:100 cows in 2008. During the period of low bull:cow ratios an increasing number of nonlocal residents hunted this area, and eventually success rates among local residents declined. This caused local hunters to either shift the area in which they hunted or change the season in which they hunted. As more hunters shifted to hunting the winter season, more cow moose were harvested, which accelerated the rate of the moose population decline. With increasing bull:cow ratios in recent years, local village harvest has steadily increased.

Residents of communities in the area served by the Galena area office are generally pleased with the results of the registration and drawing permit hunts and the ability this system affords the department to manage hunter distribution. However, frustration continues over the realization that hunter management is having little impact on the the moose population decline, which is attributable to the poor survival and recruitment of calves and yearlings, not hunting.

Private and federal land ownership and dual management presents challenges to moose management in these units. This is particularly a concern in the upper Koyukuk River drainage near Allakaket, Alatna, and Hughes where the moose population has declined the most and local hunters are struggling to harvest enough moose. Local hunters in these areas are increasingly turning to federal managers to provide for additional hunting seasons, while private corporation lands that fall under State jurisdiction maintain the more restrictive seasons in an effort to prevent further moose population declines.

The Department sponsored the Koyukuk River Moose Hunters Working Group that was organized in 1999 to develop a detailed management plan to address moose hunting concerns. The Board of Game endorsed the group's Moose Management Plan for the Koyukuk River at the winter 2001 statewide meeting.

SHEEP

STATUS: Much of the suitable sheep habitat in Unit 24 is located within Gates of the Arctic National Park and Preserve (GAAR) in Units 24A and 24B. Sheep numbers declined from the mid-1980s until the early 1990s. This decline was likely the result of severe winters from 1989 through 1993. Population estimation surveys conducted in summer 1996 in GAAR indicated that sheep numbers were lower than during the mid-1980s, but recruitment had begun to improve by 1993. Surveys in 1996 found good numbers of lambs and yearlings, which indicated the population was increasing. During 1998–2002, annual surveys were conducted in a portion of the 1996 surveys area by GAAR staff. Although there were annual fluctuations, the population was considered stable during 1996–2002. However, comparisons with surveys in the 1980s indicated that the sheep population was historically much higher in this area. From 2002 through 2009, ADF&G conducted sheep surveys in part of the upper Chandalar drainage east of the Dalton Highway in portions of Unit 24A and 25A. Total sheep numbers, lamb:ewe ratios and total legal rams have remained healthy throughout the survey years. During the 7 years of the survey the number of legal rams has ranged from 31 to 50 and the lamb:ewe ratio has ranged from 18% to 43%, with 32% estimated in the 2009 survey. Total sheep numbers have ranged from 989 to 1,539 sheep with 1,517, 1,310 and 1,535 sheep counted during 2006, 2007, and 2009, respectively. In regulatory years 2004–2008, an average of 71 hunters harvested at least 27 animals in all of Unit 24.

MANAGEMENT/RESEARCH ACTIVITIES: Sheep populations in Unit 24 are monitored by analyses of harvest reports, occasional fixed-wing aerial surveys, and anecdotal information. The NPS initiated a sheep study in GAAR in 1998 that included

assessments of harvest, population status, and movements, mostly north of the Brooks Range. Aerial surveys have also been conducted by ADF&G from 2002 through 2009 in a portion of Unit 24 and Unit 25A.

ISSUES: Dall sheep in GAAR are managed somewhat differently than in most areas of Alaska. Federal law mandates subsistence use as the highest priority consumptive use within the preserve, and the exclusive consumptive use by federally qualified users within the park. Sheep in Unit 24 outside GAAR are managed for diversified human use. Though subsistence hunting is generally localized, the present numbers of sheep in those areas are still sufficient to support current subsistence harvests. Other hunters are generally more widespread, but are restricted to areas outside GAAR. A majority of nonsubsistence hunters access Units 24A and 24B from the Dalton Highway.

WOLVES

STATUS: Wolf harvest in Unit 21B, 21C, and 21D is well below the maximum sustained level the population can support. The Units 21B, 21C, and 21D combined average annual harvest for regulatory years 2003 through 2007 (RY03–RY07; RY begins 1 July and ends 30 June, e.g., RY03 = 1 July 2003 through 30 June 2004) was 64 (range = 48–77) wolves annually, while the allowable harvest was estimated to be at least 182–304 wolves annually. Wolf harvest in Unit 24 is also well below the maximum sustained level the population can support. The Unit 24 average harvest for RY03–RY07 was 77 (range = 53–111) wolves annually, while the allowable harvest was 137–230 wolves annually. The Unit 24 wolf population was stable during 2004–2008 and changed little since regulatory year 1996, with only some localized fluctuations. Wolf numbers were highest (9–11 wolves/1000 km²) and probably increased in southern Unit 24 (south of Hughes). There were moderate and stable numbers (4–6 wolves/1000 km²) in central Unit 24 (Bettles to Hughes), and variable densities (6–8 wolves/1000 km²) with some declines in northern Unit 24 (north of Bettles). Estimated wolf population densities were highest and stable to increasing in Unit 21D (9.8–14.2 wolves/1000 km²), moderate and stable in Unit 21B (4.4–6.7 wolves/1000 km²), and moderate and stable in Unit 21C (5–7 wolves/1000 km²).

MANAGEMENT/RESEARCH ACTIVITIES: Wolf population trends were monitored through harvest reports and aerial surveys. In a portion of Unit 21D a wolf study was conducted in 1994 and reconnaissance surveys were conducted in 1999 and 2001 in Units 21D and 21B, respectively. A population estimation survey was conducted in northern Unit 21D and southern Unit 24 in 2000. Use of snowmachines is the most common method of transportation for trappers and wolf hunters. Wolf harvest has declined, particularly in Unit 24 since the ban on taking wolves and other furbearers the same day a person is airborne. Wolf snaring clinics were conducted in Allakaket, Huslia and Galena during January 2000 and in Hughes, Kaltag and Ruby during December 2001, in Nulato and Galena in 2002 then again in Huslia and Allakaket in 2005, and Nulato in 2007.

ISSUES: Wolf population levels are likely increasing throughout the area. While wolf predation on moose is also likely increasing, demand for moose by nonlocal and local hunters is intensifying. Local residents of the Galena area recognize the predator-prey relationship between moose and wolves and make a conscious effort to increase wolf harvest when they perceive that moose are declining. There is some local demand for wolf pelts used as parka ruffs and gifts at funeral potlatches. But with depressed fur prices and increasing fuel prices, the incentive to trap wolves is not high enough to encourage trapping at levels needed to cause a positive response in moose recruitment.

FURBEARERS

STATUS: Furbearers have traditionally been an important resource in Units 21B, 21C, 21D, and 24, supplying food, clothing, and items of commerce. Although furbearer populations have always been sufficient to meet local demands, they are subject to cycles of abundance. Furbearers of economic importance found in these units are marten, beaver, lynx, wolves, wolverine, red fox, mink, river otters, and muskrats. Coyotes also occur, but are rare. Weasels and red squirrels are common, but usually not targeted by trappers. Harvest trends for some species are related to markets. Some species, especially beaver, are important food items and taken in high number irrespective of markets. Based on trapper reports, furbearer population levels for the past several years in Units 21B, 21C, 21D, and 24 appear to be stable or increasing.

MANAGEMENT/RESEARCH ACTIVITIES: Harvest is monitored through sealing records, fur export reports, fur acquisition reports, and trapper surveys. The local FWS office studied the effects of forest fires on marten. Snap trapping for small mammals has provided indices of small mammal abundance in some areas.

ISSUES: Low fur prices for most species have directly affected trapper effort in the area. Furbearer populations are in good condition throughout the area. The current distribution and effort by trappers is light and compatible with the present population levels. The harvest of furbearers is below sustainable harvests, and is not expected to change significantly given the large area, number of trappers, remoteness, and fur prices.

SMALL GAME

STATUS: The overall status of small game populations in Units 21B, 21C, 21D and 24 are largely unknown. Anecdotal information suggests hare numbers were near their peak in 2008 and 2009 in some areas after a low populations during 2001–2005. Spruce and ruffed (locally called willow) grouse are common but have declined since 2000. Ptarmigan were also at their lows in the mid-2000's but may now be showing signs of increasing once again.

MANAGEMENT/RESEARCH ACTIVITIES: None

ISSUES: None

CONTROLLED USE AREAS

STATUS: There are currently two moose hunting controlled use areas (CUAs) in the Galena Management Area: the Koyukuk CUA and the Kanuti CUA.

KOYUKUK CONTROLLED USE AREA: The Koyukuk CUA was established in 1979 to reduce participation of nonlocal moose hunters and hunter conflicts by prohibiting the use of aircraft. However, by 1986 the number of hunters arriving by boat from outside the unit equaled the number of hunters who previously accessed the area by aircraft. The Koyukuk CUA occupies 4,791 mi² in northern Unit 21D and southern Unit 24 and overlaps with a large portion of the Koyukuk National Wildlife Refuge. A moose hunter check station has been operating on the Koyukuk River since 1983. It enables accurate determination of the number of hunters using the river to access the Koyukuk CUA within Unit 21D and accurate collection of biological data from harvested animals. It is also used to educate local residents on licensing and reporting requirements, to inform nonlocal hunters about regulations specific to the area and the locations of private property along the river, and as a means of monitoring compliance with regulations. The CUA, the mandatory check station, and the registration and drawing hunts are all elements for managing this high profile hunting area and, in combination, have succeeded in meeting the intended objectives.

There has been little change in the boundaries or basic elements of the Koyukuk CUA (i.e. no fly-in moose hunting) since its creation. However, there have been a variety of changes to the type of moose hunts that the department manages in the CUA, as discussed in the moose section of this overview. Currently, an unlimited number of resident hunters can hunt in the CUA on a subsistence registration hunt. Conditions include keeping all the meat on the bone, keeping the head, and sawing off the upper half of one antler and turning it in to ADF&G. Alternatively, there are a limited number of permits available for a drawing hunt. Conditions include keeping the meat on the bone of the hindquarters, forequarters, and ribs and being able to retain the entire antler. For the drawing hunt, 258 permits were allowed in RY03, while only 50 permits were allowed each year during RY04–RY07. Because of improving bull:cow ratios, the number of permits in RY07 and RY08 was increased to 80 permits. Implementation of the drawing permit hunt was a result of the Koyukuk River Moose Hunters Working Group's recommendations and it has effectively reduced nonsubsistence hunters. However, there was concern that demand for the unlimited number of subsistence registration permits will eventually increase above sustainable harvest levels. As previously reported, the regulatory changes are having little effect on reversing the declining trend of the moose population, which is the result of poor calf survival and low yearling recruitment. At this time, the poor calf survival and low yearling recruitment levels being observed are likely the result of predation.

KANUTI CONTROLLED USE AREA: The Kanuti CUA was also established in 1979 to reduce participation of nonlocal moose hunters and hunter conflicts by prohibiting the use of aircraft. The Kanuti CUA occupies 2,183 mi² of Unit 24B; the boundaries have not been changed since its creation. The Kanuti CUA overlaps much of the Kanuti National

Wildlife Refuge. Federal land within the Kanuti CUA was closed to moose hunting except for federally qualified users in 1992, so interpretation of the effectiveness of the CUA regulation is unclear. Although a few hunters who hunted the state navigable river corridor accessed the CUA from the Dalton Highway in the past, most use within the Kanuti CUA is by residents of the Unit 24 communities of Alatna, Allakaket, Bettles, Hughes, and Evansville. Overall, the federal closure that overlaps the Kanuti CUA has a greater impact on current hunting patterns in the Kanuti CUA, except for the lower Alatna River area that is mostly State land, where the closure doesn't apply.

MANAGEMENT/RESEARCH ACTIVITIES: A check station has been operated on the Koyukuk River within the Koyukuk CUA since 1981 (29 consecutive years). The Koyukuk River moose management planning effort was implemented in 1999 to deal with issues related to the two CUAs. The Koyukuk CUA was the main focus of attention because of the large number of hunters using the lower Koyukuk River.

ISSUES: The Galena Area CUAs confine distribution of hunters to the travel corridors, which are the rivers within those areas. This has the inadvertent effect of putting non-local hunters in the same areas as local hunters. Concentration of hunters creates competition for the resource among user groups, reduces harvestable moose numbers in the corridor where most non-local hunters are relegated, and has proved to be ineffective in reducing the number of hunters in the long-term. The drawing/registration permit system that was implemented in the Koyukuk CUA in 2000 has proven to be a far more effective way to regulate hunter numbers and disperse the distribution of hunters throughout the GMU.

GAME MANAGEMENT UNITS 19, 21A AND 21E

McGRATH AREA OFFICE

Area Biologist: Roger Seavoy
Assistant Area Biologist: Joshua Peirce
Seasonal Wildlife Technician: Vacant

DESCRIPTION

The McGrath area encompasses over 55,000 mi² of diverse habitats in western Interior Alaska, ranging from mountainous alpine to black spruce taiga and open tundra. All drainages of the Kuskokwim River upstream of the village of Kalskag are included, as well as a portion of the middle Yukon drainage (including the Innoko, Iditarod, and Anvik Rivers). Land status is diverse; parts of two National Parks administered by the National Park Service, two National Wildlife Refuges administered by the U.S. Fish and Wildlife Service, Bureau of Land Management (BLM) tracts, State lands, and Native Corporation lands are scattered throughout the area.

The McGrath area office is responsible for managing a wide variety of wildlife species, primarily big game and furbearers. Moose, caribou, grizzly bear, black bear, Dall sheep, and bison are present, and muskox are occasionally reported. Furbearers, particularly marten, are important for a variety of uses. Lowland areas (Units 19A, 19D, and 21E) are used largely by local, boat-borne hunters who generally reside within Units 18, 19A, 19D, or 21E. The upland units (19B, 19C, and 21A) are accessible largely by aircraft, and hunters using these upland units are generally from outside the area.

Seventeen villages in the area are represented with advisory committee seats and several village sites not represented remain important to area residents. There are four Fish and Game Advisory Committees, including McGrath, Grayling–Anvik–Shageluk–Holy Cross (GASH), the Central Kuskokwim, and the recently created Stony–Holitna AC (SHAC) which was formed when the old Central Kuskokwim Advisory Committee was divided.

MANAGEMENT AREAS

THE LIME VILLAGE MANAGEMENT AREA: The Lime Village Management Area in Unit 19A includes an area around Lime Village where moose hunting is by Tier II permit only. This area still functions to delineate this Tier II hunt.

THE UPPER HOLITNA–HOHOLITNA MANAGEMENT AREA: The Upper Holitna–Hoholitna Management Area was established in 1997 and includes all of Unit 19B within the Aniak, Kipchuk, Salmon, Holitna, and Hoholitna river drainages. In this area, all hunters are required to stop at department check stations, though none have been established for several

years, and moose and caribou taken by hunters using aircraft must be transported out of the area by aircraft. This area was established to address a perception that meat was not being completely salvaged and the requirement that hunters who fly into the management area must fly out probably addresses this salvage issue.

CONTROLLED USE AREAS

UPPER KUSKOKWIM CONTROLLED USE AREA: The Upper Kuskokwim Controlled Use Area (CUA) was originally established in 1981 across a broad area in central Unit 19D. Its purpose was to prevent the use of aircraft for moose hunting in order to reduce competition for moose by hunters using aircraft. In 2001, the CUA was enlarged as a temporary measure to restrict aircraft as predation control measures were contemplated. During March 2008, the board approved a proposal to change this CUA to a corridor near the portions of the rivers in proximity to the Upper Kuskokwim villages. Currently, this CUA includes that portion of Unit 19D extending 2 miles on either side of and including the Kuskokwim River upstream from the mouth of the Black River to the mouth of the Swift Fork, extending 2 miles on either side of and including the Takotna River, upstream of the mouth of the Takotna River to Takotna, and extending 2 miles on either side of, and including the South Fork River upstream from the mouth of the South Fork to Nikolai. Within this area, moose hunting using aircraft for access is prohibited. This CUA still functions to reduce competition for moose.

HOLITNA–HOHOLITNA CONTROLLED USE AREA: The Holitna–Hoholitna CUA was first implemented for the fall 1992 hunting season in Units 19A and 19B. It consists of the Holitna River downstream of Kasheglok, the Titnuk River downstream of Fuller Mountain, and the Hoholitna River downstream from the confluence of the South Fork of the Hoholitna River.

The Holitna–Hoholitna CUA was established to limit the number of hunters on those rivers by limiting the horsepower of their outboard motors to an aggregate of 40 hp. The moose hunting season was closed in this portion of Unit 19A in 2006 and the Mulchatna caribou herd is much reduced. Prior to this, the Holitna–Hoholitna CUA had largely accomplished its intended purpose of reducing hunting pressure. Moose hunting drives hunting pressure in this area, so whether this CUA will continue to serve its original purpose after moose hunting reopens depends on how a renewed moose hunt would be managed.

PARADISE CONTROLLED USE AREA: The Paradise CUA in Unit 21E consists of the area from the west bank of the Yukon River upstream from Paimiut to Eagle Island (45 miles upstream of Grayling) and from the mouth of the Iditarod River downstream along the east side of the Innoko River to Paimiut. It includes 1,954 mi² and was established in 1977 to reduce the competition for moose between hunters using boats and hunters using aircraft, who at the time, harvested more moose than local boat hunters. Hunting now is largely by Yukon village residents who use boats. A nonresident drawing permit hunt in Unit 21E was established beginning in fall 2006 to limit nonresident participation. This CUA has, and continues to, accomplish its intended purpose.

SPECIAL HUNT AREAS:

NONRESIDENT CLOSED AREA IN UNITS 19A AND 19B: The Unit 19A and 19B nonresident closed area includes a 4-mile wide corridor along portions of the Kuskokwim, Holitna, Titnuk, Hoholitna, and Aniak rivers, Aniak Slough, the Salmon, Kipchuk, Owhat, Kolmakof, Holokuk, Chineekluk, Veahna, Oskawalik rivers, Crooked Creek, George River, and the Buckstock and Doestock rivers. The area was established by an ad hoc group of local hunters and guides at the March 2002 Board of Game meeting to eliminate the conflict and competition between local residents, guided nonresidents and nonresident hunters dropped off by transporters. Since its implementation, moose numbers have declined and all nonresident moose hunting opportunity has been eliminated in Unit 19A and this area no longer serves its original purpose.

THE TM680 MOOSE HUNT AREA: In Unit 19A, downstream of the George River and Downey Creek drainages, moose hunting is limited through Tier II permits. This was first implemented in 2006.

BISON

STATUS: The Farewell Bison Herd ranges in Unit 19C and eastern Unit 19D. Currently, the herd consists of fewer than 225 animals, and appears to be stable to increasing.

MANAGEMENT ACTIVITIES: We conduct aerial surveys during spring and fall to assess minimum population size, annual calf production, and recruitment. The herd is radiotracked to determine distribution and to assist in population surveys. We deployed additional radiocollars in April 2008 to better assess numbers and determine the range of this herd and approximately 20 collars remain active. Two drawing permit hunts are available, one in September and the other in March and a management report is completed every 2 years.

ISSUES: Bison habitat has aged as the Farewell burn shifts from grasses and sedges toward a more forested habitat. We have encouraged efforts to change fire management plans to allow natural wildfires to burn, and a fire burned adjacent to the range of this herd during summer 2009. However, this burn may not have been hot enough to create additional bison habitat so we are still considering a controlled burn in cooperation with State Forestry personnel. Our population objective for this herd is 300 bison and because the population is lower than that the

number of permits has been reduced significantly.

This herd is proving important for bison conservation because of its genetic makeup. Nearly all studies of Lower 48 bison reveal incursions of cattle genes in the bison genome. The Farewell herd has not had any contact with cattle or cattle-bison crosses and recent examinations confirm that these are plains bison, without domestic cattle genes, that originated from Montana bison range stock. As such, the importance of maintaining a herd of adequate size to maintain genetic diversity is heightened. The parent stock in Montana now has cattle genes in the population. Our objective to maintain a herd of 300 bison is close to the number others have suggested is necessary to maintain genetic diversity.

BLACK BEAR

STATUS: Black bear populations vary throughout the management area in relation to habitat quality. Although harvest reporting is not required in most of the McGrath management area, we believe harvest is light in all units.

MANAGEMENT ACTIVITIES: Harvest statistics are assessed for areas where harvest reporting is required and we complete a management report every 3 years. The McGrath office periodically processes bears taken under defense of life and property provisions.

In association with predation control programs, we conducted a black bear population estimate in Unit 19D. This included removal of bears during May 2003 and 2004 when 125 black and grizzly bears were moved from a 528-mi² area surrounding McGrath. During spring 2007, we estimated that 72 black bears inhabited this area and a similar survey is planned for spring 2010.

ISSUES: Black bears have been identified as a primary source of moose calf mortality near McGrath. The board adopted liberal bear seasons, bag limits, and methods and means, as well as black bear predation control programs in an attempt to reduce black bear predation on moose. These measures have been ineffective both in decreasing bear predation and increasing the take of bears. Additional measures for the bear predation control area in Unit 19D were passed during the March 2009 board meeting, including the use of foot snares. These measures will be implemented during spring 2010.

GRIZZLY BEAR

STATUS: Grizzly bear populations vary throughout the management area in relation to habitat quality. Harvest is extremely light in the lowland units where bear densities are lower. In the uplands (mainly Units 19B and 19C), harvests are moderate to high.

MANAGEMENT ACTIVITIES: Harvest statistics are assessed annually and a management report is completed biennially. Most hunters are required to have their harvested grizzly sealed and hunters in Units 19B, 19C, and 21A are required to obtain a metal locking tag prior to hunting. However, hunters interested in taking grizzly bears for the meat may choose to obtain a registration permit to hunt in the Aniak River drainage in Units 19A and 19B and forgo the sealing and metal locking tag requirements. The McGrath office periodically processes bears

taken under defense of life and property provisions.

ISSUES: Grizzly bears have been identified as a primary source of moose calf mortality near McGrath. Liberalizing bear seasons and methods and means of hunting, and grizzly bear predation control permits have been attempted to reduce grizzly bear predation on moose, but they have been ineffective both in decreasing bear predation and increasing the take of bears. Additional bear control measures, including the use of foot snares, were passed during a March 2009 board meeting for the bear control area in Unit 19D and will be implemented during spring 2010.

CARIBOU

MULCHATNA, RAINY PASS, TONZONA, FAREWELL-BIG RIVER, SUNSHINE MOUNTAIN, AND BEAVER MOUNTAINS.

(Several caribou herds are partially or wholly within the McGrath Area.)

STATUS: The Mulchatna Caribou Herd population peaked in 1996 at 200,000 caribou and declined to 45,000 animals by summer 2006 and our models predict continued decline. During the period of rapid growth (early to mid-1990s) the herd greatly expanded its range, including instances when groups of Mulchatna caribou were found in Units 19C, 19D, 21A, and 21E. Currently, radiocollared Mulchatna herd caribou are regularly found in Unit 19A south of the Kuskokwim, throughout Unit 19B, western Unit 19C, and southern Unit 19D. The Department of Fish and Game office in Dillingham manages the Mulchatna herd.

The Sunshine Mountain and Beaver Mountain herds are small. Recent minimum count surveys revealed a combined total of fewer than 200 animals. Few data are available on the other area caribou herds, but hunter reports and observations made during surveys for other species suggest that the Rainy Pass, Tonzona, and Farewell-Big River herds also persist at low numbers.

MANAGEMENT ACTIVITIES: We periodically conduct minimum population surveys within the range of these small caribou herds in Unit 19. The Dillingham area biologist generally informs us regarding work being done on the Mulchatna Herd. Harvest statistics are assessed annually and a management report is written every 2 years.

ISSUES: Caribou herds have declined and the Mulchatna, Farewell-Big River, Rainy Pass, Tonzona, Sunshine and Beaver Mountains herds should be monitored; yet area office resources are limited.

FURBEARERS

STATUS: Overall, furbearer abundance is moderate to high. Marten continues to be the most important furbearer harvested in the area because of its quality, abundance, ease of pelt preparation, and a higher price paid to the trapper compared to other furs.

MANAGEMENT ACTIVITIES: An annual trapper questionnaire is mailed to area trappers to assess fluctuations in furbearer and prey populations, annual harvest, and to maintain a dialog

with trappers. Lynx, otter, and wolverine pelts are sealed when presented in the McGrath office and during village visits by Department of Public Safety personnel and a management report is written every 3 years.

ISSUES: Trapping is still an important traditional and economic activity, although not as widespread as in previous years. Pelt prices are insufficient to encourage full participation and there is an underutilized harvestable surplus of all furbearer species.

MOOSE

STATUS: The McGrath area has complex habitat and weather patterns and the status of moose populations varies considerably. In western Unit 19A, we estimated the moose population at 0.38 observable moose/mi² in 2006. Moose numbers in eastern Unit 19A were estimated at 0.28 observable moose/mi² in 2005 and 0.44 observable moose/mi² in 2008. In eastern Unit 19A, wolf numbers were successfully suppressed during a predation control program that began in 2004.

Limited resources preclude moose surveys in Unit 19B but moose populations are thought to be similar to those in portions of Unit 19A. Likewise, no population estimates are conducted in Unit 19C, although we conducted composition and trend surveys in Unit 19C that suggest adequate bull:cow ratios.

In Unit 19D, the 2008 moose surveys indicated low to moderate densities (0.5 moose/mi²) in most of the area, but densities are higher around McGrath (about 1.5 moose/mi²) where predation control has been concentrated. Twinning rates remain above 25% near McGrath, but browse utilization data suggest that density dependent effects may become evident.

In Unit 21A, hunters report seeing fewer moose, but population estimates conducted by our federal partners are equivocal. A state/federal geospatial moose population estimate is planned for the near future.

The winter moose population in Unit 21E was estimated at 1.2 observable moose/mi² in March 2009 but hunters in the area report declining numbers. A radiotelemetry project is planned to provide movement data and allow us to estimate sightability during spring surveys.

MANAGEMENT ACTIVITIES: We conduct geospatial moose population estimation surveys in eastern Unit 19A, central Unit 21E, and in Unit 19D near McGrath on a 3-year rotating basis. Additionally, research staff has conducted moose surveys in the McGrath area more frequently since the predation control programs began in 2003. We have also conducted geospatial moose population estimation surveys opportunistically in western Unit 19A and plan to assist the Innoko National Wildlife Refuge staff to conduct a geospatial moose population estimation survey in Unit 21A to establish an estimate and monitor the moose population trend.

We conduct annual spring twinning surveys in eastern Unit 19A, central Unit 21E, and in Unit 19D near McGrath. We also conduct fall composition and trend surveys in these areas as well as in portions of Units 19C and 21A.

In addition to survey data, we use hunter harvest reports to assess seasons, bag limits, and other moose regulations. Two management reports are written every 2 years, one covering Unit 19A and a second covering Units 21A and 21E.

ISSUES: There is a great diversity of issues concerning moose in the McGrath area. In general, moose densities were low and remain so, except where predation control programs have been implemented. In those areas, moose populations are either recovering (as in Unit 19D East), or show promising signs of recovery (as in eastern Unit 19A).

Winter moose seasons throughout most of the McGrath management area have been closed in response to low moose density and/or declining moose populations. However, as moose recover near McGrath, we are contemplating restoring a winter moose hunt.

The McGrath area has conducted cooperative planning efforts with representatives of multiple user groups including: 1) the Adaptive Wildlife Management plan which focused on Unit 19D East in the 1990s, 2) the Central Kuskokwim Moose Management Plan (June 2004) covering 19A and 19B, and 3) the Yukon-Innokko Moose Management Plan for Unit 21E and a portion of Unit 21A (December 2006). These plans currently guide our moose management decisions.

SHEEP

ALASKA RANGE WEST (UNITS 9, 16, AND 19)

STATUS: Sheep composition and trend surveys are conducted annually in Unit 19C in June or July, depending on weather. In 2009 we observed 28 lambs:100 ewes and almost 4% of observed sheep were full-curl rams.

The average number of hunters and sheep harvested has declined from an average of 208 hunters who harvested 116 full-curl rams during 1992–1998 to an average of 141 hunters who harvested 69 full curl rams during 1999–2008.

MANAGEMENT ACTIVITIES: To monitor changes in trend and sex and age ratios Aerial sheep composition and trend surveys are conducted in the Unit 19 portion of the western Alaska Range. However, no surveys were conducted between 2003 and 2008. Furthermore, data collected prior to electronic data storage were lost in the December 2006 office fire. Sheep horns are sealed when presented at the McGrath office, but the bulk of the sheep taken in Unit 19C are sealed in the field by Department of Public Safety personnel. Harvest reports are analyzed for changes in harvest characteristics and a management report is completed every 3 years.

ISSUES: Guides and transporters and their clients complain of overcrowding even though fewer hunters report hunting in Unit 19C. Department of Public Safety personnel suggest that the recently established sealing requirements have improved the quality of sheep taken.

WOLF

STATUS: Wolf populations are robust throughout the McGrath management area, varying in

response to prey population availability. Wolf predation control programs have been implemented in Unit 19A since 2004 and in Unit 19D East since 2003. We conduct wolf surveys in Units 19A and 19D East in conjunction with wolf control programs to assist our efforts to reduce wolves numbers by 60%–80% from the precontrol population. Thus, we manage these programs to maintain no fewer than 30–36 wolves in Unit 19A and 40 wolves in Unit 19D East.

In Unit 19A prior to wolf control, we estimated 125–150 wolves, including 75–100 wolves in the Holitna, Hoholitna, and Stony River drainages and smaller Kuskokwim River drainages upriver of Sleetmute. Subsequently we reduced wolf numbers upriver of Sleetmute by more than 60% compared to our 2004 population estimate. At the March 2009 meeting, the board created a 3,913-mi² wolf predation control focus zone within the Unit 19A predation control area. This focus zone is upriver from Sleetmute and is the portion of the larger wolf control area that provides the best opportunity for successful wolf predation control. This smaller control zone also facilitates our ability to assure that 30–36 wolves remain in Unit 19A.

Similarly, in Unit 19D East, we surveyed the wolf population in 2001 and estimated a population of 198 wolves, including 49 within a 3,210 mi² area near McGrath where predation control was focused during RY03–RY05. Within this area, wolf numbers were reduced by more than 60% of the precontrol levels. Within the Unit 19D East predation control area, aerial wolf control was permitted in a 3,210-mi² area in during RY03–RY05, a 6,245-mi² area during RY06–RY08 and in the current 4,518-mi² in effect during RY09. The current wolf predation control focus area was reduced from the larger area to concentrate efforts to reduce wolves, to facilitate our ability to assure that 40 wolves remain in Unit 19D East, and to facilitate administration by using the drainage boundaries (called UCUs) that the department uses to describe harvest locations.

We conducted a partial wolf survey in Unit 21E after our moose survey in March 2009. Although the survey was abbreviated due to bad weather, preliminary results suggest high wolf densities, consistent with reports from hunters, trappers, and pilots.

In Units 19B, 19C, and 21A, hunters and trappers report high numbers of wolves and during surveys in these areas we see tracks consistent with these observations, but we have not conducted wolf surveys in these units.

MANAGEMENT ACTIVITIES: We periodically calculate wolf population estimates for each unit, based on incidental observations, responses to trapper questionnaires, analyses of sealing documents, prey density estimates, habitat, and comparisons with other areas where population estimation surveys have been completed. Reconnaissance-style wolf surveys are conducted in Units 19A, 19D East, and 21E.

Wolf predation control has been conducted in the Unit 19D-East Wolf Predation Control Area since winter 2003–2004. Wolf control is continuing in this area and was reauthorized during the March 2009 Board of Game meeting for a 5-year period beginning in RY09.

Wolf predation control was first implemented in Unit 19A during winter 2004–2005. Wolf control is continuing in this area and was reauthorized during a March 2009 Board of Game meeting for a 5-year period beginning in RY09.

Harvest statistics are assessed annually and a management report is written every 3 years.

ISSUES: The predation control programs in Unit 19A and Unit 19D East have been the dominant issue related to wolf management in the McGrath area. Associated with these are the moose management plans including the Adaptive Wildlife Management Team plan which focused on Unit 19D East in the 1990s, and the current plans including the Yukon–Innoko Moose Management Plan (June 2004) and Central Kuskokwim Moose Management Plan (December 2006) which guide wolf management as well as moose management.



GAME MANAGEMENT UNITS 25A, 25B, 25D, 26B and 26C

NORTHEAST ALASKA AREA OFFICE

Area Biologist: Beth Lenart, Fairbanks
Assistant Area Biologist: Jason Caikoski, Fairbanks

DESCRIPTION

The Northeast Alaska area includes the drainages of the Upper Yukon basin in Game Management Units 25A, 25B, and 25D upstream from Fort Hamlin (upstream from the Dalton Highway Bridge on the Yukon River) and the eastern North Slope (Units 26B and 26C) from the Itkillik drainage to the Canadian Border. The area encompasses 73,800 mi², including more than 26,000 mi² of arctic, alpine and subalpine tundra in the eastern Brooks Range and on the north slope, and over 40,000 mi² of boreal forest in Game Management Unit 25. The Upper Yukon basin is subject to frequent lightning-caused fires. Abundant successional and riparian shrub habitat and low snowfall provide excellent habitat for moose. The Yukon Flats includes numerous lakes and meadows and is a major waterfowl nesting area. Road access is limited to the Dalton and Steese Highways. The area includes the Arctic and Yukon Flats National Wildlife Refuges, small portions of the Gates of the Arctic and Yukon-Charley National Preserves, as well as large areas managed by the Bureau of Land Management, the State, and additional areas owned by Native corporations.

Game Management Units and areas are:

25A	—	21,300 mi ²
25B	—	9,100 mi ²
25D	—	17,600 mi ²
26B	—	15,500 mi ²
26C	—	10,300 mi ²
Total Area		73,800 mi ²

There are 9 communities (Arctic Village, Beaver, Birch Creek, Chalkitsik, Circle, Fort Yukon, Kaktovik, Stevens Village, and Venetie) with a total population of about 1,700. In addition, the Prudhoe Bay complex is located in northern Unit 26B.

Advisory committees in the area include:

- Yukon Flats Fish and Game Advisory Committee
- North Slope Fish and Game Advisory Committee
- Eastern Interior Subsistence Regional Council

Conservation system units are:

- Yukon Flats National Wildlife Refuge, U.S. Fish and Wildlife Service (FWS)
- Arctic National Wildlife Refuge, National Park Service (NPS)
- Yukon–Charlie Rivers National Preserve, NPS
- Gates of the Arctic National Preserve, NPS

Controlled use/management areas include:

- Dalton Highway Corridor Management Area

The Dalton Highway Corridor Management Area (DHCMA) includes land five miles east and west of the Dalton Highway from the Yukon River north to the Arctic Ocean, with a total area of about 3,600 mi². The DHCMA was established in 1980 and some amendments were made in 1985 and 2002. The area was established based on a perceived need, primarily on the part of communities in Unit 26, to limit access by hunters. Alaska Statute 16.05.789 prohibits hunting with firearms within the corridor; however, regulation allows big game, small game, and fur animals to be hunted in the area by bow and arrow only. No motorized vehicle, except aircraft, boats, and licensed highway vehicles on publicly maintained roads, may be used to transport game or hunters within the DHCMA. Alaska Statute 19.40.210 prohibits the use of off-road vehicles within 5 miles of the highway right-of-way in this area. The DHCMA is achieving its original purpose.

- Prudhoe Bay Closed Area

The Prudhoe Bay Closed Area encompasses the Prudhoe Bay industrial complex, and extends west to include the Kuparuk River area, with a total area of 432 mi². It was established prior to the DHCMA and was based on public safety and security issues associated with the extensive oil field facilities in the area. The area is closed to the taking of big game. In 2002 the Board of Game extended the restrictions on the use of motorized vehicles for hunting in the DHCMA to apply to the Prudhoe Bay Closed Area. This is consistent with statutory intent, and closed a loophole in the regulation. The public generally accepts the restrictions, although difficulty in locating the southern boundary has caused some confusion. The closed area appears to have achieved its purpose.

GRIZZLY BEAR

STATUS: An estimated 1,430–2,070 grizzly bears occur in the area, with populations north and south of the Brooks Range estimated at 460–710 and 870–1,360 bears, respectively. In most years, the harvest of bears is below current estimates of sustainable yield. Since the mid-1990s, bear populations probably have remained stable because habitat has changed little and harvest was conservative. They are considered to be at a low to moderate density on the North Slope and moderate density south of the Brooks Range.

MANAGEMENT ACTIVITIES: Sealing, tooth aging, and compiling and analyzing harvest data are the primary management activities. In Unit 25D, an objective to temporarily reduce the number bears was established with the implementation of the Yukon Flats Moose Management Plan in 2002. This resulted in liberalizing grizzly bear seasons and eliminating the grizzly tag fee requirement.

ISSUES: Management issues typically relate to season length and bag limits in Units 26B, 26C, and 25A. During the Spring 2008 Board of Game meeting, the season in Unit 26B was extended by opening a week earlier (during the end of August) because harvest rates had been low for the previous 5 years. There was concern that opening the season in August, when many caribou and sheep hunters were still in the field, would result in exceeding the allowable harvest. In fall 2008 and 2009, the allowable harvest of 13 bears was exceeded and a proposal to eliminate the August season was submitted by the Department for the 2010 March Board of Game meeting.

The effect of grizzly bear predation on moose on the Yukon Flats in Unit 25D is of concern to some local residents. Regulations have been liberalized during the last 10 years, but has had little effect on bear harvest levels.

CARIBOU

CENTRAL ARCTIC HERD (CAH)

STATUS: The Central Arctic Caribou herd has grown substantially from 32,000 caribou in 2002 to 67,000 caribou in 2008. The CAH traditionally calved near the coast between the Colville and Kuparuk Rivers on the west side of the Sagavanirktok River and between the Sagavanirktok and the Canning Rivers on the east side. During the early 1990s, the greatest concentration of caribou calving in western Unit 26B shifted southwest as development of infrastructure related to oil production occurred in what was originally a major calving area. No directional shift in distribution of caribou calving east of the Sagavanirktok River was noted. During the 2000s, distribution of calving and postcalving caribou was similar among years. The CAH summer range extends from just west of the Colville River, eastward along the coast (and inland approximately 30 miles) to the Katakturnuk River. The CAH winters in the northern and southern foothills and mountains of the Brooks Range. The herd's range often overlaps with the Porcupine caribou herd (PCH) on summer and winter range on the east side and the Teshekpuk (TCH) herd on summer and winter range on the west side and occasionally with the Western Arctic (WAH) on fall and winter to the west.

As the herd grew, large scale movements were documented. In early July 2008 and 2009, CAH moved eastward along the coast to the Canadian border. Caribou moved back in the direction they had originated from by the middle of July. Movements of this magnitude in this direction had not been documented previously for the CAH. In addition, during the past few winters, the CAH appears to have expanded its winter range farther south on the south side of the Brooks Range, into more timbered areas, and east toward Arctic Village.

Harvest pressure is low, with a harvest rate less than 2% annually, consisting mostly of bulls (>90%). Currently, ADF&G estimates approximately 1,400 hunters harvest 1,000 caribou annually from an allowable harvest of 3,000 caribou.

MANAGEMENT ACTIVITIES: Parturition rates and calf:cow ratios are determined in early and late June by monitoring radiocollared cows. A photocensus is attempted every 2–3 years to estimate population size. Fall composition surveys will be conducted annually for the next 2 years and then biennially. Approximately 10–20 new VHF radio collars are deployed annually on female caribou to assist in maintaining an adequate sample size for determining calf:cow ratios and locating the herd during a photocensus.

ISSUES: Current harvest is approximately 1,000 caribou and the intensive management harvest objective is 1,400–1,600 caribou. The Department would like to increase harvest and hunting opportunity. A proposal to liberalize the bag limit from 2 to 5 caribou was submitted by the Department for the 2010 March Board of Game meeting. Few other management options currently exist to substantially increase harvest because AS 16.05.789 prohibits hunting with firearms and AS 19.40.210 prohibits off-road vehicle use within 5 miles of the Dalton Highway. These access-restricting statutes limit the Department's and Board of Game's ability to provide additional hunting opportunity on a caribou herd that is harvested well below sustained yield.

Although access is restricted along the Dalton Highway, there are still a large number of hunters who use the highway in August and early September and some controversial issues affecting caribou hunting in Unit 26B have occurred, particularly during the previous 7 years. The increase in the number of archers and other hunters using the Dalton Highway prompted several public proposals in previous years related to hunt quality and other conditions of the hunt. Some of the issues are wanton waste, poor hunter ethics, stalking caribou that are already being hunted, and traffic concerns with commercial industry. There has been disagreement among the hunting public as to reasonable solutions to these issues. These issues are present in any hunt that occurs along a road; although the conflicts with commercial trucking is probably worse along the Dalton Highway because the original purpose of the road was to facilitate building the pipeline and accessing the Prudhoe Bay oilfield complex. It was not built to accommodate other kinds of traffic. In addition to concerns directly along the highway, there has also been an increase in the number of hunters using boats to access areas off the highway, particularly the Ivishak River. Some hunters have expressed frustration related to hunting ethics (e.g. transporters going up and down the river dropping off hunters near other camps), similar to those observed along the highway. Therefore, even though the herd could sustain a substantial increase in harvest, conflicts between hunters themselves, and commercial trucking companies, tour companies, and other users of the Dalton Highway would likely rise as the numbers of hunters increases.

Although the herd has grown substantially, there still are concerns that as more infrastructure is put in place, the calving grounds will shift to less preferred habitat and possibly affecting the population when the herd is nutritionally stressed.

PORCUPINE HERD (PCH)

STATUS: The PCH declined from 178,000 caribou in 1989 to 123,000 caribou in 2001. A photocensus has not been conducted since 2001 due to inadequate caribou aggregations. However, population modeling indicates the herd continued to decline to about 100,000 caribou by 2009. Adult mortality, particularly cows, has been identified as the most significant cause of the herds decline.

The Porcupine caribou herd (PCH) migrates between Alaska and Yukon and Northwest Territories in Canada. In the 1980s and 1990s, most of the PCH calved along the coast in the Arctic National Wildlife Refuge, Alaska, often in the 1002 area. Since 2000, the PCH primarily calved farther east on the coastal plain from the Jago River, Alaska to the Babbage River, Yukon, in Ivvavik National Park. Caribou that calve in Canada move into Alaska shortly after calving. Postcalving distribution also changed in recent years in that the herd does not remain on the coastal plain in large aggregations, but moves South into the mountains in the Brooks Range, prior to migrating back into Canada. This distribution has made it extremely difficult to complete a photocensus since 2001 because caribou are in smaller, more scattered groups, drinking beer in rough terrain & fog???. Winter distribution varies and in some years a portion or most of the PCH winters in Alaska near Arctic Village, while in other years most of the herd winters in Canada.

The PCH is lightly hunted in Alaska; thus, harvest in Alaska probably played a relatively small role in the decline of the PCH. Approximately 85 caribou are reported harvested annually by nonlocal residents of Alaska and nonresidents. We estimate that 400–700 caribou are harvested annually by Arctic Village and other Yukon Flats residents during years that a large proportion of the herd winters in Alaska. There is little information about harvest levels or composition in Canada; however, harvest is thought to average 4000 caribou annually when the herd is accessible via the Dempster Highway. As the PCH declines in size, current harvest levels in Canada will likely become more additive and either precipitate additional herd decline or suppress recovery. Canada has attempted to address the harvest issue by drafting a Harvest Management Plan (HMP) for the PCH in 2008. It is currently under review (See Issues below).

The PCH is internationally co-managed through an agreement with the U.S. and Canada and the establishment of the International Porcupine Caribou Board. The purpose of the agreement and role of the board is to promote international coordination and co-management of the PCH and its range. However, regulatory jurisdiction is segregated between countries.

MANAGEMENT ACTIVITIES: Parturition rates and calf:cow ratios are estimated in early and late June by monitoring radiocollared cows. A photocensus is attempted every 2–3 years to estimate population size. Fall composition surveys will be conducted when possible. Approximately 20–30 new radio collars are deployed annually on female caribou to maintain 100–110 active radio collars to assist in estimating parturition rates, calf:cow ratios, seasonal distribution, and conducting photocensuses.

ISSUES:

A photocensus has not been conducted on this herd since 2001 due to inadequate caribou aggregations. Population modeling and various population indicators indicate the herd is slowly declining. ADF&G staff has explored alternate techniques to estimate herd size and has rejected them; however, we are making progress toward using the photocensus technique under marginal conditions.

Because the herd is likely declining, there is concern about the unknown number (and composition) of caribou harvested, particularly in Canada, where in some years harvest was thought to be as high as 5,000 caribou. The unknown number of caribou harvested by local residents of Unit 25 and 26C is of also concern; although far fewer people in Alaska harvest the PCH compared with Canada. We estimate the number of caribou harvested by local residents of Unit 25 and 26C to be 400–700 caribou in years the PCH is wintering in Alaska.

Wildlife agencies in Canada were also concerned about the unknown harvest rate on the PCH and their liberal regulations. Therefore, in 2008, the Porcupine Caribou Management Board (of Canada) drafted a Harvest Management Plan (HMP) to regulate hunting in Canada. At the time the HMP was being drafted, hunting seasons and bag limits in Canada were mostly unrestricted. The HMP outlines a harvest strategy that would restrict or liberalize harvest based on herd size. In general, the plan would allow:

PCH population size	Hunting Regulations
> 125,000	Unrestricted harvest
75,000–125,000	Voluntary bull only harvest
50,000–75,000	Mandatory bull only harvest
< 50,000	No harvest (except for ceremonial purposes)

In the interim, for the 2009 hunting season, the Yukon Government implemented “immediate conservation measures to protect the Porcupine Caribou Herd until an approved harvest management plan is accepted and implemented by the Parties to the Porcupine Caribou Management Agreement.” Those measures restrict all harvest in Canada to bulls only, restrict licensed hunters to 1 bull, and require harvest reporting for all hunters. Alaska and the U.S. have not yet initiated a harvest management planning process for users of the PCH in Alaska. However, we have endorsed the HMP in Canada. Because the PCH is near or below the population objective of 135,000 caribou and we support the HMP in Canada, the Department submitted a proposal to the March 2010 BOG meeting to reduce the nonresident season from July 1–Apr. 30 to Aug. 1–Sept. 30 and reduce the nonresident bag limit from 5 caribou to 2 bulls.

FURBEARERS

STATUS: Furbearers are less abundant in Unit 25A compared with other parts of Interior Alaska. The most common furbearers are wolverine and red fox.

Furbearers present in the Yukon Flats in 25B and 25D include all species endemic to Interior Alaska. Species of most importance for local trappers include lynx, marten, fox and beaver. Lynx populations in Unit 25D and 25B began increasing in 2002 and may currently be at the peak of the population cycle. Muskrat continue to be at low numbers for unknown reasons.

Arctic and red fox are common in Unit 26B and 26C, and an occasional lynx and river otter are observed. Arctic and red fox populations were particularly high on the North Slope in Unit 26B and 26C during the winter of 2006–2007, which precipitated a rabies outbreak. Fox populations likely declined significantly but are expected to recover.

MANAGEMENT ACTIVITIES: Sealing records, fur export reports, direct communication with trappers, and the results of a trapper questionnaire are used to monitor population and harvest levels of furbearers.

ISSUES: Trapping has been historically important in the culture and to the economy of the Yukon Flats, but trapping activity is presently low due to declining fur prices (except for marten) and other social and economic changes.

MOOSE

UNITS 25A, 25B, AND 25D

STATUS: Moose in Unit 25A are at a low density (~0.20 moose/mi²) because much of Unit 25A is in the Brooks Range and consists of less suitable habitat. Bulls appear to use the area particularly during rut. Approximately 100 hunters reported harvesting 40 moose annually in Unit 25A.

Moose in Units 25B and 25D are distributed throughout the area and are an important resource for local communities. However, population density is low compared to other areas in Interior Alaska, ranging from 0.20 moose/mi² to 0.35 moose/mi². There is widespread concern about the low density of moose in Units 25B and 25D, which includes substantial areas with excellent moose habitat. Limiting factors include predation by black bears, grizzly bears and wolves, as well as hunting. Predation by black bears and grizzly bears are the major causes of calf moose mortality during summer, accounting for over 80% of the calves born during a 2-year study by the FWS in western Unit 25D.

In Unit 25B, approximately 90 hunters reported harvesting 30 moose annually. In eastern Unit 25D, approximately 70 hunters reported harvesting 15 moose annually. In addition, 10–30 moose are reported taken annually in western Unit 25D under Tier II and federal subsistence permits. However, a large proportion of the harvest by local residents is not reported. A harvest-monitoring project conducted by the Council of Athabaskan Tribal Governments (CATG) indicates that local residents harvest 150–200 moose annually in 25D and 25B.

MANAGEMENT ACTIVITIES: Population and composition surveys in Unit 25D are conducted annually in cooperation with the CATG Natural Resources Department and Yukon Flats National Wildlife Refuge. A major management effort took place in 2001 and 2002 in which the Yukon Flats Cooperative Moose Management Plan was developed and implemented. This effort focused on community and agency initiatives that together could maintain or increase moose abundance, especially in key hunting areas near local communities. We continue to work from the 2002 Yukon Flats Cooperative Moose Management Plan.

In 2008, we implemented an Intensive Management (IM) program in a 530-mi² area surrounding the village of Beaver. The IM program relies on the community of Beaver because it requires the community to acquire grants to provide incentives to hunters and trappers, provide harvest data, and harvest only bull moose. Therefore, success of the program depends on a community. We are focusing on 4 specific actions to help increase the moose population:

- 1) Take more wolves
- 2) Take more bears
- 3) Obtain accurate harvest information on moose, wolves, and bears
- 4) Do not kill cow moose

Management activities associated with the IM program include:

- 1) Conduct moose survey or census within IM area
- 2) Conduct a black bear population estimate within the IM area to determine the number of bears are in the area so that we can determine how many need to be removed
- 3) Conduct wolf surveys
- 4) Cooperate with Yukon Flats National Wildlife Refuge to conduct wolf predation rate study

Work with the Beaver Tribal Council and CATG

We successfully completed a moose survey in November 2008. Snow was inadequate to conduct a moose survey in 2009. Black bears were captured and radiocollared in May 2009 to assist the black bear population estimate survey to be conducted in May 2010. A wolf survey was conducted in 2009 and we intend to conduct another in spring 2010. We are in the second year of the cooperative wolf predation rate study.

ISSUES: Chronically low moose numbers in Unit 25D continue to be a major concern. Both local and nonlocal users are concerned about predation by wolves and bears and the illegal harvest of cow moose. Although the number of nonlocal moose hunters in Unit 25 is small (≤ 30), their presence is sufficient to cause concern among local residents.

Approximately 65% of Unit 25D is on federal land. Conflicting state and federal regulations and boundaries are often confusing to local hunters and make it difficult to hunt legally. Staff from ADF&G and Yukon Flats National Wildlife Refuge intend to conduct a series of meetings during 2010–2011 throughout the Yukon Flats communities and with interested advisory committees to address moose regulations in Unit 25D. The

most confusing issue for local hunters is identifying the boundary between state, federal, and private lands and how that relates to different seasons.

UNITS 26B AND 26C

STATUS: The moose population in Units 26B and 26C declined dramatically during the early 1990s, probably due to a combination of factors including disease, weather, increased predation by wolves and grizzly bears, and possibly insect harassment. In Unit 26B, the population gradually increased during the 2000s, and we currently estimate the population consists of 550–650 moose. Moose numbers in central Unit 26C remained stable at approximately 50–60 moose during the 2000s. Including eastern Unit 26C, I estimate over 200 moose in all of Unit 26C, recognizing that the eastern portion has a migratory component to its population.

In 2006, harvestable surplus was estimated at 15 bulls in Unit 26B (excluding the Canning River drainage) and a moose season was opened to resident hunters because the population objectives were met. It includes a general season for 1 bull for 14 days during Feb. 15–April 15 and a limited drawing permit (up to 30 permits) for 1 bull during Sept. 1–14. Since the season was opened, 7 moose were harvested in 2006, 3 in 2007, 6 in 2008, and 3 in 2009 under the drawing permit. No moose were reported harvested under the general season.

MANAGEMENT ACTIVITIES: Spring surveys are conducted annually to estimate population size and percent calves in the population.

ISSUES: The moose season was closed in 1996 in response to the dramatic decline in moose numbers and reopened in Unit 26B in 2006 to residents only. ADF&G will continue to monitor the population. The state season in Unit 26C remains closed, but a federal season is open and managed by Arctic National Wildlife Refuge.

MUSKOXEN

STATUS: During the mid 1990s, approximately 500–600 muskoxen inhabited northeastern Alaska (eastern Unit 26A, Unit 26B, and Unit 26C). In 1999, muskoxen numbers began to decline in Unit 26C. By 2001, we determined that the overall population size in northeast Alaska declined considerably, but the population dynamics were different in the subunits. Abundance of calves, yearlings, and adults declined in Unit 26C beginning in 1999. In eastern 26A and Unit 26B, abundance of calves and yearlings was stable during 1999–2006, but numbers of muskoxen declined during 2003–2006. During a census conducted in 2006, we observed 216 muskoxen in Unit 26B and eastern Unit 26A and 1 muskox in Unit 26C. Numbers remained relatively stable during 2007–2009. Groups of muskoxen migrate back and forth across the Canadian border and Unit 26C. Therefore, in some years, 30–40 muskoxen may reside in Unit 26C.

The major factors influencing the decline probably were annual variation in weather affecting female body condition, reproductive success, winter foraging, and predation by

grizzly bears. However, to account for the low number of muskoxen observed in Unit 26C, emigration was also most likely involved, and disease may also have played a role.

Beginning in regulatory year 2006, permits to hunt muskoxen were not issued in eastern Unit 26A and Unit 26B. All hunts remain in regulation and permits include a Tier II hunt in eastern Unit 26A and Unit 26B west of the Dalton Highway, and a Tier I registration and a drawing hunt in Unit 26B east of the Dalton Highway. Hunting in Unit 26C is managed by the Arctic National Wildlife Refuge. Beginning in regulatory year 2003, the Federal Subsistence Board agreed that no permits would be issued until a minimum of 36 animals were observed in Unit 26C during April surveys. The number of permits that can be issued is 3% of the estimated muskox population in Unit 26C and for bulls only. No permits were issued in Unit 26C during 2003–2007. One permit was issued in 2008.

MANAGEMENT ACTIVITIES: ADF&G works cooperatively with the Arctic National Wildlife Refuge to manage muskoxen in northeastern Alaska. In general, ADF&G directly manages the eastern Unit 26A and Unit 26B subpopulation and the Arctic National Wildlife Refuge manages the Unit 26C subpopulation. Activities include conducting censuses in April every 2–3 years, compositions counts in June, deploying radio collars, and administering permit hunts. The structure of the permit hunts was developed in the North Slope Muskox Harvest Plan which was approved by the Board of Game in 1999. ADF&G, North Slope Borough, U.S. Fish and Wildlife Service, Bureau of Land Management, and representatives from local villages participated in developing the plan.

Beginning spring 2007, a research project to look at potential causes of muskoxen mortality and the decline—which include nutrition, disease, predation, and re-distribution—was initiated. It is possible all of these contributed to the decline. Specific objectives were to: 1) estimate annual birth rates for muskox cows, 2) estimate annual calf recruitment through late June, 3) determine rates and causes of mortality of muskox during April–June, 4) evaluate relative importance of mortality of cows vs. calves, and 5) estimate the prevalence of various diseases in the muskox population.

ISSUES: Current issues involve investigating causes of mortality and reasons for the population decline. There has been some concern about increased predation by grizzly bears on muskoxen in these areas and the role that may play in the decline.

SHEEP

STATUS: Population size for the eastern Brooks Range is unknown, but sheep are distributed throughout the mountains. In the mid 1990s, sheep populations in Interior Alaska declined substantially and these declines appeared to be correlated with deep snowfall during winters between 1988 and 1993. In general, sheep were far less abundant in the mid 1990s compared with the 1980s. Since the mid 1990s, survey data in a portion of eastern Unit 24A and western Unit 25A indicate that the population has been relatively stable.

An average of 440 hunters harvest 150 sheep annually in eastern Unit 24 and Units 25A, 26B and 26C. In the 1980s, sheep harvest was approximately 250 annually. Although the population is lower compared to the 1980s, the area is still popular among sheep hunters and guides. A small number of sheep are taken in a winter registration hunt in Units 25A and 26C.

MANAGEMENT ACTIVITIES: Beginning in 2002, population surveys were completed annually in the upper Chandalar drainage in an area that has become popular for resident sheep hunters and guided nonresidents hunters. Survey results suggest that the sheep population and the proportion of legal rams have been stable in recent years. Sheep harvest and hunter effort are monitored based on harvest ticket reports.

In March 2009, a 3-year study was initiated to evaluate factors that may limit sheep population growth in the central Brooks Range and to assess movement patterns that may be affected by development along a corridor associated with the Dalton Highway. Objectives of the study are to: 1) investigate seasonal and annual distributions and movement patterns of sheep and 2) estimate survival of lambs to yearling age class and determine the causes of mortality. The study area for this research project is located in Unit 24A, and is within the area where a population survey is conducted regularly.

ISSUES: A reduced sheep population that resulted from significant declines during the late 1980s and early 1990s is an ongoing concern. Sheep numbers continue to be well below historic highs, although recruitment appears to have improved in some areas.

The Federal Subsistence Board established the Arctic Village Sheep Management Area in Unit 25A in 1991, and its northern boundary was expanded in 1995. This area was closed to sheep hunting by non-federally qualified hunters and has been the subject of debate in connection with dual management. A portion of this area was re-opened in May 2007 to a full-curl general season hunt to comply with ANILCA.

There is also a registration permit hunt available to Alaska residents in Units 25A and 26C during Oct. 1–Apr. 30, with a bag limit of 3 sheep. The conditions of this permit have the effect of limiting hunting by people living outside the units and likely few sheep are taken by nonlocals. A federal permit with the same bag limit and season exists in this area, causing confusion for residents of Kaktovik pertaining to obtaining permits and reporting. Thus, there is little or no reporting by hunters from Kaktovik. ADF&G plans to work with the North Slope Borough to determine number of sheep harvested by residents of Kaktovik.

The number of hunters and guides in western Unit 25A and eastern Unit 24 has increased in recent years. Some guides have expressed concerns that the area is overcrowded and would like to see exclusive guide areas re-established. We have expanded population monitoring efforts in this area. In general, we estimate that most of the full curl rams observed during the sheep survey are harvested in the fall.

SMALL GAME

STATUS: The overall status of small game populations in the area are largely unknown. Anecdotal information suggests hare numbers were near their peak in 2008 and 2009 in some areas after a low populations during 2001–2005. Spruce and ruffed grouse are common but have declined since 2000. Ptarmigan were also at their lows in the mid-2000's but may now be showing signs of increasing once again.

MANAGEMENT/RESEARCH ACTIVITIES: None

ISSUES: None

WOLVES

STATUS: Wolves are widely distributed throughout Units 25A, 25B, and 25D and harvests are low relative to the total population (~4.4–5.3 wolves/1000 km²). Annual harvest, primarily by trappers, has been relatively stable over the past 15 years and averages 50 wolves.

Wolves are present on the North Slope in Units 26B and 26C in low numbers (2.2–3.2 wolves/1000 km²). Approximately 5–35 wolves are harvested annually, primarily by trappers, and likely have little effect on the population.

MANAGEMENT ACTIVITIES: Major activities include monitoring harvests, communicating with residents and pilots to obtain anecdotal information on wolf numbers, and conducting periodic wolf population surveys. Wolf surveys in portions of Units 25B and 25D were conducted in spring 2000, 2001, 2006 and 2009.

In 2008, in cooperation with the Yukon Flats National Wildlife Refuge, a wolf predation rate study was initiated in western Unit 25D.

Some communities in Unit 25 have requested trapping clinics. In 2007 and 2008, ADF&G conducted a wolf snaring clinic in Beaver and Venetie, respectively.

ISSUES: Wolf predation on moose is a concern, particularly in Units 25B and 25D. Local residents are currently exploring methods to increase wolf harvest and reduce moose predation by wolves.

FORTY MILE CARIBOU HERD HARVEST PLAN

2006–2012



This plan was developed by a coalition of the, Fairbanks, Upper Tanana/Fortymile, Central, Delta Junction, and Eagle Advisory Committees and the Eastern Interior Regional Subsistence Advisory Council in cooperation with Yukon Fish and Wildlife Management Board, Yukon Department of Environment, Yukon First Nations and the Alaska Department of Fish and Game.

Adopted by the Board of Game in March 2006
Endorsed by the Federal Subsistence Board in May 2006

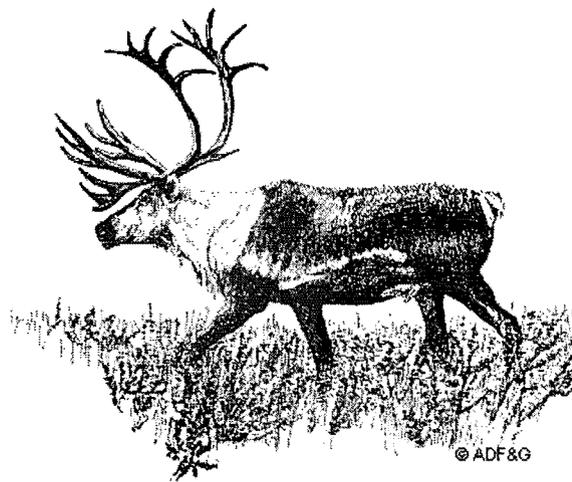


INTRODUCTION

This plan has been developed as a guide for managing harvest of the Fortymile Caribou Herd (FCH) in Alaska from 2006 through 2012. This plan retains many of the provisions of the first harvest plan for Fortymile caribou that guided harvest of the herd between 2001 and 2005. As was the case with the previous plan, the Fortymile Caribou Herd Harvest Plan 2006–2012 (“Harvest Plan”) was developed by representatives from the Central, Delta Junction, Eagle, Fairbanks and Upper Tanana/Fortymile State Fish and Game Advisory Committees (F&GACs), and the Eastern Interior Regional Advisory Council (EIRAC). Important contributions were added by participants from the Yukon Fish and Wildlife Management Board, the Yukon Department of Environment and Yukon First Nations. The Alaska Department of Fish and Game Division of Wildlife Conservation provided support in developing the plan.

The Harvest Plan includes recommended actions and regulations governing overall herd harvest levels, allocation of harvest between Alaska and Yukon and between different areas in Alaska, and harvest management options (permits, seasons, bag limits, methods and means). It also includes other information to help guide future decisions regarding harvest of Fortymile caribou, including herd history and historic harvest data. The Harvest Plan was developed in the spring and summer of 2005 for review by the involved advisory committees, the EIRAC and the public during fall 2005. The Alaska Board of Game (BOG) endorsed the plan at its meeting in March 2006 and the Federal Subsistence Board (FSB) passed a resolution in support of the plan in May 2006.

The specifics of managing the Yukon FCH harvest allocation will be developed by the Yukon Fish and Wildlife Management Board, the Yukon Department of Environment and Yukon First Nations.



BACKGROUND

FORTY MILE CARIBOU HERD PLANNING

The Fortymile Caribou Herd Management Plan ("Management Plan") was completed in October 1995 by the Fortymile Caribou Herd Planning Team. The primary purpose of the Management Plan was to help restore the FCH to its former range and abundance. It addressed many aspects of herd management and included provisions to reduce caribou mortality by decreasing harvest and by implementing a non-lethal predator control program. The plan provided a guide to management of the FCH from 1995 through 2000. During that time harvest of Fortymile caribou was limited to a quota of 150 bulls per year.

In 1999, with the herd increasing in size and the Fortymile Caribou Herd Management Plan soon to expire, several state fish and game advisory committees began a cooperative effort to develop a framework for expanding opportunities to harvest the herd. This initial harvest plan provided for increasing the harvest quota from 150 bulls per year to 2-3% of the estimated population size and allowed for annual quota increases if the herd grew by 10% or more in the previous year. ADF&G conducted periodic photo census counts and modeled annual population trends to estimate herd population size and growth rate. The Alaska BOG endorsed the 2001–2006 Harvest Plan and adopted new FCH hunting regulations in March 2000. The FSB approved the plan and revised regulations later that spring.

In the winter of 2004–2005, with the 2001–2006 Harvest Plan nearing its end and in order to produce an update within the BOG's two-year meeting cycle, the involved advisory committees began reviewing information on FCH population status and harvest and generating ideas for a *new* harvest plan. On July 7, 2005, representatives of the Delta Junction, Eagle, Fairbanks and Upper Tanana/Fortymile Advisory Committees (Central Advisory Committee was unable to attend), the EIRAC, the Yukon Fish and Wildlife Management Board, Yukon Department of Environment and the T'rondeĥ Hwēchĥn First Nation, met in Tok to discuss the FCH population and harvest and seek agreement on recommendations to be included in an updated harvest plan. Staff from Alaska Department of Fish and Game, Divisions of Wildlife Conservation and Subsistence, the Bureau of Land Management, the Tetlin National Wildlife Refuge and the National Park Service provided technical support for this meeting.

Participants in the July 7 meeting reached agreement on the basic provisions of the draft plan which were circulated for review and comment by the F&GACs, EIRAC and the general public. The key points that emerged from the meeting that are a basis for this Harvest Plan include:

- The FCH, with the latest population estimate at 40,000 (2005) down from 43,375 (2003), has not grown as rapidly as envisioned in the initial harvest management plan.

- The group reaffirmed the commitment to support growth of the FCH so that it will continue to expand into its historic range in both Alaska and the Yukon and to provide for greater harvest.
- The harvest quota for Alaska should remain at 850 caribou, with up to 25% cows, until the herd reaches 50,000 caribou.
- Because the ADF&G has less funding available for extensive monitoring of the FCH, the new harvest plan needs to be implemented within a more standard survey and inventory program.
- Because the FCH is an Intensive Management population under Alaskan law, and because the mortality over the last two years has exceeded the calf production, it is *absolutely* necessary to implement a lethal wolf predation control program specifically designed for the FCH to ensure the herd reaches the Intensive Management (IM) population *and harvest* objectives within a reasonable time-frame.
- ADF&G research shows 88% of the annual mortality in the Fortymile Herd was caused by predators and only 5% is “harvest” by hunters.
- The harvest quota will rise to 1,000 when the pre-calving population reaches 50,000.
- The wolf sterilization project (1997-2001) is not producing a long term increase of the FCH.

HERD POPULATION GROWTH

Estimates of the size of the FCH in the 1920s were within 350,000-568,000 animals and the herd's range encompassed some 85,000 square miles, extending from Whitehorse, Yukon, to the White Mountains north of Fairbanks, Alaska. Population estimates from around 1950 were 46,000–60,000. By the 1970's the population declined to an estimated low of 5,000 animals. Since 1973, the herd has occupied only a small portion of its previous range. For example, the herd seldom crossed into Yukon in significant numbers during the 1970's, 1980's and 1990's. Between 1974 and 1990 the herd grew slowly to about 23,000 caribou. The herd population remained at that level until 1995 due largely to low calf survival. In 1995 the FCH was estimated at 22,000 to 23,000 animals. An intensive private wolf trapping effort, nonlethal predator control, favorable weather conditions and reduced hunting pressure enabled the population to increase to 43,375 caribou by 2003 (Figure 1). The FCH has not increased numerically as envisioned in the previous Harvest Plan, which projected a FCH population of 57,000 or more by 2003, and 70,000 or more by 2005.

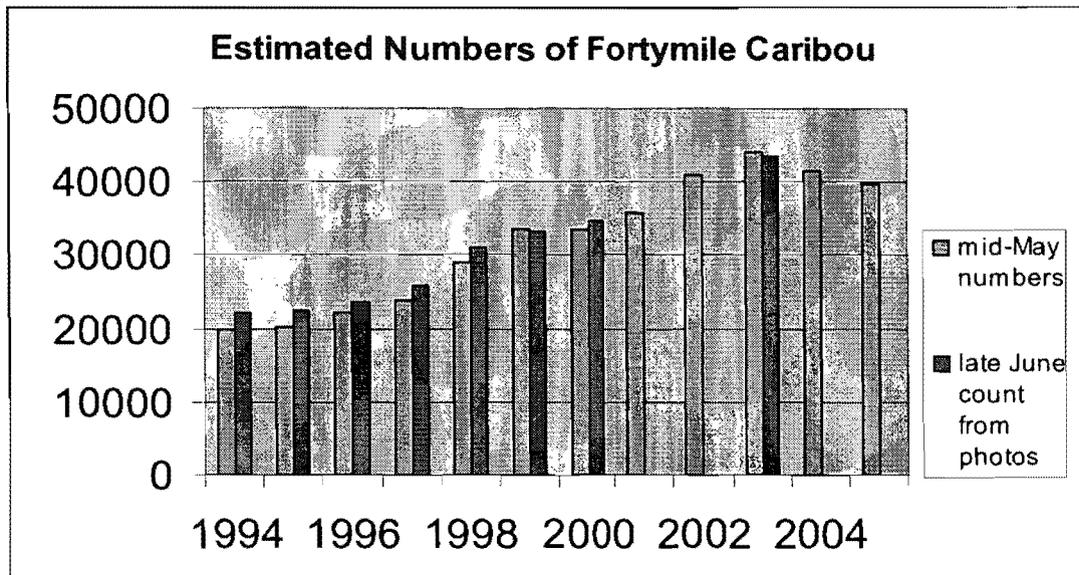


Figure 1: Estimated numbers of Fortymile Caribou 1994–2005

In 2001 the herd crossed the Steese Highway for the first time in about three decades. By November 2002 over 30,000 FCH animals were in Yukon, Canada and 5,000 were north of the Yukon River near Dawson. This was the first time since the early 1960s that Fortymile caribou crossed the Yukon River and a vast majority of the herd wintered in the Yukon.

In mid-May 2004, the FCH population decreased to an estimated 42,000 caribou. This decline was likely due largely to a very low percentage of births in the herd during 2003 (69% birthrate). This low percentage of calves likely occurred because of adverse summer weather in 2002 that caused poor body condition in cows and decreased the 2003 pregnancy rate.

The FCH population further declined to an estimated 39,700 caribou by early May 2005. This estimate was derived from the early May 2004 estimate, spring 2004 calving ground surveys, fall 2004 composition counts, and winter mortality rates estimated from the number of radiocollared caribou that died during the winter of 2004-2005. Elevated mortality of calves and adults during the winter of 2004 – 2005 was caused by increased predation during adverse weather.

HARVEST

The FCH historically provided much of the food for earlyday residents. From the late 1800s to World War I, it was subject to market hunting in both Alaska and Yukon. Before the Taylor Highway was constructed in the mid-1950s most hunting was concentrated along the Steese Highway and along the Yukon River above Dawson. During the 1960s,

hunting was concentrated along the Steese and Taylor highways in Alaska and the Top of the World Highway in Yukon. From the mid 1970s through the 1980s, FCH hunting regulations were designed to benefit local hunters and to prevent harvest from limiting herd growth. Bag limits, harvest quotas, and season openings were primarily used to meet these objectives. Hunting seasons were deliberately scheduled to avoid the period when road crossings were likely. Consequently, hunter concentration and harvest distribution shifted from highways to trail systems accessed from the Taylor and Steese highways and to areas accessed from small airstrips within the Fortymile and Charley river drainages.

Harvest was further restricted during the 1990s to ensure little impact on herd growth. Harvest regulations also became increasingly complex due to a change in Alaska's subsistence law that resulted in federal management of subsistence uses of the FCH on federal lands. During this period, many residents within the herd's range were unhappy with the ineffectiveness of dual federal and state management in administering the hunts and bringing about a herd increase.

During regulatory years 1996–1997 through 2000–2001 [regulatory year (RY) begins 1 July and ends 30 June; e.g. RY00 = 1 Jul 2000 through 30 Jun 2001], under the Fortymile Caribou Herd Management Plan, the harvest quota was 150 bulls. Since fall 1996, ADF&G and federal subsistence staff have managed the fall and winter Fortymile caribou hunts using a joint Federal Subsistence/State Registration permit. One permit is used and all hunt reports are returned to ADF&G. Federally-qualified subsistence users can begin hunting on federal public lands 15–30 days before other hunters.

The 2001–2006 Harvest Plan recommended a conservative annual harvest rate of about 2–3% to be divided between Alaska and Yukon. Sixty-five percent of the annual harvest was allocated to Alaska and 35% to Yukon. During this time, the T'rondek Hwëchîn First Nations chose to forego their hunting rights and the Yukon Department of Environment opened no seasons when the FCH wintered in Canada, so that the Canadian harvest quota could be reallocated to herd growth.

Under the 2001–2006 Harvest Plan, if a growth rate of approximately 10% was not achieved in a particular year, the harvest objective for that hunting season was reduced to the level of the previous year. Because the Fortymile Caribou Herd grew at less than 10% per year and declined after 2003, the annual harvest quota remained at 850 per regulatory year except in FY02 when the quota was set before an accurate population estimate was made. The Alaska quota was further divided between fall-harvest (75%) and winter-harvest (25%) (Table 1). The fall quota was allocated between 3 areas based on historical take and herd migration. The Steese Highway-Central area was assigned 35% of the fall harvest objective; the Salcha-Goodpaster roadless area was assigned 15%; and the Tok-Taylor Highway area was assigned 50%. A different registration permit was used for each of these 3 areas, and areas were closed by emergency order if their quotas were filled. Registration permit boundaries were changed several times to alleviate the need for most hunters to obtain more than 1 permit to hunt a particular area and to accommodate changes in herd movements and range expansion.

Table 1. Alaska harvest quota allocation.

Area	Regulatory Year			
	2001-2002	2002-2003	2003-2004	2004-2005
Steese/Chena Hot Springs Area (35%)	230	250	230	230
Taylor Highway Area (50%)	320	355	320	320
Salcha-Goodpaster Roadless Area (15%)	90	105	90	90
Fall Hunt Total Quota	640	710	640	640
Steese/Chena Hot Springs Area	N/A ^a	95	125 (181) ^b	125 (181) ^b
Taylor Highway Area	N/A ^a	145	85 (121) ^b	85 (135) ^b
Winter Hunt Quota	210	240	210 (302)^b	210 (335)^b
Total Quota	850	950	850	850
ACTUAL HARVEST	693	864	800	840
NUMBER OF PERMITS ISSUED	4537	4156	5718	4212 ^c

^a The winter quota was not allocated by area until regulatory year 2002–2003.

^b This number is the remaining unfilled quota, which equals the winter quota allocation plus the unfilled portion of the fall quota.

^c The 3 fall registration permits were combined into one permit so hunters were not issued multiple permits to hunt Fortymile caribou in different places during the fall season.

Animals not harvested under the fall quota were reassigned to the winter hunt quota, except in RY01, when the unfilled portion of the fall quota was put toward herd growth. During RY02–RY05, 60% of the winter quota was allocated to the unit in which most of the herd was located at the time, along with Units 20D and 20B, while 40% was assigned to the unit where the minority of the herd ranged. During this timeframe, Unit 25C, along with 20B and 20D, received 60% of the winter harvest quota during 3 of the 4 years. This allocation of the winter quota allowed harvest across the winter range, and prevented the season in one area being closed because the entire winter quota had been taken in another area.

The 3 fall registration permits were combined in RY04. Harvest quotas for the different areas were retained and portions of the hunt area were closed by emergency order if harvest quotas were filled. This reduced confusion and eliminated the problem of multiple permits being issued to individual hunters who wanted to hunt Fortymile caribou in more than one area during the fall.

Concerns about increased hunting pressure on the moose population in Unit 20E, led to establishment of caribou/moose registration hunts in RY02 under which hunters were only able to possess a registration permit for one species at a time in most of Unit 20E. This was intended to prevent excessive incidental harvest of moose in Unit 20E by FCH hunters.

ADVISORY COMMITTEE COALITION MANAGEMENT RECOMMENDATIONS

GOALS AND OBJECTIVES

Goals

Primary goal: Promote continued growth of the FCH to meet intensive management population and harvest objectives and restore it to its historic range in both Alaska and Yukon.

Secondary goal: Increase the allowable harvest of the FCH when the herd grows.

Objectives

Promote and support management actions to obtain the following FCH Intensive Management Objectives established by the BOG:

- Population objective of 50,000–100,000
- Harvest objective of 1,000–15,000 caribou.

HARVEST MANAGEMENT

Harvest Rate

- Maintain a conservative harvest rate of approximately 2–3% of the herd population.

Allocation of Harvest Between Alaska and the Yukon Territory

- 65% of the harvest will be allocated to Alaska and 35% to Yukon. This effectively means that Alaska's harvest allocation is approximately 2% of the FCH population and 1% is allocated to the Yukon.

Alaska Harvest Quota

- Maintain an annual harvest quota of 850 caribou ($\pm 15\%$), with no more than 25% of the harvest being cows.
- When the FCH (pre-calving) population reaches 50,000 or more animals the harvest will be increased to 1,000 caribou.
- Through information and education programs, encourage hunters to take bull caribou rather than cows in order to keep cow harvest at less than or equal to 25% of the harvest.

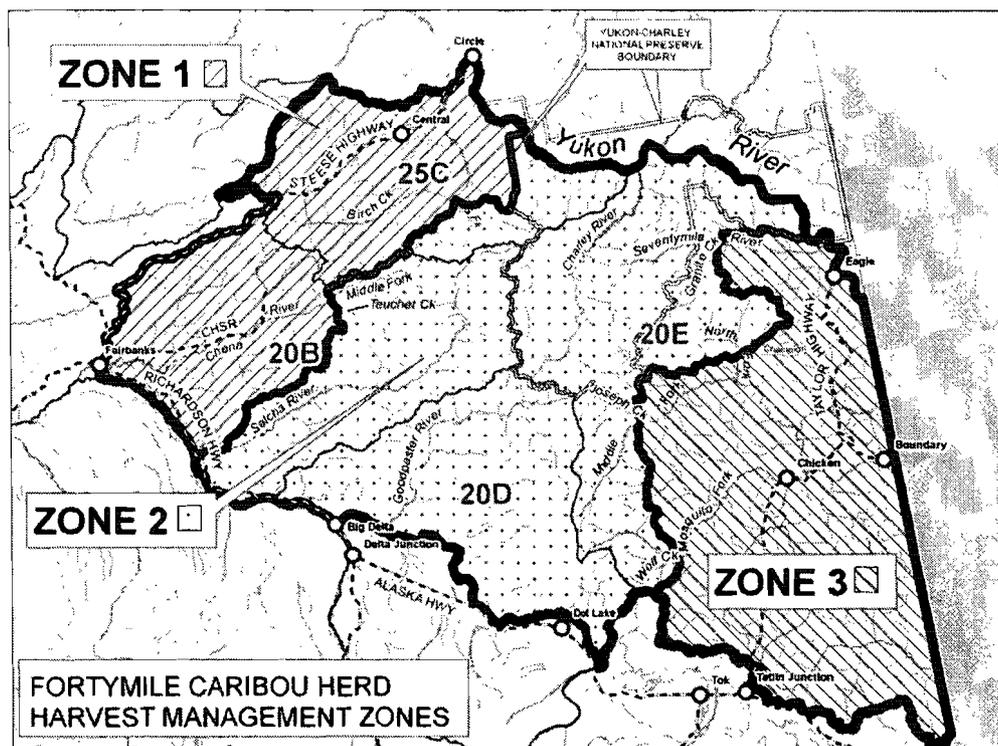
The intent is to keep the average FCH harvest within the 850 quota, but to allow up to a 15% variation in a single year. If the quota is either not reached or exceeded in one year,

harvest allocation may be adjusted the following year to compensate.

There is concern that if bull-only bag limits are applied, increased waste might result if hunters inadvertently take cows and do not salvage them. When hunters are allowed to choose between bulls and cows during the fall season, experience with the FCH and other herds has shown that 60% to 80% of hunters select for bulls. In addition, because of the difficulty in differentiating between cows with antlers and young bulls with antlers, cows are often illegally harvested during bull-only hunts. By allowing either-sex harvest, illegal harvest related to mistaken harvest of cows is eliminated and cows that might be wasted are utilized. In addition, the either-sex season allows hunters to select for cows when the meat quality of bulls is poor at the onset of the rut in late September. To protect against the over-harvest of cows, the cow harvest has been limited to 25% of the annual harvest. A portion of the cow quota is reserved for the winter season. Hunter education is intended as the main mechanism to keep cow harvest at 25% or less.

Harvest Management Zones

Fortymile caribou herd harvest should be managed so that hunters in different parts of the herd's range all have hunting opportunity. The following zones are intended to help manage and distribute FCH harvest (see map of zones below):



Zone 1: The road and trail accessible portion of the herd's range in the vicinity of the Steese Highway and Chena Hot Springs Road.

Zone 2: Generally, the portion of the herd's range that has few roads and trails and access is more difficult. This zone extends down to the Richardson Highway but very few, if any, caribou occur near the highway where they might be available for harvest.

Zone 3: The road and trail accessible portion of the herd's range in the vicinity of the Taylor Highway.

A written description of the areas included in Zone 2 is as follows:

Unit 20E

1. The Charley River drainage.
2. The Seventymile River drainage upstream from and including the Granite Creek drainage.
3. The North Fork of the Fortymile River drainage upstream from, but not including the Champion Creek drainage.
4. The Middle Fork of the Fortymile River upstream from and including the Joseph Creek drainage.
5. The Mosquito Fork of the Fortymile River drainage upstream from and including the Wolf Creek drainage.
6. The drainages within Unit 20E flowing into the Yukon River downstream from the confluence of the Seventy Mile River and Yukon River.

Unit 25C

That portion draining into the South Fork of Birch Creek and the portion within the Yukon-Charley Rivers National Preserve.

Unit 20B

That portion of the Middle Fork of the Chena River drainage upstream from and including the Teuchet Creek drainage and all of the Salcha River drainage.

Unit 20D

That portion north of the south bank of the Tanana River.

Allocation Among Different Seasons and Harvest Management Zones

- 75% of the Alaska harvest quota will be allocated to the fall hunt.
- Fall quota: Zone 1, the Steese Highway-Central and Chena Hot Springs Road area will be assigned 30%; Zone 2, the roadless less accessible areas in the range of the herd, will be assigned a minimum of 25% (additional harvest would be permitted from this zone if caribou were not accessible in either of the other zones, but not to exceed the fall quota); and; Zone 3, the Tok-Taylor Highway area will be assigned 45%.
- 25% of the harvest quota and any surplus from the fall quota will be allocated to the winter hunt.

- Winter quota: 60% will be allocated to the road accessible zone (either Zone 1 or Zone 3) where the majority of the herd is located immediately prior to the opening of the winter season. The remaining 40% of the quota will be assigned to the remaining road accessible Zone. Zone 2 will remain open until the winter quota is reached. Large numbers of caribou are not expected to be readily accessible in this Zone.
- This will allow harvest across the winter range, and prevent the season in one area from being closed because the entire winter quota is taken in another portion of the hunt area.

Hunt Management Recommendations

- ADF&G and federal subsistence program managers should cooperatively manage the fall and winter FCH hunts and continue using a single joint state/federal registration permit.

Participants in the July 7 meeting agreed it is important to maintain a single state/federal registration permit. A registration permit hunt provides important data necessary for timely management of hunts with harvest quotas. A short reporting period is required to manage harvest within the quotas. ADF&G will close all or parts of the state seasons when the harvest quotas for those areas are met. The ADF&G will also work with federal subsistence hunt managers to seek closure of federal seasons when harvest quotas are met, if qualified federal subsistence users have had sufficient opportunity to harvest caribou.

Because of high hunting pressure and low moose numbers in Unit 20E, hunters should not be allowed to possess a Fortymile Caribou registration permit (RC860) and a Unit 20E moose registration permit (RM865) at the same time. Hunters may harvest both species, but should not possess both permits at the same time. Traditionally, caribou hunters and moose hunters have hunted at different times in different areas. This recommended restriction is intended to allow hunters maximum opportunity to hunt their intended quarry without further restricting the moose season.

- In the future, if the FCH reaches a higher population, management of the hunt under a general harvest ticket, instead of a registration permit, should be considered.

Seasons and Bag Limits

The hunting season for the Fortymile caribou herd should be split between a fall hunt and a winter hunt. The split season facilitates hunting during the traditional fall season and allows some communities to take advantage of the proximity of the caribou during the winter. This plan recommends hunting from August 10 to September 30 (fall season) and from December 1 to February 28 (winter season). The federal subsistence winter season will open a month earlier than the state winter season.

- ADF&G should have the authority to announce a 1- to 3-day season for resident

hunters to harvest caribou on state managed lands in the American Summit area near Eagle between October 20 and November 30.

To offer fall hunting opportunity in the Eagle area, this plan recommends that ADF&G have the authority to announce a 1- to 3-day season for resident hunters to harvest caribou on state managed lands in the American Summit area between October 20 and November 30. Permits will only be available in Eagle. This season will be opened if: (1) there has been insufficient local opportunity in September to harvest caribou, and (2) Fortymile caribou are present in the area. This hunt will be conducted as a registration permit hunt and every effort will be made to maintain the harvest at no more than 30 caribou. The animals harvested during this hunt will be counted toward caribou harvested under the winter quota for the Tok-Taylor Highway area. This hunt is intended to accommodate residents of Eagle but would be open to all Alaska residents. If excessive harvest occurs or other problems develop with this hunt, it should be permanently suspended.

Historically, nonresident hunters have selected for large bulls and were not allowed to hunt during the winter season when it may be more difficult to distinguish bulls from cows. Restricting nonresident hunters to taking bulls only should not significantly increase the incidence of cows shot illegally. In addition, the winter hunt is important for meeting the subsistence needs of Alaska residents. Based on this hunt history and the importance of providing for Alaska resident subsistence uses, nonresidents should not be allowed to participate in the winter hunt, at least at the current FCH population level.

- The bag limit for all Fortymile Caribou Herd hunts should remain 1 caribou per regulatory year for residents and 1 bull per regulatory year for nonresident hunters until the population is demonstrated to be more than 100,000 animals, at which time changes in bag limits should be considered.
- Nonresident hunters should be allowed to participate in the fall Fortymile caribou hunt with a bag limit of one bull but there should be no nonresident seasons during the winter hunts.

Hunting methods and access

Access to the Fortymile herd in off-road areas is important to hunters and non-hunters alike. The herd will be monitored throughout the year, and information will be available to the public regarding herd distribution and movements so that conflicts between hunters and non-consumptive users will be minimized.

Some non-hunting road travelers are upset when hunters leave animal parts and viscera either in the roadside ditch or in plain view of the road. Hunters will be required under conditions of the registration permit to move viscera out of view of maintained roads. When large numbers of caribou are crossing major roads, such as the Taylor or Steese Highways, special hunt management provisions are needed to avoid the possibility of excessive harvest and to minimize public safety concerns. Because a narrow no-hunting corridor along a road (e.g., one mile either side of a highway) can be difficult to enforce, this is not the preferred method to define closed areas.

- ADF&G should manage situations where large numbers of caribou are crossing roads by enacting temporary hunting closures in clearly specified areas. Preferred methods are to temporarily close a specific drainage or other easily-delineated broader area, make such an area walk-in only, or delay a hunt opening. Hunters who are disabled and qualify for special licensing will be exempt from such closures along the Taylor and Steese highways.

Information and Education

ADF&G should conduct public information and education programs regarding this Harvest Plan. Hunter information specific to FCH harvest will be included on or with the registration permit. This information might include descriptions of cow and bull caribou, examples of removing viscera from view, harvest reporting requirements, signs or markers used to delineate the hunting area or closures, access routes and access restrictions. Additional educational material should also be provided to help hunters select for bulls when meat quality of bulls is good. Harvest reports will suffice to accurately monitor harvest quota allocation by area and season.

Harvest Management in the Yukon Territory

The specifics of Yukon harvest will be developed by the Yukon Fish and Wildlife Management Board, the Yukon Department of Environment and Yukon First Nations. It is unlikely that Yukon will begin to harvest a significant number of Fortymile caribou until the herd grows much larger and begins to regularly cross into Canada. Yukon residents believe that the herd numbered about 60,000 when Fortymile caribou last entered Yukon in numbers high enough for hunting. Any caribou not harvested by Yukon hunters will not be re-allocated to the Alaska harvest. If the number of caribou harvested does not reach the objective in a given year, the surplus will be used to promote herd growth.

Wolf Predator Control Project

A lethal wolf control program specifically designed to achieve the Intensive Management population and harvest objectives for the FCH was recommended as part of this plan and a wolf predation control program was authorized by the BOG at their March 2006 meeting. The program is being conducted by private citizens, similar to the other on-going wolf control programs in Alaska. The Wolf Predation Control Program previously in place for increasing moose numbers in Units 12 and 20E was expanded to include portions of the FCH range with little increase in the resources needed by ADF&G for program administration.

Grizzly Bear Management Project

Grizzly bear predation on caribou calves is a significant factor in reducing calf survival and herd growth. The Unit 20E Brown Bear Predation Control Area adopted by the BOG in May 2006 as part of the Upper Yukon/Tanana Predation Control Implementation Plan is primarily designed to benefit moose but should also benefit the FCH. In the Upper Yukon/Tanana Predation Control Area the BOG authorized the sale of black bear hides. It

is also legal to sell the hides of brown bears taken in the Unit 20E Brown Bear Predation Control Area. Additional actions which would encourage bear harvest should be considered by the BOG. Additional bear harvest will provide for additional herd growth and achievement of intensive management harvest and population objectives.

**Unit 19D-East Predation Control Implementation Plan and Activities
Division of Wildlife Conservation Report to the Alaska Board of Game
March 2010**

Background

The Unit 19D-East wolf predation control implementation plan was first adopted by the Board of Game in fall 1995. In January 2000, the Board made a finding of emergency regarding the Unit 19D-East situation and extended the Commissioner's authority to reduce wolves during 2000–2005. In March 2001, the Department established the Experimental Micro Management Area (EMMA) to focus predation control and associated management efforts in a relatively small area and to conduct research on the efficacy of the program. In March 2003 the Board re-evaluated the Unit 19D-East wolf predation control program and issued comprehensive new board findings. The Board endorsed the EMMA concept and allowed the department discretion to change the size of the control area to provide for adaptive management.

The wolf predation control program began in regulatory year (RY) 2003 (regulatory year begins on July 1 and ends June 30, e.g., RY03 = July 1, 2003–June 30, 2004). In January 2006, the Board adopted a revised implementation plan in the form of an emergency regulation. The emergency regulation clarified and updated key components of the implementation plan that included: wildlife population and human use information, predator and prey population levels and objectives, plan justifications, methods and means, time frame for updates and evaluations, and miscellaneous specifications.

In May 2006, the Board further modified the emergency regulation, added black and brown bear predation control within the EMMA, deleted the link between the hunting closure in the EMMA and intensive removal of predators, and adopted a final predator control implementation plan. The plan was approved for 5 years, beginning on July 1, 2004. The following prey and predator population levels and population objectives for Unit 19D-East were specified.

- 2004 moose population: 3,444–5,281 (0.5 moose/mi²)
- Moose population objective: 6,000–8,000
- Moose harvest objective: 400–600
- Fall 2000 pre-control wolf population estimate: 198
- Wolf population control objective:
 - As low as possible in EMMA
 - No less than 40 in 19D-East
- Pre-control black bear population estimate:
 - 1,700 in 19D-East
 - 130 in EMMA
- Black bear population control objective:
 - As low as possible in EMMA
 - Maintain as a viable part of natural ecosystem in 19D-East
- Pre-control brown bear population estimate:

- 128 in 19D-East
- 9 in EMMA
- Brown bear population control objective:
 - As low as possible in EMMA
 - Maintain as a viable part of natural ecosystem in 19D-East

In March 2009, the Board of Game reauthorized the predation control implementation plan for a period of 5 years, from July 1, 2009 through June 30, 2014. This plan redefined the EMMA as the bear control area (BCA) and established the wolf control focus area. The focus area includes approximately 4,600 mi² surrounding the villages of McGrath, Takotna, Medfra and Nikolai to concentrate wolf control around villages. The Department has the authority to adjust the size and shape of this area (in RY09, the estimated size of the wolf control focus area was 4,484 mi²). The Board also established the Upper Kuskokwim Villages Moose Management Area (MMA), which includes 1,118 mi² surrounding the village of McGrath and adjacent to Takotna and Medfra. It was created to designate an area where moose numbers are closely monitored and objectives for moose and moose harvest can be applied. The Department has the authority to change the size and shape of the wolf control focus area, the MMA, and the BCA.

In March 2009, the Board of Game also expanded bear control efforts to include bear snaring within the BCA because bear numbers had largely recovered following Department nonlethal bear removal in 2003 and 2004 and because public efforts to reduce bear numbers were not successful. Snaring of any bear will be implemented under bear control permit conditions during spring 2010.

Plan Implementation Activities

WOLF CONTROL

The Board authorized the commissioner to issue public aerial shooting or land and shoot permits as the method of lethal wolf removal pursuant to AS 16.05.783. We exercised discretion to adjust the size of the area where wolf predation control activities would occur within the Unit 19D-East Wolf Predation Control Area. The wolf control zone established when control efforts began in RY03 initially encompassed 1728 mi², surrounding and including the EMMA. Within 2 weeks, it was expanded to 3,210 mi² to allow permittees to take wolves that used the EMMA but were frequently located outside its borders. In RY06, we expanded the wolf control zone to 6,245 mi² to provide local residents with more moose available for harvest by hunters displaced from the EMMA, which was closed to moose hunting. The expanded area included all of Unit 19D-East, west of a north-south line near Telida (153° 20' 0.00" west longitude). In RY09, the wolf control area was restricted to a 4,484 mi² area downriver of 4th of July Creek, Soda Creek, and the Tonzona Rivers.

In RY08, we received 37 applications and issued 7 pilot and 7 gunner permits. These permittees took 19 wolves from Unit 19D East (Table 1). We estimated that 35-59 wolves needed to be taken to reach the control objective.

In RY09, as of January 12, 2009, we received 51 applications and issued 7 pilot and 8 gunner permits. To date, these permittees have taken no wolves from Unit 19D East. We estimate that 55–65 wolves need to be taken to reach the control objective.

Table 1. Wolf control dates, control permits issued and wolves killed.

Year	Authorized dates	Permits issued		Wolves killed		
		Pilot	Gunner	F	M	Total
RY03	Dec. 2003–Apr. 30, 2004	28 ^a		7	10	17 ^b
RY04	Nov. 17, 2004–Apr. 30, 2005	6	11	7	7	14
RY05	Dec. 3, 2005–Apr. 30, 2006 ^c	3	3	3	1	4
RY06	Nov. 1, 2006–Apr. 30, 2007	5	3	2	0	2
RY07	Nov. 1, 2007–Apr. 30, 2008	9	15	13	16	29
RY08	Nov. 1, 2008–Apr. 30, 2009	7	7	8	11	19

^aRecord of number of pilots vs. gunners was lost, some permittees had multiple permits.

^bThree additional wolves were taken illegally outside the control zone.

^cThe wolf control program was closed January 18–27, 2006 due to a court injunction.

BLACK BEAR AND BROWN BEAR CONTROL

The board approved black bear and brown bear control within the EMMA beginning in RY06. We began issuing control permits on September 1, 2006 and continued until June 30 of each regulatory year. Requirements and restrictions for the take of black and brown bears included in the Alaska Hunting Regulations apply to the permittees, except that permittees do not have an individual kill limit and they may set out 10 additional bait stations for black bears, may bait brown bears, and may take brown bears same-day-airborne at bait stations if the bait stations are registered with the McGrath office. In addition, hunting regulations allow permittees to bait black bears, take black bears same-day-airborne at bait stations and sell the raw hide and skull of both black and brown bears if they obtain a department sale tag and permit.

In RY08, we issued 10 black bear control permits and 11 black bear control baiting permits. Also, we issued 11 grizzly bear control permits and 10 grizzly bear control baiting permits. Generally, the same individuals holding black bear permits held grizzly bear permits and monitored the same bait stations. Three grizzly bears and no black bears were taken during RY08 using bear control permits.

In RY09, as of January 12, 2010, we have issued 10 black bear control permits and 5 black bear control baiting permits. Also, we have issued 10 grizzly bear control permits and 5 grizzly bear control baiting permits. No bears have yet been taken using bear control permits.

Status of Prey and Predator Populations

MOOSE POPULATION

Population Size. In fall 2001, we estimated 3,959 moose in Unit 19D-East (0.46 moose/mi²), based on extrapolation of a survey conducted in a 5,204 mi² portion of the unit. Using similar techniques in 2004, we estimated 4,374 moose in Unit 19D-East (0.5 moose/mi²).

In fall 2008, we estimated 5,481 moose in Unit 19D-East (0.61 moose/mi²), based on extrapolation of a survey conducted in a 4,195 mi² portion of the unit. This estimate is below our intensive management objective of 6,000–8,000.

In fall 2009, we conducted a moose population estimation survey within the 1,118 mi² MMA. A preliminary estimate of 1,806 moose was obtained. That estimate will be extrapolated to all of Unit 19D-East when it is finalized.

Harvest. Beginning in RY08, an area in the immediate vicinity of McGrath that had been closed to moose hunting using discretionary permit authority was reopened with a Sept 1–Sept 15 season. Upstream of the village of Takotna on the Tokotna River, the season was Sept 1–Sept 20. Elsewhere within Unit 19D-East, the season was Sept 1–Sept 25. The RY01–RY09 average reported harvest of moose in Unit 19D-East under the registration permit system is 80 per year (range 60–103; Table 2). This harvest is well below our objective of 400–600 moose annually.

Table 2. Unit 19D-East moose registration permit hunt (RM650) results, 2001–2009.

Regulatory year	Successful	Unsuccessful	Did not hunt	Total permits issued
2001–2002	73	137	83	293
2002–2003	98	127	50	275
2003–2004	75	115	66	256
2004–2005	60	109	73	242
2005–2006	71	115	51	237
2006–2007	62	112	74	248
2007–2008	86	99	68	253
2008–2009	103	114	74	291
2009–2010	92	130	72	294

WOLF POPULATION

Population Size. The wolf population density was moderate, with an fall 2000 pre-control population estimate of 198 wolves (23.3 wolves/1000 mi²). We estimated the 2004 fall wolf population was 103 wolves based on the spring 2005 wolf survey, RY04 wolf harvest, and estimated number of pups. No surveys were completed during winter 2006–2007 because of unsuitable survey conditions. However, we estimated the fall 2006 population at 85–110 wolves using our PredPrey model. We estimated the fall 2007 wolf population was 86–114 wolves based on previous population estimates, previous harvest, productivity, survival and immigration. A partial wolf survey was conducted in Unit

19D-East during March 2009, including the entire 6,245 mi² wolf control area and 44–46 wolves were found. The fall 2008 wolf population estimate of 75–99 wolves was based on this survey and previous harvest. The fall 2009 wolf population was an estimated 95–105 wolves, based on previous population estimates, previous harvest, productivity, survival and immigration. A wolf population survey is planned during RY09, but has not been completed as of January 12, 2010.

Harvest. Wolf harvest was 15–44 during RY97–RY09 (Table 3). The desires of local trappers to help reduce predation on moose and a private wolf harvest incentive program have helped to maintain a relatively high level of trapping effort.

Table 3. Reported wolf harvest in 19D, 19D-East, and EMMA; RY97–RY08. Includes wolves taken in wolf control program beginning in RY03.

Regulatory year	Wolf harvest			% 19D-East harvest in EMMA
	19D ^a	19D-East	EMMA	
1997–1998	30	29	22	76%
1998–1999	21	14	3	21%
1999–2000	40	34	12	35%
2000–2001	37	36	17	47%
2001–2002	30	24	7	29%
2002–2003	44	39	22	56%
2003–2004	35(17)	27	7	26%
2004–2005	32(14)	29	15	52%
2005–2006	15(4)	15	7	47%
2006–2007	24(2)	19	5	21%
2007–2008	38(29)	38	5	13%
2008–2009	29 (19)	28	4	14%

^a Number in parenthesis is the number of wolves taken in the wolf control program.

BLACK AND BROWN POPULATIONS

Population Size. In 2005, we estimated the pre-control black bear population at 1,700 in Unit 19D-East by using data from the bear removal program as well as extrapolating bear estimate data from areas with similar habitat. We estimated the brown bear pre-control population at 128 in Unit 19D-East by extrapolating brown bear data from bear removal in the EMMA, as well as extrapolating bear estimate data from areas with similar habitat.

During May 2007, we conducted an aerial black bear survey and estimated 72 independent black bears (60 – 91 95% CI) in the EMMA.

Harvest. During RY01–RY08, 53 black bears were reported taken in Unit 19D East. As of RY03, all black bears taken in Unit 19D East were required to be sealed (average = 7/year; Table 4). In RY03–RY05, registration hunt permits were available for hunters to take 2 additional black bears per year in 19D-East. However, no permits were issued. In RY06, the black bear bag limit was changed from 3 to 5 under general hunting regulations. The maximum number any hunter harvested since RY01 was 2 black bears per year.

During RY01–RY08, 24 brown bears were killed in 19D-East (average = 3/year). Harvest averaged 2/year prior to implementation of the brown bear resident tag fee exemption in 1998. The bag limit for brown bears in Unit 19D was raised to 2/year in RY06 but no hunter has reported harvesting 2 brown bears during any regulatory year.

Table 4. Reported black and brown bear harvest in Unit 19D East RY01–RY08.

Regulatory year	Black bear		Brown bear	
	Hunting harvest	Control take	Hunting harvest	Control take
2001–02	2		4	
2002–03	6		0	
2003–04	8		1	
2004–05	3		4	
2005–06	8		2	
2006–07	1	0	4	0
2007–08	16	0	3	0
2008–09	7	0	2	3

Recommendations to Achieve Plan Objectives

We recommend continuing the predator control program.

**Upper Yukon/Tanana Predation Control Implementation Plan and Activities
Division of Wildlife Conservation Report to the Alaska Board of Game
March 2010**

Background

Residents of the upper Yukon/Tanana drainages have expressed concern, since the early 1980s, about the chronically low density of the Fortymile Caribou Herd (FCH) and of moose in Units 12 and 20E. They felt the low density of caribou was primarily due to wolf predation and the low density of moose was due to a combination of wolf and brown bear predation. During Board of Game meetings in March 2004 and 2006, the Upper Tanana/Fortymile Fish and Game Advisory Committee and the public provided testimony explaining the problem and requested corrective action.

The Board first adopted the Upper Yukon/Tanana Predation Control Implementation Plan in November 2004 to increase the moose population. The plan authorized control of wolves in Units 12 and 20E and control of brown bears in southcentral Unit 20E. The plan was authorized for 5 years, and began on January 1, 2005. In January 2006, the Board adopted a revised implementation plan in the form of an emergency regulation. The emergency regulation limited wolf control activities to northern Unit 12 and southern Unit 20E and clarified and updated key components of the plan that included: boundaries of the bear control area, wildlife population and human use information, predator and prey population levels and objectives, plan justifications, methods and means, time frame for updates and evaluations, and miscellaneous specifications. In May 2006, the Board further modified the emergency regulation and adopted it as a final regulation. Modifications included: adding a goal to increase the FCH, expanding the wolf control area to encompass the FCH range (all of Unit 20E and portions of Units 12, 20B, 20D and 25C), and expanding the brown bear control area to include more of southcentral Unit 20E. In March 2009, the Board reauthorized the implementation plan with modifications. Modifications included: suspending the bear control portion of the plan on July 1, 2009, because it was determined to be ineffective at removing bears from the control area due to a combination of ineffective methods and a lack of incentive to program participants. The plan is in effect for 5 years, and began on January 1, 2009. The Board authorized the commissioner to issue public aerial shooting permits or public land and shoot permits as methods of wolf removal pursuant to AS 16.05.783. Objectives of the plan, as listed in 5 AAC 92.125, are to:

- Increase the Fortymile Caribou Herd to aid in achieving the intensive management population objective of 50,000–100,000 and harvest objective of 1,000–15,000.
- Increase the moose population in Unit 12 north of the Alaska Highway and in Unit 20E to aid in achieving the geographically proportional intensive management moose population objective of 8,744–11,116 and harvest objective of 547–1,084.

Plan Implementation Activities

2008–2009 CONTROL PROGRAM

We conducted control activities during regulatory year (RY) 2008 under authority of the wolf and brown bear control program adopted by the Board in November 2004 and modified in January 2006 (regulatory year begins on July 1 and ends June 30, e.g., RY08 = July 1, 2008–June 30, 2009).

Wolf Control. We conducted wolf control activities in: that portion of Unit 12 north of the Alaska Highway; that portion of Unit 20D within the Goodpaster River drainage upstream from and including the South Fork Goodpaster River drainage, and within the Healy River, and the Billy and Sand creek drainages; that portion of Unit 20B within the Salcha River drainage upstream from and including the Goose Creek drainage, and within the Middle Fork of the Chena River drainage; all of Unit 20E; and that portion of Unit 25C within the Birch Creek drainage upstream from the Steese Highway bridge, and within the area draining into the south and west bank of the Yukon River upstream from the community of Circle. We received 73 applications for public wolf control permits and issued 53 permits (25 pilots, 28 gunners). The control program was in effect during October 6, 2008–April 30, 2009. Permittees were allowed to take wolves using aerial shooting or land and shoot methods. They took 49 wolves, and an additional 87 and 84 wolves were taken by hunters and trappers and Department of Fish and Game personnel in helicopters, respectively (Table 1). We were unable to reduce the population to 88–103 wolves, as specified in the predator control implementation plan adopted by the Board in May 2006 and reauthorized in March of 2009.

Table 1. Wolf harvest and wolf control take in the Upper Yukon/Tanana Predator Control Area, RY01–RY08.

Regulatory Year	Hunting and Trapping Harvest	Wolf Control Take	F&G Helicopter Take	Total Kill
2001–2002	50	-	-	50
2002–2003	65	-	-	65
2003–2004	56	-	-	56
2004–2005	75	58	-	133
2005–2006	69	17	-	86
2006–2007 ^a	80	23	-	103
2007–2008 ^a	70	27	-	97
2008–2009 ^a	87	49	84	220

^a Control area expanded to include all of the FCH range in Alaska.

Brown Bear Control. We conducted brown bear control activities in that portion of Unit 20E within the South Fork Fortymile River drainage upstream from and including the Butte Creek drainage, the Middle Fork Fortymile River drainage upstream from but not

including the Joseph Creek drainage, and the Sixtymile and North Ladue river drainages. We issued 44 control permits to the public, and registered 20 brown bear bait sites. The control program was in effect during August 1, 2008–June 30, 2009. Requirements and restrictions for the take of brown bears included in the Alaska Hunting Regulations applied to the permittees, except that permittees did not have an individual kill limit, they had the option to bait brown bears and take brown bears same-day-airborne at bait stations if the bait stations were registered with our Tok office. Permittees took 2 brown bears, and an additional 8 bears were taken by hunters (Table 2). Two bears were taken at bait sites. We were unable to reduce the population to 68 bears, as specified in the predator control implementation plan adopted by the Board in May 2006.

Table 2. Brown bear harvest and brown bear control take in the Upper Yukon/Tanana Predator Control Area, RY01–RY08.

Regulatory Year	Hunting	Brown Bear Control Take	Total Kill
2001–2002	6	-	6
2002–2003	9	-	9
2003–2004	11	-	11
2004–2005	8	2	10
2005–2006	7	3	10
2006–2007 ^a	2	1	3
2007–2008 ^a	5	6	11
2008–2009 ^a	8	2	10

^a Control area expanded to include a larger portion of southcentral Unit 20E.

2009–2010 CONTROL PROGRAM

We are conducting control activities during RY09 under authority of the wolf control program reauthorized by the Board in March 2009.

Wolf Control. We are conducting wolf control activities in: that portion of Unit 12 north of the Alaska Highway; that portion of Unit 20D within the Goodpaster River drainage upstream from and including the South Fork Goodpaster River drainage, and within the Healy River, and the Billy and Sand creek drainages; that portion of Unit 20B within the Salcha River drainage upstream from and including the Goose Creek drainage, and within the Middle Fork of the Chena River drainage; all of Unit 20E; and that portion of Unit 25C within the Birch Creek drainage upstream from the Steese Highway bridge, and within the area draining into the south and west bank of the Yukon River upstream from the community of Circle. We received 82 applications for public wolf control permits and issued 57 permits (25 pilots, 32 gunners). The control program will be in effect during October 27, 2009–April 30, 2010 or until the wolf population is reduced to the control objective of 88–103 specified in the predator control implementation plan reauthorized by the Board in March 2009. We estimate that 159–196 wolves will need to be taken to reach the upper end of the control objective. To date, 8 wolves have been taken by control permittees.

Brown Bear Control. The bear control portion of the plan was suspended on July 1, 2009. No permits will be issued for bear control in RY09.

Status of Prey and Predator Populations

CARIBOU POPULATION

Population Composition. Fall surveys indicated there were an estimated 37, 33 and 34 calves per 100 cows in 2007, 2008 and 2009 respectively. Calves per 100 cows averaged 27 during the prior 5 years (fall, 2002–2006).

Population Size. Based on results from a photo census, the July 2009 minimum herd size was estimated at 46,509 caribou. The last successful photo census was completed on the herd in July of 2007, with 38,364 caribou counted. The next photo census is planned for June 2010. The May 2010 herd size is expected to show an increase over 2009, assuming normal to below normal late-winter mortality. Herd size remains below the intensive management objective of 50,000–100,000.

Harvest. Harvest is guided by the FCH Harvest Plan (2006–2012), which was developed by a coalition of fish and game advisory committees and the Eastern Interior Regional Subsistence Advisory Council in cooperation with Yukon First Nations, the Yukon government, US Bureau of Land Management and the Alaska Department of Fish and Game. The plan calls for continuing the present registration permit system with a conservative harvest rate of 2% or 850 animals to facilitate herd growth.

Average annual harvest during RY02–RY06 was 820. Harvest during RY07, RY08 and RY09 was 1,011, 893 and 1,080 respectively. Based on our current population estimate and using guidelines in the FCH Harvest Plan, the harvest quota for RY10 will be approximately 850 caribou. The harvest quota is below the intensive management objective of 1,000–15,000 caribou.

MOOSE POPULATION

Population Composition. Since the beginning of the control program in January of 2005, we conducted surveys in a 4,630mi² area of southern Unit 20E during each fall (2005 – 2008). In this area, the estimated calves per 100 cows were 23, 31, 26, and 30 and yearling bulls per 100 cows 11, 6, 11, and 16 during each of these years respectively. During fall 2000–2004, calves and yearling bulls per 100 cows averaged 18 and 9, respectively. Additional surveys are planned during fall 2010. Current data suggests the proportion of young moose may be increasing in a portion of southern Unit 20E where the wolf population was reduced by $\geq 70\%$ of the precontrol fall population level during 2005–2009.

Population Size. We estimated the moose population size in Unit 12 north of the Alaska Highway and Unit 20E at 2,600–4,300 in 2004, 3,400–5,100 in 2005, 4,000–5,900 in 2006, 4,000–6,100 in 2007, 3,900–5,500 in 2008 and 4,700–6,600 in 2009. These

estimates were based on extrapolations from fall surveys conducted in a 4,630 mi² area of southern Unit 20E during 2004–2009 and surveys conducted within a 1,200 mi² area of the Yukon Charley Rivers Preserve in northern Unit 20E in 2003 and 2006. Additional surveys are planned for fall 2010. The current population is well below the intensive management objective of 8,744–11,116 and is likely stable in the overall area. However, current data suggests the population may be increasing within a portion of southern Unit 20E where the wolf population has been reduced by $\geq 70\%$ of the precontrol fall population level during 2005–2009.

Harvest. Average harvest of moose in Unit 12 north of the Alaska Highway and in Unit 20E during RY02–RY06 was 142. Harvest during RY07, RY08 and RY09 was 151, 189 and 180 respectively. Based on current 2009 estimates of recruitment and a 4% harvest rate of bulls only, the harvestable surplus was 188–264, well below the intensive management harvest objective of 547–1,084.

WOLF POPULATION

Population Size. We estimated the pre-control population in the current wolf control area during fall 2004 was 350–410 in 50–70 packs or approximately 18–2 wolves/1000 mi². This estimate was based on department wolf surveys, wolf research in interior Alaska and Yukon, anecdotal observations, trapper and hunter interviews, and sealing records.

During RY04, wolves were reduced due to predation control activities and hunter and trapper harvest. We estimated the fall 2005 population in the current wolf control area was 300–375 wolves in 50–70 packs (approximately 16–19 wolves/1,000 mi²). This estimate was based on information from wolf research in Interior Alaska and Yukon, wolf control permittee reports, our observations, and sealing records.

During RY05, RY06 and RY07, additional wolves were taken by wolf control permittees, hunters and trappers. Using our PredPrey model, we estimated the fall 2006, 2007, 2008 and 2009 wolf population in the current wolf control area at 300–425, 366–398, 393–431 and 262–299 wolves respectively. The model uses the relationship between spring wolf, moose and caribou population size to predict a likely growth rate for the wolf population to fall. Mathematical equations which define model functions were taken from published predator-prey studies conducted across North America.

Harvest. Hunting and trapping harvest of wolves in the current control area during RY 01–RY08 averaged 69 annually (Table 1). An additional 58, 17, 23, 27 and 49 wolves were taken in the wolf control program during RY04–RY08, respectively. In March 2009, helicopters were used by Department staff to take 84 more wolves to bring the total number of wolves taken from the control area to 220 in RY08.

BROWN BEAR POPULATION

Population Size. In June 2004 we estimated the pre-control brown bear population within the current brown bear control area was 170 bears. The estimate was based on

extrapolation of a density estimate obtained in central Unit 20E during 1986 and on intensive research studies conducted in similar habitats with similar bear food resources during 1981–1998 in Unit 20A, 100 miles to the west.

During May 20–July 18, 2006, we conducted a DNA-based mark-recapture estimate of brown bear numbers in a 2005 mi² portion of the current bear control area. The survey area core population estimate was 48 bears (20.8/1000 km²). The core population is the average number of brown bears within the survey area. Extrapolation of these data resulted in an estimate of 150 bears (111–189) in the entire control area in summers of 2006–2009. This is higher than the 114–143 bears reported to the board in March 2007 and is the result of a more thorough understanding of the differences in bear distribution within the survey area.

Harvest. Hunting harvest of brown bears in the current control area during RY01–RY08 averaged 7 annually (Table 2). An additional 2, 3, 1, 6 and 2 bears were taken in the bear control program during RY04–RY08, respectively.

Recommendations to Achieve Plan Objectives

We recommend continuing wolf control activities as approved by the Board. Wolf reduction objectives have not been achieved for a variety of reasons, including lack of snow cover for tracking wolves and landing aircraft, dense tree cover in parts of the control area, and the high price of aircraft fuel. However, progress is being made, and the program should be continued to allow operations during more favorable snow conditions. In addition, department conducted control is recommended to help achieve wolf reduction objectives in areas where permittee efforts alone are unlikely to result in objectives being met.

Brown bear reduction objectives have also not been achieved. The bear control portion of the UYTSCP was suspended on July 1, 2009, because authorized control methods were not effective and more extreme methods such as snaring, same-day-airborne, or sale of tanned hides were not supported by the Department. However, results of the recent brown bear population survey indicate bear density within burned portions of the control area is likely lower than initially thought which may benefit moose calf survival in those areas. Benefits to moose calf survival associated with the fires of 2004 and wolf control efforts appear to be adequate to make progress toward prey population objectives.

While bear control was not effective under the conditions in this control area, we do not feel brown bear baiting, same-day-airborne at bait-stations and sale of raw hides would necessarily be ineffective in other areas. Following 5-years of implementation, it is clear that the likelihood of success of future bear control programs should be assessed on a case-by-case basis. A specific method, or combination of methods, may prove ineffective in one area, but may be successful in another.

**Unit 19A Wolf Predation Control Implementation Plan and Activities
Division of Wildlife Conservation Report to the Alaska Board of Game
March 2010**

Background

Prior to 2004, the Central Kuskokwim Fish and Game Advisory Committee had expressed concern to the Board about declining moose numbers in both Units 19A and 19B. The committee submitted several regulation proposals and recommended wolf predation control to halt the decline of the moose population and boost moose numbers in the area. In response to the concerns of the advisory committee and other users, the Alaska Department of Fish and Game initiated a comprehensive planning process for the area with a citizen based planning committee composed of a broad cross-section of stakeholders in Units 19A and 19B wildlife management. Upon reviewing information on the moose populations the majority of the Central Kuskokwim Moose Management Planning Committee agreed:

“There is a major concern that the moose populations in Units 19A and 19B will not meet the needs of local subsistence users and other consumptive users. Local observations and available scientific data indicate that the moose population has substantially declined and in some areas is very low and will continue to jeopardize subsistence and other uses.”

The Central Kuskokwim Moose Management Plan was developed by the planning committee and is a comprehensive plan for the area that included a recommendation for a wolf predation control program for Units 19A and 19B. The control program is one component of a multifaceted plan to rebuild the moose populations in the Central Kuskokwim region. The planning committee recommended that the first priority for wolf predation control efforts should be the areas most important for providing moose for subsistence uses. Unit 19A is where the majority of subsistence moose hunting by local residents and residents of Unit 18 occurs.

A wolf control implementation plan was first adopted by the Board of Game in March 2004 for the Central Kuskokwim and consisted of Units 19A and 19B. It was approved for 5 years and began on July 1, 2004. The Board authorized the commissioner to issue public aerial shooting permits or public land and shoot permits for Unit 19A only as methods of wolf removal pursuant to AS 16.05.783. In January 2006, the Board adopted a revised implementation plan in the form of an emergency regulation. The emergency regulation limited control activities to Unit 19A to make it consistent with the Board's previous findings that implemented wolf control in Unit 19A only. Also, the emergency regulation clarified and updated key components of the plan that included: wildlife population and human use information, predator and prey population levels, and objectives, plan justifications, methods and means, time frame for updates and evaluations, and miscellaneous specifications. In May 2006, the Board further modified the emergency regulation and adopted it as a final regulation. Authorization to issue

public aerial shooting permits or public land and shoot permits was reaffirmed, and the following prey and predator population estimates and population objectives were specified.

- 2006 moose population: 2,700–4,250
- Moose population objective: 7,600–9,300.
- Fall 2004 precontrol wolf population: 125–150
- Wolf population control objective: 30–36

In March 2009, the Board of Game reauthorized the wolf control implementation plan for a period of 5 years, from July 1, 2009 through June 30, 2014. This reauthorization established a Central Kuskokwim Villages Moose Management Area (MMA) within the drainages of the Holitna, Hoholitna, and Stony Rivers to focus intensive management activities, including wolf control and habitat management, in a relatively small, accessible area. The department has the discretion to adjust its size and shape up to 40% (approximately 4,000 mi²) of Unit 19A.

Plan Implementation Activities

2008–2009 CONTROL PROGRAM

We conducted control activities during regulatory year (RY) 2008–2009 in Unit 19A under authority of the wolf control implementation plan adopted by the Board in May 2006 (regulatory year begins on July 1 and ends on June 30, e.g. RY 08=July 1, 2008–June 30, 2009). We received 71 applications for public wolf control permits and issued 41 permits, 16 to pilots and 25 to gunners. The control program was in effect during November 1, 2008–April 30, 2009. The control objective of 30–36 was specified in the the May 2006 plan. To achieve the upper end of this objective we needed to remove 48–54 wolves. Thirty-one wolves were reported taken. (Table 1).

Table 1. Wolf harvest and wolf control take in Unit 19A, RY01–RY08.

Regulatory Year	Hunting and Trapping Harvest	Wolf Control Take	Total Kill
2001–2002	49	-	49
2002–2003	25	-	25
2003–2004	30	-	30
2004–2005	29	43	72
2005–2006	33	47	80
2006–2007	3	7	10
2007–2008	9	15	24
2008–2009	11	20	31

2009–2010 CONTROL PROGRAM

We are conducting control activities during RY09 in Unit 19A under authority of the wolf control implementation plan adopted by the Board in March 2009. As of January 11, 2010, we had received 62 applications for public wolf control permits and issued 18 permits, 12 to pilots and 6 to gunners. The control program will be in effect during November 1, 2009–April 30, 2010 or until the control objective of no fewer than 30–36 wolves is achieved, as identified in the March 2009 plan. To achieve the upper end of this objective we need to remove 36–60 wolves, and as of January 11, 2010, no wolves had been reported taken.

Status of Prey and Predator Populations

MOOSE POPULATION

Population Composition. In November 2005, we conducted composition surveys in central Units 19A and B in the Holitna–Hoholitna drainage and in western Unit 19A in the Aniak drainage including the Kuskokwim River from Lower Kalskag to Napaimiut. In central Units 19A and B, a total of 307 moose were observed and the bull:cow ratio was 8:100 with most bulls classified as yearlings (12 of 19). The calf:cow ratio was 24:100. In western Unit 19A, a total of 410 moose were counted, with a bull:cow ratio of 20:100 and a calf:cow ratio of 23:100. No composition surveys were completed during November 2006 because survey conditions were unsuitable.

In May 2007, we conducted twinning surveys in Unit 19A in the Aniak and Holitna River drainages. In the Aniak drainage, too few moose were located to provide for a meaningful analysis. In the Holitna River drainage, we located 71 moose, with 7 of 11 litters produced twins (64% twinning rate).

In November 2007, we conducted composition surveys in the Aniak drainage including the Kuskokwim River from Aniak to Lower Kalskag and in the Holitna drainage within the Holitna, Titnuk, and Hoholitna Rivers. In the Aniak survey we found 122 moose, including 68 cows, 35 calves (including 6 sets of twins and one set of triplets; 51 calves:100 cows), and 28 bulls:100 cows. In the Holitna survey, we found 200 moose, including 111 cows, 50 calves (including 9 sets of twins; 45 calves:100 cows), and 35 bulls:100 cows.

In November 2008, we conducted composition surveys in the Aniak drainage including the Kuskokwim River from Aniak to Lower Kalskag and in the Holitna drainage within the Holitna, Titnuk, and Hoholitna Rivers. In the Aniak survey we found 51 moose, including 31 cows, 7 calves (including 1 sets of twins; 23 calves:100 cows), and 42 bulls:100 cows. This sample size is less than ideal. In the Holitna survey, we found 117

moose, including 77 cows, 21 calves (including 3 sets of twins; 27 calves:100 cows), and 34 bulls:100 cows.

In November 2009, we conducted composition surveys in the Holitna drainage within the Holitna, Titnuk, and Hoholitna Rivers. We found 129 moose, including 69 cows, 25 calves (including 6 sets of twins; 36 calves:100 cows), and 51 bulls:100 cows.

Population Size. In March 2006, we estimated 2,700–4,250 moose ($0.27\text{--}0.42$ moose/mi²) were present in Unit 19A. This estimate was corrected for moose sightability and was based upon extrapolation of population estimation surveys conducted in the entire area south of the Kuskokwim River in February 2005 (0.27 moose/mi² $\pm 16\%$, 90% CI) and south of the Kuskokwim between Kalskag and Crooked Creek in March 2006 (0.39 moose/mi² $\pm 15\%$, 90%CI; 3440 mi²). The estimated population is well below the objective of 7,600–9,300 moose.

In March 2008 we estimated 3200–5275 moose ($0.32\text{--}0.53$ moose/mi²) were present in Unit 19A. This estimate was based upon extrapolation of a population survey conducted in 3,874 mi² of the Holitna, Hoholitna, and Stony River drainages (0.55 moose/mi² $\pm 28\%$ at 90% CI) that was corrected for moose sightability.

It appears that moose numbers within the Holitna, Hoholitna, and Stony River drainages increased between 2006 and 2008. Analysis of survey data from the 3874 mi² survey area indicated a density of 0.28 moose/mi² ($\pm 17\%$ at 90% CI) in 2006 and $.44$ moose/mi² ($\pm 28\%$ at 90% CI) in 2008. Neither estimate was corrected for sightability. This apparent growth is coincident with reduction of wolves to a very low level in these drainages.

Harvest. Based upon current estimates of recruitment, population density and bull:cow ratios, there is no harvestable surplus of moose in eastern Unit 19A (upstream from and excluding the George River). The hunting season was closed in eastern Unit 19A beginning in RY06, with the exception of the Lime Village Management Area (LVMA). Hunting is currently allowed in the LVMA under a state Tier II permit during August 10–September 25 and November 20–March 31 with a bag limit of 2 bulls and under a federal community harvest system during July 1–June 30 with a quota of 28 bulls. One bull was reported taken during RY08 under the state and federal hunts.

In western Unit 19A (downstream from and including the George River), the harvestable surplus is estimated to be 60 bulls. Beginning in RY06, hunting in this area was restricted to a state Tier II permit hunt with 200 permits issued and a federal permit hunt with 100 permits issued during September 1–20. The bag limit was 1 bull. Reported harvest during RY06 included 26 bulls taken by Tier II permittees and 6 bulls taken under the federal permit. During RY07, 230 Tier II and 100 federal permits were issued. Reported harvest included 54 bulls taken by Tier II permittees and 16 bulls taken under the federal permit. During RY08, 230 Tier II and 97 federal permits were issued. Reported harvest included 56 bulls taken by Tier II permittees and 11 bulls taken under the federal permit. During

RY09, 231 Tier II and 92 federal permits were issued. Preliminary reported harvest included 51 bulls taken by Tier II permittees and 13 bulls taken under the federal permit.

In addition, moose are allowed to be taken outside normal seasons and bag limits consistent with 5 AAC 92.019 for Alaska Native funerary or mortuary religious ceremonies. During RY06, 4 parties took 2 moose, including 1 bull and 1 cow. During RY07, 9 parties took 4 moose, including 4 bulls and 0 cows. During RY08 21 parties took 19 moose, including 15 bulls and 4 cows with 2 parties reporting unsuccessful hunts and no parties failing to report. During RY09 to date, 5 parties took 4 moose including 3 bulls and 1 cow, and one reported being unsuccessful, while 5 parties have contacted us but had not reported as of January 11, 2010.

WOLF POPULATION

Population Size. We conducted a complete wolf survey in Unit 19A in January and March of 2006, and estimated 107–115 wolves in 26–27 packs or approximately 1.1–1.2 wolves/100 mi². Sixty-seven wolves were reported killed after the survey was completed, leaving an estimated 40–48 wolves in the population when all take of wolves by control program permittees and hunters and trappers was suspended by emergency order on April 4, 2006.

We conducted a complete wolf survey in Unit 19A in February 2008, and estimated 74 wolves in 17 packs or approximately 0.74 wolves/100 mi². Prior to this survey, 4 wolves were reported killed during August 2007.

Harvest. Hunting and trapping harvest during RY01–RY08 averaged 24 wolves annually (Table 1). Periodically, higher harvests occurred and are probably related to effects of snow on travel in the Aniak and Holitna drainages. An additional 43, 47, 7, 15, and 20 wolves were taken in the wolf control program during the last 5 regulatory years, respectively.

Recommendations to Achieve Plan Objectives

We recommend continuation of wolf control activities.

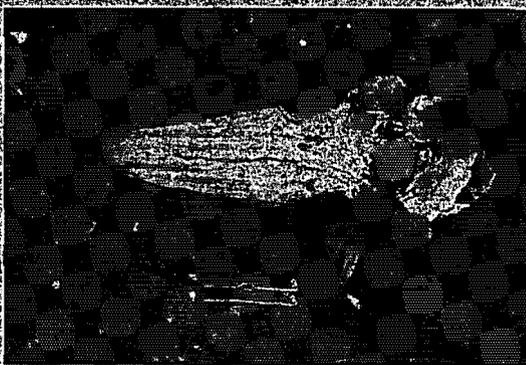
Wood Bison Project Update



Alaska Board of Game
February-March 2010



Wood bison bones have been found on Yukon Flats and other parts of Alaska



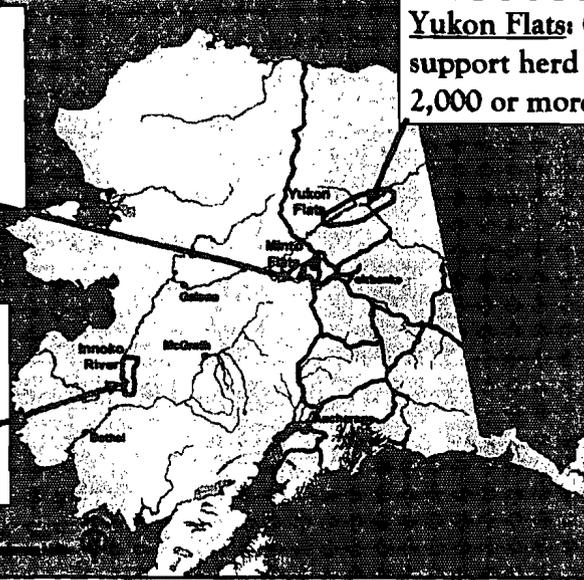
Bison horn core found on the
Porcupine River

The sites now being considered include:

Minto Flats:
Potential for
herd of about
500 wood
bison

Yukon Flats: Could
support herd of
2,000 or more bison

Lower Innoko:
Potential for at
least 400 animals,
but region could
likely support more



2005 Wood Bison Restoration Advisory Group

Representatives of:

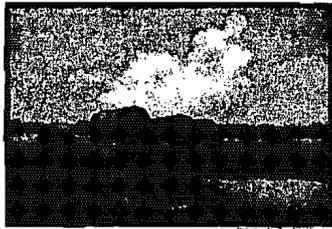
- local villages and fish and game advisory committees
- Sportsman's organizations
- Environmental groups
- Native organizations
- Animal welfare interests



The Wood Bison Restoration Advisory Group unanimously supported moving forward with wood bison restoration and continuing to consider all three potential release sites.

April 2007 - Wood Bison Environmental Review

Wood Bison Restoration in Alaska:
A Review of Environmental and Regulatory Issues and
Proposed Decisions for Project Implementation



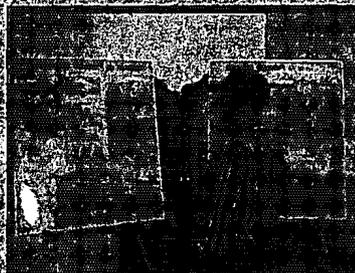
Alaska Department of Fish and Game
Division of Wildlife Conservation



April 2007

- Over 90% of the comments favored wood bison restoration in Alaska.
- Many comments supported restoring wood bison in the Minto Flats area first because it is primarily state land in the Minto Flats State Game Refuge.

Strong Public Support



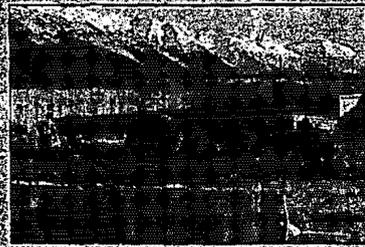
Decision after Environmental Review, December 2007

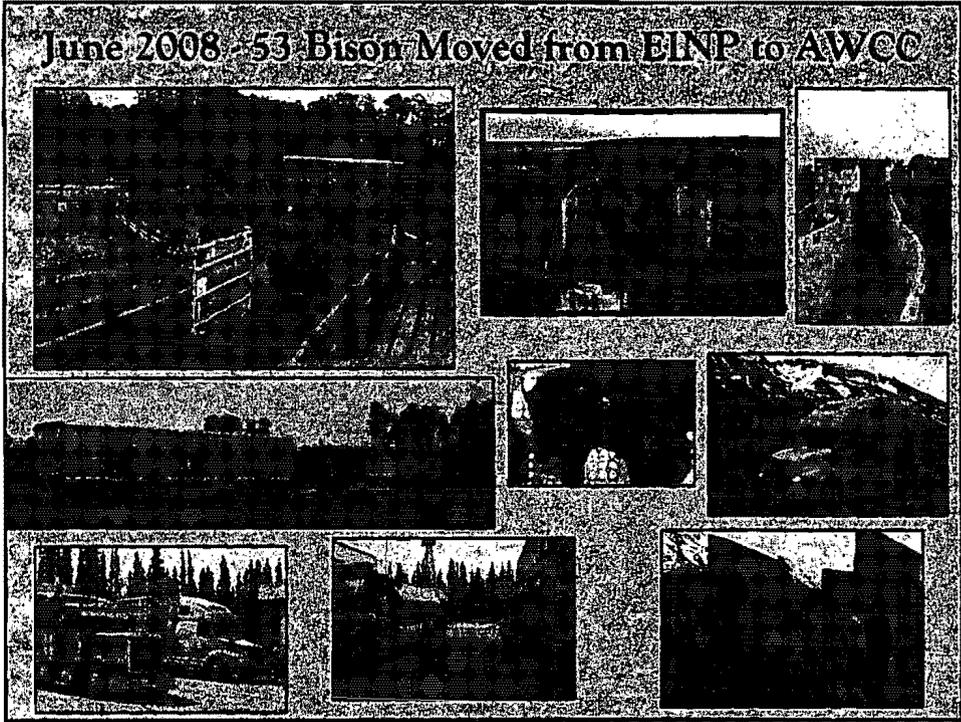
- Minto Flats would be first site for wood bison restoration.
- Follow with restoration on Yukon Flats and/or the lower Innoko/Yukon River area as soon as possible.



Alaska Wildlife Conservation Center: an essential partner

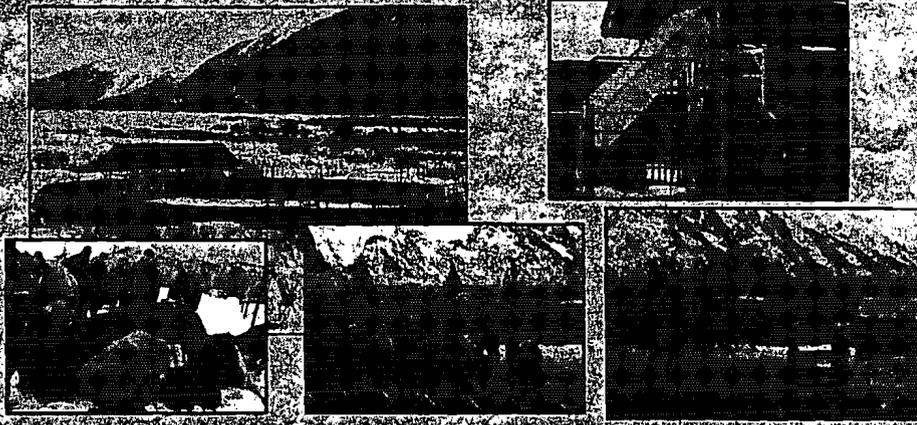
- Located at Portage about 45 miles southeast of Anchorage.
- Temporary handling facility to maintain bison and complete disease testing until wood bison can be released in the wild.





Wood Bison Health Certification Program

- Currently 82 bison at Alaska Wildlife Conservation Center
- ADF&G and DEC are completing a comprehensive disease testing and health certification program, in addition to extensive testing done in Canada.



- Wood bison handled and tested in November 2008, March 2009, and February 2010
- All test results so far indicate herd is healthy and that bison will be suitable for release

ESA Issue

- In 2004 FWS indicated that wood bison in Alaska would not be treated as an endangered species.
- In 2007-2008 FWS reevaluated the status of wood bison under the ESA and determined that wood bison have status as an endangered species "wherever they occur," including Alaska.



ESA Issue (continued)

- Change in legal interpretation provides:
 - legal clarity (removes the threat of a petition for listing or legal challenge over endangered status)
 - an opportunity to develop a special rule - reduce the regulatory requirements



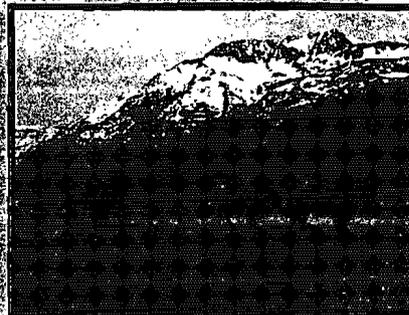
ESA Issue (continued)

- In 1982 Congress added section 10(j) to the ESA specifically to reduce regulatory requirements for reintroduced populations
- Reduce opposition among land owners and other development interests



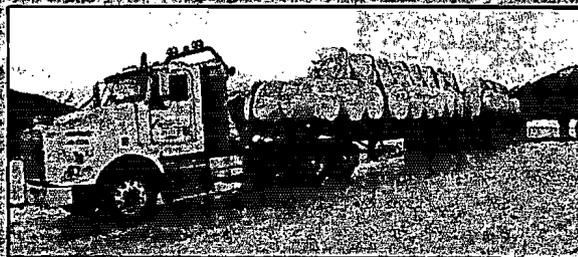
ESA Issue (continued)

- ADF&G is working with Department of Law (ADOL), DNR and FWS to develop a 10(j) rule designating wood bison in Alaska as a "nonessential experimental population" or NEP.
- Wood bison in Alaska meet legal requirements for NEP status.



A section 10(j) rule will:

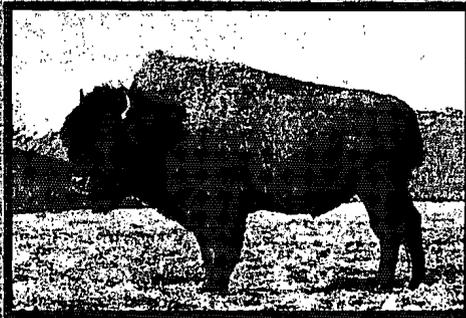
- Virtually eliminate requirements to consult with the FWS about other resource development activities that might affect wood bison or their habitat.



Carlisle Transportation delivering hay to AWCC

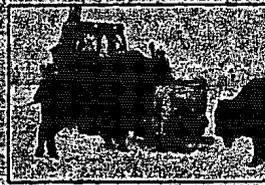
10(f) rule (continued)

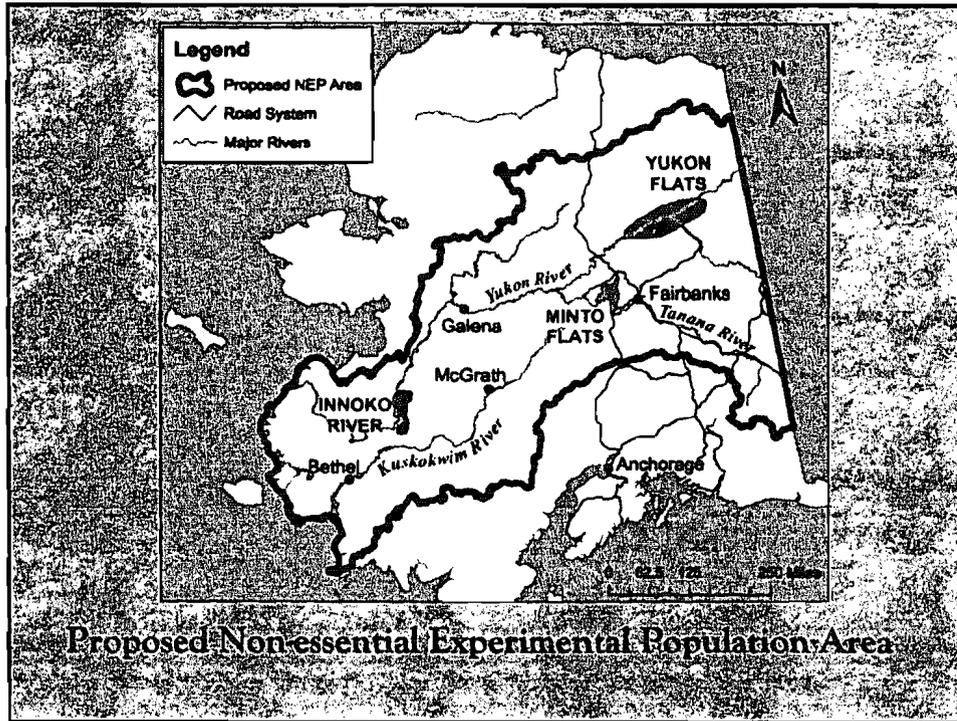
- ESA prohibits designation of "critical habitat" for NEP's, which could otherwise restrict land use activities that might adversely affect an endangered species.



10(f) rule (continued)

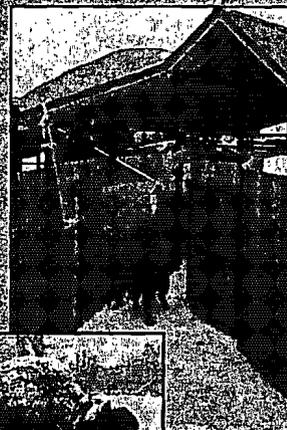
- Draft rule includes provisions to allow "incidental take," provide for state management, regulated harvest in the future, allow hazing bison, taking in defense of life, etc.
- No legal action if wood bison are "incidentally taken" (for example, disturbed, injured or killed in connection with other resource development)





Petition to Downlist Wood Bison to "Threatened"

- Petition submitted in 2007 by Canada's Wood Bison Recovery Team
- FWS may propose delisting rather than downlisting—status in Canada improved



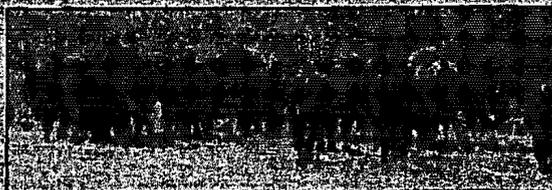
Concerns About the ESA

- In January 2009 Doyon, Ltd recommended that the Governor and legislature "halt and reverse" the wood bison project
- Senate resolution (SCR 2) opposing wood bison release proposed
- ADF&G and ADOL distributed paper responding to concerns about the ESA and explaining how the state will address them



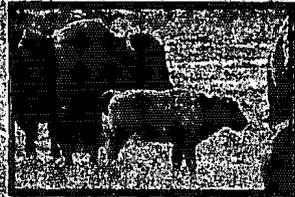
Efforts to Inform Public about Wood Bison and the ESA

- Meetings with DNR to develop understanding of 10(j) rules
- Dept. of Law analysis of litigation on previous 10(j) rules - none overturned
- Presentations to the Fairbanks Chamber of Commerce, Alaska Miners' Association and others



State Actions

- No action taken on SCR 2 last year
- ADE&G, ADOL, ADNR and Governor's Office evaluated the situation and agreed to pursue a suitable 10(j) rule and then decide whether to proceed
- ADOL, DNR and ADE&G see NEP designation as legally sound and appropriate solution
- Wood bison cannot be released until final rule or delisting in place



10(j) Process Moving Forward

- FWS, ADE&G, ADOL and ADNR developed draft 10(j) rule
- In August 2009 Governor's Office approved going ahead with 10(j) process
- FWS now working to publish proposed rule in Federal Register



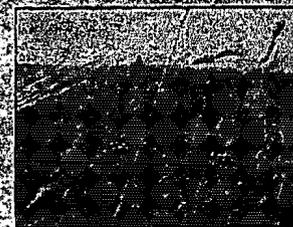
Possible Release Timeline

- Proposed rule and EA to be published soon – public comment
- Final federal regulations or delisting action possible by late 2010
- First release could occur in 2011 – a delay is possible



Potential Development Near Release Sites

- Petroleum exploration in Minto and Yukon Flats
- Natural gas pipeline along eastern edge of Minto Flats
- Proposed agricultural development south of Minto Flats, west of Nenana
- Donlin Creek mine about 40 miles from lower Yukon/Innoko site
- Current sensitivity to ESA issue greatest for Minto and Yukon Flats



Additional Considerations

- Yukon Flats has best habitat and could support the largest wood bison herd. FWS no longer in opposition
- Concerns remain about flooding and snow depth in the lower Yukon/Innoko area.



Yukon Flats meadows



Spring 2009 flooding on the Innoko River

Future Harvest Management

- Must address state subsistence law at all sites
- Yukon Flats and the lower Yukon/Innoko areas involve federal lands and subsistence issues
- ADF&G is committed to ensuring that the benefits of wood bison restoration are shared among local and non-local residents of Alaska and others.
- Future harvest management and access will be addressed in site-specific planning efforts.



Recent Public Comment

- Yukon Flats AC resolution of support Oct, 2008
- Nenana, Minto and Birch Creek village councils passed resolutions opposing wood bison restoration in spring 2009
- Letter of support from Eastern Interior Regional Advisory Council in September 2009
- Lower Yukon Sub Region (encompassing the GASH villages) passed a resolution of support in December 2009



Residents of the lower Yukon/Innoko area gather to discuss the AC in October 2009

Conclusions

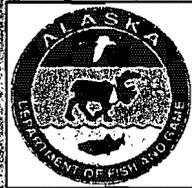
- Continued political support necessary to move forward and release bison - wood bison supporters need to stay involved
- Final ESA actions should provide assurances needed for wood bison to be restored at all three sites
- The lower/Innoko Yukon may be best site for initial planning
- Allow time for NEP status or downlisting before initiating planning efforts on Yukon Flats or Minto Flats
- Hope to complete bison restoration projects over period of about 5-6 years



Widely Supported--Major Contributors

ADF&G greatly appreciates the partnership with the Alaska Wildlife Conservation Center and contributions and support provided by:

- The Turner Foundation
- Safari Club International Foundation and the Alaska and Kenai Chapters
- Carlisle Transportation Systems



Contributions from these organizations have been used to obtain matching federal funds under the State Wildlife Grant program

Other Wood Bison Project contributors include:

- University of Alaska Fairbanks
- Teck Cominco Alaska
- Home Depot
- Camai Printing Company
- Chugach National Forest
- U.S. Fish and Wildlife Service
- Natural Resource Conservation Service
- Anchorage Soil and Water Conservation District



Additional Wood Bison Project supporters and contributors include:

- Canada's Wood Bison Recovery Team
- Elk Island National Park
- Canadian Wildlife Service
- Canadian Food Inspection Agency
- World Conservation Union
- U.S. Department of Agriculture
- Alaska State Veterinarian
- Alaska Board of Game
- Alaska Outdoor Council
- Council of Athabascan Tribal Governments
- Many state fish and game advisory committees, local communities and village councils



Wood Bison Restoration in Alaska



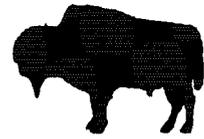
celebrating the return of a native species

Painting by Randall Compton



Wood Bison and the Endangered Species Act:

*How ADF&G is Addressing Concerns About
Possible Restrictions on Resource Development*



February 10, 2009

Wood bison are currently included on the list of endangered species under the U.S. Endangered Species Act (ESA). If not properly addressed, provisions of the ESA that are designed to protect endangered species could slow or stop other natural resource development and limit future wood bison management options. The U.S. Fish and Wildlife Service (FWS) is now evaluating a proposal to change the status of wood bison to "threatened," a category that allows more flexibility in how a listed species can be managed and protected.

The Alaska Department of Fish and Game (ADF&G) recognizes the need to make sure that wood bison restoration does not cause significant restrictions to other natural resource development projects. ADF&G has been working with the Department of Law to evaluate different options available under the ESA to ensure the project does not restrict oil and gas or other natural resource development and that harvest can be allowed in the future. The state, in cooperation with FWS, has determined that the best way to address concerns about the ESA is to establish a *special federal rule* to designate wood bison in Alaska as a "nonessential experimental population." The special rule will remove many of the regulatory requirements that normally apply to endangered species.

Designating wood bison in Alaska as a nonessential experimental population under section 10(j) of the ESA allows them to be treated as "threatened" rather than "endangered." The special rule can allow state management of wood bison, and after the number of wood bison has increased enough, can allow harvest according to cooperative management plans. It can also reduce or eliminate regulatory requirements that normally apply to an endangered species as follows:

- ◆ The requirement to consult with the FWS over resource development activities that might affect wood bison will apply only on national park and national wildlife refuge lands. No consultation would be required on BLM, state, and private lands.

- ◆ Designation of critical habitat, a classification that can restrict land use activities that might adversely affect an endangered species, is prohibited with a special rule developed under section 10(j).
- ◆ The special rule will protect industry from state or federal legal action if wood bison are harmed or killed during oil or gas exploration or other specified activities. At the same time, the special rule cannot eliminate enforcement for “intentional” harm to wood bison. Until the wood bison population grows and regulations are adopted to allow harvest, penalties for intentionally killing an endangered species can be severe.
- ◆ Wood bison in Alaska would still be considered a “nonessential experimental population” even if their populations later declined or disappeared due to unforeseen events. This means the wood bison could not be treated as an endangered species with more strict regulatory requirements if they do not grow and prosper, as we believe they will.

ADF&G is presently working with the FWS to create a special rule under the ESA for wood bison in Alaska. The special rule must be developed through the federal rulemaking process. This will include publishing a proposed rule for public review and comment. In addition, an Environmental Assessment is required and will include opportunities for public comment.

ADF&G will not release wood bison into the wild until the final special rule is in place, and provides sufficient protection for other existing and future land uses.

A more complete description of how ADF&G is addressing concerns about wood bison and the ESA is available on request or on our web site at:
<http://www.wildlife.alaska.gov/index.cfm?adfg=game.restoration>



Drawing courtesy of Wes Olson

By working together we can ensure that wood bison and oil and gas and other resource development activities can prosper side by side.



A Review of Concerns Identified by Doyon, Ltd. and the Alaska Department of Fish and Game's Efforts to Address Issues Involving the Status of Wood Bison Under the U.S. Endangered Species Act

February 4, 2009

Executive Summary

Wood bison occurred naturally in Alaska for most of the last 5-10,000 years but were extirpated sometime in the last few hundred years. The most likely reason they disappeared was the combined effects of hunting by humans and changes in habitat distribution. In an effort to re-establish wood bison in Alaska, the Alaska Department of Fish and Game (ADF&G) has been evaluating the possibility of reintroducing them to suitable habitat in Interior Alaska since the early 1990s.

Since the inception of the project ADF&G has provided extensive opportunities for public review and comment and received broad public support from diverse interests. The ADF&G has made a concerted effort to address all the issues raised in the most forthright and transparent manner possible.

Wood bison in Canada are presently considered a threatened species under Canada's Species at Risk Act. They are listed as "endangered" under the U.S. Endangered Species Act (ESA). The U.S. Fish and Wildlife Service (FWS) has initiated a federal rulemaking process to change the status of wood bison under the ESA to "threatened."

Recently, major concerns have been raised about the potential for wood bison restoration to impede oil and gas and other natural resource development projects due to provisions of the ESA. As with other concerns involving the wood bison restoration project, ADF&G has been working to address issues involving the ESA in an open dialog with all interested parties.

Doyon, Ltd. distributed the report "A Major and Unnecessary Risk: Wood Bison on Lands Planned for Development" (Doyon Report #1) to the Governor of Alaska and members of the Alaska Legislature during the week of January 19-23, 2009. A second paper titled "Wood Bison Risks" (Doyon Report #2) was distributed on January 28, 2009. The Doyon Reports outline the company's views on the risks involved with wood bison restoration in Alaska as a result of the ESA. In this paper, ADF&G addresses the concerns raised in the Doyon Reports and provides an explanation of the process the state has underway to address the status of wood bison under the ESA and ensure that provisions are in place to protect resource development projects and other land uses before any wood bison are released in the wild.

The status of wood bison under the ESA and how the listing status might affect opportunities for developing Alaska's natural resources has been extensively reviewed by the Alaska Department of Law (DOL; please note that the narrative of DOL review in this document is for informational purposes only and does not imply a formal opinion about any matter discussed.) The DOL and

ADF&G are actively working with the U.S. Fish and Wildlife Service (FWS) to promulgate a special rule under section 10(j) of the ESA to designate wood bison in Alaska as a "nonessential-experimental population." This action will provide a strong and legally defensible basis for wood bison under the ESA and will include exemptions from many of the regulatory requirements that normally apply to an ESA listed species.

For purposes of the ESA, establishing a special rule to designate wood bison in Alaska as a nonessential experimental population allows them to be treated as "threatened" rather than "endangered." This will provide FWS greater discretion under ESA section 4(d) to adopt special management programs and regulations. The special rule promulgated under sections 10(j) and 4(d) of the ESA will accomplish the following:

- For section 7 consultation purposes, wood bison would be treated as "proposed for listing" on all lands other than National Park and National Wildlife Refuge lands, where they would be treated as "threatened;"
- Requirements for consultation with FWS regarding specified actions that might affect wood bison would be essentially eliminated on BLM, state, and private lands;
- Designation of critical habitat would be prohibited;
- The rule would specify that unintentional "incidental take" due to other specified activities will not result in FWS or ADF&G enforcement actions (e.g., if a wood bison were accidentally harmed or killed during an oil and gas development project);
- Provide for state management and future harvests of wood bison under state management plans; and,
- The rule would remain in effect even if the wood bison population was diminished or completely eliminated due to unforeseen circumstances.

ADF&G will not release wood bison into the wild until the final special rule containing the nonessential experimental population designation and special conditions and exemptions are in place and determined to ensure sufficient protection to existing and future land uses.

ADF&G appreciates the extensive economic investments that Doyon and other organizations have made to assess the oil and gas potential of Minto Flats, Yukon Flats and other areas. The State applauds the efforts of Doyon and others to explore and plan for oil and gas development in Interior Alaska and the State intends to continue working to see those projects come to fruition. In cooperation with the DOL and the FWS we have developed a course of action that we believe will not result in any significant impediment to Doyon's or other organizations' plans for oil and gas or other development, either current or proposed, in the areas being considered for wood bison restoration.

ADF&G will work with all parties affected by the wood bison and ESA issue to objectively evaluate the legal protections that can be accomplished through a special rule under section 10(j) of the ESA for the establishment of nonessential experimental population status and reintroduction of wood bison in Alaska.

By continuing to work together we can implement an approach that will ensure that wood bison and oil and gas and other resource development activities can prosper side by side.

Background

In 2004 the Commissioner of the ADF&G wrote to the Director of the U.S. Fish and Wildlife Service (FWS) requesting clarification of how wood bison, if restored in Alaska, would be treated under the ESA. At that time the FWS indicated that wood bison were listed as "endangered in Canada" and the Service would not take action to list them as an endangered species if they were re-introduced in Alaska. Under this legal interpretation the provisions of the ESA would not apply to wood bison in Alaska.

This interpretation of the status of wood bison under the ESA was cited in the April 2007 ADF&G report "Wood Bison Restoration in Alaska: a Review of Environmental and Regulatory Issues and Proposed Decisions for Project Implementation." Several organizations subsequently submitted comments that expressed concern that the legal basis for this interpretation was unclear and could result in efforts to force listing wood bison as endangered in Alaska after they were released. Comments from Doyon expressed concern that there would be a high likelihood a third party would file a petition to list wood bison as endangered and that litigation could follow with the potential to force a subsequent "endangered" listing.

Based on these concerns and the need to fully address ESA issues, ADF&G sought review of the matter from the DOL. The DOL concluded there indeed was risk of legal challenge involved with the FWS interpretation that wood bison would not be considered as endangered if they were re-introduced in Alaska. Both ADF&G and DOL sought further review of the matter and worked with the FWS to explore other options for achieving a greater degree of legal certainty that wood bison restoration would not result in restricting other resource development activities.

In December 2007, the Department of Interior Solicitor's Office further evaluated the matter and determined that a more correct and legally defensible interpretation of the law is that wood bison, if introduced in Alaska, would be considered an "endangered" species under the ESA. In a letter received by Commissioner Lloyd in November 2008, the FWS stated that "The wood bison is listed as endangered wherever found and, as such, would retain its endangered status if introduced into the United States." However, the FWS letter also outlined a regulatory approach that would allow wood bison to be reintroduced to Alaska in a manner that would greatly reduce the regulatory complications normally associated with a listed species. This approach involves adopting a special rule under section 10(j) of the ESA to designate wood bison in Alaska as a nonessential experimental population and include provisions allowed under section 4(d) to provide for state management. The special rule can contain special regulations and exemptions to address the ESA restrictions that would otherwise apply to a listed species.

While the change in legal interpretation brings wood bison in Alaska under the auspices of the ESA, it also provides legal clarity and an opportunity to develop a special rule to greatly reduce the regulatory burdens normally associated with a listed species.

ADF&G staff met with the Alaska Regional Director of FWS and other FWS staff on January 16, 2009 and agreed to cooperate in developing a special rule for wood bison in Alaska under the ESA, completing requirements of the National Environmental Policy Act (NEPA), and prepared an initial timeline to complete the rulemaking process.

How Concerns About Wood Bison and the ESA are Being Addressed

Status of wood bison under the ESA

The primary concern identified in Doyon Report #1 is the possibility of a third party filing a petition and/or taking legal action to force the listing of wood bison in Alaska as "endangered" under the ESA. *The FWS determination that wood bison are listed as an endangered species wherever they occur eliminates the basis for a third party petition to force a listing of wood bison in Alaska.* The examples cited in the Doyon Reports of forced endangered species listings that occurred after "friendly" reintroductions involving lynx in Colorado and bighorn sheep in California are not relevant to wood bison. Those reintroductions involved species that were not listed at the time and therefore were not preceded by a special rule designating them as nonessential experimental populations, such as we are proposing for wood bison under ESA section 10(j). While such a designation is potentially challengeable, we are unaware of any successful challenges of nonessential experimental population designations. As such, we feel confident that that these rules are defensible.

Develop a special rule for wood bison in Alaska under Sections 10(j) and 4(d) of the ESA

Beyond questions of wood bison being listed as endangered under the ESA, which are addressed above, developing a special rule for wood bison in Alaska under Sections 10(j) and 4(d) of the ESA will address virtually all of the concerns outlined in the Doyon Reports. Requirements for interagency federal consultations are significantly reduced under a nonessential experimental population designation and associated special rules. There is a prohibition against designation of critical habitat, and restrictions on "take" or harm to wood bison can be reduced. Also, we have the opportunity to specify the geographic coverage for these rules. We intend to cover an area that not only includes the release site(s), but also any areas the bison may move onto in the future. This will assure that any protections of the rule apply throughout the possible future range of wood bison in Alaska.

Some issues raised in the Doyon Reports involve speculation about possible change in federal policy due to the recent change in administration. ADF&G is not aware of any indication that policy changes are likely to occur. However, it is extremely unlikely that the FWS would want to change the agreed upon special rule once it was published and adopted given the precedent that such an action would set. Changing such rules would make it difficult for the FWS to enter into agreements for recovery of a species using the nonessential experimental rule process, since it would cast doubt on the strength of such agreements. Providing certainty to the interested parties is the very reason why reintroductions are made under section 10(j). Thus, it is extremely unlikely that a policy change would threaten the rule once it was adopted and administratively in place.

In the following discussion relevant excerpts from special rules previously published in the Federal Register are shown with indents and italics and are intended to provide additional background on the purpose and effects of ESA section 10(j). Emphasis has been added in bold type in several places.

"Congress made significant changes to the Endangered Species Act (Act) in 1982 with addition of section 10(j), which provides for the designation of specific reintroduced populations of listed species as "experimental populations." Previously, we had authority to reintroduce populations into unoccupied portions of a listed species' historical range when doing so would foster the conservation and recovery of the species. However, local citizens often opposed these reintroductions because they were concerned about subsequent enactment of restrictions and prohibitions on Federal, State, and private activities. Under section 10(j), the Secretary can designate reintroduced populations established outside the species' current range, but within its historical range, as "experimental." Based on the best available information, we must determine whether an experimental population is "essential" or "nonessential" to the continued existence of the species. Regulatory restrictions are considerably reduced under a Nonessential Experimental Population (NEP) designation."

Wood bison in Alaska should qualify for designation as a nonessential experimental population because it can easily be determined that they are not essential to the survival of the species in the wild, and the source of wood bison stock is a captive breeding herd in Canada. There are 6 disease-free wood bison populations in Canada, totaling nearly 5,000 animals, so it is hard to envision a way that "non-essential" status in Alaska could be at risk in the foreseeable future because of declines in Canada.

Concern about civil or criminal liability for harm to wood bison

Under the Act, species listed as endangered or threatened are afforded protection primarily through the prohibitions of section 9 and the requirements of section 7. Section 9 of the Act prohibits the take of endangered wildlife. "Take" is defined by the Act as harass, harm, pursue, hunt, shoot, wound, trap, capture, or collect, or attempt to engage in any such conduct. Service regulations (50 CFR 17.31) generally extend the prohibition of take to threatened wildlife. However, permits to allow the take of listed species can be issued when populations reach a level that creates pressure on their habitat...

...For purposes of section 9 of the Act, a population designated as experimental is treated as threatened regardless of the species' designation elsewhere in its range. Through section 4(d) of the Act, threatened designation allows us greater discretion in devising management programs and special regulations for such a population. Section 4(d) of the Act allows us to adopt whatever regulations are necessary to provide for the conservation of a threatened species. In these situations, the general regulations that extend most section 9 prohibitions to threatened species do not apply to that species, and the special 4(d) rule contains the prohibitions and exemptions necessary and appropriate to conserve that species. Regulations issued under section 4(d) for nonessential populations (NEPs) are usually more compatible with routine human activities in the reintroduction area.

A special rule developed under ESA sections 10(j) and 4(d) can address unintentional or incidental "take." As in previous rules that have been promulgated for NEPs, we intend to

include provisions in the proposed rule that will distinguish "incidental take" that results from authorized activities (e.g.; oil and gas development) from "knowing or intentional take" from unauthorized activities (e.g., poaching) and will specify that *neither the FWS nor ADF&G will take legal action if unintentional/incidental take occurs*. Based on precedents and recent discussions with FWS, the proposed rule can also provide for management primarily by the state and for future harvests of wood bison as described in state management plans for each herd, and stipulate that *even the decline or disappearance of the reintroduced population(s) would not change their status as a nonessential experimental population or the provisions in the special rule*.

Concerns about requirements for federal consultation on endangered species

For the purposes of section 7 of the Act, we treat NEPs as threatened species when the NEP is located within a National Wildlife Refuge or National Park, and section 7(a)(1) and the consultation requirements of section 7(a)(2) of the Act apply. Section 7(a)(1) requires all Federal agencies to use their authorities to conserve listed species. Section 7(a)(2) requires that Federal agencies consult with the Service before authorizing, funding, or carrying out any activity that would likely jeopardize the continued existence of a listed species or adversely modify its critical habitats. When NEPs are located outside a National Wildlife Refuge or National Park, we treat the population as proposed for listing and only two provisions of section 7 would apply--section 7(a)(1) and section 7(a)(4). In these instances, NEPs provide additional flexibility because Federal agencies are not required to consult with us under section 7(a)(2). Section 7(a)(4) requires Federal agencies to confer with the Service on actions that are likely to jeopardize the continued existence of a proposed species. The results of a conference are advisory in nature, and do not restrict agencies from carrying out, funding, or authorizing activities.

As stated previously, requirements for interagency federal consultations are significantly reduced under a nonessential, experimental population designation. For the purposes of section 7 consultation, each member of the experimental population is treated as "proposed to be listed" except where they occur within a National Wildlife Refuge or National Park. This will significantly reduce the federal consultation requirements, particularly on state and private lands in the Minto Flats area, where ESA consultation would not be required for specified activities. There would still be some federal consultation requirements for some activities on the Yukon Flats National Wildlife Refuge or other National Wildlife Refuge system lands; however, we do not believe those consultation requirements will result in additional impediments to oil and gas development, which is already closely regulated on refuge lands.

Concern about designation of critical habitat

Section 10(j)(2)(C)(ii) provides that *"critical habitat shall not be designated under this Act for any experimental population determined under Subparagraph (B) to not be essential to the continued existence of the species (emphasis added)."* *Once a section 10(j) rule is adopted critical habitat cannot be designated.*

Concern that a 10(j) rule will be litigated and overturned by the courts

We have conducted a preliminary review with the FWS and are not aware of any instances where a 10(j) rule has been blocked or overturned by litigation. Footnote no. 1 of Doyon Report #2 cites several cases involving 10(j) reintroduction programs. Not to minimize concerns about litigation, the rules establishing the nonessential experimental populations and related regulations in those case decisions were actually upheld.

Differences between a 10(j) rule for wood bison and the 4(d) rule developed for the polar bear

The paper refers to the polar bear 4(d) rule as the "same type of rule" the ADF&G proposes for wood bison. The situations are not similar. When a species is listed as "threatened" through the typical listing process, by regulation the FWS applies the same prohibitions that would otherwise apply to a species listed as endangered unless it also issues a "4(d) rule" containing any exceptions or special terms. The primary similarity is that ESA section 4(d) is the authority that gives the FWS greater discretion to adopt whatever regulations are necessary for the conservation of a threatened species, whether in the form of a separate 4(d) rule at the time a species is listed as threatened or in support of special terms contained in a final rule under section 10(j). The special provisions and exceptions applicable to wood bison are intended to provide for state management and are not nearly as controversial or likely to generate litigation as the 4(d) rule for polar bears. As noted, the special final rule will result in wood bison being treated as threatened under ESA section 10(j) and will contain special provisions tailored to the wood bison reintroduction, including certain exceptions from the "take" prohibitions as permitted by ESA section 4(d). We intend to include all these provisions in the special final "10(j) rule" that designates wood bison in Alaska as a nonessential experimental population. It is not anticipated that there will be a separate "4(d) rule." However, should the rule making process in support of the reintroduction of wood bison take the form of separate 10(j) and 4(d) rules, ADF&G will not release wood bison until all rules meet our objectives.

Concern about challenges from animals rights groups due to provisions for future hunting of wood bison

A provision to provide for state management of wood bison and to allow potential harvest of wood bison at an appropriate time in the future will be included in the final rule. These provisions will be subject to public review and comment, which will provide insight into whether any interest groups may challenge this provision. To date there has been no indication of opposition among environmental or animal protection organizations to the idea that wood bison may eventually be hunted.

Wood bison health certification

Doyon Report #1 references public comments expressing serious concerns that the two year quarantine for wood bison at the Alaska Wildlife Conservation Center in Portage may not work (the only comments received on this point were from Doyon). The second Doyon report indicates the importation of bison was prohibited for several years because of brucellosis and raises concerns about wood bison in Alaska being infected by brucellosis and declining in the future.

The U.S. border was not closed to the import of bison (and cattle) because of brucellosis. The import of bovines, except for immediate slaughter, was banned for several years because of concerns about mad-cow disease (BSE) in cattle. The ban was lifted in 2007.

ADF&G has taken every precaution possible to ensure that any wood bison that are released to the wild will not pose a threat to other wildlife or livestock. ADF&G has developed a cooperative agreement with the Alaska Department of Environmental Conservation (ADEC), Office of the State Veterinarian that specifies very stringent disease testing protocols. In addition, the U.S. Department of Agriculture (USDA) has completed an extensive analysis showing that the risk of disease (including brucellosis) from stock imported from the source herd in Canada is negligible (less than .01 percent). The bison imported from Canada in 2008 were tested twice for brucellosis before an import permit was issued by the USDA. The wood bison will all be tested for brucellosis, bovine tuberculosis and other diseases of concern a minimum of two times before they are certified for release to the wild. The health certification requirements for wood bison likely exceed any health certification program for a wildlife reintroduction that has occurred anywhere in North America, and exceed the requirements for the importation of livestock. Any wood bison that do not meet these stringent health certification requirements will not be released, and if any major issues involving critical diseases of concern arise, the agreement with ADEC includes a provision to destroy the entire herd, if necessary.

Petition for downlisting

Canada's Wood Bison Recovery Team has submitted a petition to the FWS to downlist wood bison under the ESA to "threatened." On February 3, 2009, the FWS issued a 90 day finding on the petition concluding that it "presents substantial scientific and commercial information indicating that the petitioned action of reclassifying the wood bison from endangered to threatened status under the Act may be warranted." 74 Federal Register 5908. This notice also announced that the FWS is initiating a status review of wood bison to review the reclassification and solicited scientific and commercial information regarding wood bison for the purpose of the review. Following the status review, they will issue a 12-month finding on the petition. There is a strong biological justification for downlisting wood bison to "threatened," and ADF&G anticipates this will occur once FWS completes the necessary biological review and regulatory process.

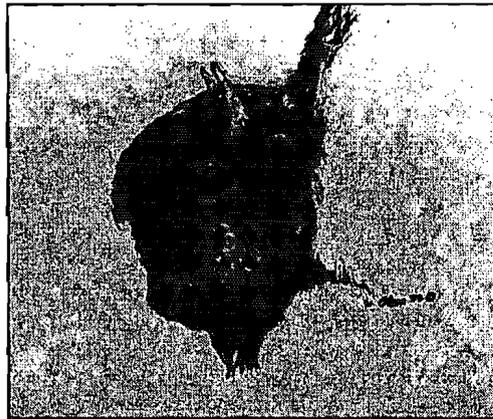
Effects of global warming

Should warming conditions occur in Interior Alaska it may increase the habitat available for wood bison. Faculty at the University of Alaska-Fairbanks, including Professor Terry Chapin, a member of the National Academy of Sciences, have suggested that global warming may cause parts of the Interior's boreal forest to convert to grasslands. Having wood bison present on the landscape provides extra assurance that abundant wildlife populations will remain in Alaska, should climate change reduce the quality of habitat available for moose or other species. Wood bison populations in Alaska are not likely to be put at risk by global warming, and instead would be likely to benefit.

Conclusions

ADF&G has taken Doyon's concerns about wood bison and the ESA seriously and has identified an approach to address those concerns to the greatest degree possible. By using the federal rulemaking process outlined above we can significantly reduce the risk to oil and gas or other natural resource development in the Minto Flats area or elsewhere. We look forward to continued dialog with all stakeholders to ensure that we do the best job possible in addressing concerns about the ESA and other matters as we move forward. Once a proposed special rule for nonessential, experimental population status for wood bison in Alaska is published for public review, ADF&G welcomes an objective analysis of the protections afforded to oil and gas and other resource development projects.

Once a final rule is adopted, if the conclusion reached by the state in consultation with other interested parties is that adequate safeguards are not present and wood bison restoration could severely impact other development opportunities, ADF&G will not proceed with releasing wood bison in areas proposed for development, or possibly anywhere in Alaska.



Drawing courtesy of Wes Olson

Nonessential Experimental Populations – No Litigation

1. Silvery Minnow in the Rio Grande 12/08/08;
2. 15 Freshwater Mussels, 1 Freshwater Snail, 5 Fishes in Tenn. 09/13/07; 72 FR 52434
3. 2 Fishes, Boulder Darter, Spotfin Chub in Tenn., Alabama 04/08/05; 70 FR 17916
4. Black-Footed Ferrets in South-Central South Dakota 05/16/03; 68 FR 26498
5. 4 Fishes (Duskytail Darter, Smoky Madtom, Yellowfin Madtom, and Spotfin Chub) in the Tellico River 08/12/02; 67 FR 52420
6. Whooping Cranes in the Eastern United States 06/26/01; 66 FR 33903
7. 16 Mussels and 1 Aquatic Snail in Tennessee River 06/14/01; 66 FR 32250
8. Black-Footed Ferrets in North-Central South Dakota 10/13/00; 65 FR 60879
9. Black-Footed Ferrets in NW Colorado and NE Utah 10/01/98; 63 FR 52824
10. Whooping Cranes of the Rocky Mountains 07/21/97; 62 FR 38932
11. California Condors in Northern Arizona 10/16/96; 61 FR 54044
12. Black-Footed Ferrets in Aubrey Valley Arizona 03/20/96; 61 FR 11320
13. Black-Footed Ferrets in Southwestern South Dakota 08/18/94; 59 FR 42682
14. Black-Footed Ferrets in North-Central Montana 08/18/94; 59 FR 42696
15. Whooping Cranes in Florida 01/22/93; 58 FR 5647
16. Black-Footed Ferrets in Southeastern Wyoming 08/21/91; 56 FR 41473
17. Guam Rails, Rota in the Comm. of N. Mariana Islands 10/30/89; 54 FR 43966
18. Yellowfin Madtom in Virginia and Tennessee 08/04/88; 53 FR 29335
19. Southern Sea Otters 08/11/87; 52 FR 29754
20. CO Squawfish, Woundfin in the Gila River Drainage in AZ 07/24/85; 50 FR 30188
21. Delmarva Fox Squirrel into Sussex County Delaware 09/13/84; 49 FR 35951

Nonessential Experimental Populations – Associated with Litigation

1. Grizzly Bears in Bitterroot Area of Idaho and Montana; 11/17/00, 65 FR 69624
Case only involved a FOIA request for names and addresses of people who submitted comments on proposed rulemaking.

2. Red Wolves in North Carolina and Tennessee; series of final rules 11/19/86, 51 FR 41790; 11/04/91, 56 FR 56325; 04/13/95, 60 FR 18940
Related regulation was upheld.

3. Mexican Gray Wolf in Arizona and New Mexico; 01/12/98, 63 FR 1752
The 10(j) rule was upheld.

4. Gray Wolves are covered by a series of Final Rules relating to several NEPs:

11/22/94, 59 FR 60266 – Final rule establishing NEP of gray wolves in Central Idaho & Southwestern Montana.

11/22/94, 59 FR 60252 – Final rule establishing NEP of gray wolves in Yellowstone Nat'l Park in Wyoming, Idaho and Montana.

4/1/03, 68 FR 15804 – Final rule to reclassify and remove gray wolf from endangered list in portions of U.S. and to establish 2 special regulations for threatened gray wolves.

2/8/07, 72 FR 6052 – Final rule designating Western Great Lakes Population as a DPS and removing that DPS from endangered species list.

1/28/08, 73 FR 4720 – Final Rule revising 2005 special regulation for Yellowstone and Central Idaho gray wolves and modifies the definition of "unacceptable impact" to wild ungulate populations. It also revised 2005 rule to allow take of wolves in the act of attacking dogs or stock animals.

2/27/08, 73 FR 10514 – Final Rule designating Northern Rocky Mountain Population of Gray Wolf as DPS and Removing that DPS from endangered species list.

12/11/08, 73 FR 75356 – Final Rule in compliance with court orders - reinstating regulatory protections under ESA in western Great Lakes region and northern Rocky Mountains.

04/02/09, 74 FR 15123 – Final Rule to identify the Northern Rocky Mountain Population of Gray Wolf as a Distinct Population Segment and to Revise list of Endangered and Threatened Wildlife Removing the gray wolves within this DPS, except Wyoming, from list.

Litigation involving Nonessential Experimental Populations of Gray Wolves included claims challenging geographic separateness of the experimental and non experimental populations of the species, delisting rules, and special take provisions to protect livestock and wild ungulates. The base components of the 10(j) rules and NEP designations have been upheld. In 2008, the delisting of the northern rocky mountain distinct population was enjoined. However, a new delisting rule was prepared and published reaffirming the delisting of the northern Rocky Mountain wolves, except those in Wyoming. The final rule was published on April 2, 2009.

4. Northern Aplomado Falcons in New Mexico, Arizona 07/26/06; 71 FR 42298. The challenges to the 10(j) were denied, and the case is now on appeal in the 10th Circuit. The NEPA predetermination claim was also denied.

DELTA BISON HERD MANAGEMENT REPORT



Board of Game Report

February 26, 2010

Presented by:

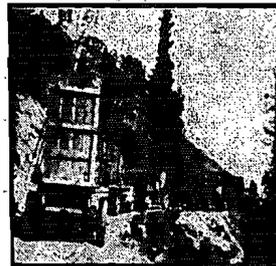
- **Steve DuBols: Delta Area Biologist**
 - Delta bison herd management
 - Proposed actions and conclusions
- **Randy Rogers: Wildlife Planner**
 - Delta Bison planning process and recommendations



Purposes of the Presentation

- Inform the Board about conflicts between Delta bison and Delta agriculture and the on-going effort to update the management plan.
- Identify options that are being considered to reduce impacts of the Delta Bison Herd (DBH) on agricultural operations in the Delta area.
- Seek discussion and feedback from the Board and public on DBH management.

Delta Bison History



- 23 plains bison were moved from Montana to Delta Jct in 1928 to start the herd.
- Bison from Delta were transplanted to:
 - the Copper River (1950)
 - Chitina River (1962)
 - Farewell (1965 and 1968)

Delta Bison History

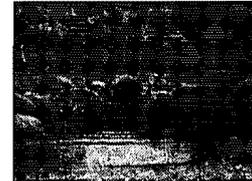


- Agriculture started in Delta Junction in 1950s in range of bison.
- The state initiated the Delta I & II agricultural land sales in 1979.

Over time conflicts between bison and agriculture have escalated.

Delta Bison History

- 1979 Alaska Legislature established the Delta Junction Bison Range (DJBR).
- Purposes were to:
 - perpetuate free-ranging bison.
 - alter seasonal movements to diminish damage to agriculturally developed land.
- Does not prohibit public uses including hunting, trapping, recreation activities, using the land for access to adjacent areas.



The DBH has National Bison Conservation Significance

- Recent studies have shown that the DBH is one of the few genetically pure plains bison herds in the United States.
- National interest in conservation of DBH and Alaskan plains bison genetics.



DBH Seasonal Movements



DBH Management is Complex

ADF&G must balance conflicts between statewide hunting interest and local agricultural development.



- The DBH is a wildlife resource with statewide importance.
- Intensively managed herd (~20%/yr harvest rate).
- Much of bison forage and hunting comes from private land.
- Bison management involves state, federal and private lands.

Cooperation with the U.S. Army

- Much bison summer range is military training & impact area
- Military training increasing on summer range
- Military training impacts bison movements, use areas, data collection, etc



Delta Bison Management Plan

Since 1980 a series of Delta Bison Management Plans have served as the guide for DBH management.



Available online

http://wildlife.alaska.gov/management/planning/planning_pdfs/dbplan.pdf

Delta Bison Working Group



The DBWG was initially formed in 1992 to advise ADF&G on DBH management.

- Phil Kaspari: Statewide agriculture & research
- Mike Schultz: Delta agriculture
- Don Quarberg: Delta hunting
- Leonard Jewkes: Statewide hunting
- Glen Wright: Delta community
- John Sloan: Delta business
- John Haddix: U.S. Army

Delta Bison Management Plan Mission Statement

- Maintain a healthy, free-ranging bison herd in the Delta Junction area
- that provides the greatest reasonable opportunity to hunt and view bison
- while also minimizing conflicts between bison and private property owners using all management techniques available to the Alaska Department of Fish and Game.

Delta Bison Management Plan

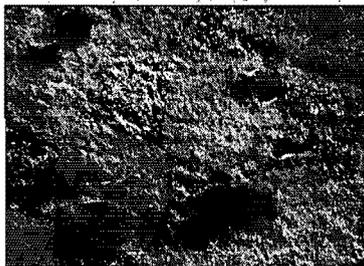
Herd Size And Composition Goal:

- Balance between opportunity to hunt & minimum negative impacts
 - Herd size of 360 precalving (~475 ± 20 prehunt)
 - Sex ratio no less than 50 bulls:100 cows

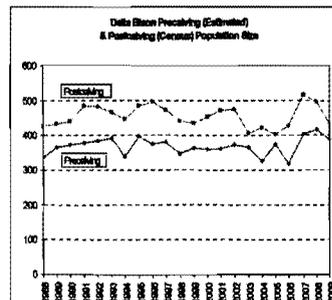


Herd Size Objective has Changed Over Time

- **1980-1985:** 250-300 precalving
- **1985-1988:** 275-325 precalving
- **1989:** 325-360
- **1992-present:** 360 precalving



Delta Bison Herd Size



- Herd size is managed through hunting
- **2009 precalving = 367**
- **2009 posthunt = 435**



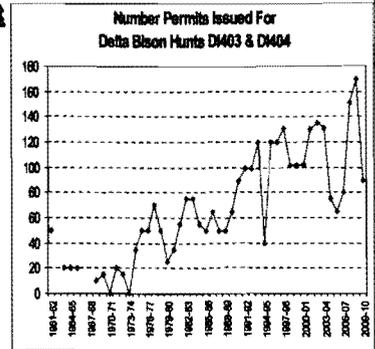
Delta Bison Herd Size

- Hunter success has been declining over time, making it more difficult to manage herd size
- Factors
 - Number of permits
 - Landowners more difficult to find
 - More fences
 - More no hunting, or only 1 party
 - Less forage acreage, more CRP, fallow, land taken out of ag base



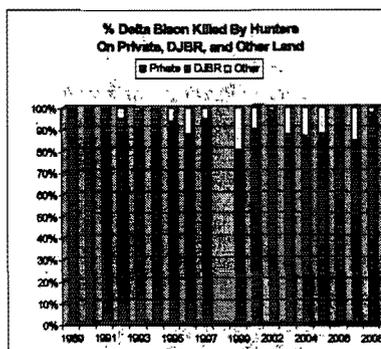
Delta Bison Herd Size

- Number of bison hunt permits is increasing to compensate for lower success
- Makes hunting difficult
- Most permits ever in 2007-2008 and 2008-2009
 - Either-sex permits in 2008 & 2009 to increase hunter success
 - Problems include greater wounding & skewed sex ratio



Delta Bison Herd Size

- Most hunters kill bison on private land
- Private land owners have significant influence on herd size management
 - & on data collection (i.e. comp counts)



Delta Bison Management Plan

- Bison Conflicts Goal: Minimize conflicts with public & agriculture
- Objectives:
 - Administer hunt to minimize landowner/hunter conflicts
 - Manage DJBR to keep DBH south of AK Hwy as late as possible & attract bison in winter for greater hunter accessibility
 - Enhance summer range
 - Provide assistance with bison conflicts inside fences

Delta Junction Bison Range



~90,000 acres

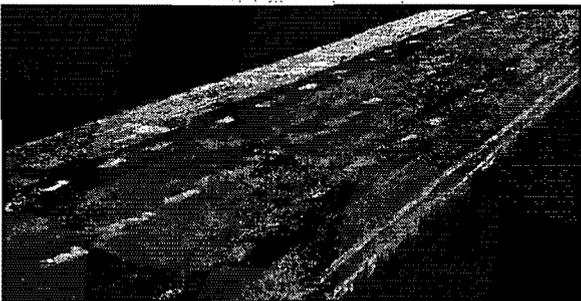
~2,700 acres bison forage

Delta Junction Bison Range

- Original DJBR working hypothesis was to produce adequate high quality forage on south side of AK Hwy to hold bison until harvest was completed
- Changes in agricultural production (i.e. more hay & CRP acreage) have made this less effective over time.



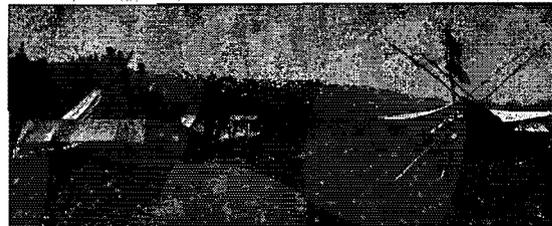
Delta Junction Bison Range



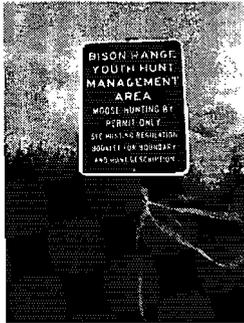
322 bison in Panoramic Field oats

Delta Junction Bison Range

- Multiple use area when compatible: hunting, fishing, camping, trapping, logging, berry picking
 - Muzzleloader Rendezvous



Bison Range Youth Moose Hunt



- Established In 2002 to reduce disturbance to bison and help keep them on the DJBR
 - Consists of Panoramic & Gerstle Fields of DJBR
- Provides unique moose hunting opportunity for youth by drawing permits
 - Use of motorized vehicles for hunting is prohibited

Delta Junction Bison Range Ruffed Grouse Habitat Management Area



Summer 2009: Increased Forage Production on the DJBR

- ADF&G allocated additional funding for habitat improvement on the DJBR in 2009
 - Planted an additional 200 acres of oats
 - Increased the fertilization rate on 700 acres of perennial bluegrass
 - Planted 30 acres with forage turnips to see if it would help keep bison on the DJBR longer
 - These efforts did not significantly alter bison crop damage



2009 Pilot Crop Damage Assessment Program

- ADF&G cooperated with the Division of Agriculture to assess crop damage from August- September 2009
- ADF&G conducted overflights to identify and photograph areas of damage
- Div. of Ag. conducted site inspections to estimate percent loss of crops in damaged areas
- 2009 was a good crop year and bison damage was judged to be less than normal



Aerial photograph of bison in agricultural fields

Div. of Ag. Crop Damage Estimate

Grain down (174 tons x \$185)	\$32,190
Extra grain drying costs	30,700
Grass, hay and straw	37,250
Potato damage	35,000
Seedling grass field damage	4,000
Fence damage	3,000
Missed opportunities	0
Total	\$142,140

Dr. Charles Knight, Division of Ag., emphasized that these are very rough estimates and further work is needed to more accurately assess actual crop damage.

Delta Junction Bison Range

- **Bottom Line:** Is DJBR meeting legislative objective by "altering seasonal movements (of bison) ... to diminish the damage caused by the herds to agriculturally developed land?"

- Answer: **Yes**

- *The DJBR has altered seasonal movements & has diminished crop damage*

- Is DJBR eliminating all damage?

- Answer: **No**

Delta Bison Management Plan Update

- Current plan titled DBMP "2000-2005" - plan has remained effective.
- Encompasses the "Game Management Plan" for the DJBR.
- Delta Bison Working Group (DBWG) meets periodically to review the plan - only minor revisions needed.
- ADF&G proposed a minimal planning process to complete a relatively simple plan update.



Fall 2008 Controversy Increased

Factors Involved:

- Summer 2008 was very cool and wet and a bad crop year in Delta.
- The agreements for approximately 10,000 acres of CRP land will expire in the next few years. Farmers need to decide to re-enroll or plant new crops.
- There may be an improved market for oats in Alaska but farmers may be reluctant to plant oats if bison depredation is likely to occur.
- The Cooperative Extension Service and Delta Chapter of the Alaska Farm Bureau organized meetings to discuss bison-caused damage.

Planning Process Expanded

- Because of significant interest expressed by the Delta agricultural community a scoping meeting was held in Delta in March 2009.
- Seven DBWG meetings were held in Delta in 2009.
- Alaska Division of Agriculture has actively participated in the planning process.
- Two presentations and discussions occurred at the Fairbanks Advisory Committee.



Legislative Involvement

- Staff from Rep. John Harris attended some DBWG meetings
- HB 220 was introduced 4/7/09
- Would amend the requirements for a DJBR game management plan to include:

"designing, developing, and building diversionary fencing, holding pens, and other apparatus to control movement of bison into unharvested agricultural crops."

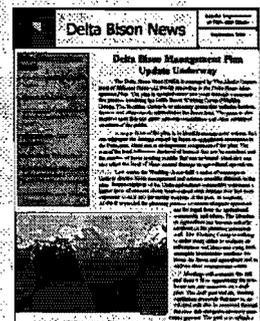
Delta Bison and Ag. Field Trip August 4, 2009

- Participants included:
 - ADF&G
 - Div. of Ag.
 - DBWG members
 - Delta Soil and Water Conservation District
 - U.S. Army
 - farmers
 - Advisory Committee members.



Delta Bison News, Sept. 2009

- Management plan update underway
- Background and history.
- Recommendations being considered
- Opportunity for public comment



Public Input

- Most comments during DBWG meetings in Delta came from farmers expressing concerns about crop damage.
 - Some Delta residents spoke in support of the bison herd and noted the benefits to the community.
- All the written comments received in response to the newsletter came from hunters who did not want to see a loss of hunting opportunity.
- Fairbanks AC submitted detailed comments.

Points Raised by Agricultural Interests

- Some farmers feel that the DJBR and other management actions have not adequately reduced bison crop damage.
- Some have questioned the validity of the legislative intent to maintain a free-ranging herd of bison and assert the state is liable for crop damage.
- There is a strong desire to implement a more complete and long-term solution.
- There is not consensus among agricultural interests about the best solutions.

Points Raised by Hunting Interests

- The bison herd was there before agriculture was developed in Delta and farmers knew the risk of bison damage.
- There should be no reduction in the size of the DBH until all other alternatives have been exhausted.
- Hunters are strongly opposed to fencing the bison herd into the DJBR.
- Several comments noted the importance of the crop damage assessment program.
- Some criticized the planning process for the focus in the Delta area - Need broad statewide involvement.

Fencing Alternatives Considered

1. Support a cost-sharing program to assist farmers in fencing bison out of their property.
2. Construct a "drift fence" to prevent bison from moving north across the Alaska Highway until crops are harvested.
3. Fence the bison herd into the DJBR.
4. Fence the bison into the Panoramic Fields on a temporary basis in the summer and then release them after crops have been harvested (SWCD proposal).

All fencing options would be expensive!

Considerations of Fencing Bison out of Agricultural Areas

- Advantages
 - Does not affect free-ranging status of the herd
 - Not all land would be fenced (e.g., CRP)
 - Private landowners would maintain the fences and could better control access to their land
- Disadvantages
 - Would remove forage from bison
 - Could shift impacts to other areas
 - Could disrupt movements of other wildlife

Considerations of Fencing Bison into the Bison Range

- Advantages
 - Would require less total fencing
 - Bison survey and management could be easier
 - Would remove bison from Army lands
 - Would reduce chance of disease transmission & genetic contamination
- Disadvantages
 - Would no longer be a free-ranging herd (legislative action required)
 - Would disrupt other wildlife movements and the bison range youth moose hunt
 - Would restrict access for other public uses (legislative action required)

Working Group Consensus Recommendations

- Increase funding for bison habitat improvement
- Allow use of herbicides on the DJBR
- Support BOG proposals to ensure harvest objectives are achieved
- Increase the application fee for Delta bison permits from \$10 to \$20 with increase going to DBH management
- Establish an on-going crop damage assessment program



Working Group Recommendations December 8, 2009 Meeting

- After considering many ideas the DBWG agreed that the long term solution to bison and agriculture conflicts is fencing.
- The group did not agree on the best fencing option.

→ **DBWG Impasse**



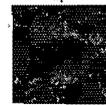
ADF&G and ADNR Coordination

- **Agreed to take a 3-phased approach to addressing Delta bison and ag. conflicts**
 - Continue the crop damage assessment program to gather fundamental information that can be used to judge the costs and benefits of possible solutions.
 - Seek to conduct a legislative briefing on Delta bison and agriculture issues.
 - Evaluate fencing and other alternatives more thoroughly.



Agricultural Interests are Seeking Immediate Action

- **Legislative action and/or litigation are possible.**
- **ADF&G and ADNR have limited options for what can be done immediately without legislative action and/or additional funding.**
- **Until an initial briefing is held ADF&G does not know what level of interest exists in the legislature to address Delta bison issues:**



Status of Plan Update

- **Intended to submit plan update to the Board at this meeting**
- **On-hold pending Board input and possible legislative consideration**
- **Will consider additional working group meetings or other public process if needed**
- **Will work to finish at least an interim plan update pending more long-term solutions.**



ADF&G Proposed Actions

- **Continue to maximize forage production on the DJBR within available funding:**
- **Continue to assess crop damage levels cooperation with ADNR, Div. of Ag.**
- **Implement regulatory proposals (74, 75) to allow flexibility to harvest problem animals and ensure the harvest objective is achieved.**
- **Maintain willingness to work with all interests and the legislature to explore fencing and other options for more complete and long-term solutions to bison and agricultural conflicts:**

Consider Reducing the Herd Size to 300 Bison, Pre-calving for Five Years

- This level of reduction in herd size is not out of line with herd size objective in place in the 1980's and early 1990's.
- This is one action ADF&G can take within existing authority that may help reduce bison crop damage.
- Success in reducing crop damage can be evaluated after a 5-year period and the herd size objective changed, if warranted.

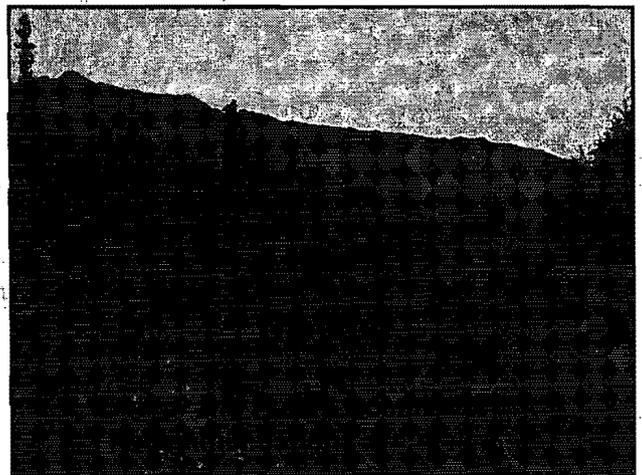


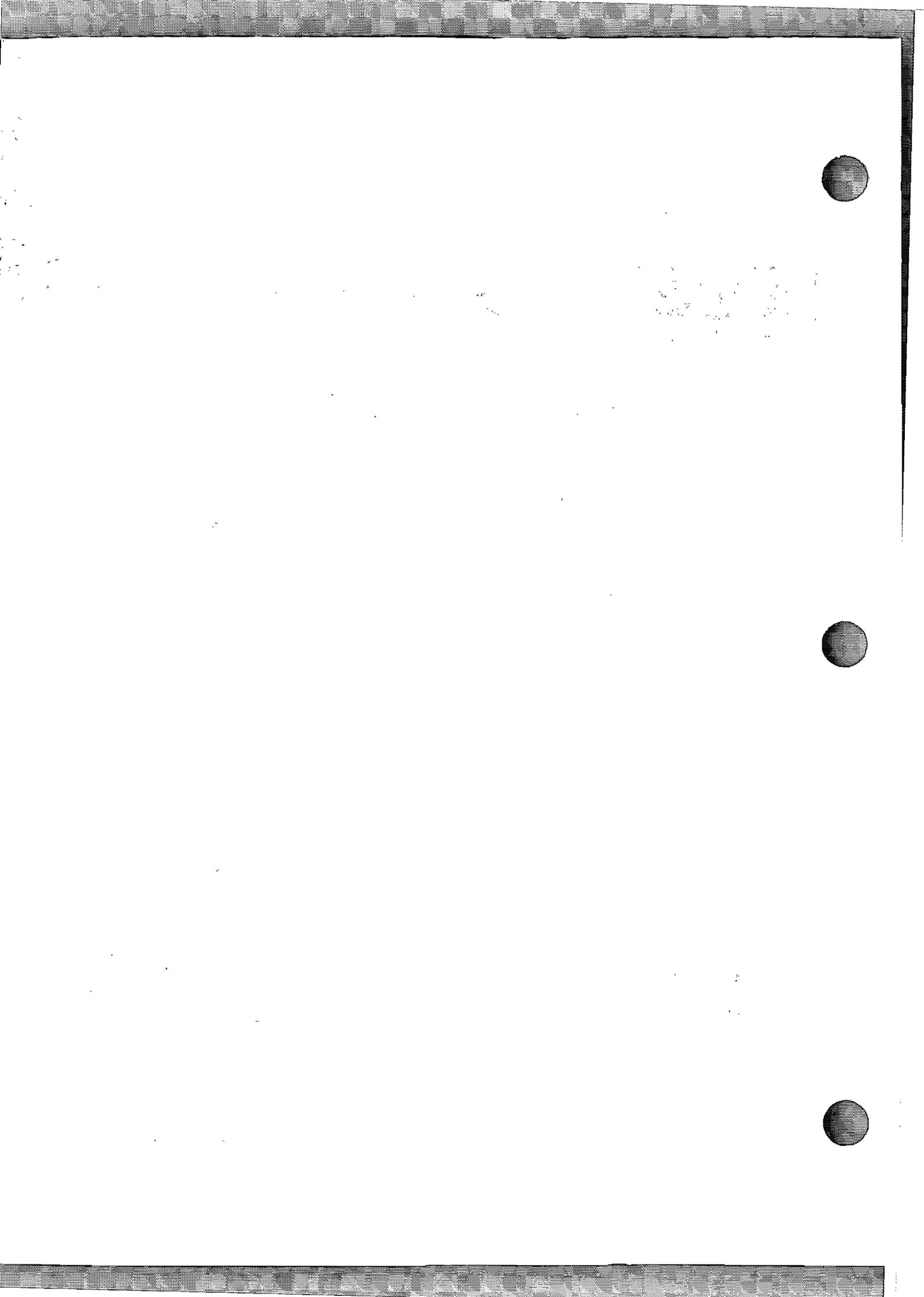
Effects of Herd Size Reduction on Hunting Opportunity

- Initially more hunting permits would be issued to reduce the herd size.
- At a herd size of 300 approximately 70 - 90 permits could be issued each year, depending on success rates (compared to 100-150 at present)
- Harvest management can be improved by reducing the need to issue large numbers of permits which result in high competition among hunters and crowding at times.

Conclusions

- ADF&G and ADNR cannot completely eliminate bison and agricultural conflicts with existing authorities and funding.
- What ADF&G can do at the present is considered by some as a "band-aid" fix.
- More permanent long-term solutions will require legislative action and should be developed with opportunities for broad public participation which reflects the statewide interest in the DBH.





DELTA BISON MANAGEMENT PLAN

2000–2005

Cover photo intentionally omitted
to reduce file size.

photo by Steve DuBois

Alaska Department of Fish and Game
Division of Wildlife Conservation



by: Steve DuBois and Randy Rogers
March 2000



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MISSION STATEMENT

Maintain a healthy, free-ranging bison herd in the Delta Junction area that provides the greatest reasonable opportunity to hunt and view bison while also keeping conflicts between bison and private property owners to the minimum level possible using all management techniques available to the Alaska Department of Fish and Game.

INTRODUCTION

The Delta Bison Herd (DBH) is a valuable and special wildlife resource for residents and visitors of the state of Alaska. Introduced in 1928, this plains bison herd provides unique opportunities for viewing and hunting bison within the road-accessible portion of the state. The herd is also unique nationally, because it is one of the few wild, free-ranging, hunted bison herds in the United States.

Management of the DBH is complex because management decisions can directly affect many activities in the Delta Junction area, particularly agricultural land use and hunting. Balancing the statewide hunting interests with local agricultural land use is the key issue involved in this plan. An equitable balance of these interests must be maintained to provide for a free ranging bison herd in close proximity to agricultural activities, and to preserve public access to nonpublic lands for hunting and viewing bison as well as a variety of other species including waterfowl, grouse, coyote, fox, and moose. In addition, forage from private agricultural lands currently provides an important component of the DBH's diet.

This document presents the Alaska Department of Fish and Game's (Department) plans for managing the DBH from January 1, 2000 to January 1, 2005. This plan also serves as the game management plan for the Delta Junction Bison Range (DJBR) required under Alaska Statute 16.20.310 (Appendix A). Most of the information pertinent to management of the DJBR is located under the Bison Conflict Management Goal (page 17). Information on DJBR land use permitting and forestry activities is provided in Appendix B.



The mission statement, goals, objectives and tasks identified in this plan were developed through a collaborative process involving Department staff and a citizens' advisory panel, the Delta Bison Working Group (DBWG). Throughout the process members of the public have had opportunities to contribute ideas and have been encouraged to attend meetings.

The DBWG was formed in 1992 by the Department to bring citizens into the planning process. The DBWG assists the Department by helping to establish the appropriate balance between the competing interests of the bison herd and agricultural development. Specifically, the Department asked the DBWG to consider different ways of managing the DBH, to develop management options, and to make recommendations to the Department on how to manage the herd. The DBWG participated in development of the 1993–1998 Delta Bison Management Plan and continued to meet periodically to review the Department's progress towards accomplishing the goals and objectives in that plan.

At the beginning of the effort to develop the 2000–2005 plan, two seats were vacant in the DBWG. The Department solicited nominations for a Delta Junction business representative from the Delta Junction Chamber of Commerce and wrote to numerous fish and game advisory committees and private hunting organizations to seek nominations for a statewide hunting interest representative.

The current DBWG includes six individuals who represented the following interests for the 2000–2005 planning effort: 1) statewide hunting, 2) local agriculture, 3) Delta Junction hunting and agriculture, 4) the Delta Junction community, 5) Delta Junction business, and 6) Fort Greely. For further information refer to Appendix C—The Role and Membership of the Delta Bison Working Group.

The DBWG began monthly meetings in July 1998 to work on the 2000–2005 plan. In November 1998, a public meeting was held in Delta Junction to provide residents an opportunity to identify issues of concern involving management of the bison herd. The 1993–1998 plan served as the basis for drafting the revised plan. In July 1999 the draft plan was mailed to members of the Delta and Fairbanks Fish and Game Advisory Committees, to the chairpersons of other advisory committees where interest in the Delta bison hunt is high and to all persons who expressed



interest during the planning process. The draft plan was also available on the Division of Wildlife Conservation web site. In October 1999 the Delta Junction Fish and Game Advisory Committee hosted a public meeting on draft plan in Delta Junction. Staff also presented the draft plan to the Fairbanks Fish and Game Advisory Committee. Few public comments were received, however, one Delta farmer and the Salcha–Big Delta Soil and Water Conservation District suggested that the herd size objective be lowered. Reducing the herd size was not strongly advocated earlier in the planning process and revising one of the most central objectives to the plan might have required revisiting the entire plan. The herd size objective was not changed in the final plan; however, this issue will likely be brought forward in future planning efforts. Although no regulatory proposals were needed to implement the new plan, in March 2000 the Alaska Board of Game voted unanimously to endorse the plan. The DBWG will continue to meet annually, or as needed, to oversee implementation of the plan and the effectiveness of the management program.

The following section of this plan provides the reader with a detailed background on the DBH, developments in area land use patterns, and information on bison movements and hunting. Following the background information there is a section that identifies the primary constraints facing the Department in managing the DBH. Together, these sections provide the reader with the information necessary to understand the basis for the goals, objectives and tasks that comprise the overall management program for the DBH. Appendix A includes legal information that pertains to management of the DBH, Appendix B describes land use permitting requirements for the DJBR and Appendix C provides further detail on the DBWG. Appendix D describes the DBWG's consideration of awarding a Delta bison hunting permit to agricultural landholders and the possibility of providing hunters additional chances of drawing a permit based on the number of years an individual has applied. Appendix D includes a recommendation of the DBWG regarding possible revisions to the Delta bison hunting permit system.



BACKGROUND

HISTORY OF THE DELTA BISON HERD AND THE LAND IT OCCUPIES

Bison colonized North America after migrating from Asia to Alaska over the Bering land bridge several hundred thousand years ago. They were one of the most abundant large mammals in Alaska for most of the last 100,000 years. Large-horned forms such as steppe bison (*Bison priscus*) once roamed Alaska in the company of now extinct mammoths, mastodons, horses, lions, sabre-toothed tigers and dire wolves, as well as moose, caribou, Dall sheep and muskox. Large-horned bison evolved into modern small-horned bison (*Bison bison*) between 5,000 and 10,000 years ago. Wood bison (*Bison bison athabascaae*) were the last type of bison to occur in Alaska. They were extirpated during the last few hundred years, most likely because of hunting and changes in the distribution of habitat; however, they are still present in Canada. Wood Bison once inhabited a large region in Alaska including the Delta River near where the community of Delta Junction is now located.

In 1928, 23 plains bison (*Bison bison bison*) were transplanted from the National Bison Range in Montana to Delta Junction, Alaska. They were released on the Delta River near the mouth of Jarvis Creek because the area supported abundant native forage. Herd size steadily increased until 1950 when a hunting season was established to stabilize herd size.

Allen Army Airfield was established in 1942 near Delta Junction. The base evolved in purposes over the years and was designated as Fort Greely in 1955. Currently, the Fort Greely cantonment area is slated for closure under the Base Realignment and Closure program. However, the military land in the area, including that used by the DBH, will remain military land and continue to be used for a variety of military training and cold weather testing programs.

Development of agriculture in the vicinity of Delta Junction began in the 1950s within the area traditionally used by the DBH. Simultaneously, native bison forage began decreasing in the Delta Junction area as wildfires were suppressed and forests became more abundant. As farms were developed, bison began to include hay and cereal crops in their fall and winter diets. Crop depredation increased following development of the Delta Agricultural Project (DAP) in 1979 (Figure 1 Primary Land



Ownership Patterns and Bison Migration Routes, page 26). Most crop damage occurs when bison move onto farms prior to fall harvest.

In 1979 the Alaska Legislature established the approximately 90,000 acre DJBR on the south side of the Alaska Highway, across from the DAP (Figure 1). The purposes of the range identified in the legislation are to:

- Perpetuate free-ranging bison on the land described in the act by management of habitat to provide adequate winter range for bison, and;
- Alter seasonal movements of bison herds on the land in order to diminish the damage caused by the herds to agriculturally developed land.

The law establishing the DJBR had a 3-year sunset clause. In 1980 the Alaska Legislature extended the sunset clause from the original 3 years to 10 years.

In 1984 the Alaska Legislature appropriated \$1.54 million in Capital Improvement Project (CIP) funds for DJBR development and they also increased the application fee for a Delta bison hunt permit from \$5 to \$10. Funds derived from the application fee increase were intended for management of the DJBR. CIP funds paid for development of 2,700 acres of bison forage on the DJBR, the purchase of equipment for forage management, and to hire personnel to accomplish these tasks. Permit application fees have been used for annual forage management. In 1988 the Alaska Legislature eliminated the 10-year sunset clause for the DJBR.

The Delta Land Management Planning Study and the Delta-Salcha Area Plan, completed by the Alaska Department of Natural Resources (DNR) in 1982, both considered the development of the DAP, wildlife habitat and the public interest in maintaining a free-ranging bison herd in the Delta Junction area. These plans resulted in the recommendation that the area south of the Alaska Highway, including the DJBR, should be managed as wildlife habitat and that land north of the Alaska Highway be managed for agriculture.

The Delta-Salcha Area Plan has now been incorporated into DNR's Tanana Basin Area Plan (TBAP) as Subregion 7, Delta-Salcha. Lands within the



DAP are now identified in the TBAP as "private." As such, the acronym DAP used in this plan should not be interpreted to mean the area is currently a public project or is publicly owned. The DJBR is identified in TBAP as Management Unit 7K. The primary surface use of the unit is wildlife habitat and the secondary use is forestry. The plan states that "Reference to the Delta Bison Management Plan should be made on all management decisions concerning this unit" and that "Small timber sales may occur where consistent with the primary management intent, and will require the approval of the Department of Fish and Game." With regard to recreation and access, the plan indicates "The existing trail network shall remain available for recreational access. Establishing new access trails for recreational use or to reach other state land and resources must be compatible with maintaining the overall habitat value of this unit, and will be coordinated with the Department of Fish and Game." See Appendix B for further detail on land use permitting procedures within the DJBR.

Since 1978 the state of Alaska has sold nearly 100,000 acres in over 200 farm tracts in the Delta Junction area. Additional farms located in the Delta-Clearwater area began as early as the mid-1950s. Most of the farmland in the Delta Junction area has been cleared and is in production, is in the federal Conservation Reserve Program (CRP) or is available for production. In 1997 (the latest year for which statistics are available) approximately 19,000 acres were planted in the Tanana Valley, principally in the Delta Junction area. Approximately 25,000 acres were in CRP. Major cropping activities include the production of barley, oats, hay, and potatoes. Livestock enterprises include dairy, beef, swine, and game farms (Ed Arobio, Alaska Division of Agriculture, personal communication, 1999).

MOVEMENT PATTERNS OF THE DELTA BISON HERD

The DBH has ranged over an area that extends from the hills north of the Tanana River south to the mountains of the Alaska Range. At times, Delta bison have ranged as far east as Healy Lake and as far west as the Little Delta River, and as far south as Rainbow Mountain in Game Management Unit 13.

The DBH normally travels toward the floodplain of the Delta River from mid February to March. The majority of cows calve from late April to early



June on the floodplain (Figure 1). The herd spends the remainder of the summer along the Delta River floodplain and adjacent uplands between Black Rapids Glacier and the mouth of the Delta River.

In July, August, or September, the bison herd migrates from the Delta River to the DJBR. Typically they move onto private agricultural lands north of the Alaska Highway in August, September, or October. The herd then winters on both private agricultural lands and the DJBR. Two areas burned by wildfire are also used by bison at times.

DELTA BISON HERD FEEDING PATTERNS AND CHANGES IN FORAGE AVAILABILITY

Bison are primarily grazers, foraging mostly on grasses and sedges. However, they include other plants in their diet as well, including willows. Prior to development of agriculture in the Delta Junction area, the DBH subsisted on native arctic grasses that had low forage quality in the fall. Arctic grasses are adapted to transfer nutrient reserves into the root system in midsummer to fall as they prepare for dormancy and the onset of winter. During this period of senescence, forage quality of the grass is greatly reduced.

With the introduction of agricultural crops to their range, the DBH was able to choose between higher quality domestic crops versus lower quality native grasses for their fall and winter forage. Due to agricultural development in the range of the DBH, conflicts developed between bison and agriculture.

As agricultural grain crops mature in the fall prior to harvest, forage quality decreases as the plant transfers nutrients from the leaves and stems into the seed grain. Although grain crops lose forage quality in the fall, similar to native arctic plants, they remain higher quality than native grasses.

Large scale DJBR forage development began in the mid-1980s based on the working hypothesis that DJBR forage would be managed for higher quality than forage available in the DAP during the fall harvest or than native grasses. Therefore, bison would utilize the highest quality forage available and thus remain on the DJBR until lower forage quality crops were harvested in the DAP.



The DJBR working hypothesis appeared valid in the mid to late 1980s. The greatest determining factor for success was the ability to produce an adequate amount of high quality forage on the DJBR to meet the forage requirements of the DBH. High quality forage was also combined with mineral blocks, water, and low disturbance levels to entice the DBH to remain on the DJBR.

During the mid to late 1980s, most crops in the DAP were grains, and grass hay crops were small. The trend in recent years however, is for increasing acreage on private agricultural lands to be in grass production, primarily as oat and brome hay.

Hay farming practices in the Delta Junction area produce fall regrowth with high forage quality but that is not of adequate quantity to be harvested commercially and is left in the field. The regrowth is as high quality as grass produced on the DJBR. Consequently, instead of having high quality forage available primarily on the DJBR during the fall, there are increasingly large quantities available on private farmlands. Because of the close proximity of the private farmlands to the DJBR, and because bison are wandering animals, it has been much easier in recent years for bison to move from the DJBR to private farmlands without sacrificing forage quality.

HERD SIZE AND HUNTING MANAGEMENT

In June 1998 the Department estimated there were 471 bison in the DBH before the hunting season. Herd composition in September 1998 was 48 bulls:100 cows and 53 calves:100 cows. The Department's 1993–1998 Delta Bison Management Plan has a precalving herd size objective of 360 bison (430–440 bison pre hunting). Previous to that, the herd size objective was 325 animals, precalving.

The DBH hunting permits are one of the most sought after hunting permits in the state, with over 15,000 people applying in recent years for approximately 100–130 permits (Appendix D—DBWG's recommendation on establishing a permit preference system). Revenues from bison hunting permit applications are the only source of funding for bison forage management on the DJBR.



The Department uses hunting as the main tool for managing the size and composition of the DBH. Predation is not a major mortality factor. An unknown number of bison die each year from other causes such as drowning, wounding loss, and other accidents.

The Board of Game authorized the Department to issue up to 200 bison hunting permits per year. The number of permits issued has ranged from 100-130 during the 1993-1998 plan. The current hunting season is from July 20 to March 31; however, the Department will not issue permits until October 1, except to use hunting as a tool to reduce bison crop depredation.

Most hunting occurs on private agricultural land and state land in the DJBR; however, a small amount occurs on federal land. The ability of hunters to have access to the DBH on private land is dependent on the willingness of private landowners to allow access (see Appendix A for information on landowner authority to regulate hunting access). Hunting on private land has become more difficult for hunters in recent years because: 1) some landowners are now charging access fees; 2) other landowners have stopped allowing hunters on their property; and 3) the number of individual landowners is increasing because farm tracts are being subdivided into smaller but more numerous parcels which makes determining ownership and obtaining access more difficult.

Those landowners that charge access fees feel the cost is justified because there is a cost to landowners of providing access to hunters. For example, dealing with hunters takes time, there may be some damage to fields and fences, and bison carcass remains left in the field can damage farm equipment.

Landowners that have stopped allowing hunting on their property generally cite the following 2 reasons: 1) landowners have problems with motorized vehicles as discussed below and 2) landowners have a sense that the Department and hunters are not concerned about the difficulty farmers have with bison.

Motorized vehicles are not restricted for hunting bison. Unfortunately, some hunters use 4-wheelers and snowmachines in an illegal manner to pursue and herd bison while hunting. Commonly this action results in



bison being chased through fences. As more private farm acreage becomes fenced, there is an increasing incidence of hunters chasing bison through fences. This activity has resulted in one landowner attempting to unite all property owners to prohibit the use of motorized vehicles for hunting bison on all private agricultural lands.

STATEMENT OF MANAGEMENT CONSTRAINTS

The Delta Bison Herd (DBH) is a public resource that uses both public and private land during the year. A number of issues constrain the Department's options for management of the bison herd and the DJBR. Some of these constraints reduce the Department's ability to influence the movements of the DBH. These issues are discussed below.

FREE-RANGING HERD

The DBH has always been a free-ranging herd. The Alaska Legislature reaffirmed this management approach when the DJBR was established by specifically stating that one of the purposes of the range is to "perpetuate free-ranging bison." The Department is able to influence the timing and direction of DBH movements to some extent by indirect actions, including habitat management on the DJBR. However, management practices that would confine the herd, such as fencing, are not possible.

DELTA JUNCTION BISON RANGE MANAGEMENT CONSTRAINTS

Although DJBR management practices have reduced bison depredation, conflicts have not been eliminated. The success of the DJBR to date has been influenced to some extent by limitations placed on the Department by various factors including the following:

- 1 *Pesticides.* Department policy currently prohibits the use of herbicides to reduce the invasion of undesirable plant species in domestic grasses managed for bison forage on the DJBR. Policy also prohibits the use of some insecticides to control grasshopper outbreaks, which weaken and reduce range productivity, condition, and composition. This policy was developed due to public opposition to the Department's use of the herbicide Roundup to control native grasses. The result of this policy was that the Department's ability to manage high quality forage on the DJBR was reduced. The



Department has compensated by managing undesirable native grasses by mechanical methods that are less effective and more expensive.

- 2 *Fences.* The Department has not used fences to control bison grazing pressure on domestic forage species, especially during the establishment year. Bison grazing pressure on DJBR forage is most intense in the late summer and autumn when grasses are preparing for winter. This results in weaker plants that are more susceptible to winterkill. Legislative intent to maintain a free-ranging herd, and the cost of constructing bison-proof fencing for rotational grazing, precludes the use of fences to control grazing pressure on desirable grasses. Thus DJBR managers are not able to practice rotational grazing or reduce grazing pressure on selected areas of forage as needed.
- 3 *Soils.* Soil conditions are poor on the DJBR and make producing high quality forage expensive and difficult. DJBR soils are acidic, shallow, silty, rocky, and have low organic matter contents that results in very low capacity to hold moisture. Because of the poor soil condition, DJBR forage production is dependent on adequate precipitation and large quantities of expensive fertilizer. Quantity and timing of precipitation is critical for incorporating fertilizer into the soil and for providing moisture for plants. Droughty conditions, common in recent years, significantly reduce bison forage quality and quantity on the DJBR.
- 4 *DJBR Funding.* Funding the DJBR operation including maintaining farm equipment, purchasing agricultural supplies such as fertilizer, and paying staff salary, is limited to funds available from Delta bison permit hunt application fees. Therefore, any factor that potentially reduces the number of bison hunter applications also reduces DJBR management funds, and thus the Department's ability to manage the DJBR.
- 5 *DJBR Staffing.* Work time for DJBR management personnel is limited by state labor contracts and funding. The Department is not able to provide labor comparable to similar agricultural operations in the Delta Junction area. For example, Department staff is limited



to a 37.5-hour workweek while private agricultural workers do not have this restriction.

INFLUENCES OF THE DELTA AGRICULTURAL PROJECT

Crops grown on private agricultural areas have a significant influence on bison movement to and within those lands. The Department is unable to control bison movements in response to crops grown on private land. A trend for increasing production of high quality grass hay on private agricultural lands is making it increasingly difficult for the Department to attract the DBH to the DJBR and hold them there for long periods.

FEDERAL MILITARY LAND USE LIMITATIONS

Military testing and training activities may influence DBH movements, particularly on the Fort Greely portion of the DBH's critical calving and summer range along the Delta River. The Department coordinates with the Fort Greely Range Control regarding areas used by bison but generally few, if any, areas are closed to firing (Fort Greely Draft Integrated Natural Resources Management Plan for 1998-2002, pages 20-22). Military training facilities may also be constructed in or adjacent to bison habitat areas. Thus military testing and training activities may influence DBH movements but the Department has very limited ability to influence military land use and training practices.

HUNTING

Hunting is the Department's primary tool to manage DBH size and composition. However, the Department has no authority to regulate hunter access on private or federal land. Access fees and restrictions for hunting on private land have been increasing in recent years and hunters are having more difficulty finding a place to hunt bison.

DISEASE MANAGEMENT

The Department has no regulatory authority to monitor livestock diseases in domestic herds, to regulate importation of livestock into the state, to take regulatory action for livestock diseases that could have a detrimental effect on the DBH, or to regulate confinement of most domestic livestock. Therefore, the Department has little control over domestic livestock health and the consequences of contact between free-ranging bison and livestock.

GOALS, OBJECTIVES, AND TASKS FOR MANAGING THE DBH

The following are goals, objectives, and tasks (management actions) for management of the DBH from January 1, 2000 to December 31, 2005. Each section begins with a goal statement, then provides information pertinent to that goal. Finally, the management objectives and tasks needed to work towards accomplishment of the goal are outlined.

HERD HEALTH MANAGEMENT GOAL

- Ensure that the Delta Bison Herd remains healthy and free of any diseases that might threaten the herd or other wildlife species.

Herd Health Pertinent Information

- 1 The DBH is free-ranging and relatively free of disease. During its movements, the herd comes into close contact with domestic livestock in the Delta Junction area.
- 2 Several diseases are known to occur in domestic livestock in the Delta Junction area, including infectious bovine rhinotracheitis, bovine viral diarrhea, bovine respiratory syncytial virus, infectious bovine kerato conjunctivitis, parainfluenza III (PI3) and Mycobacterium paratuberculosis. The only infectious disease for which we have reliable evidence of exposure in the DBH at this time is PI3. This evidence is based on the results of blood tests. PI3 was first detected in Delta bison in 1977, but the serologic evidence of exposure to the virus was found in 100% of the animals sampled by 1984. The Department believes domestic livestock was the source of PI3 infection in bison, but this not known for certain. PI3 is not currently a major health concern for the DBH.

Herd Health Management Objectives

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

Task 1: Collect bison blood to test for evidence of disease through serologic surveys conducted on an annual basis or as need and funding allow.



Task 2: Communicate with local, state and federal veterinarians whenever there are concerns about the transmission of diseases to bison.

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

Task 1: If serious livestock diseases are discovered in area livestock, consider measures to prevent contact between livestock and wild bison.

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.

Task 1: Diseases with relatively mild symptoms and that do not present a significant risk to bison, livestock or other wildlife species will be monitored by the serologic survey.

Task 2: Diseases that produce moderately severe symptoms in bison and/or diseases of unknown pathology for other wildlife will be monitored with a serologic survey. In addition, the Department may limit contact between bison, livestock and other wildlife species by managing the DBH for fewer bison.

Task 3: Diseases that produce extremely severe symptoms that may be devastating for bison, livestock and/or other wildlife species may require reducing the risk for transmission from bison to livestock or other wildlife by one or more of the following actions:

- a Place a portion or all of the DBH in captivity and test them for the disease. Slaughter infected animals. Use disease-free captive bison to reestablish the herd.

- b Slaughter the existing DBH. The herd will be reestablished with disease-free bison.

Herd Health Management Actions

The Department will monitor the health of the DBH by conducting an annual serologic survey. We will collect bison blood and test it for evidence of disease. We will communicate with local, state and federal veterinarians whenever we have concerns about the transmission of diseases to bison.

HERD SIZE AND COMPOSITION GOAL

- Manage the Delta Bison Herd to accomplish a reasonable balance between providing the greatest opportunity to hunt and view bison while keeping negative impacts to private property at a minimum.

Herd Size and Composition Pertinent Information

For decades there have been strong conflicting opinions about what the appropriate size of the DBH should be. These opinions remain today.

- 1 Some people think the herd size should not be managed below the limit set by natural environmental factors in order to reduce conflicts. The DBH is not currently limited by winter forage because it has access to large quantities of forage produced on private farms and the DJBR. Also, since the herd is free-ranging it can seek new range. However, the herd will be most productive if it is managed slightly below its maximum biological limit.
- 2 Several studies of forage availability on the traditional summer range indicate that current herd size may be exceeding the availability of summer forage, and may be affecting bison use of this area. The DBH is altering the areas of their use on the summer range, and the timing of migration from the summer range.
- 3 The option for a larger herd size has been discussed. One potential negative impact could result in all agricultural lands being fenced as a result of increased depredation. If the DBH were to lose access to the DAP, it is possible that conflicts with bison would be transferred from the DAP to farm fields in other areas of Delta Junction, and to nonagricultural areas.



- 4 There is a lot of interest in hunting the DBH and permits to hunt the DBH are among the most sought after drawing permits in the state. Currently more than 15,000 applications are received each year to hunt Delta bison.
- 5 Most Delta bison hunters and permit applicants are satisfied with the quality and difficulty of the hunt. Any actions that decrease hunter satisfaction (i.e., less access to farm fields for hunting) may not be in the best interest of hunters.
- 6 For a population to remain viable (a healthy, reproducing and self-sustaining population), it should not go below a certain size, or minimum viable population size (MVP). Small populations are more likely to go extinct or approach extinction than large populations. Small populations are more vulnerable to disease, extremes in weather, predation or loss of genetic diversity than large populations. Although this concept is often applied to a species, it can be applied to isolated populations of a species as well. The DBH can be viewed as an isolated population in the sense of the MVP concept. Although we do not know what the MVP is for the DBH, the range in size of the herd over the past several decades suggests that the current and past sizes of the herd did not go below the MVP.

Herd Size and Composition Objectives

Objective 1 — Manage the Delta Bison Herd to maintain a herd size of approximately 360 bison at the pre-calving count.

Task 1: Monitor herd size and composition by conducting a herd census and a composition count annually.

Task 2: Issue hunting permits for bull bison, cow bison, or either sex bison to achieve desired sex and age composition.

Objective 2 — Manage the Delta Bison Herd to maintain a sex ratio of no less than 50 bulls (>1 year old):100 cows.

Task 1: Monitor herd size and composition by conducting a herd census and a composition count annually.

Task 2: Issue hunting permits for bull bison, cow bison, or either sex bison to achieve desired sex and age composition.

Herd Size and Composition Management Actions

The Delta bison permit hunt will be managed to provide the greatest reasonable hunting opportunity. This objective will provide the greatest number of bison for hunting and viewing but will not maximize the number of large mature bulls in the herd. A census and a herd composition count will be conducted annually to monitor herd size and composition.

The Department will try to compensate for increased difficulty hunting on private land by providing more winter bison forage on the DJBR. This should result in the DBH spending more time on the DJBR and give hunters a greater opportunity to pursue bison there.

To prevent conflicts between hunters and farmers during the harvest period, hunters will not begin hunting until October 1. However, hunting may be used as a tool to reduce bison/agricultural conflicts prior to October 1 by issuing permits to hunt specific areas on a case-by-case basis beginning July 20, if affected landowners reach consensus that this is a desirable action. Hunters will be provided long hunting seasons from October 1 to March 31 to provide maximum hunting opportunity (see Bison Conflict Management Goal for further detail).

BISON CONFLICT MANAGEMENT GOAL

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

Bison Conflict Management Pertinent Information

- 1 Bison caused conflicts with residents of Delta Junction before the development of agriculture. Since agriculture began in the Delta Junction area in the 1950s conflicts with bison have occurred primarily on farms.
- 2 Bison conflict goals in the 1993–1998 Delta Bison Management Plan have not been met with past levels of funding and staffing, or



manipulation of herd size. Specifically, the Department has been unable to keep the DBH west of the Richardson Highway or out of the DAP by the dates specified in the Goals and Objectives of the 1993-1998 plan. This is due in part to changing agricultural practices in the DAP as discussed earlier.

- 3 There is legislative intent for the Department to reduce bison/agricultural conflicts. Actions taken by the Alaska Legislature to reduce conflicts include establishing the DJBR, appropriating funds for DJBR development and by raising Delta bison permit application fees with the intent that the money be spent on DJBR management.
- 4 Bison will find and use forage with the highest nutritional quality, including agricultural crops. If bison have access to high quality agricultural crops, it will be difficult or impossible to completely eliminate bison/agricultural conflicts. Unless farmers fence their crops some level of bison/agricultural conflicts will likely occur.
- 5 The DBWG farmer's representative believes most farmers can tolerate a reduced level of bison damage, but believe the current amount of annual damage is unacceptable. If the current level of annual damage continues or increases, farmers would like some type of compensation for damages.
- 6 Fencing farms has been proposed as a long-term solution to bison/agricultural conflicts. Several factors pertaining to fencing that should be considered are:
 - a A significant portion of fall and winter forage used by the DBH is produced on private farm lands. Fencing farms to exclude bison would eliminate a significant source of fall and winter forage. The size of the DBH is not currently limited by winter forage. We do not know how the DBH would react if they were prevented from accessing this agriculturally produced forage.
 - b Some people think farmers should fence their fields to keep bison out. Some farmers do not think they should be required to pay for fencing their property from bison.

- c There are certain disadvantages to the public if farmers fence or restrict access to their farms. Fencing will reduce access to most users. Farms provide significant opportunity for hunting (bison, moose, geese, ducks, sandhill cranes, and grouse), trapping, predator calling, and wildlife viewing. If bison/agricultural conflicts increase and farmers are forced to fence their land to protect their crops, some farmers may restrict public access to their farms for hunting of all species and wildlife viewing.
- d Fencing farms with bison-proof fences is expensive, and there is no government program to provide farmers with financial assistance to help with the capital outlay of fencing. Estimates for fencing range from \$5,000 to \$14,000 per mile.
- e When bison move onto a farm before crops are harvested, farmers must either chase the bison off their property or ask the Department for assistance. The farmers may not kill bison in defense of life and property unless they have taken all practical measures to protect their property by fencing. If farmers fence their fields, they may be entitled to destroy bison that get inside their fences. It has not been determined in the courts if "all practical measures" mandates a bison-proof fence.
- f If winter forage is not available to bison due to fences in the DAP, the bison may move into other agricultural areas in Delta Junction along the Clearwater and Tanana Loop roads. These areas do not experience bison conflicts at this time.
- g If all agricultural areas in Delta Junction are eventually fenced, the availability of nonagricultural winter forage may become a limiting factor for the DBH unless the herd seeks and finds winter forage in other areas. The behavior and movements of the herd under such conditions are unknown.
- h Farmers may be willing to accept a certain level of bison damage rather than fencing their fields.



- 7 Farmers would like to be compensated by the state for damage caused by bison. The Attorney General and Alaska Court System have determined that the State is not liable for damage caused by wildlife, including bison (Appendix A). However, the legislature could establish a program to compensate farmers for damage, as has been done in other states.
- 8 Farmers who purchased farms in the Delta I portion of the Delta Agricultural Project were not officially informed of potential bison problems. Sale contracts for agricultural parcels in the Delta II portion of the Delta Agricultural Project state that the DBH uses the area for a portion of their range and that the State is not responsible for damage caused by bison to farms. At the time of Delta II sales, the DBH management goal was 250-300 bison pre-calving.
- 9 There is evidence to indicate that bison forage on the traditional Delta bison summer range is deteriorating and bison may be changing their use of the summer range.
 - a Bison are currently altering their summer range to include areas of greater military activity on Fort Greely Military Reservation.
 - b Bison are migrating from the Delta River to the DJBR earlier in the summer, which makes it more difficult to keep the bison out of farm crops.
- 10 It is the Department's desire to keep bison completely out of private farmlands until October 1 annually, or until all crops are harvested each fall.
- 11 It is possible that ATV use on the DJBR in August-September contributes to the DBH moving towards private farmlands earlier in the year. Closing the DJBR to motorized recreation would require working with DNR in a rule-making process that would require public hearings (See Appendix B).

Bison Conflict Management Objectives

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.

Task 1: Issue permits that require hunting to begin after October 1 to help prevent conflicts between hunters and farmers during the harvest period.

Task 2: When needed as a tool to reduce bison/agricultural conflicts, issue permits as early as July 20 to hunt specific areas on a case-by-case basis, when the affected agricultural community reaches consensus to implement an early hunt.

Task 3: Provide long hunting seasons from October 1 to March 31 to provide hunters with maximum hunting opportunity. This should also help to avoid concentrating hunter interference with private landowner's activities into a shorter period of time, and to provide a safer hunt for local residents and hunters.

Task 4: Assist landowners in minimizing problems with motorized vehicles on private lands through emphasizing this concern during the hunter orientation. Disseminate individual landowner's policy regarding motorized vehicle use to hunters at the orientation.

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.

Task 1: The Department will place salt blocks west of the Richardson Highway to encourage bison to remain west of the Richardson Highway as late in the summer/fall as possible.



Task 2: Depending on funding, the Department may consider the following possibilities for habitat management west of the Richardson Highway:

- a Cooperate with the US Army to improve existing military bison food plots and natural forage on Fort Greely.
- b Use prescribed fires to improve summer range habitat.
- c Fertilize native forage along the Delta River.

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.

Task 1: Promote growth of annual and perennial grasses for bison fall and winter forage through use of a combination of seeding, fertilizing, mowing, burning, and weed control.

Task 2: Use prescribed fires to remove plant debris and recycle nutrients.

Task 3: Control undesirable plants with a combination of replanting problem areas, mowing, and burning. There are no immediate plans to use herbicides.

Task 4: Provide mineral blocks and water for bison on the DJBR.

Task 5: Experiment with voluntary restrictions on motorized recreational use in the DJBR when motorized use is suspected to drive the bison herd towards private agricultural lands prior to October 1. Voluntary motorized use closures should be the least restrictive possible needed to limit adverse effects to bison migrations and will not be suggested for application to

the main access trails crossing the DJBR (such as 1397, 1402, or 1408 Roads). See Appendices A and B for information on recreational use and land use permitting on the DJBR.

Objective 4 — The Department will provide assistance to the public experiencing bison conflicts.

Task 1: Where bison/agriculture conflicts occur inside a fenced farm, assist the farmers by attempting to move bison out of fenced areas until crops are harvested or until October 1, whichever is earlier.

Task 2: Where bison/agriculture conflicts occur in unfenced areas, assist the farmers by directing hunters to problem areas during the bison hunting season if requested by landowners.

Task 3: Assist other members of the public who experience bison problems on a case-by-case basis.

Bison Conflict Management Actions

The Department will reduce bison/agriculture conflicts primarily by managing DJBR forage and administering the bison hunt to reduce conflicts.

Because hunter access to private land has been declining, the Department will manage forage on the DJBR to attract more bison to the DJBR in the winter and provide greater accessibility to the herd on public land for bison hunters. However, the ability to attract larger numbers of bison to public lands during winter will depend on funds being available to accomplish this task.

The Department will use Delta bison permit application fees to manage the DJBR. The perennial grasses, nugget bluegrass and arctared fescue, and the annual grasses oats and barley, will be managed on the DJBR with a combination of seeding, fertilizing, mowing, burning, and weed control. Bluegrass and oats or barley will be managed primarily as a high quality fall forage. Fescue will be managed primarily as a lower quality winter forage.



Approximately \$25,000–\$30,000 will be spent to fertilize 400–600 acres of forage annually, and approximately 200–400 acres will be planted with annual grass. Fertilizer application rates, forage quality, and forage quantity will be monitored and adjusted to achieve the most economical application rate. The acreage fertilized will depend on the availability of funds and bison forage requirements.

Prescribed fires will be used to remove plant debris and recycle nutrients. Undesirable plants will be controlled with a combination of replanting problem areas, mowing, and burning. There are no immediate plans to use herbicides. Mineral blocks and water will also be provided for bison.

Native grasses are actively competing with bison forage on the DJBR. At current funding levels, domestic forage is slowly deteriorating and may be replaced by invading native vegetation. The Department will continue working with mechanical instead of chemical methods to eliminate undesirable vegetation that competes with bison forage.

The Department will manage the bison hunt to minimize conflicts between bison hunters and farmers while crops await harvesting. Permits will not be issued until after the harvest is completed, except in special circumstances when hunting is used to move bison off unharvested crops. The Department may issue permits as early as July 20 to use hunting as a tool to reduce bison/agricultural conflicts if affected landowners reach consensus that this is a desirable action. However, it is the Department's intent to prohibit regular hunting until October 1.

BISON VIEWING MANAGEMENT GOAL

- Provide opportunities for non-consumptive enjoyment of the Delta Bison Herd, such as bison viewing, interpretation, and education.

Bison Viewing Pertinent Information

- 1 The Department is cooperating with the Alaska Department of Transportation and Public Facilities to construct a new bison viewing interpretive sign in the vicinity of the Black Rapids Glacier on the Richardson Highway.
- 2 During most of the summer tourist season the bison herd is normally located along the Delta River and on Fort Greely in the

Meadows Road area. Permits are required for public access to much of this area and there may be restrictions to prevent danger to the public from military training activities.

- 3 The Fort Greely draft Integrated Natural Resources Management Plan 1998–2002 provides for construction of bison viewing platforms by the military after use of bison food plots is determined. This must be done in coordination with Range Control to minimize conflicts with military training and is not expected to occur until 2001.
- 4 The DBWG has not supported using the limited funds from bison hunting permit application fees for bison viewing enhancement.

Bison Viewing Management Objectives

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

Task 1: Work with the Alaska Department of Transportation and Public Facilities and other agencies to improve bison viewing facilities as opportunities arise within agency's routine planning programs.

Task 2: Work with the US Army to provide public bison viewing platforms or designated viewing areas on bison summer range on Fort Greely.

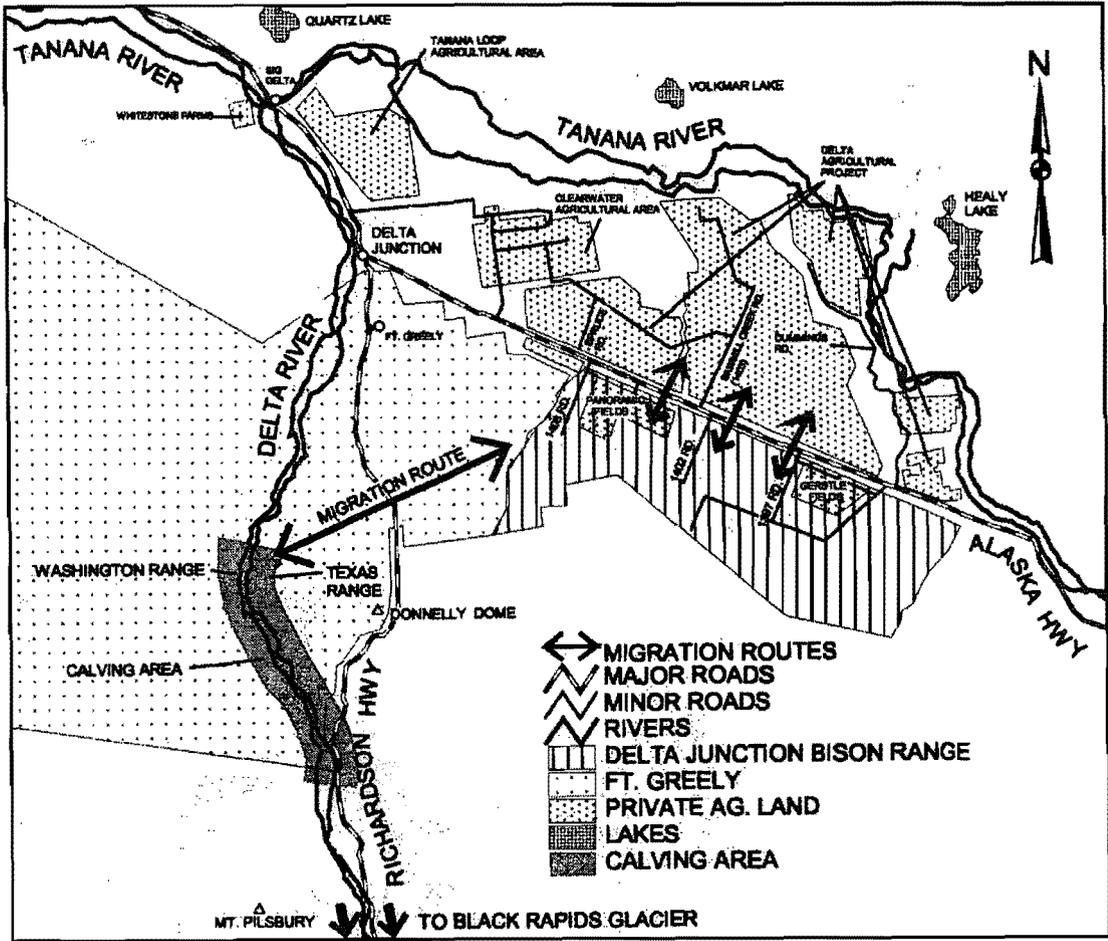


Figure 1 Primary landownership patterns and bison migration routes

APPENDIX A Excerpts of Legal Document Relating to Management of the Delta Bison Herd

I Constitution of the State of Alaska

Article VIII of the Constitution of the State of Alaska provides the overarching policy for management of natural resources in the state. Section 3, often referred to as the “Common Use Clause” is particularly pertinent to discussions of the DBWG during the development of this plan. This clause likely precludes the possibility of designating one or more Delta bison hunting permits to a specific group, such as the Delta agricultural landowners who experience impacts from the bison herd and bison hunting.

Article VIII, Natural Resources states:

Section 1. It is the policy of the state to encourage the settlement of its land and the development of its resources by making them available for maximum use consistent with the public interest.

Section 2. The legislature shall provide for the utilization, development, and conservation of all natural resources belonging to the state, including land and waters, for the maximum benefit of its people.

Section 3. Wherever occurring in the natural state, fish, wildlife, and waters are reserved to the people for common use.

Section 4. Fish, forests, wildlife, grasslands, and all other replenishable resources belonging to the state shall be utilized, developed, and maintained on the sustained yield principle, subject to preferences among beneficial uses.

Section 5. The legislature may provide for facilities, improvements, and services to assure greater utilization, development, reclamation, and settlement of lands, and to assure fuller utilization and development of the fisheries, wildlife, and waters.



II Title 16 of the Alaska Statutes

Several sections of Title 16, Fish and Game, apply to management of Delta bison and the DJBR. There are general provisions, such as the authority of the commissioner and there are specific measures that apply to the DJBR and the auctioning and/or raffling of bison hunting permits.

Sec. 16.05.020. Functions of commissioner. The commissioner [of the Alaska Department of Fish and Game] shall

(2) manage, protect, maintain, improve, and extend the fish, game and aquatic plant resources of the state in the interest of the economy and general well-being of the state.

In 1979 House Bill 31 established the DJBR. The purposes of the act identified in Section 1 of the legislation are:

"to perpetuate free-ranging bison on the land described in this Act by management of habitat to provide an adequate winter range for bison," and

"to alter seasonal movements of bison herds on the land in order to diminish the damage caused by the herds to agriculturally developed land."

This legislation was codified into Sections 16.20.300-320 of the Alaska Statutes. Section 16.20.300 identifies the lands included in the DJBR. The text of the other portions of the statute follows.

Sec. 16.20.310. Game management plan for bison. (a) The commissioner shall develop and may amend a game management plan for bison in the area described in AS 16.20.300. After holding public hearings in accordance with 44.62.310 and 44.62.312, the commissioner shall implement the game management plan.

(b) The game management plan must include, but is not limited to

(1) planting grains for bison and planting other wildlife forage;

(2) altering existing plant cover to create additional range and year-round habitat for bison and other animal species in the area;

(3) tilling to produce forage.

(c) The commissioner shall develop and amend the game management plan to coordinate, as closely as possible, the game management plan with the activities of the Agricultural Development Authority, Department of Natural Resources, relating to the Big Delta agricultural development project.

Sec. 16.20.315. Bison range timber sales. The Department of Natural Resources, division of forestry, shall provide for the sale of timber in the Delta Junction bison range area in a manner that does not delay implementation of the game management plan required under AS 16.20.310.

Sec. 16.20.320. Activities on bison range area. Nothing in AS 16.20.300–16.20.320 shall be construed as prohibiting activities on land described in AS 16.20.300 that are otherwise permitted in accordance with the laws and regulations of this state, including, but not limited to, hunting, trapping, engaging in recreational activities, using the land for access to adjacent areas, and a 300-foot Alaska Railroad right-of-way.

AS 16.05.343 provides for auctions or raffles of big game harvest permits. These provisions are relevant to the DBWG's consideration of providing a bison harvest permit to Delta agricultural interests who are impacted by bison depredation (Appendix C). The key provision of both paragraphs (a) and (c) is that "The donation may be made only to a nonprofit corporation established to promote fish and game law enforcement..." Thus, donation of a bison harvest permit to an agricultural organization would require legislative action to make an organization other than a nonprofit established to promote fish and game law enforcement eligible for a permit donation. Even if legislation were proposed, it may violate the Equal Access Clause of the Constitution (see above).



Sec. 16.05.343. Auctions or raffles for big game harvest permits.

a) The department may donate one bison harvest permit each year for a bison from the Delta Bison Herd for a competitive auction or raffle. The donation may be made only to a nonprofit corporation established to promote fish and game law enforcement, subject to the terms of a memorandum of understanding developed by the department.

b) (Not applicable to Delta Bison)

c) The department, subject to regulations adopted by the commissioner, may issue, through a competitive auction or raffle, up to two harvest permits each year for each of the following big game species: Dall sheep, bison, musk ox, brown or grizzly bear, moose, caribou, and wolf. Notwithstanding AS 36.30, the department may authorize a qualified organization to conduct the auction or raffle on behalf of the department. If the department does authorize a qualified organization to conduct an auction or raffle for a big game species, the department shall make available to a qualified organization based in the state at least one harvest permit for that species. If the auction or raffle is conducted by a qualified organization, the organization may retain an amount from the gross proceeds of the auction or raffle equal to the administrative cost of the auction or raffle plus an amount not to exceed 10 percent of the net proceeds. The proceeds from the auction or raffle of a big game harvest permit may not be used to make a contribution to any candidate for political office or to any organization supporting or opposing ballot propositions or to pay expenses associated with lobbying the legislature or administration. All proceeds from the auction or raffle of the big game harvest permit, less the amount that is retained by a qualified organization under this subsection, shall be deposited in the fish and game fund under AS 16.05.100. A person who is issued a big game harvest permit under this subsection shall receive upon the person's request a complimentary hunting license and a big game tag for the big game species for which the big game harvest permit is issued. A hunting license issued under this subsection must bear the inscription "Governor's license" or a similar designation. A person who receives a big game harvest permit, hunting license, or big game tag under this subsection may exercise the privileges conveyed by the permit, license, or tag only in

accordance with applicable law. In this subsection "qualified organization" means a nonprofit corporation established to promote fish and game law enforcement or an organization that is established to promote management of hunted game species and use of game populations for hunting and that complies with applicable laws governing activities under this subsection.

III Legislative History, Attorney General's Opinions and Legal Decisions

During preparation of the Delta Bison Management Plan for 1993–1998 Department staff collected legal background information on several points relevant to management of the Delta Bison Herd and DJBR. A summary of some key points from this research follows.

A MANAGEMENT OF THE DELTA BISON HERD AND DELTA JUNCTION BISON RANGE

In 1980 the Alaska Legislature passed House Bill 568 which extended the life of the DJBR from 3 years to 10 years (in 1988 the legislature repealed the termination date for the DJBR). Although the bill consisted of only a few lines of text, the Chairman of both the House Special Agricultural Committee and the House Resources Committee sent the Speaker of the House, Terry Gardiner, a letter of intent stating:

"It is the intent of the Legislature that the Delta Junction bison herd be managed for maximum reproduction and productivity. The present base population is not to be reduced and the past average number of animals harvested by hunting permit shall be continued. Any animals which seasonally exceed the base population after historic hunting allocation shall be disposed for maximum return to the state."

B State Liability for Bison Depredation of Crops

In 1980 a Delta Farmer, Howard Smith, was sued by the Alaska Farmer's Cooperative for nonpayment for seed and fertilizer he purchased from the cooperative. In his defense, the farmer filed a cross-complaint against the state alleging the state was liable for any sums owed because the state failed to protect his crop from bison depredations. The state filed a motion for summary judgement against Smith and the motion was granted in the



state's favor in a June 1982 court decision. The state's case was based on "the common law rule that states are not liable to individuals for damages to real or personal property inflicted by wild animals protected by game laws which are administered by governmental agencies."

In a memo to Representative Pappy Moss dated February 27, 1981 the Alaska State Legislature House of Representatives Research Agency described the state's potential liability for wildlife depredation of crop land. This memo was written in response to questions relating to proposed legislation dealing with compensation by the state to producers of certain agricultural products for income loss attributable to bison depredation. The memo refers to two Assistant Attorney General Opinions and was inconclusive with regard to the State's liability. Eighteen months later the courts issued the Howard Smith decision that determined that the state is not liable for bison depredation of crops.

C Access Fees for Hunting on Agricultural Lands

An Assistant Attorney General's memo to the Commissioner of the Department of Fish and Game, dated May 7, 1992, addresses the topic of access fees for hunting on agricultural lands. The memo specifically examines holders of state agricultural rights in the Delta Junction area. The memo concludes:

"The owner of the agricultural interests to land acquired from the state may limit access to those lands for hunting and other purposes. The owner may allow public access, and charge a fee therefore, if the hunting use of the land is not inconsistent with or contrary to the agricultural use of the land."

APPENDIX B Delta Junction Bison Range Management and Land Use Permitting

The statutory designation of the Delta Junction Bison Range (DJBR) in AS 16.20.300-320 provides for a game management plan for bison and other wildlife species, timber sales on the range and continued public use of the lands (Appendix A). The law requires that the game management plan for the DJBR be coordinated with the Department of Natural Resources (DNR). This appendix stems from review and coordination with the DNR and is intended to help clarify how agency and public land use permitting on the DJBR is to be handled.

I. Public Recreational Use and Other Activities

Activities permitted in accordance with the laws and regulations of the state, including, but not limited to, hunting, trapping and recreational activities on the DJBR are specifically authorized in AS 16.20.320. Generally, casual public use of DJBR lands is authorized without a permit, similar to other state owned and managed lands. This plan does not include any proposals to adopt regulations to restrict public use of the DJBR. If in the future the Department of Fish and Game (ADF&G) sought to close the DJBR to certain public uses in order to better manage for bison or wildlife habitat, the Department would be required to work with the DNR to restrict land uses through a public rulemaking process according to state land use regulations.

Organized events or other public uses that might result in impacts to the land may require a state Land Use Permit (LUP). The DNR, Division of Mining, Land and Water (DMLW), should be consulted on the need for a LUP. The Delta Junction Area Biologist will forward all DJBR public use requests to the DMLW for determination of permitting requirements. If a proposed activity requires an LUP or other authorization, the DMLW shall consult with the Division of Wildlife Conservation (DWC) and will only issue a permit after receiving the DWC's concurrence that the activity will not result in significant adverse effects to bison and other wildlife habitat purposes for which the DJBR was established.



II. Department of Fish and Game Wildlife and Wildlife Habitat Management Activities

Management activities for wildlife and wildlife habitat undertaken by the ADF&G are covered within the statutory purposes of the DJBR and generally do not require a LUP from the DMLW. This includes typical activities such as tilling to produce forage, altering existing plant cover to create habitat for bison and other animal species and planting grains for bison and planting other wildlife forage.

Prescribed burning on the DJBR will be done in consultation with the DNR. The prescribed burn approval is sufficient authorization from DNR for a prescribed burn on the DJBR; however, if the burn is to extend outside of the DJBR lands, a Land Use Permit is also required.

Timber in the DJBR is included in the DNR, Division of Forestry (DOF) timber base. Because of vegetative cover type and seasonal hydrology, some lands within the DJBR may be considered wetlands by the US Army Corps of Engineers (COE). Normal silvicultural practices intended to regenerate forest cover types after timber harvesting, including surface preparations that scarify soil, are exempt from COE Section 404 permits (33 CFR 323.4 (a)). However, if DWC wildlife management activities are intended to *convert* [italics added] areas of forest cover into grasslands, a COE 404 wetland permit may be required. Before undertaking actions to convert forest lands to grasslands or other nonforest land uses, the DWC should consult the COE and, if necessary, request a wetlands determination for the specific lands involved. If required by the COE, wetland permits must be obtained prior to initiating the project. If such a forest land use conversion project is envisioned by the DWC, the DOF should be notified so that the lands can be removed from the timber base. The term "conversion" does not include a temporary change in forest cover type such as removing black spruce to allow growth of aspen or other species (See AS 41.17.110 and 11 AAC 95.200, that governs conversion of forest land to other uses). In addition, if DJBR lands are cleared for non-timber purposes the DWC, in consultation with DOF, will determine if the timber has significant salvage value (See AS 41.17.083). If the timber has significant salvage value, the timber will be salvaged as part of the clearing

process, unless there are overriding reasons why the salvage would be detrimental to the purposes of enhancing bison or other wildlife habitat.

III. Timber Sales and Other Forestry Practices

Timber sales, access roads, and other forestry practices proposed for the DJBR by the DOF are designated as secondary uses by DNR's Tanana Basin Area Plan, and will be coordinated with the ADF&G Habitat and Restoration Division and the Delta Area Biologist. Any proposed forestry practices must be consistent with or not interfere with the primary purpose of the bison range, which is enhancement of bison and other wildlife habitat. Concurrence of the DWC must be obtained prior to initiation of forestry activities on the DJBR.

IV. Fire Management

The ADF&G is the land manager for decisions on fire suppression during wildland fire events, particularly as related to wildlife populations and/or habitat. The Delta Area Biologist or his/her designee will cooperate with the DOF in preparation of the Wildland Fire Situation Analysis as provided for in the Alaska Interagency Wildland Fire Management Plan. The fire Incident Commander retains ultimate authority for decisions involving a threat to public safety and for overall fire manageability. Fire rehabilitation on the DJBR will be accomplished through the normal fire rehabilitation process and funding mechanisms in the DOF, with rehabilitation decisions being made cooperatively with the Delta Area Biologist to maximize benefit to bison and other wildlife habitat.



APPENDIX C The Role and Membership of the Delta Bison Working Group

The Delta Bison Working Group (DBWG) was established to advise the Alaska Department of Fish and Game (Department) on Delta Bison Herd management and to promote communication among the public, bison interests and the Department. The six-member working group serves in an advisory capacity to the Department but their recommendations carry significant weight in determining management direction. The DBWG is charged with assisting the Department with establishing the management direction for the bison herd through preparation and renewal of the Delta Bison Management Plan. Moreover, the real product of the working group's efforts will be biologically and legally sound bison management policies which help to minimize conflict and enhance both consumptive and non-consumptive enjoyment of bison by the public. During the term of adopted plans, the working group will meet as necessary to monitor implementation of the plan and address any new issues that may arise.

The following individuals serve on the DBWG and represent the primary different interests relative to Delta Junction bison management:

- 1 Statewide hunting – Darrell Darland, Delta Junction. Darrell was nominated by the Delta Fish and Game Advisory Committee. Darrell is a long-term resident of Delta Junction, and an active hunter that has hunted bison several times. He is also a member of the Delta Fish and Game Advisory Committee and participated in the 1993–1998 Delta bison planning process.
- 2 Local agriculture – Mike Schultz, Delta Junction. Mike was originally nominated by the Alaska Farmers and Stockgrowers Association to represent agriculture on the DBWG during the 1993–1998 Delta bison planning effort. Mike is a farmer in Delta Junction, and has hunted Delta bison.
- 3 Delta Junction hunting and agriculture – Don Quarberg, Delta Junction. Don was originally asked by the Department to serve as an ad hoc member on the DBWG during the 1993–1998 Delta bison

planning effort. Don is a retired extension agent with the University of Alaska Cooperative Extension Service in Delta Junction. Don has expertise in forage crop management in Interior Alaska, he is a member of the Delta Junction Fish and Game Advisory Committee, and he is a hunter.

- 4 Delta Junction community – Glen Wright, Delta Junction. Glen was nominated by the previous mayor of Delta Junction to represent the Delta Junction community on the DBWG during the 1993–1998 Delta bison planning effort. At the time, Glen was the mayor pro tem; however, he remains active in Delta Junction affairs and maintains a local business.
- 5 Delta Junction business – Dan Splain, Delta Junction. Dan was nominated by the Delta Junction Chamber of Commerce to serve on the DBWG. Dan is a long time resident of Delta Junction and operates a lodging facility that caters to hunters and especially bison hunters. Dan is an active hunter.
- 6 Fort Greely – Ken Spiers, Fairbanks. Ken was nominated by Colonel Kenneth Jarman, Garrison Commander, Fort Greely, to represent Fort Greely on the DBWG during the 1993–1998 Delta bison planning effort. Ken served as the wildlife biologist for Fort Greely Military Reservation from 1981–1991, and worked closely with the Department to manage bison habitat on Fort Greely. Ken is currently serving as the Fort Greely Base Realignment and Closure environmental coordinator, while stationed at Fort Wainwright.



APPENDIX D Delta Bison Hunting Permit Considerations and Recommendation

The DBWG has carefully considered two matters involving the Delta bison permit drawings. The first matter is exploring the concept of providing additional chances at drawing a permit, based on the number of years a hunter has applied. This has generally not been possible in the Department's current hunt permit processing system. However, the Division of Wildlife Conservation has a Permit Task Force in place that is examining ways of revising the permit drawing system and changes may be possible within the duration of this plan. Therefore, the DBWG makes the following recommendation:

"The DBWG recommends that the Department continue evaluating a means of providing additional chances at drawing a Delta bison hunting permit, based on the number of consecutive years a hunter has applied. If such a system is found, and would not result in significantly reducing the number of bison hunter permit applications (which are the primary source of revenue for maintenance of the DJBR), the system should be implemented for the Delta bison hunting permit drawing."

The second matter involves a desire by the DBWG to award one or more bison permits to Delta farmers who are impacted by the bison herd. The DBWG discussed this concept as a means of providing a gesture of support to the Delta agricultural community and to try to help maintain hunter access to agricultural lands. Even though on the surface the concept seems simple enough, designation of one or more permits to one special group of Alaskan residents may violate the Equal Access Clause of the State Constitution and there are many questions as to how such a program could be fairly administered. For example, how would eligibility for the permit award or benefits from the permit be determined? This type of permit designation does not fall within the existing authority of the Department for Auctions or Raffles of Big Game Harvest Permits provided under AS 16.05.343 and would require legislative action (Appendix A).

Delta Bison News

Delta Bison Working Group

- ◆ **Don Bunselmeier**— statewide hunting
- ◆ **John Haddix**— U.S. Army
- ◆ **Phil Kaspari**— agriculture and Delta Cooperative Extension Agent
- ◆ **Mike Schultz**— Delta agriculture
- ◆ **John Sloan**— Delta business
- ◆ **Don Quarberg**— Delta hunting and Chairman of the Delta Fish and Game Advisory Committee
- ◆ **Glen Wright**— Delta Junction community

Delta Bison Management Plan Update Underway

The Delta Bison Herd (DBH) is managed by The Alaska Department of Fish and Game (ADF&G) according to the *Delta Bison Management Plan*. The plan is updated every few years through a cooperative process involving the Delta Bison Working Group (Working Group). The Working Group is an advisory group that includes hunters, farmers and other people interested in the bison herd. The process also involves state fish and game advisory committees and other interested members of the public.

A major focus of the plan is to identify management actions that can minimize the damage caused by bison to agricultural operations in the Delta area. Herd size is an important component of the plan. The size of the herd influences the level of harvest that can be sustained and the number of bison hunting permits that can be issued. Herd size can also affect the level of bison-caused damage to agricultural operations.

Last winter the Working Group held a series of meetings in Delta to discuss bison management and address possible changes to the plan. Representatives of the Delta agricultural community expressed a higher level of concern about bison-caused crop damage than had been expressed to ADF&G for earlier versions of the plan. In response, ADF&G expanded the planning process to ensure adequate opportuni-

ties for input from the agricultural community and others. The Division of Agriculture has become actively involved in the planning process as well. The Working Group is seeking to make every effort to evaluate all information and ideas and bring forth strategies to minimize conflicts between the bison and agriculture and to address other management issues.

Meetings will continue this fall and there will be opportunity for public review and comment on a draft plan. The draft plan and any hunting regulation proposals that may be developed will also be reviewed through

(Continued on page 2)

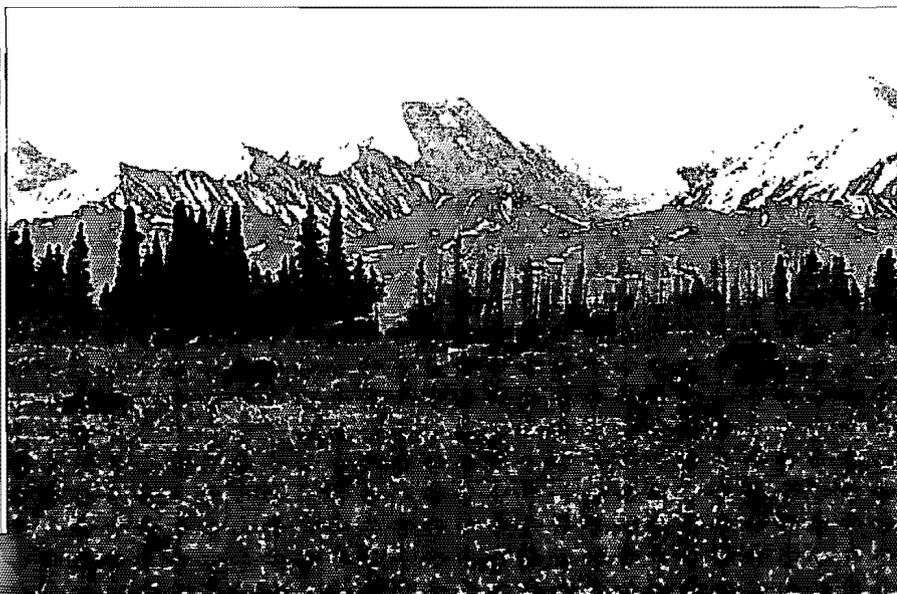


Photo by Steve DuBois

Delta Bison and Alaska Range



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This information is on the web at
[http://www.wildlife.alaska.gov/index.cfm?
adfg=planning.main](http://www.wildlife.alaska.gov/index.cfm?adfg=planning.main)

Public Comment Invited on Delta Bison Management

This newsletter is intended to inform people about Delta bison management issues and to provide an opportunity for public comment. Several important topics are being considered.

Please take some time to review the background information and preliminary ideas outlined in this newsletter. Let us know what you think. Your input will help the Delta Bison Working Group develop recommendations for the best bison management objectives including ways to minimize conflicts between bison and agriculture as well as to address other important issues.

We would appreciate your sending comments to Rita St. Louis (listed above) before October 31, 2009.

Let us know of other people who would like to be added to the mailing list to be kept informed about the planning process and opportunities for public involvement.



Photos by Steve DuBois

Delta Bison

2009 Delta Bison Crop Damage Assessment Report

Steve DuBois, Alaska Department of Fish and Game, P.O. Box 605, Delta Junction, AK

Abstract: Delta bison crop damage assessment aerial surveys were conducted on August 20, September 1, and September 14, 2009 for grain crops in the Delta I and Delta II agricultural areas north of the Alaska Highway. Delta bison began moving out of the Delta Junction Bison Range and into agricultural lands north of the Alaska Highway on August 11. Damaged crops were identified and photographed. Digital photographs of bison damage were given to Division of Agriculture staff for assessment.

Introduction

During the 2009 Alaska Department of Fish and Game (ADF&G) Delta bison management planning process the Delta Bison Working Group and other participants determined that having an assessment of bison damage to agricultural crops would be an important set of data to acquire. Therefore, ADF&G and Alaska Department of Natural Resources, Division of Agriculture (ADNR) agreed to cooperate on a Delta bison crop damage assessment program during fall 2009.

ADF&G and ADNR agreed that the damage assessment would be based on an estimate of crop yield and acreage damaged calculated by ADNR staff. Four damage assessment aerial surveys were to be flown with one near the beginning of harvest, one near the end of harvest, and two in the interim.

Two assessment techniques were to be tested if possible. One technique was to take aerial photographs of damaged grain crops to allow a visual examination of the photographs for an estimation of acreage damaged. I was going to test the photographic technique. The second technique was to use a computer tablet with maps or photographs of the area to record damaged acreage, as currently conducted by Alaska Division of Forestry for timber surveys. Division of Agriculture staff was going to test the computer tablet technique.

Methods

I conducted the photographic surveys from a Piper PA-18 Supercub aircraft and observed all agricultural areas with grain crops north of the Alaska Highway in the Delta I and Delta II agricultural areas. I took photographs of grain crops that I identified as having bison damage. I identified bison damage by the evidence of trails through grain that appeared to be made by numerous animals and that showed other evidence of bison such as wallows, beds, or the presence of bison. I took the photographs from an altitude of 1,000 feet above ground level (AGL) to give adequate coverage and perspective of the damage. I took photographs at a focal length of approximately 50mm through an open window in the aircraft. I used large jpg files on a Canon 1DMark3 digital single lens reflex camera with resolution of 3888 x 2592 pixels and 3.5 MB file size. 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. I recorded latitude and longitude of each damaged area in WGS 84 degrees decimal minutes. I also made a visual estimate of the total proportion of crops damaged in a farm tract.

Results

Bison were first observed by ADF&G north of the Alaska Highway on August 11 when 40 bison were seen on Tract 3 (Fig. 1), nine days prior to the first damage assessment survey. During the August 20 survey, 192 bison were seen on Tract 3 and 230 were observed on the Delta Junction Bison Range (DJBR) Gerstle Fields (Fig. 1). During the September 1 and 14 surveys all of the bison I observed were north of the Alaska Highway.

August 20 Survey

I flew the damage assessment flight with Golden Eagle Outfitters of Delta Junction from approximately 1745 hours until 1900 hours on August 20, 2009 for a cost of approximately \$250.

I identified 20 agricultural tracts that had grain crops (Table 1) and determined that 16 had no visible bison damage. Three tracts (F, 3, U) had damage that I estimated to total <1% of grain on each tract respectively (Fig. 2). One tract (5) had more damage that I estimated to be approximately 20% of grain on the tract. I observed numerous tracts with moose trails and beds and grain that was down due to environmental factors such as wind or rain.

I submitted sample photographs to ADNR Natural Resources Manager Charles Knight for initial evaluation as a damage assessment tool.

September 1 Survey

Prior to the September 1 survey, ADNR staff determined that using the computer tablet was not an acceptable method to document bison damage and we decided that I would continue to fly photographic surveys.

I flew the September 1 survey damage assessment flight from 1730 hours until 2050 hours for a cost of about \$425. This flight time included conducting an aerial bison census, which required about one-half of the flight time.

I surveyed the 20 agricultural tracts identified as having grain crops during the August 20 survey (Table 2). Harvest was underway ranging from 100% of grain crops harvested on some tracts and none harvested on others. Bison trails and damage to crops were more extensive than during the August 20 survey. Tract U owned by the Schultz's appeared to have the heaviest bison damage I observed. I saw no signs of bison damage on nine tracts. I took aerial photographs of those tracts that had bison damage for assessment by ADNR staff.

I observed the most bison on Peterson's Tract 1B where I counted a group of 227 bison in apparent CRP acreage. There were also approximately 100 bison in the Delta

Clearwater River bog. No bison were present on the DJBR.

September 14 Survey

I flew the September 14 survey from 0755 hours until 0910 hours for a cost of about \$240. I also conducted a bison census during this time.

I surveyed 19 of the same 20 agricultural tracts identified as having grain crops during the August 20 survey (Table 3). I did not survey Hendry's Tract 8E because it was difficult to determine if grain was present. However, I did survey Tract A3 on the south side of the Alaska Highway that had grain but I had not surveyed before.

Most grain crops were harvested at the time of this survey and much of the grain straw had also been baled (Table 3). Ron Nelson had just started harvesting potatoes on Tract V and there were extensive bison trails through the bare dirt on his tract and undoubtedly bison had been walking through his potatoes.

Bison were observed on several farm tracts. Peterson's Tract 4 had 14 bison in grain, Schultz's Tract U had 117 bison in CRP brome, Nelson's Tract V had 41 bison in brush, and Geier's Tract 8C (Figure 4) had 170 bison with most in brush but some in grain.

After the September 14 survey I determined that there was not enough unharvested grain remaining to justify flying another damage assessment survey. I gave digital copies of all photographs I had taken to Division of Agriculture staff. At the request of Mr. Ron Nelson I also gave him copies of photographs taken of his acreage.

Discussion

Based on the August 20 Delta bison assessment survey I felt that overall damage to agricultural crops was light at that time, although Tract 5 owned by Mike and Scott Schultz had received most of the damage that had occurred. It appeared to me that Tract 5 was receiving the majority of current damage because bison were attracted to this area because there was an abundance of CRP brome grass nearby which provided a large quantity of quality bison forage, the nearby Gerstle River and a gravel pit pond on Tract 5 provided bison with a water source, and the adjacent Gerstle River greenbelt provided easy escape cover for the bison.

At the time of the September 1 survey, bison had been present north of the Alaska Highway for an additional 12 days and there were more extensive bison tracks and damage within the agricultural tracts. Although harvest was underway, rainy and cool weather had delayed harvest during the previous 12 days. The Schultz acreage appeared to be receiving the most damage, with Tract U being most impacted at the time.

During the September 14 survey, most grain had been harvested which made determining additional damage difficult on those tracts where the grain was harvested. Harvest of straw was underway. All bison located were north of the Alaska Highway.

I think the photographic assessment technique was a practical and affordable method to determine the extent of bison crop damage. If damage becomes more extensive requiring substantially more photographs to be taken and organized then the technique would likely be more difficult and costly.

The quality of light appeared to influence the ability to observe and photograph bison crop damage from the air. Damage was easier to observe and photograph when the sky was clear and sunlight was bright and casting shadows versus when the sky was overcast and there were few shadows.

Based on my frequent observations of grain that was damaged due to environmental factors, damage assessment observers should be careful not to attribute damaged grain to wildlife if it had some other cause.

Table 1. August 20, 2009 Delta bison crop damage assessment data sheet.

Date: August 20, 2009

Time Off Delta: 5:45 pm

Time On Delta: Completed damage assessment at 7:00 pm; on Delta at 8:30 pm

Weather: Prtly cldy; 65F; wind 030 at 4 mph

Pilot: Jim Cummings

Observer: Steve DuBois

Aircraft: PA-18

Camera: Canon 1DMark3 at large jpg

<i>Farm Tract:Owner</i>	<i>Latitude/ Way Pt</i>	<i>Longitude</i>	<i>Photo file numbers</i>	<i>Description of Observed Damage</i>
B:Rule				No visible bison damage (NVBD)
Robinson:Hanson Rd				NVBD-moose trails
C-1:Wrigley				NVBD-cow/calf moose; blow down
C-3:Robinson				NVBD-blow down
G:Olson			2459-2460	NVBD-moose trails
E-1:Purviance				NVBD-blow down
E-8:Green			2461-2465	NVBD-blow down
F:Green	63°55.50	145°14.68	trail 1 = 2466-2482	2 bison trails with no major wallows or
	63°55.73	145°15.75	trail 2 = 2483-2486	feeding; trails & beds on eastern tree line
			NW damage = 2487-	& NW corner likely moose; total Tr F
			2490	bison
			E. tree line = 2491-	damage ~<1%
			2492	
H:Eagles Ridge				NVBD-moose trails; blow down
4A:Peterson				NVBD
4B:Peterson				NVBD
2:Heide				NVBD
3:Schultz	64°01.11 64°01.36	145°06.40 145°05.82	2493-2494	Damage in 2 areas; total ~<1%
5:Schultz	64°00.94 64°00.82	145°03.98 145°04.35	2496-2507	Significant damage ~20% of Tr F
U:Schultz	63°59.81 63°59.01	145°03.39 145°03.48	2510-2516	Minor bison damage ~<1% in NW; blow down
9D:Robinson				NVBD-blow down
8C:Geier				NVBD
V:Nelson				NVBD
Q:Green				NVBD
S:Filla				NVBD

Table 2. September 1, 2009 Delta bison crop damage assessment data sheet.

Date: September 1, 2009
 Time Off Delta: 5:30 pm
 Time On Delta: 8:50 pm (completed simultaneous bison census)
 Weather: Overcast, 60F, 090° @9mph
 Pilot: Jim Cummings
 Observer: Steve DuBois
 Aircraft: PA-18
 Camera: Canon 1DMark3 at large jpg

NVBD=No visible bison damage

<i>Tract:Owner</i>	<i>Latitude/ Way Pt</i>	<i>Longitude</i>	<i>Photo file numbers</i>	<i>Description of Observed Damage</i>
B: Rule				NVBD; ~5% harvested
Hanson				NVBD; 0% harvested
Rd:Robinson				NVBD; moose trails; harvest starting
C-1:Wrigley				NVBD; 100% harvested
C-3:Robinson				NVBD; ~50-70% harvested
G:Olson				NVBD; 0% harvested
E-1:Purviance				Hvy bison trail on North fld; <1% damage; 0% harvested
H:Eagle Ridge	63°57.52	145°15.02	3027-3029	NVBD; 0% harvested
H continued				Hvy bison trails & wallows in NW oats
E-8:Greens				Trails of 4 griz bears obsrved by Cummings
F:Greens	63°56.50	145°16.78	3030-3036	<1% damage TrF; 0% harvested
F continued	63°55.22	145°15.84	3037-3039	Hvy bison trails; <1% damage Tr4; 0% harv
F continued				Hvy bison trails; 5% damage; 0% harv
4:Peterson	63°00.03	145°09.19	3040-3045	Hvy bison trails; 5% damage;
2:Hiede	64°01.53	145°10.06	3046-3049	48 bison in CRP; 33% harvested
2 continued	64°01.76	145°11.16	3050-3053	
3:Schultz	64°01.57	145°08.97	3054-3061	Hvy bison trails in straw; 75% harvested
3 continued	64°01.195	145°07.62	3062	Hvy bison trails; 5% damage; 50% harv
3 continued	64°01.09	145°06.67	3063-3066	
5:Schultz				
U:Schultz	63°58.64	145°02.81	3067-3075	Hvy trails in dirt, hard to see in potatoes
U continued	63°59.07	145°02.92	3076-3086	100% harvested
V:Nelson			3087-3094	
10A:Robinson				
8E:Hendry	64°00.22	144°54.98	3094-3100	Trails from bison or cows; 0% harvested
8C:Geier	64°00.73	144°58.78	3101-3103	Bison trails; <1% damage; 0% harvested
Q:Green				NVBD; 0% harvested
S:Filla				NVBD; 0% harvested

Table 3. September 14, 2009 Delta bison crop damage assessment data sheet

Delta Bison Damage Data Sheet

Date: September 14, 2009

Time Off Delta: 0755

Time On Delta: 0910

Weather: Prtly cldy; wind calm; 37F

Pilot: Cummings

Observer: DuBois

Aircraft: PA 18

Camera: Canon 1DM3

				NVBD = No visible bison damage
Tract:Owner	Latitude/ Way Pt	Longitude	Photo file numbers	Description of Observed Damage
B:Rule				100% harvested; straw remaining
Hanson:Robinson				100% harvested; straw 50%
C1:Wrigley				100% harvested; straw 50%
C3:Robinson				100% harvested; straw 100%
G:Olson				100% harvested; straw 100%
E1:Purvivance				100% harvested; straw 50%
E8:Green				100% harvested; straw 100%
F:Green				50% harvested; 25% straw;
F continued				no new visible bison damage
H:Eagle Ridge				100% harvested; 0% straw
4:Peterson				75% harvested; 25% straw;
4 continued				no new visible bison damage
2:Peterson	64°01.83	145°10.38	4707-4710	50% harvested; 20% damage
3:Schultz				100% harvested; straw 100%
5:Schultz				100% harvested; straw 40%
U:Schultz				100% harvested; straw 100%
V:Nelson	63°58.04	145°01.20	4715-4728	10% harvested; lots bison tracks
V continued				in dirt
8C:Geier			4730-4737	20% harvested; 20% bison damage
10A:Robinson				100% harvested; straw 100%
Q:Green				100% harvested; straw 0%
S:Filla				50% harvested; straw 0%; NVBD
A3				100% harvested

Figure 1. Map of agricultural tracts north of the Alaska Highway that were surveyed during 2009 Delta bison crop damage assessment survey, and the Panoramic and Gerstle Fields of the Delta Junction Bison Range south of the Alaska Highway.

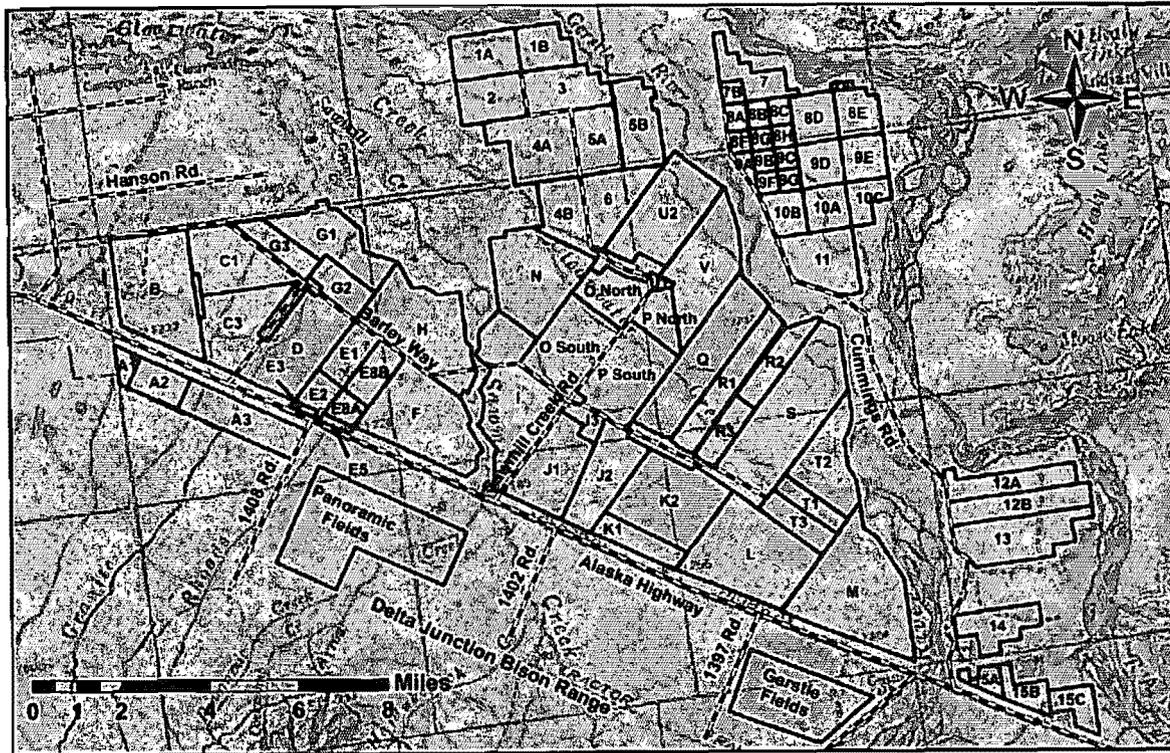


Figure 2. Overview photograph of a bison trail across agricultural Tract F taken on August 20, 2009 during a Delta bison crop damage assessment survey.



Figure 3. A portion of the bison damage observed on Tract U during the September 1, 2009 damage assessment survey.



Figure 4. Bison observed on Tract 8C during the September 14, 2009 damage assessment survey.





Estimated Bison Damage to Delta Agricultural Fields – 2009 Charles Knight

In the fall of 2009, I used aerial photos taken by Steve DuBois to indicate where bison damage was occurring in farmers' fields. I then visited the fields on three occasions and assessed damage by measuring yields in undamaged areas and estimating percent loss in damaged areas. I also interviewed several farmers and used an on-line survey to gather additional information on bison damage. In general, farmers agreed that bison damage in 2009 was less than normal. I have summarized bison damage by type and amount.

Types of damage:

Grain down = barley or oat fields that had been trampled, wallowed, or eaten. Values were determined by field areas and percent losses estimated within each field.

Extra grain Drying Costs = In the Delta area, farmers normally start combining grain when the grain moisture level reaches about 18% and expect to harvest their grain between 18 and 13% moisture. At the Alaska Farmers Co-op, drying grain at 18% moisture costs \$10.83 per ton. In an attempt to minimize bison damage to their crops, Delta farmers often harvest their grain early in the moisture range of 20 to 25%. Grain at 25% moisture costs \$20.41 per ton for drying at the Co-op. I determined that approximately 3070 tons of grain (approximately half of the 2009 Delta area production) had been harvested above 20% moisture to avoid bison damage at an additional drying cost of approximately \$10 per ton.

Grass, Hay and Straw = According to the Black and Peterson families, approximately 30 bison stay in the Gerstle River area year around and eat a considerable amount of grass forage from hay fields. In August, additional bison come in from the south and roll around the big round hay bales and eat holes in them reducing the quality and storage. Bison also scatter hay that is drying in windrows and spread fresh manure up and down the rows reducing the quality and value of the hay or straw. They also get into stacks of baled hay or straw and break open bales that are being stored. Farmers occasionally don't get their straw all baled in the fall and wait until spring to bale it. Bison eating, bedding down, and spreading manure on the straw during the winter reduces quantity and quality. All of these losses have been lumped together in this category.

Potato Damage = bison running through potato fields step on and crack some tubers and kick dirt off others making them more susceptible to diseases and damage from the elements. When stored, a few damaged potatoes can affect the whole potato pile. Damaged potatoes must be dehydrated or they will cause the whole pile to rot. To dehydrate a small percentage of damaged potatoes, the entire storage unit must be kept warmer and dry air circulated through the pile to get rid of excess moisture. This results in weight loss in all tubers, not just damaged ones.

Seedling Grass Field Damage = when grass is planted either for forage or grass seed production, the soil is worked up fine and smoothed out very smooth. Bison find these

fields ideal places to roll and dust themselves. This destroys the grass stand in large irregular areas in the fields. In forage fields, these areas can sometimes be worked up and reseeded the following year, but fields for seed production are inspected based on a limited number of years of production and cannot have new seedlings in an established stand. These damaged areas become weed patches and must be kept mowed or sprayed or the whole field replanted.

Fence Damage = bison usually respect fences unless they are being pursued or are really attracted to a crop behind the fence. I had four reports of bison going through fences in 2009, causing more labor than actual materials damage.

Missed Opportunities = many farmers would like to plant higher cash-value crops than hay or barley, such as oats, canola, field peas, wheat, or later maturing, higher yielding varieties of barley. However, these crops are highly attractive to bison and the farmers feel that they would be foolish to plant such crops as they would almost certainly be damaged by bison. Several farmers mentioned that these missed opportunities were the source of their greatest losses, however, it is impossible to place a value on something never ventured.

2009 Estimated Cost of Bison Damage:

Grain Down (174 tons x \$185)	\$32,190
Extra Grain Drying Costs (3070 tons x \$10)	\$30,700
Grass, Hay and Straw	\$37,250
Potato Damage	\$35,000
Seedling Grass Field Damage	\$ 4,000
Fence Damage (labor and materials)	\$ 3,000
Missed Opportunities	\$ <u>0</u>
Total	\$142,140

Legislative Purpose of the Delta Junction Bison Range as Written in the 1979 Session Laws

Note: The establishment of the Delta Junction Bison Range is codified in AS 16.20.310. The codified version does not include the purpose language included in the session law reproduced below. Nonetheless, the legislative intent for purposes of the Delta Junction Bison Range, including the intent to "perpetuate free-ranging bison," remains legally valid.



LAWS OF ALASKA

1979

Chapter No.

39

Source

CS 2d SSIB 31 am 8

AN ACT

Creating the Delta Junction Bison Range Area.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:
THE ACT FOLLOWS ON PAGE 1, LINE 8

* Section 1. It is the purpose of this Act to perpetuate free-ranging bison on the land described in this Act by management of the habitat to provide an adequate winter range for the bison. It is also the purpose of this Act to alter seasonal movements of bison herds on the land in order to diminish the damage caused by the herds to agriculturally developed land.

* Sec. 2. AS 16.20 is amended by adding new sections to read:

ARTICLE 6. STATE RANGE AREAS.

Sec. 16.20.300. DELTA JUNCTION BISON RANGE. The following described areas, excluding valid existing rights, are established as the

Statutory Requirements for the Game Management Plan for the Delta Junction Bison Range

Note: The Delta Bison Management Plan 2000-2005 also serves as the Game Management Plan for the Delta Junction Bison Range.

Sec. ~~16.20.310~~. Game management plan for bison.

(a) The commissioner shall develop and may amend a game management plan for bison in the area described in AS 16.20.300. After holding public hearings in accordance with AS 44.62.310 and 44.62.312, the commissioner shall implement the game management plan.

(b) The game management plan must include, but is not limited to

(1) planting grains for bison and planting other wildlife forage;

(2) altering existing plant cover to create additional range and year-round habitat for bison and other animal species in the area;

(3) tilling to produce forage.

(c) The commissioner shall develop and amend the game management plan to coordinate, as closely as possible, the game management plan with the activities of the Department of Natural Resources relating to the Big Delta agricultural development project.

Sec. 16.20.315. Bison range timber sales.

The Department of Natural Resources, division of forestry, shall provide for the sale of timber in the Delta Junction bison range area in a manner that does not delay implementation of the game management plan required under AS ~~16.20.310~~.

Sec. 16.20.320. Activities on bison range area.

Nothing in AS 16.20.300 - 16.20.320 shall be construed as prohibiting activities on land described in AS 16.20.300 that are otherwise permitted in accordance with the laws and regulations of this state, including, but not limited to, hunting, trapping, engaging in recreational activities, using the land for access to adjacent areas, and a 300-foot Alaska Railroad right-of-way.

HOUSE BILL NO. 220

IN THE LEGISLATURE OF THE STATE OF ALASKA

TWENTY-SIXTH LEGISLATURE - FIRST SESSION

BY REPRESENTATIVE HARRIS

Introduced: 4/7/09

Referred: Resources, Finance

A BILL

FOR AN ACT ENTITLED

1 **"An Act relating to game management of bison."**

2 **BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:**

3 *** Section 1. AS 16.20.310(b) is amended to read:**

4 (b) The game management plan must include, but is not limited to

5 (1) planting grains for bison and planting other wildlife forage;

6 (2) altering existing plant cover to create additional range and year-
7 round habitat for bison and other animal species in the area;

8 (3) tilling to produce forage;

9 (4) designing, developing, and building diversionary fencing,
10 holding pens, and other apparatus to control the movement of bison into
11 unharvested agricultural crops.

STATE OF ALASKA

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF AGRICULTURE

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February 23, 2010

To: Board of Fish & Game

Re: Delta Bison Working Group Recommendation

The Division of agriculture has appreciated the Delta Bison Working Group's commitment to resolving the conflict between the Delta bison herd and the agriculture community.

We fully support the recommendation put forward by this group that states "the only long term solution is fencing".

Sincerely,



Franci Havemeister
Director

Customary and Traditional Use Worksheet:

**Chisana Caribou Herd, GMU 12, Upper Tanana–White
River Area**

Prepared by

James J. Simon and Caroline L. Brown

Alaska Department of Fish and Game

Division of Subsistence

for the February–March 2010 Fairbanks Board of Game meeting

February 2010

Alaska Department of Fish and Game

Division of Subsistence



Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the reports by the Division of Subsistence. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft ³ /s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols

alternating current	AC
ampere	A
caloric	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

all commonly-accepted abbreviations
e.g., Mr., Mrs., AM, PM, etc.

all commonly-accepted professional titles e.g., Dr., Ph.D., R.N., etc.

Alaska Administrative Code AAC
at @

compass directions:

east E
north N
south S
west W

copyright ©

corporate suffixes:

Company Co.
Corporation Corp.
Incorporated Inc.
Limited Ltd.

District of Columbia D.C.

et alii (and others) et al.

et cetera (and so forth) etc.

exempli gratia (for example) e.g.

Federal Information Code FIC

id est (that is) i.e.

latitude or longitude lat. or long.

monetary symbols (U.S.) \$, ¢

months (tables and figures): first three letters (Jan,...,Dec)

registered trademark ®

trademark ™

United States (adjective) U.S.

United States of America (noun) USA

U.S.C. United States Code

U.S. state use two-letter abbreviations (e.g., AK, WA)

Measures (fisheries)

fork length	FL
mid-eye-to-fork	MEF
mid-eye-to-tail-fork	METF
standard length	SL
total length	TL

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations

alternate hypothesis	H _A
base of natural logarithm	e
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics (F, t, χ ² , etc.)	
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	E
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	log ₂ , etc.
minute (angular)	'
not significant	NS
null hypothesis	H ₀
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

SPECIAL PUBLICATION NO. BOG 2010-03

**CUSTOMARY AND TRADITIONAL USE WORKSHEET:
CHISANA CARIBOU HERD, GMU 12, UPPER TANANA-WHITE RIVER
AREA**

by
James J. Simon and Caroline L. Brown
Alaska Department of Fish and Game, Division of Subsistence
Fairbanks

Alaska Department of Fish and Game
Division of Subsistence
1300 College Road, Fairbanks, Alaska, 99701-1599

February 2010

The Division of Subsistence Special Publications series was established for the publication of techniques and procedure manuals, informational pamphlets, special subject reports to decision-making bodies, symposia and workshop proceedings, application software documentation, in-house lectures, and other documents that do not fit in another publications series of the Division of Subsistence. Most Special Publications are intended for readers generally interested in fisheries, wildlife, and the social sciences; for natural resource technical professionals and managers; and for readers generally interested the subsistence uses of fish and wildlife resources in Alaska.

Special Publications are available through the Alaska State Library and on the Internet: <http://www.subsistence.adfg.state.ak.us>. This publication has undergone editorial and professional review.

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This document should be cited as:

Simon, J.J. and C.L. Brown. 2010. Customary and traditional use worksheet: Chisana caribou herd, GMU 12, Upper Tanana-White River area. Alaska Department of Fish and Game Division of Subsistence, Special Publication No. BOG 2010-03, Fairbanks.

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INTRODUCTION

Proposal 18 for the March 2010 Alaska Board of Game (BOG) meeting in Fairbanks requests the establishment of a joint federal–state drawing permit hunt for the Chisana caribou *Rangifer tarandus* herd in Game Management Unit (GMU) 12 (Figure 1), starting in fall 2011. However, prior to opening this hunt and pursuant to Alaska Statute 16.05.258 (subsistence law), the BOG will need to consider the 8 criteria in 5 AAC 99.010 to determine whether the herd is associated with customary and traditional uses (e.g., 5 AAC 99.025), and if so, establish regulations that provide a reasonable opportunity for subsistence uses of Chisana caribou. This worksheet has been developed by the Alaska Department of Fish and Game (ADF&G) to assist the BOG in making a customary and traditional use determination prior to considering Proposal 18.

THE EIGHT CRITERIA

CRITERION 1: LENGTH AND CONSISTENCY OF USE

A long-term consistent pattern of noncommercial taking, use, and reliance on the fish stock or game population that has been established over a reasonable period of time of not less than one generation, excluding interruption by circumstances beyond the user's control, such as unavailability of the fish or game caused by migratory patterns.

Caribou hunting in the north Wrangell Mountains is a well documented component of the annual harvest cycle of the Ahtna and Upper Tanana Athabascan people of the 19th and early 20th centuries.

The economic life of the Upper Tanana centers around the caribou. Not only does the animal constitute the source of food for the natives and their dogs, but also it supplies the material for their clothing, shelters, and boats as well as netting for their snowshoes and babiche and sinew for their snares, cords, and lashings. (McKenna 1959:47)

The Nutzotin Mountains were the historical caribou (*Udzih*) hunting territory of the Chisana and Upper Nabesna bands of Athabascan Indians (who were called *Ddhat Tot iin* or “Among the Mountain People” in their local Native language). Inter-regional cooperation between Upper Tanana and Upper Ahtna bands of Athabascans was an important safeguard against food shortages (Haynes and Simeone 2007:25; see also Strong 1972, 1976). For example, “The people from Tanacross/Mansfield Lake, Tetlin, Northway/Nabesna and Chisana would come to the Upper Copper to fish for salmon in times when food resources in their area were poor” (Strong 1976:74). The Upper Chisana/Upper Nabesna band hunted and trapped in the basins of the White, Nabesna, and Chisana rivers” (Figure 2). “Members of the band and their descendants now live in Northway, Mentasta, and Chistochina” (Haynes and Simeone 2007:10).

The caribou was the most important food animal in the Upper Tanana before the coming of the non-natives and resultant disintegration of the original nomadic patterns. Twice a year, tremendous herds of caribou passed between the heads of the White and Chisana Rivers. (Vitt 1971:147–148).

Beginning in 1898, gold prospecting brought new settlements and change to the local economy. Native residents began supplementing their seasonal hunting and fishing with mining-related activities such as freighting and supplying gold camps with fish and game. Thus, a mixed subsistence–cash economy was in place by the early 20th century. The Alaska Department of Labor and Workforce Development estimates that 9 people still live in Chisana (ADOL 2008) ¹.

Residents in Upper Tanana and Copper River basin communities continue to be active in caribou hunting. Northway caribou hunters have been documented to travel south to the Mentasta and Nutzotin mountains

¹ Uncertified estimate from 2008.

(Case 1986; see also Goldschmidt 1946:51). ADF&G research conducted in 1980s (Figure 3) documented caribou hunting areas by Northway residents during the period 1974–1984 (Case 1986). Northway residents hunted caribou from the Chisana herd and the Fortymile herd during this time period. Northway residents also hunt Fortymile caribou north of the Alaska Highway and along the Taylor Highway (Marcotte 1991). In 1987, an estimated 49% of Northway households attempted to harvest caribou and an estimated 64% used caribou; Northway residents harvested an estimated 32 caribou (Marcotte 1991).

During an ADF&G study conducted in 2004–2005, researchers observed that caribou continue to constitute an important subsistence resource for the community of Northway as well as for other residents of the region. Respondents reported that the resource was predominately harvested from the Fortymile herd during this time period, primarily due to the unavailability or reduced availability of caribou from other herds, such as the Chisana, Macomb, Nelchina, and Mentasta herds. Caribou harvests by Northway residents represented an estimated total of 4,133 edible pounds of meat, or 16 pounds per person, from an estimated 41 harvested caribou (Figure 4). An estimated 32% of Northway households attempted to harvest caribou and an estimated 32% reported using caribou. This use of caribou accounted for approximately 10% of the big game consumed by Northway residents in 2004–2005.²

There have been no reported harvests of Chisana caribou since 1993, and the hunt has been closed since 1994 (Table 1). From 1981 through 1993 Alaska residents' harvests have ranged between 6 and 17 with GMU 12 resident harvests ranging from 0 to 3 as a subset of that resident total, depending on the year. However, data on hunter residency and harvests are unavailable from 1984 through 1989.

CRITERION 2: SEASONALITY

A pattern of taking or use recurring in specific seasons of each year.

Historically, the Chisana and Upper Nabesna bands of Athabascan Indians hunted caribou primarily from October to December and from April to June (Table 2; e.g., Guédon 1974; Marcotte 1991; McKennan 1959). People traveled from Batzulnetas on the Upper Copper River to Jacksina Creek, a tributary of the Nabesna River, to hunt cooperatively with relatives from Upper Tanana villages in Cooper Creek and Chisana (e.g., Strong 1976:74). Also, Vitt (1971) writes that

Caribou killed during the mid-May migration were dried to ensure proper preservation. Those killed prior to winter, or during the winter, were cut to manageable chunks and frozen to be stored in high caches. (Vitt 1971:148)

In some cases, a hunting party would follow the caribou to the calving grounds and secure a number of calves for use in light-weight summery clothing. (Vitt 1971:150)

ADF&G research conducted in 1980s documented caribou hunting areas by Northway residents during the period 1974–1984 (Figure 1) (Case 1986). Northway residents also hunted caribou from the Chisana herd and the Fortymile herd during this time period. Contemporary use has been governed by regulation during the month of September. Currently, however, there is no open season for the Chisana herd. ADF&G research conducted in 2004–2005 provides contemporary information on Northway caribou hunting locations (Figure 2).

CRITERION 3: MEANS AND METHODS OF HARVEST

A pattern of taking or use consisting of methods and means of harvest that are characterized by efficiency and economy of effort and cost.

² Koskey, M. *In prep.* Subsistence resource use among ten Tanana river valley communities, 2004–2005. Alaska Department of Fish and Game Division of Subsistence draft technical paper, Fairbanks (hereinafter cited as Koskey *In prep.*; see also the ADF&G Division of Subsistence Community Subsistence Information System (hereinafter cited as CSIS), on-line at <http://www.subsistence.adfg.state.ak.us/CSIS>

Historically, caribou were taken by groups of Upper Tanana residents along caribou fences and in corrals and primarily with the use of snares during the two great annual migrations in spring and fall. One fence was located near Chisana, and others were placed in the Nabesna River drainage. "A well-made fence with yearly repairs had a life expectancy of many generations" (Vitt 1971:149). Guédon (1974:48) noted that the small caribou fence at Chisana also was used for moose *Alces americanus*.

Caribou were also pursued individually on snowshoes during winter by hunters using bow and arrow (McKenna 1959; Vitt 1971:146). "Next to the caribou fence, the bow and arrow was the most important implement in the taking of big game animals" (Vitt 1971:72).

Firearms were in regular use in the area by the 1920s. In 1988, hunters from the Upper Tanana and Copper River basins reported using aircraft, off road vehicles, or boats to access hunting areas. Historically, access to Chisana caribou was often by foot (Marcotte 1991).

CRITERION 4: GEOGRAPHIC AREAS

The area in which the noncommercial, long-term, and consistent pattern of taking, use, and reliance upon the fish stock and game population has been established.

Historically, the Chisana and Upper Nabesna bands of Athabascan Indians occupied most of the north side of the Wrangell–St. Elias Mountains (Figure 2). Caribou hunting took place in the Mentasta and Nutzotin mountains. Guédon (1974:52) noted that fluctuations in wildlife sometimes affected the entire population of the Upper Tanana region, such that one band of people might move south, from their traditional hunting grounds in the Fortymile caribou herd range to the area around Mentasta, Nabesna, and Chisana (see also Strong 1972, 1976).

ADF&G research conducted in 1980s documented caribou hunting areas by Northway residents during 1974–1984 (Case 1986). Northway residents hunted caribou from the Chisana herd and the Fortymile herd during this time period (Figure 3).

Contemporary caribou hunting was reported by Northway residents in the Mentasta Mountains, which were accessed by river as well as along the Nabesna Road. Between 1973 and 1977, most of the local hunting by Northway residents occurred near Beaver Creek, or near Nabesna River drainages, or in the Mentasta Mountains. Use of the Wrangell–St. Elias National Park and Preserve within GMU 12 was documented for Upper Tanana and Copper River basin communities in 1988 (Marcotte 1991). A majority of households in several area communities have reported using these GMU 12 areas, which are within the Nabesna and Chisana drainages. Specific results of the 1988 study documented that 3.5% of Upper Tanana households with a history of use of the Wrangell–St. Elias National Park and Preserve hunted for caribou in the Chisana area, which included 3.9% of Tok households with a history of park use (Marcotte 1991:149,153).

Contemporary use has been governed by regulation during the month of September. Currently, however, there is no open season for the Chisana herd. ADF&G research conducted in 2004–2005, however, provides contemporary information on Northway caribou hunting locations and demonstrates that caribou hunting still occurs near the Chisana caribou herd range (Figure 4).

CRITERION 5: MEANS OF HANDLING, PREPARING, PRESERVING, AND STORING

A means of handling, preparing, preserving, and storing fish or game that has been traditionally used by past generations, but not excluding recent technological advances where appropriate.

Historically, caribou were used primarily for food, although their skins were also used for clothing and tents in small settlement areas (Marcotte 1991; McKenna 1959; Vitt 1971:70,98).

Caribou killed during the mid-May migration were dried to ensure proper preservation. Those killed prior to winter, or during the winter, were cut to manageable chunks and frozen to be stored in high caches. (Vitt 1971:148)

After the arrival of non-Natives in the region, clothing styles changed. "Gloves, patterned after those sold by the trading posts, were made of caribou skin and used not only in the cold weather months but also during the summer as a protection from mosquitoes" (Vitt 1971:71). Caribou and moose hides were also used as boat covers, to carry heavy loads, or to cross rivers, but would last only for a year (or less) because the hides were prone to rot in damp conditions (Vitt 1971:105).

Today, most caribou meat is typically used fresh, or is frozen for later use. ADF&G research conducted in 2004–2005 documented that much of the animal is often used: the nonedible parts as well as the meat. Among Northway caribou hunting households, for example, an estimated 95% made use of the meat, 79% made use of the antlers, 63% made use of the hides, 47% used the heart, 42% of households used the liver, 53% used caribou fat, and 37% used the bones. As many as one-fifth of reporting households made use of the kidneys, stomach, sinews, hooves, and the head. Some individuals and households reported that their preference for certain parts of the caribou (as well as other animals), for food or other uses, provided impetus for them to acquire these parts at a greater rate through sharing. In Northway, 95% of households using caribou froze their meat, although 63% of households also processed caribou into sausage, and 32% of households continue to dry caribou meat for storage (Koskey *In prep.*)

CRITERION 6: INTERGENERATIONAL TRANSMISSION OF KNOWLEDGE, SKILLS, VALUES, AND LORE

A pattern of taking or use that includes the handing down of knowledge of fishing or hunting skills, values, and lore from generation to generation.

Historically, mobile camps comprised of families were considered the basic subsistence economic unit of production. The camps were typically associated with the geographic areas identified in Figure 2. Knowledge of hunting resources was shared within this family context through direct participation, through observation of hunting and processing practices, and through storytelling, which was often limited to winter in the Upper Tanana area (e.g., Guédon 1974:200).

Robert McKennan, who conducted anthropological research among the Upper Tanana Athabaskan Indians in 1929, stated:

...At an early age the boy is given tiny toboggans and bows and arrows as playthings. When but five or six years old he is taken on hunting trips by his father. Often such trips mean that the father must carry the child in his arms. It is on such excursions that a boy learns the habits of the animals and the taboos associated with them. During the long winter evenings he listens to the stories told by his father and the older men, and thus imbibes the lore, the taboos, and the beliefs of his people. (McKennan 1959:117; see also Vitt 1971:114–115)

Some of the lore and values of the Upper Tanana involving caribou hunting stories from the Chisana area are provided in Appendix A.

Ramon Vitt, who conducted anthropological research among the Upper Tanana Athabaskan Indians in 1970, documented through working with Native elders that:

Groups of youths would hold target practice and when they became good in the use of the bow and arrow the elders would set aside a day to evaluate their proficiency. A series of birch bark plates were placed together at a given distance, usually about 100 feet. They youths that showed a great degree of accuracy and were able to penetrate a certain number of the bark plates were thought to be ready for actual participation in big game

hunting. Those that needed more practice were instructed to continue until all were able to pass the test. (Vitt 1971:115–116)

Vitt (1971:124) also documented that in historical times, the heads of moose, caribou, and sheep were not to be fed to dogs because this would bring bad luck to hunters. Heads were to be buried, or cached high in the fork of a tree. Heads could also be eaten, by men, as long as the bones were cached away from the dogs.

CRITERION 7: DISTRIBUTION AND EXCHANGE

A pattern of taking, use, and reliance where the harvest effort or products of that harvest are distributed or shared, including customary trade, barter, and gift-giving.

Historically, caribou meat was widely traded among Upper Tanana bands.

Sharing of big game within the group was and is customary among the Upper Tanana. It was commonplace for an entire camp to move to a kill site where a moose or caribou was killed and stay until it was consumed. A hunter, after making the kill, would send up smoke signals for those in the hunting party and/or camp to come to his assistance. Everyone received meat for his efforts. (Vitt 1971:111)

One family of four to six people required a minimum of ten to twelve caribou each year to insure against starvation and to have sufficient materials for clothing and other necessary household items. However, since the meat of animals killed was divided among the members of the camp, a successful provider might end up with less than the required safe amount. (Vitt 1971:148)

The caribou that were killed by using the fence-corral method were divided according to set rules. The fence owner was usually a chief or headman in his own right, and received ownership rights to a certain number of caribou. The remaining kills were distributed to everyone who participated in the hunt as well as those members who, through age or disability, were not actively participating. (Vitt 1971:148–149)

After 1898, when gold camps were established in the area, local Natives engaged in supplying fresh meat to miners. “A gold strike in the Chisana area in 1913 led to the establishment of a community of about 300 people within a year” (Reckord 1983a; see also Reckord 1983b). In Chisana, where a small number of current residents participate in a guiding and outfitting operation, extra meat from nonlocal hunters is widely available.

Area residents continue to share caribou among community households. In 1987–1988, for example, 64% of households reported using caribou, 49% reported attempting to harvest caribou, and only 20% of households actually reported harvesting them (CSIS). The fact that a significantly greater proportion of households used caribou than attempted or successfully harvested them is testimony to the importance of sharing in area caribou harvest and use patterns. In short, more than one-third of Northway households obtained caribou through sharing (Marcotte 1991:122).

In the Upper Tanana area, as in the Ahtna area, traditional foods, which include caribou, are highly valued at potlatches and other ceremonial events.

CRITERION 8: DIVERSITY OF RESOURCES IN AN AREA; ECONOMIC, CULTURAL, SOCIAL, AND NUTRITIONAL ELEMENTS

A pattern that includes taking, use, and reliance for subsistence purposes upon a wide variety of fish and game resources and that provides substantial economic, cultural, social, and nutritional elements of the subsistence way of life.

A wide variety of wild resources is used by households, as indicated in Table 2 in the Upper Nabesna-Chisana area (Guédon 1974:49). In a 1988 survey of Upper Tanana community households, for example, over 84% of households in each Upper Tanana community were estimated to have harvested wild resources. In addition, there was an average estimated harvest of 7 different resources per household and an average harvest of 569 usable pounds of wild resources per household. Average per capita harvests in 5 Upper Tanana communities ranged from 114 to 278 pounds per person, with an average of 183 usable pounds per person (Marcotte 1991).

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TABLES AND FIGURES

Table 1.—Chisana caribou harvests 1981–1994.

Year	Alaska resident hunters	Alaska resident harvests	Local hunters (GMU 12)	Local harvests	Nonresident harvests	Total harvests
1981	23	14	3	2	9	23
1982	21	10	6	2	11	21
1983	22	17	5	3	9	26
1984	—	—	—	—	—	31
1985	—	—	—	—	—	65
1986	—	—	—	—	—	41
1987	—	—	—	—	—	49
1988	—	—	—	—	—	34
1989	—	—	—	—	—	30
1990	27	12	7	3	21	33
1991	17	8	0	0	13	21
1992	17	6	2	2	10	16
1993	17	11	4	2	8	19
1994	0	0	0	0	0	0

Note Dashes (-) indicate that hunter residency data are unavailable.

Source ADF&G Division of Wildlife Conservation WinfoNet.

Table 2.—Upper Nabsena—Chisana annual cycle.

Resource	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Caribou	■	■	■					■	■	■	■	■
Moose	■											
Sheep								■	■	■	■	■
Rabbit			■	■	■	■	■					
Beaver and muskrat							■	■				
Ptarmigan and grouse	■	■	■	■	■	■	■	■	■	■	■	■
Whitefishes												
Berries											■	■
Fur trapping			■	■	■	■	■					

Source Guédon 1974.

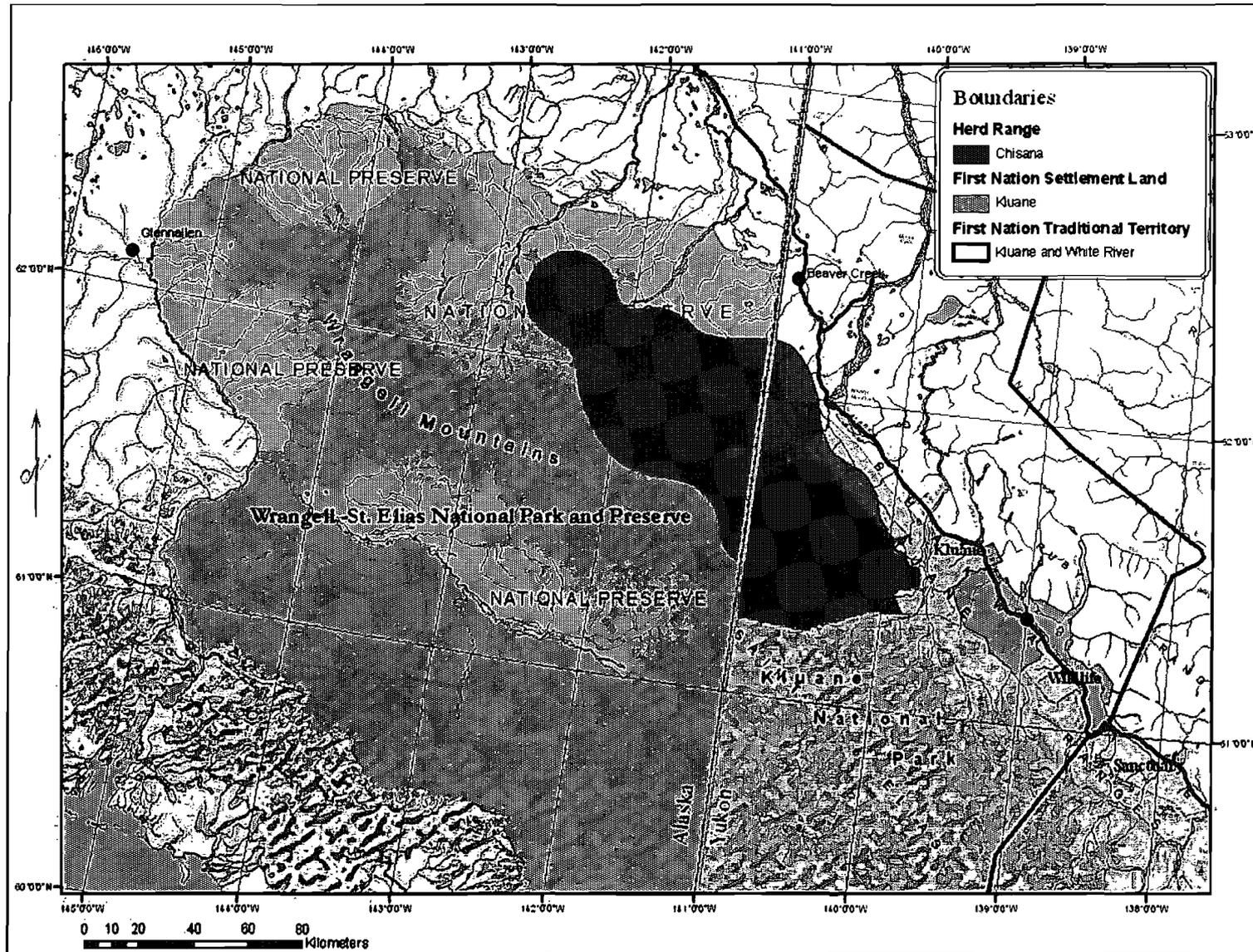


Figure 1.—Map of Chisana caribou range in relation to GMU 12.

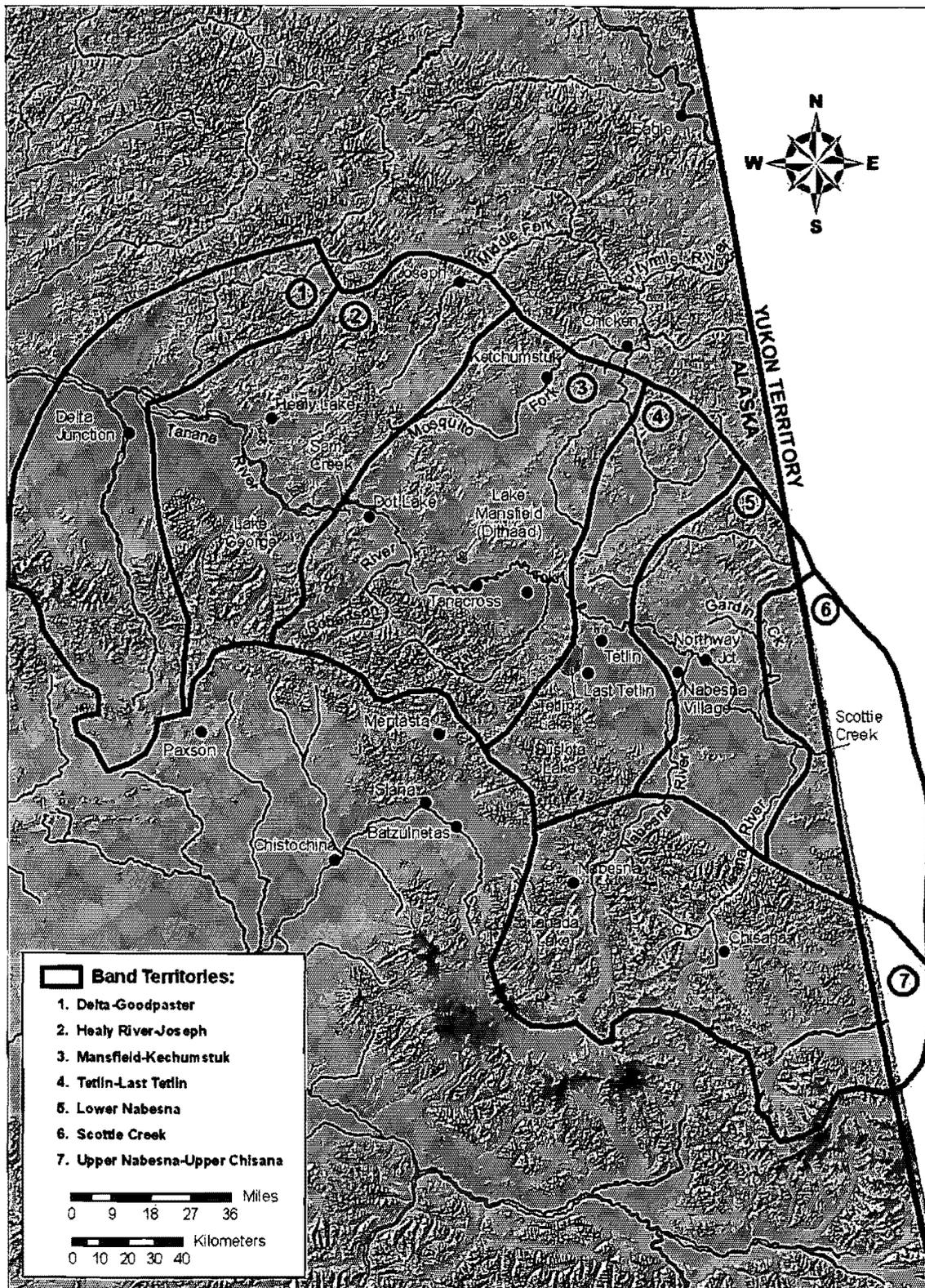


Figure 2.—Band territories and villages, upper Tanana region.

Source Haynes and Simeone 2007:9.

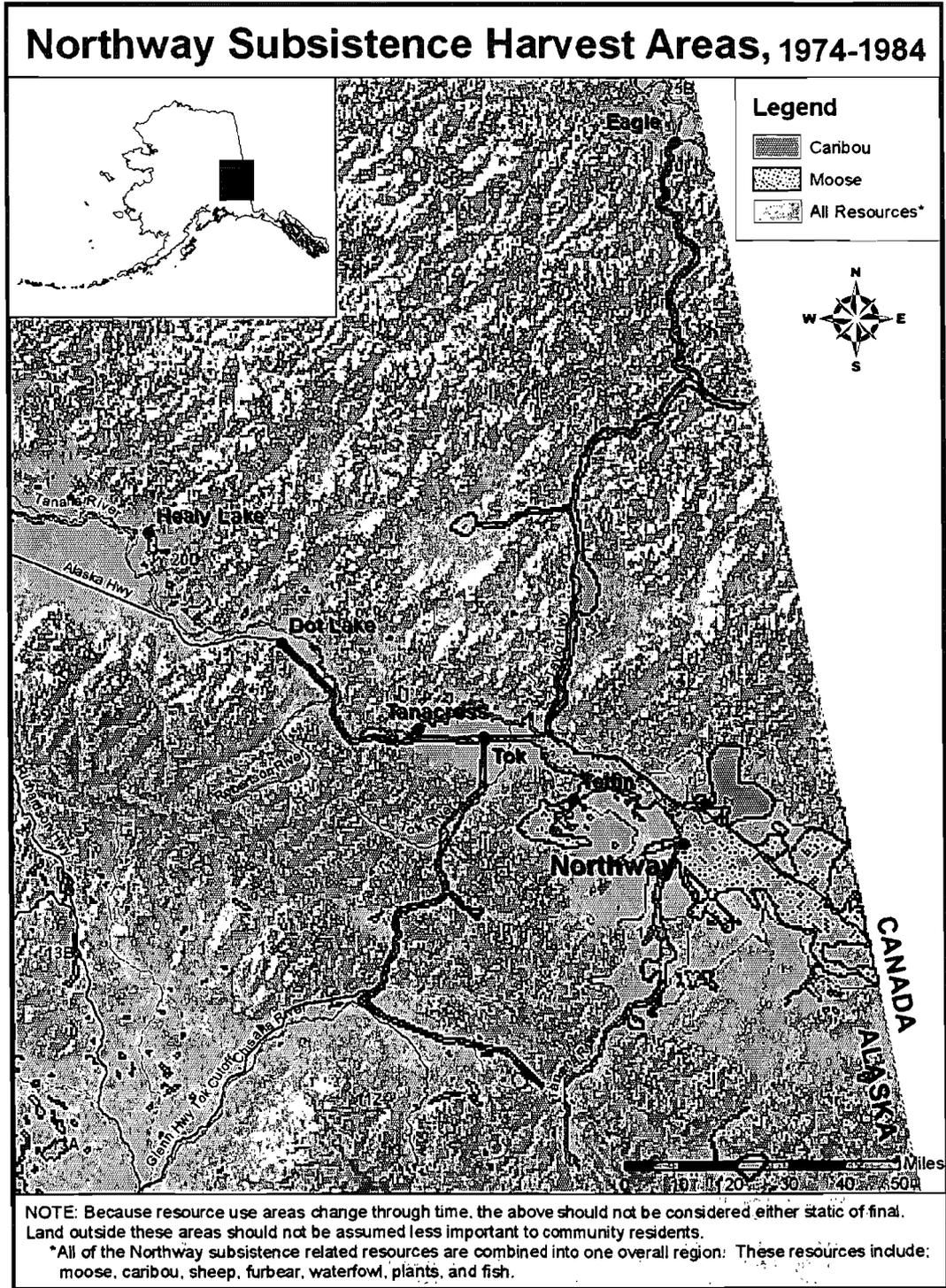


Figure 3.—Northway resident caribou hunting areas in the Chisana and Fortymile caribou herd ranges, 1974–1984.

Source Case 1986.

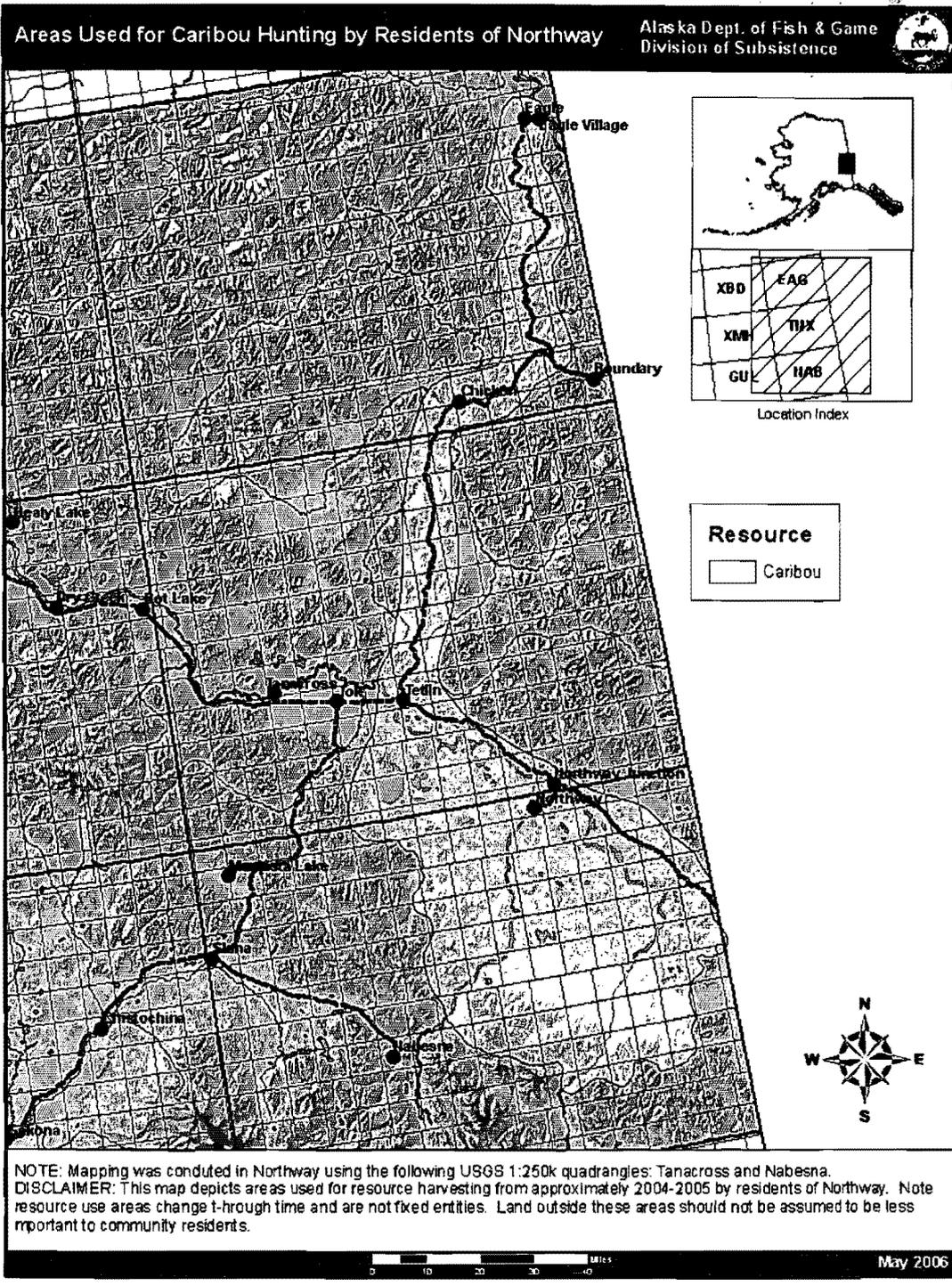


Figure 4.—Northway resident caribou hunting areas in the Chisana and Fortymile caribou herd ranges, 2004–2005.

Source Koskey *In prep.*

**APPENDIX A: UPPER TANANA LORE AND VALUES
REGARDING CARIBOU**

UPPER TANANA LORE AND VALUES REGARDING CARIBOU

Literature examining traditional Alaska Native cultures often reports that hunters frequently consulted medicine men or shamans in order to learn whether they would have luck and return with meat, especially caribou, for their families. One such example explained how a medicine man helped an entire camp keep from starving to death, which they would do without the caribou (Vitt 1971).

...The medicine man called together all the people in the camp and he made medicine for them. He sat down and instructed the people to cover him with a blanket of skins whereas he went into a trance-like state for 30 minutes or more. At the end of his visit with the spirit world, he came out of his blanket singing a magic song. He also brought back from the spirit world a fresh caribou pouch, and with it he sang and danced. When he stopped singing and dancing, he told the people "Tomorrow everyone must go out and try to find caribou tracks. If you find caribou tracks, you must not follow it but you must come home and tell everyone where it is and the direction it went." The following morning everyone in the camp did like the medicine man said. They went out in all directions to look for a caribou track. One man found an old caribou track maybe a week or 10 days old, and he hurried home to tell everyone about it and what direction it went. No one else found any caribou tracks. The one the man found was the only one in the whole area. The medicine man listened and then said to the people, "Tomorrow you must go out to where the one man found the track and you must all follow it. You will soon find a little caribou. It will be all white in color—do not kill this white one for it is a spirit sign. You must follow the little white one where it takes you and you will find many caribou there. These you can kill—kill them all but do not harm the little white caribou for he is a magic spirit and must not be harmed..." They all did like the medicine man said and followed the tracks. Soon they saw the little white caribou ... and they followed it when it walked down the trail. ... Over the hill they saw the spirit caribou in the middle of a herd of caribou—all fat. They killed all the caribou like the medicine man said to do but they did not harm the spirit one. Now the people had food to eat and did not starve anymore. Without the medicine man, many would have died. (Athabascan elder Oscar Isaac as cited in Vitt 1971:121–122)

McKenna(1959) documented a story from Chisana Joe about *Tson-shan*, the "Man Who Went to the Moon." This story demonstrates how storytelling transmits traditional hunting values, especially those focusing around caribou, from one generation to the next.

A group of Indians had a camp. One day while the men were away the women heard a baby cry. A young woman went out to look for it, but she could not find it. Soon it cried again. Another girl went out to look for it, but she could not find it. It cried again. This time a very old woman set out to locate the cry. In the middle of a hollow tree she found a tiny baby. She took it back to her camp, which was a moss house. She called it *Tson-shan* (He comes out).

The baby grew into a young man though he was always small. He was a great fun maker and was always playing tricks. The old lady decided to move on to another camp where she had many brothers and cousins. Before they moved *Tson-shan* dressed up in old clothes. He took a piece of skin and made a round mask, cutting out holes for eyes, nose, and mouth. At the new camp *Tson-shan* was always joking. People thought he was a little foolish.

One day a man came in and reported seeing a band of about fifty caribou. *Tson-shan* said, "I will go out and kill them."

Everybody laughed at him. The next morning he got up early and started out. He was wearing his old clothes and was using a worn-out pair of snowshoes. Nobody thought he would even get near the caribou. He went on. Pretty soon he saw the caribou, but he could not get near them on his old snowshoes. He stopped in the snow. He took off his old snowshoes; he took off his mask; he took off his old clothes. He laid them all out in the snow as if they were a man. Suddenly he was dressed in new clothes and was wearing new snowshoes. He went on and killed the caribou. Then he went back to camp and told the men, "I have killed all the caribou."

They did not believe him but they went out to see. Sure enough, there were the dead caribou, fifty of them. All the men started skinning and cleaning them. Tson-shan built a fire. He took some caribou fat and put it on the end of his snowshoe. He put the snowshoe in the fire, half burning it up, and cooked the fat. Then he ran about, laughing and joking, saying, "Here is some caribou fat. Eat it." Everyone thought he was silly.

Tson-shan told the men, "Save all the web fat and bring it to me. I want it."

But when they got back to camp no one brought him any of the fat. All he got was just one little piece. Tson-shan was much hurt. He cried and wailed all night. The old woman tried to comfort him but it did no good. About midnight he suddenly jumped to his feet. He held the little piece of bloody caribou fat high in his hand. He started to fly upwards. The old woman ran to stop him and caught him by the heel of his moccasin, which was attached to the leg of his trousers. Still he went up, leaving his trousers in the hands of the old lady. He flew on and on until he reached the moon.

Before he left he had killed everyone in camp. Only the old woman was spared. (Chisana Joe, as cited by McKennan 1959:195-196)

McKenna (1959) also documented a story from Nabesna John, "The Contest for Chieftaincy Among Moose, Sheep, and Caribou," which provides a general illustration of the place of moose, sheep, and caribou in the Athabaskan world view in the Chisana-Nabesna area.

Moose, Sheep, and Caribou all had a camp together.

Moose said, "I am the big chief, I am boss."

But Sheep said, "No, I am boss."

And Caribou said, "I am boss."

Moose said, "I am the biggest, I should be the chief. Caribou is next largest he will be little chief. Sheep will be last."

But Sheep said, "I am the smartest. I understand everything. I am the boss."

All were together in the timber. They wrangled and talked. Finally they decided to settle it on the basis of numbers. Moose said, "My number is as many as the hairs on my back."

But Caribou and Sheep said the same, so they decided to settle it on the basis of counting the hairs. In this, Sheep won, Moose was next, and then Caribou.

But Moose was not satisfied. He said, "I have the biggest bones."

But Sheep answered, "No, your bones are too soft. They break easily."

Moose said, "My legs are long. In the deep snow I can outdistance everyone."

But Sheep said, "No, in the winter I am wise. I do not go down into the deep snow. I stay up on top of the hills. Your bones are soft. Feel them, they break easily."



Moose felt them, and they were soft. So were those of the Caribou. Sheep's bones were hard, just like iron. Sheep still insisted on being chief.

Then Sheep said, "Tonight we will all go up on top of the hill. He who gets cold first and has to go down into the timber cannot be chief."

They all went up on a high, bald peak. A cold wind came up. Caribou had to go down to the timber. Soon Moose followed him. Sheep stayed there all night. The next morning he came down and joined the others.

He said, "Let there be no chief. It only makes trouble. Let us all be like brothers. I will be the oldest brother; Moose can be next; and Caribou can be the youngest."

Moose and Caribou agreed. So they all lived like brothers.

Sheep said, "My legs are short. I will stay high lest the wolves catch me. You and Caribou stay down in the timber."

Moose and Caribou said, "All right."

After that there was no more talk, and they got along fine together. (Nabesna John cited in McKennan 1959:210)

Record Copy 3 Tab 7

Record Copy 3 Tab 7 contains two Customary and Traditional Use Worksheets previously provided to the board:

- (1) Special Publication No. BOG 2008-07 Customary and Traditional Use Worksheet, Black Bears, Game Management Units 12, 19, 20, 21, and 24 (Interior Alaska) (November 2008 Board of Game RC 2, Tab E) and
- (2) Special Publication No. BOG 2008-08 Customary and Traditional Use Worksheet, Black Bears, Game Management Unit 25 (November 2008 Board of Game RC 2, Tab D).

These C&T Worksheets were adopted by the board in November 2008 when positive customary and traditional use findings were made for black bear hunting in Game Management Units 19, 21, and 24 and the previous C&T finding for black bears in GMU 25 was revised and reconfirmed to provide more specific detail regarding denning and snaring based upon a board request in March 2008 (5 AAC 99.025).

No C&T findings were adopted for Game Management Units 12 and 20 because there were no regulatory change proposals specifically addressing black bears in those units at the November 2008 board meeting. The board should make C&T findings for black bears in Units 12 and 20 before adopting any regulatory changes to black bear hunting opportunities.

No C&T findings for trapping of black bears have been adopted by the board. If black bear trapping opportunities are pursued, the board should consider the information contained in these two C&T worksheets and make customary and traditional use determinations for black bears in Interior Alaska Game Management Units under furbearers and fur animals findings in 5 AAC 99.025(13).

Special Publication No. BOG 2008-07

**Customary and Traditional Use Worksheet,
Black Bears, Game Management Units
12, 19, 20, 21, and 24 (Interior Alaska)**

Prepared by

James J. Simon

for the November 2008 Juneau Board of Game meeting

November 2008

Alaska Department of Fish and Game

Division of Subsistence



Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Division of Subsistence. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)		General		Measures (fisheries)	
centimeter	cm	Alaska Department of Fish and Game	ADF&G	fork length	FL
deciliter	dL	Alaska Administrative Code	AAC	mid-eye-to-fork	MEF
gram	g	all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	mid-eye-to-tail-fork	METF
hectare	ha			standard length	SL
kilogram	kg			total length	TL
kilometer	km				
liter	L			Mathematics, statistics	
meter	m	all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.	all standard mathematical signs, symbols and abbreviations	
milliliter	mL			alternate hypothesis	HA
millimeter	mm			base of natural logarithm	e
				catch per unit effort	CPUE
Weights and measures (English)		at	@	coefficient of variation	CV
cubic feet per second	ft ³ /s	compass directions:		common test statistics	(F, t, χ^2 , etc.)
foot	ft	east	E	confidence interval	CI
gallon	gal	north	N	correlation coefficient (multiple)	R
inch	in	south	S	correlation coefficient (simple)	r
mile	mi	west	W	covariance	cov
nautical mile	nmi	copyright	©	degree (angular)	°
ounce	oz	corporate suffixes:		degrees of freedom	df
pound	lb	Company	Co.	expected value	E
quart	qt	Corporation	Corp.	greater than	>
yard	yd	Incorporated	Inc.	greater than or equal to	≥
		Limited	Ltd.	harvest per unit effort	HPUE
		District of Columbia	D.C.	less than	<
Time and temperature		et alii (and others)	et al.	less than or equal to	≤
day	d	et cetera (and so forth)	etc.	logarithm (natural)	ln
degrees Celsius	°C	exempli gratia (for example)	e.g.	logarithm (base 10)	log
degrees Fahrenheit	°F	Federal Information Code	FIC	logarithm (specify base)	log ₂ , etc.
degrees kelvin	K	id est (that is)	i.e.	minute (angular)	'
hour	h	latitude or longitude	lat. or long.	not significant	NS
minute	min	monetary symbols (U.S.)	\$, ¢	null hypothesis	H ₀
second	s	months (tables and figures): first three letters	Jan., ..., Dec	percent	%
		registered trademark	®	probability	P
Physics and chemistry		trademark	™	probability of a type I error (rejection of the null hypothesis when true)	α
all atomic symbols		United States (adjective)	U.S.	probability of a type II error (acceptance of the null hypothesis when false)	β
alternating current	AC	United States of America (noun)	USA	second (angular)	"
ampere	A	U.S.C.	United States Code	standard deviation	SD
calorie	cal	U.S. state	use two-letter abbreviations (e.g., AK, WA)	standard error	SE
direct current	DC			variance	Var
hertz	Hz			population sample	var
horsepower	hp				
hydrogen ion activity (negative log of)	pH				
parts per million	ppm				
parts per thousand	ppt, ‰				
volts	V				
watts	W				

SPECIAL PUBLICATION NO. BOG 2008-07

**CUSTOMARY AND TRADITIONAL USE WORKSHEET, BLACK BEARS,
GAME MANAGEMENT UNITS 12, 19, 20, 21, AND 24
(INTERIOR ALASKA)**

by

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1300 College Road, Fairbanks, Alaska, 99701-1599
November 2008

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This document should be cited as:

Simon, J. J. 2008. Customary and traditional use worksheet, black bears, Game Management units 12, 19, 20, 21, and 24 (Interior Alaska). Alaska Department of Fish and Game Division of Subsistence Special Publication No. BOG 2008-07, Fairbanks.

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INTRODUCTION

BACKGROUND

Pursuant to Alaska Statute 16.05.258 (Subsistence use and allocation of fish and game) and 5 AAC 99.010 (Boards of fisheries and game subsistence procedures), the Alaska Board of Game made a positive customary and traditional use finding for black bears *Ursus americanus* in Game Management units (GMUs) 12, 19, 20, 21, and 24 at its March 2008 regulatory meeting (ADF&G 2008a; ADF&G 2008b; ADF&G 2008c). At that time the board established an amount reasonably necessary for subsistence (ANS) of 30 to 50 black bears for Game Management Unit 19, and concluded that the lack of information on harvest levels precluded making ANS findings for the customary and traditional harvest and use of black bears in units 12, 20, 21, and 24.¹

At its March 2008 Interior Region regulatory meeting, the Alaska Board of Game requested that the ADF&G Division of Subsistence provide more detail on the customary and traditional uses of black bears in Interior Alaska, specifically with reference to methods and means of black bear harvests in units 12, 19, 20, 21, and 24 (Criterion 3, 5 AAC 99.010(b)(3)). The additional information was requested so as to better evaluate a number of deferred proposals to recognize in regulation customary and traditional harvest practices of black bears.

The revised customary and traditional use summary for black bears in units 12, 19, 20, 21, and 24 found below provides an expanded description of customary and traditional harvest and use practices for black bears from the ethnographic and ethnohistorical literature of this region of Interior Alaska. Appendix A is included at the end of this report to provide pertinent quotations related to customary and traditional uses of black bears from the literature.

THE EIGHT CRITERIA

CRITERION 1: LENGTH AND CONSISTENCY OF USE

A long-term, consistent pattern of noncommercial taking, use, and reliance on the fish stock or game population that has been established over a reasonable period of time of not less than one generation, excluding interruption by circumstances beyond the user's control, such as unavailability of the fish or game caused by migratory patterns.

Historically, black bears have been harvested by residents of the Interior of Alaska as an important source of meat, fat, and fur. Today, black bears remain an important subsistence resource (e.g., Andersen et al. 1998; Andersen et al. 2001; Case and Halpin 1990; McKennan 1959; Mishler and Simeone 2004; Nelson 1973; Nelson et al. 1982; Osgood 1959; Osgood 1971; VanStone 1979). In several communities, over 1/3 of the households successfully harvested black bears (Table 1), according to recent Division of Subsistence surveys.

In communities within or near spruce woodlands, such as Lime Village, Stony River, Sleetmute, Chuathbaluk, Hughes, Huslia, Galena, Minto, and Tanacross to name a few, hunting and use of black bears is a well-established pattern. In other communities, black bears are most often taken

¹ In 2008, the Alaska Board of Game established an amount reasonably necessary for subsistence uses of black bears in Unit 19 based upon Division of Wildlife harvest ticket reports and Division of Subsistence household surveys. According to the ADF&G harvest database, an annual average of 29 black bears was reported harvested in Unit 19 since 1986. Division of Subsistence household surveys documented an average of 32 black bears annually by Unit 19A residents alone from 2003 to 2006 (ADF&G 2008b).

opportunistically when targeting other animals, such as moose *Alces alces* or small game; however, their use is common. Most residents familiar with the use of black bears report that they have harvested black bears in regularly-hunted areas as long as elders in their communities can recall, and can recount stories of uses by previous generations (e.g., Charnley 1984; Kari 1983, Kari 1985). Historical sources from the 19th century mention use of bears by residents of this region.

CRITERION 2: SEASONALITY

A pattern of taking or use recurring in specific seasons of each year.

Black bears are hunted primarily in the spring, fall, and throughout the winter (e.g., Andersen et al. 1998:25; Andersen et al. 2001:5; Case and Halpin 1990:88; McKennan 1959:49; Mishler and Simeone 2004:100; Nelson 1973:115-121). In areas within or near black bear habitat, black bear hunting continues after bears begin venturing from their dens in April and extends through May; or when the salmon fishing season starts. Black bears are a notable resource in these areas, often being the only large animal reasonably available during late winter when food stores are depleted.

In the fall, from late August through October, black bears are hunted in conjunction with or incidental to moose and caribou *Rangifer tarandus*. Snaring of black bears was a particularly useful and efficient method of harvest during the fall (Nelson et al. 1982:44). The quality of black bear flesh is often mentioned as a factor in the timing of targeted hunting. Black bears "retire to their dens by late September, but remain fat and tasty through the winter" (Nelson 1973:116). Den hunting ("denning") of black bears is still practiced throughout the winter (e.g., Andersen et al. 1998; Andersen et al. 2001; Nelson 1973:115-116; Nelson et al. 1982:48). The flesh of black bears is considered best, fat and palatable, in the fall and early winter, when the bears have been feeding primarily on berries. However, food stores are often diminished in the spring, and any fresh meat is welcome. Also, immediately after coming out of hibernation in the spring, black bears have some fat for a short period of time.

CRITERION 3: MEANS AND METHODS OF HARVEST

A pattern of taking or use consisting of methods and means of harvest that are characterized by efficiency and economy of effort and cost.

Traditional and historical methods of taking black bears include the use of spears, lances, bow and arrows, clubs, deadfalls, snares along trails, snares in trees, rifles, and the use of nooses to take swimming bears from boats (McKennan 1959:49; Nelson 1973:116-117,120-121,122; Nelson et al. 1982:44; Osgood 1958; Osgood 1971; VanStone 1974). Dogs were sometimes used to track bears or locate dens (McKennan 1959:49). Today, black bears are commonly taken with large caliber rifles or sometimes with snares (Nelson 1973:116-117,118; Nelson et al. 1982).

Black bears are either specifically sought after or harvested incidental to other activities, such as fishing, berry-picking, or hunting for moose or waterfowl. Hunters typically access hunting areas by boat in the summer and fall and by snowmachine in the winter. Near some communities, walking to harvest areas is common, such as in the Kuskokwim area where residents hike to the mountains for bear hunting. All-terrain vehicles (ATVs) are also used occasionally. Formerly, snowshoes and dog teams were a common means of access. Black bears are often attracted to fish camps during the summer months, when fish are processed and stored. In the upper

Kuskokwim (GMU 19D) area, fish scraps are sometimes placed on distant sand bars in an effort to divert bears from the fish processing area. Occasionally, these bears are intentionally taken, although such bears are considered less desirable for human consumption because of the flavor of their meat during that time of year.

Taking black bears from their dens, or "denning," is still commonly practiced today (Andersen et al. 1998:25; Andersen et al. 2001:5; Case and Halpin 1990:21, 88; Nelson 1973:115-116, 118)². Known "denning" sites are checked for signs of occupancy in the late fall and early winter.

Once they have discovered a den they check it each fall. The Koyukon usually consider each den a sort of property, 'owned' by the man who discovered it or learned of it from his father. (Nelson et al. 1982:118)

Hunters take note of grass piles and other likely denning sites in the fall. In the winter, the dens are located by examining the areas for scratch marks and bits of fur on trees (e.g., Nelson 1973:118-121; Nelson et al. 1982:45-47). Many hunters know from the size of the den and signs around it if a single animal or a female with cubs occupies it, but "to find a den obligates the hunter to harvest its occupants" (Nelson et al. 1982:48).

From time to time, one may discover a den occupied by a sow bear and one or two yearling cubs. These cubs are often two-thirds the size of a full adult. It is the obligation of the hunter to take all occupants of a den. If the bears did not wish to be taken they would not have revealed themselves, and to not take them would be an act of disrespect. (Nelson et al. 1982:47)

Once an occupied den is located, the bear is either shot through a hole in the top of the den or through the entrance. Sometimes the bear is disturbed and shot upon its exit from the den.

Often bears can be hunted in their dens by a much simpler method. The hunter simply disturbs the animal until it comes up into the den tunnel or pokes its head out the entrance, and then he shoots it. Or in many cases a hunter looks into the den tunnel, using a flashlight or torch to locate the animal inside. If he can see it clearly, he is able to aim and shoot effectively from the den entrance. (Nelson et al. 1982:47)

Occasionally the entrance is blocked to slow exiting bears (e.g., McKennan 1959:49). Bears taken in dens are typically butchered away from the den site to maintain the productivity of the den and to ensure its use by bears the following year (Nelson 1973; Sumida 1988:141-142, Sumida 1989).

Black bears are also harvested by using snares, which is typically done during the fall "when they are fat and seem to wander along well-defined trails" (Nelson 1973:116-117). In Chuathbaluk, Sleetmute, Lime Village, and Stony River, wire snares have been set in or near smokehouses in recent years to capture troublesome bears. Specific bear snaring techniques are discussed at length in Nelson (1973:116-117) and Nelson et al. (1982:44). For example, one technique involved placing the snare in a tall straight spruce tree near a well-traveled black bear trail. The tree is stripped of branches on one side up to a height of approximately 12 feet. A basket of fish is hung on a branch just above the trimmed area and the rawhide line of the snare forms a noose approximately 18 inches in diameter and approximately 9 feet above the ground.

² Brown bears (*U. arctos*) were also harvested from dens in times past (Case and Halpin 1990:84,87; Hadleigh-West 1963:140-141,343; McKennan 1965:144-145).

A bear smelling the fish and seeing the basket hung in the tree would climb up the trimmed area, pushing his head through the willow loop and its supported rawhide noose. As it descended, the noose, tied with a special non-slip knot, would tighten and kill it. Bear snares were set in the latter part of August and were checked each day by the owner. (Nelson et al. 1982:4)

People in the Anvik area (GMU 3) set snares along a tree that was felled at an incline. Fish entrails and eggs, used as bait to attract the bears, were placed in a birch bark basket tied to the upper end of the tree. The name of this snaring method, *deoako 'n*, literally means "fish guts up in the air." Kuskokwim (GMU 19) hunters report dragging bear carcasses away from dens before butchering in an effort to maintain productivity of the dens. Stevens Village residents (GMU 25) report that they thoroughly clean dens to help ensure their use the following year.

The harvest of bears found swimming in the water is described in the Kuskokwim area (GMU 19) and other parts of Interior Alaska (e.g., Nelson et al. 1982:48). A noose is looped around its neck and the animal pulled to shore. This method was reportedly used in the Lime Village area as late as the 1950s. It is also reported that bears in the water are taken by spear in the Upper Tanana area (GMU 12).

Bears are also hunted from boats during the open-water season. A number are usually taken during the fall moose hunt when the Indians see them along the river. Some bears are wary enough to run when they see a boat coming, but others are unafraid. Bears are also shot by hunters traveling the river in spring, often by duck hunters in their little canoes. (Nelson 1973:123)

Hunters in Tok use bait stations to attract and harvest black bears.

CRITERION 4: GEOGRAPHIC AREAS

The area in which the noncommercial, long-term, and consistent pattern of taking, use, and reliance upon the fish stock or game population has been established.

Each community typically hunts black bears in areas known to be productive. In many cases, areas used to hunt black bears are similar to those used to hunt moose and both activities often occur together. Information specific to black bear hunting areas does not exist for most communities; depiction of black bear hunting areas is often combined with brown bear or moose hunting areas. However, Figures 1 through 12 provide maps representing some of the documented areas used for black bear hunting in Interior Alaska.

Lime Village residents hunt moose, caribou, and black bears in river flats throughout their land use area. They hunt moose intensively along the Stony River and its side streams, including the Stink River and Hungry Creek. They also use Caribou Snare Creek and other streams that drain into Tundra Lake. Can Creek is an important hunting ground for both moose and black bears (Kari 1983).

Stony River residents hunt black bears along the Kuskokwim River about 70 miles upstream and 20 miles downstream of the village as well as along the Swift and Stony rivers and their tributaries; and along the Tatla, Kuk, Holitna, and Big rivers (Kari 1985). Chuathbaluk residents have hunted black bears along the Kuskokwim River from just downstream of their community, to upstream of McGrath. Areas along the Aniak, Holokuk, and Oskawalik rivers, as well as the lower tributaries of the Tanana River have also been hunted (Charnley 1984).

Sleetmute hunters primarily use the Holitna drainage, along with the lower reaches of the George River, to hunt black bears (Harnley 1984).

Kwethluk hunters (from GMU 18) have used the Holokuk River drainage, especially since the 1940s, to hunt black bears. Areas of use include the Kuskokwim River as far upstream as McGrath, and the Holitna River upstream to its headwaters (Coffing 1991).

Tuluksak residents (from GMU 18) have hunted bears along the Kuskokwim River from the village upriver to the mouth of the Holitna River, as well as in a few areas near the Johnson River, between the Yukon and Kuskokwim rivers. Tributaries of the Kuskokwim River between the village and the Holitna River have also been hunted for bears. These include the Tuluksak River drainage upstream to the Risher Dome area; Bogus and Ophir creeks and the area around Whitefish Lake; the Anik River approximately 10 miles upstream of the Kolmakof and Holokuk rivers; the Holitna River upstream as far as Kashegelo; and the first 10 river miles of the Hoholitna River (Andrews and Peterson 1983).

Nunapitchuk residents (from GMU 18) hunt black bears at the same time as moose. They hunt north and east of their village, upstream to the headwaters of the Pikmiktalik, Kvichavak, and Johnson rivers, including adjacent lakes and tributaries. They sometimes portage from the Johnson River to the Yukon River and hunt along the Yukon River as far upstream as Paimiut Slough. They also hunt along the Kuskokwim River as far upriver as the Stony River, 320 miles distant (Andrews 1989).

Black bear hunting areas used by Russian Mission residents (from GMU 18) include the Yukon River corridor from Ohogmiut upstream to the outlet of the Bonasila River; the lower reaches of the Bonasila River; and the Innoko River upstream to its confluence with the Shageluk River. Northern and eastern hills along the north bank of the Yukon River were hunted as well. Areas along the lower Atchueling River are recent additions to regular black bear hunting areas, with hunting in that area occurring while residents are at their fish camps.

CRITERION 5: MEANS OF HANDLING, PREPARING, PRESERVING, AND STORING

A means of handling, preparing, preserving, and storing fish or game which has been traditionally used by past generations, but not excluding recent technological advances where appropriate.

Black bears provide an important source of meat, fat, and fur. Depending on the particular custom, bear meat is eaten in the household in the context of community celebrations or during feasts for special occasions, such as the "bear party" practiced along the Koyukuk River. Valuable parts, such as the ribs and hind quarters, are saved for potlatches.

Butchering practices follow culturally-established beliefs and values. In many communities, the skull is left in the field, either buried, as is the practice along the Kuskokwim River; hung upon a small tree near the kill; or burned in a clean fire, as is the practice along the Koyukuk River. In any case, it is not brought back to the village so as to show proper respect toward the animal. The hunter cuts the eyes of the bear so that its spirit cannot see a possible violation of butchering taboos.

Black bears are butchered in the field and processed like other large game. The meat is shared with relatives, especially if fresh meat has been scarce. Some sources report patterns of

butchering and sharing that are dependent upon the hunting party, the hunter who made the kill, and the age of the hunters. The meat is prepared in many ways: frozen, dried, smoked, canned for later use, or cooked by boiling, barbecuing, or roasting. In some communities, the fat is rendered for use in making "Native ice cream." The choicest parts, such as the hindquarters or kidneys, and intestines, are often given to elders. If the meat has to be transported, or if return to the village is not imminent, the meat may be dried in the field in order to reduce its weight and prevent spoilage.

Bear skins are used in the Tanana area (GMU 23) for kluks, and cabin bedding. Their use to insulate doors is described in the Yana (GMU 25). In Koyukuk River communities, precautions are taken to ensure that bears do not come in contact with young women.

CRITERION 6: INTERGENERATIONAL TRANSMISSION OF KNOWLEDGE, SKILLS, VALUES, AND LORE

A pattern of taking or use that includes the transmission of knowledge of fishing or hunting skills, values, and lore from generation to generation.

Athabascan tradition attributes great spiritual power to bears. Bears feature prominently in Interior Athabascan oral traditions and mythology (Nelson et al. 1959:146). There is an elaborate set of beliefs and values surrounding their harvest. Bear meat is often taboo for women. For example, residents in Koyukuk River (GMU 24) follow proscriptions on who may eat bears, what portions may be eaten, how they are prepared, uses of the inedible parts, such as claws and skulls, and the ways to dispose of them.

Bear hunting among the Koyukuk Athabascans is a activity that far transcends the meeting of simple biological needs. To the [black] bear is invested with particularly powerful spiritual powers and is hunted by culturally prescribed methods, the killing, treatment, and consumption is literally a religious act. (Nelson et al. 1982:45)

An example is the "bear party" practiced along the Koyukuk River (GMU 24). It is held in the forest, away from the village, and may be attended as a way of showing proper respect to the animal after its death. In Allakaluk, they include cooking meat from the head, neck, feet, and backbone; dancing; and singing songs.

The knowledge of the medicinal uses of bear and other bear parts has been handed down, but is generally not in use today.

As with many subsistence activities, teaching young people to track, hunt, and butcher black bears, and young women how to process and prepare and other products, is through participant observation. Children are included in the activities, and are expected to show interest and eventually participate in the activities according to their age and acquired skills. Most hunting is done in family-based groups, and the skill and proficiency of younger participants is monitored.

CRITERION 7: DISTRIBUTION AND EXCHANGE

A pattern of taking, use, and reliance where the harvest or products of that harvest are distributed or shared, including customary exchange and gift-giving.

Black bear meat is widely shared between communities, particularly when it is the only fresh meat available during such as late winter. Certain parts, such as the hindquarters, heart, and kidneys, are given to elders.

Bear meat is often considered a gift and served at funeral and memorial potlatches (e.g., Minto, where the backbone, etc. are served). The fat and meat from fall hunts is served at community-wide meals on Christmas Day and New Year's Eve (e.g., Minto).

The common pattern in the Nation's bear meat is that only the men and the elder women should eat it. This pattern is observed in the Kuskokwim area. In Minto, the limbs of harvested black bears are given special attention as they are reportedly cut into three pieces and each piece given to a household.

CRITERION 8: DIVERSITY OF RESOURCES IN AN AREA; ECONOMIC, CULTURAL, SOCIAL, AND OTHER ELEMENTS

A pattern that includes taking reliance for subsistence purposes upon a wide variety of the fish and game resources that provides substantial economic, cultural, social, and nutritional elements in the way of life.

Black bears are one of several mammals used for food by residents of these GMUs. Although the numbers harvested are fewer than those of moose or caribou, black bears are an important food source, particularly in spring and early summer.

In some parts of these GMUs, non-fishing equipment are often very costly, and the means of generating cash are not widely available. Residents of these communities harvest a large variety and considerable amounts of resources, including:

1. the 5 species of Pacific salmon found in Alaska
2. whitefishes *Prosopium* or *Coregonus*
3. northern pike *Esox lucius*
4. burbot *Lota lota*
5. Alaska blackfish *Dallia pectoralis*
6. smelt *Thaleichthys pacificus*
7. trout *O. mykiss* and *Salvelinus*
8. Arctic lampreys *Lampetra japonica*
9. moose
10. caribou
11. black bears
12. brown bears
13. hares *Lepus*
14. ptarmigan *Lagopus*
15. porcupines *Erethizon dorsatum*

16. grouse *Bonasa*, *Dendragapus*, *Tympanuchus*

17. numerous species of waterfowl

18. furbearers, including:

- a. beavers *Castor canadensis*
- b. mink *Mustela vison*
- c. river otters *Lutra canadensis*
- d. muskrats *Ondatra zibethicus*
- e. wolverines *Gulo gulo*
- f. wolves *Canus lupus*
- g. red foxes *Vulpes vulpes*
- h. lynx *Lynx canadensis*
- i. martens *Martes americana*

Residents also harvest many varieties of plants and berries.

Much of the wild resources harvested are salmon and freshwater fishes. However, communities further inland depend more heavily on land mammals, such as black bears. Kari (1983) reported that Lime Village residents prefer fresh animal meat as a staple over fish and birds. Caribou, moose, and beavers provided the most meat for Lime Village residents; in some years, black bears may have equaled beavers in pounds consumed.

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TABLES AND FIGURES

Table 1.- Black bear harvests, Interior Region, 1982-1987.

Community	Year	Percentage of households harvesting	Estimated total number harvested	Lbs per capita harvest
Allakaket	1982	37	23	9
Anderson	1987	7	10	4
Beaver	1985	10	10	4
Bettles	1982	25	3	5
• Dot Lake	1987	8	1	1
Fort Yukon	1987	31	150	7
Galena	1985	18	36	5
Healy	1987	2	7	1
Hughes	1982	53	17	11
Huslia	1983	37	41	32
McGrath	1984	n/a	15	2
McKinley Park	1987	2	1	0.8
• Minto	1984	20	16	16
Nikolai	1984	n/a	6	3
• Northway	1987	9	10	2
Stevens Village	1984	40	17	19
• Tanacross	1987	4	3	1
• Tanana	1987	14	38	28
• Tok	1987	8	40	2

Source ADF&G Division of Subsistence survey data.

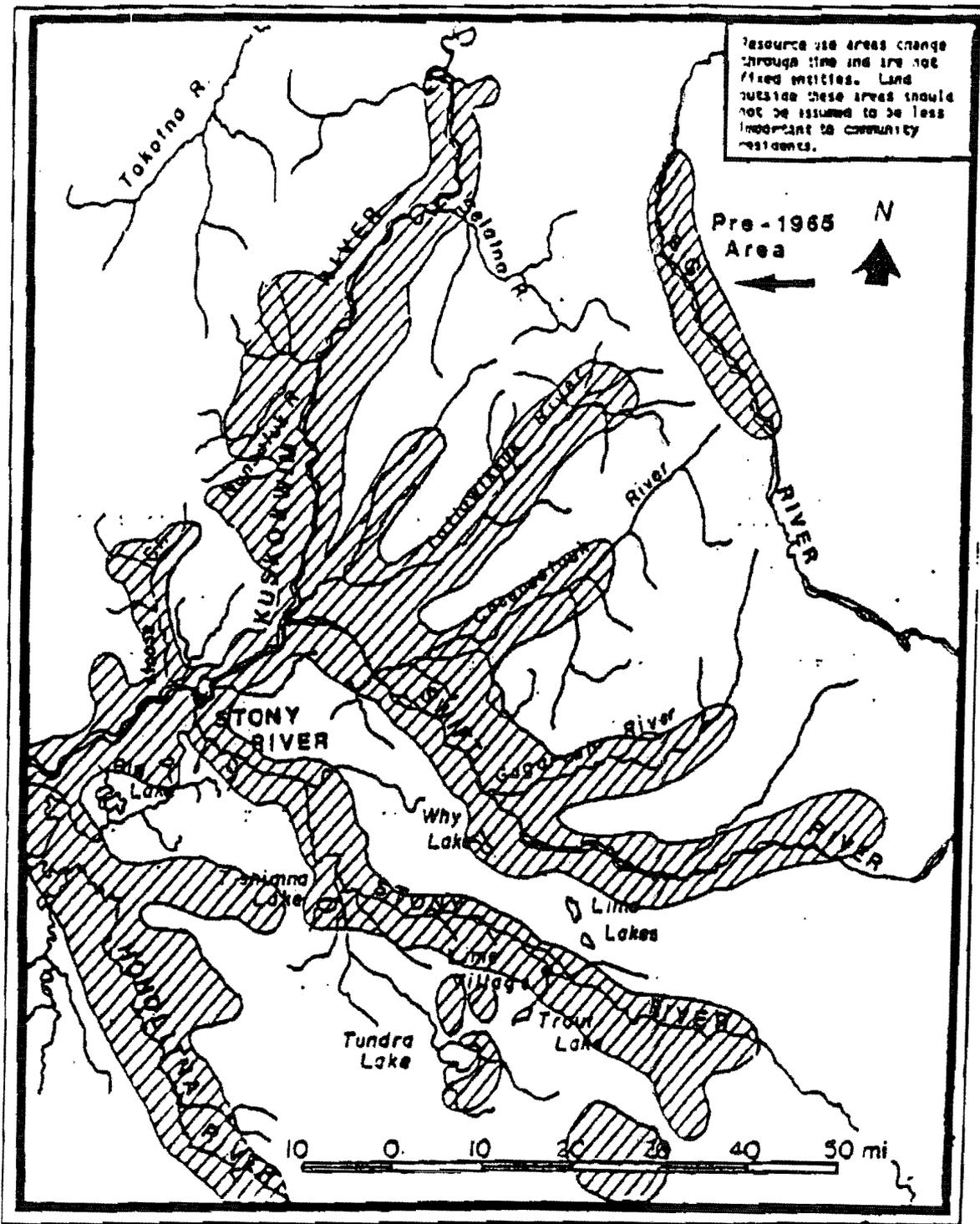


Figure 1.—Areas used for black bear hunting during the lifetimes of Stony River residents as reported in 1983-1984.

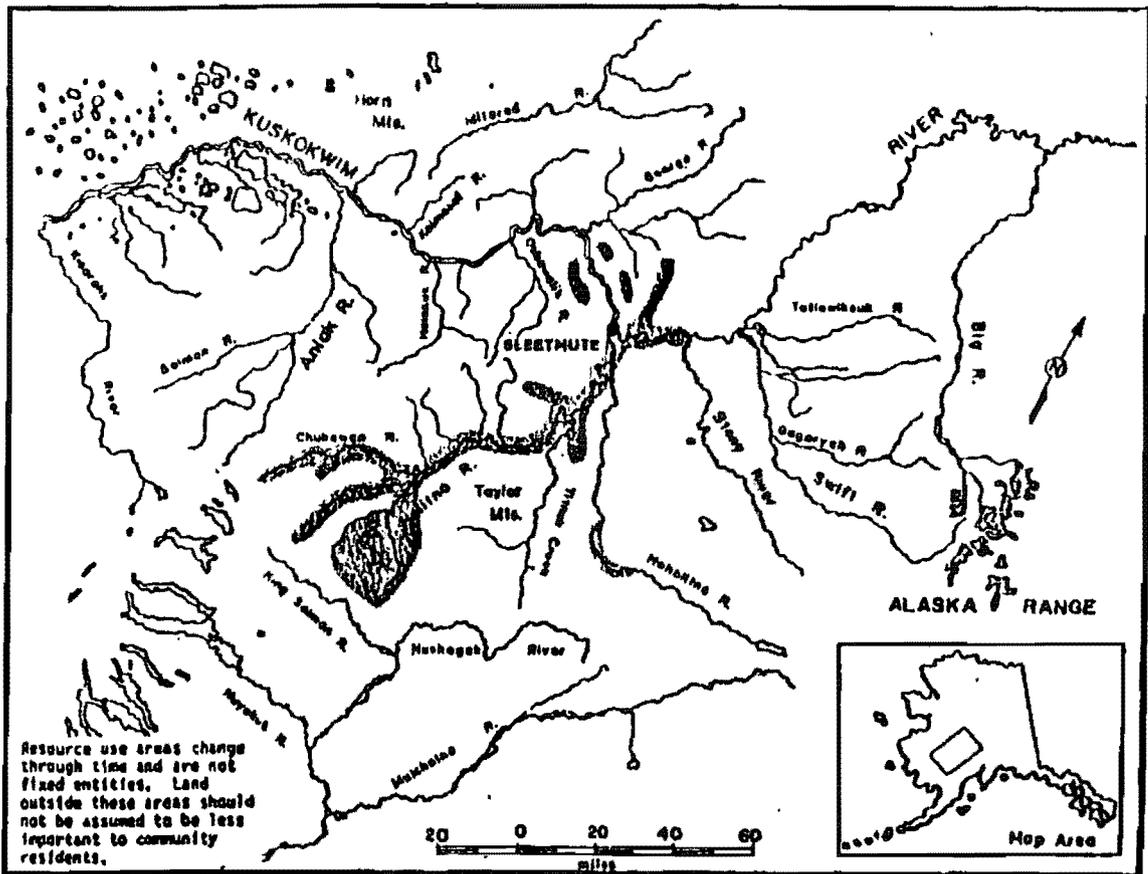


Figure 2.—Areas used by Sleetmute residents for hunting bears prior to the use of snowmachines.

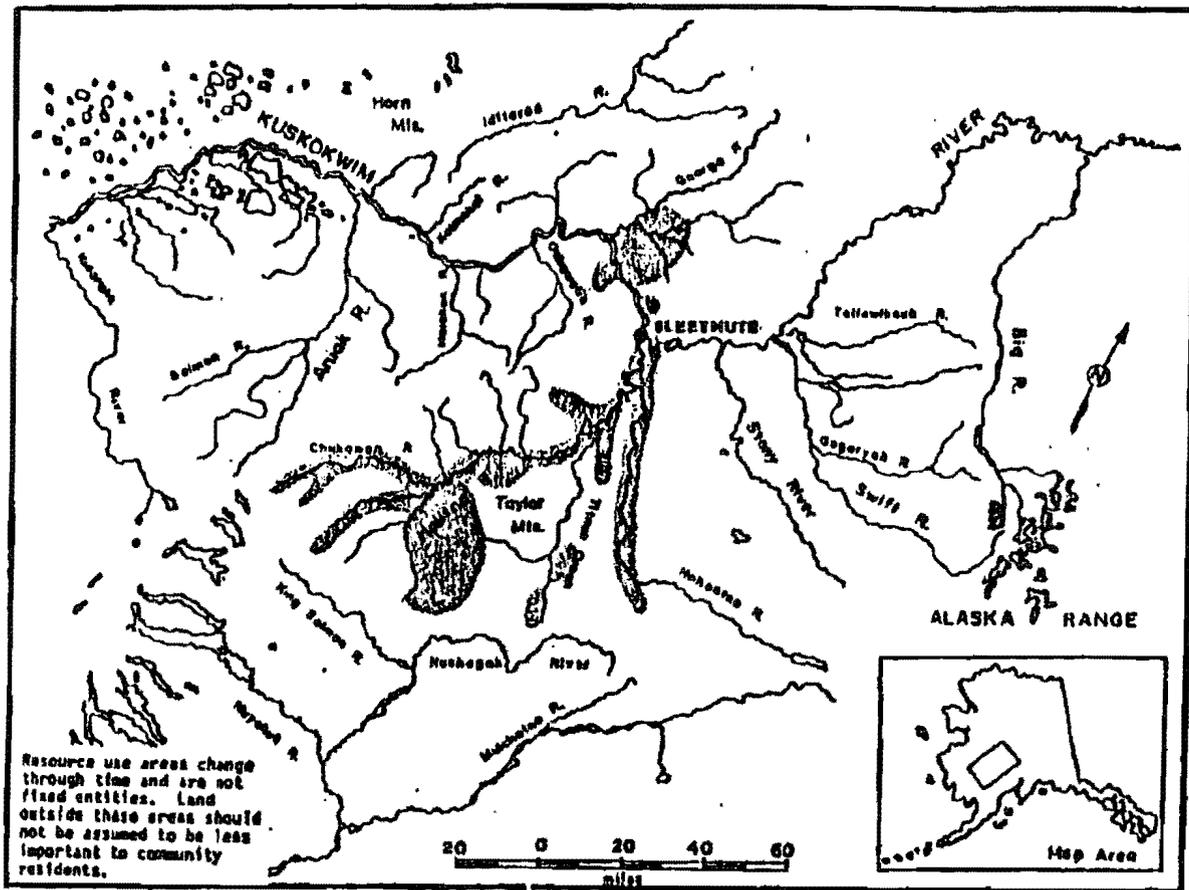


Figure 3.—Areas used by Sleethmute residents for hunting bears since the use of snowmachines, through 1983.

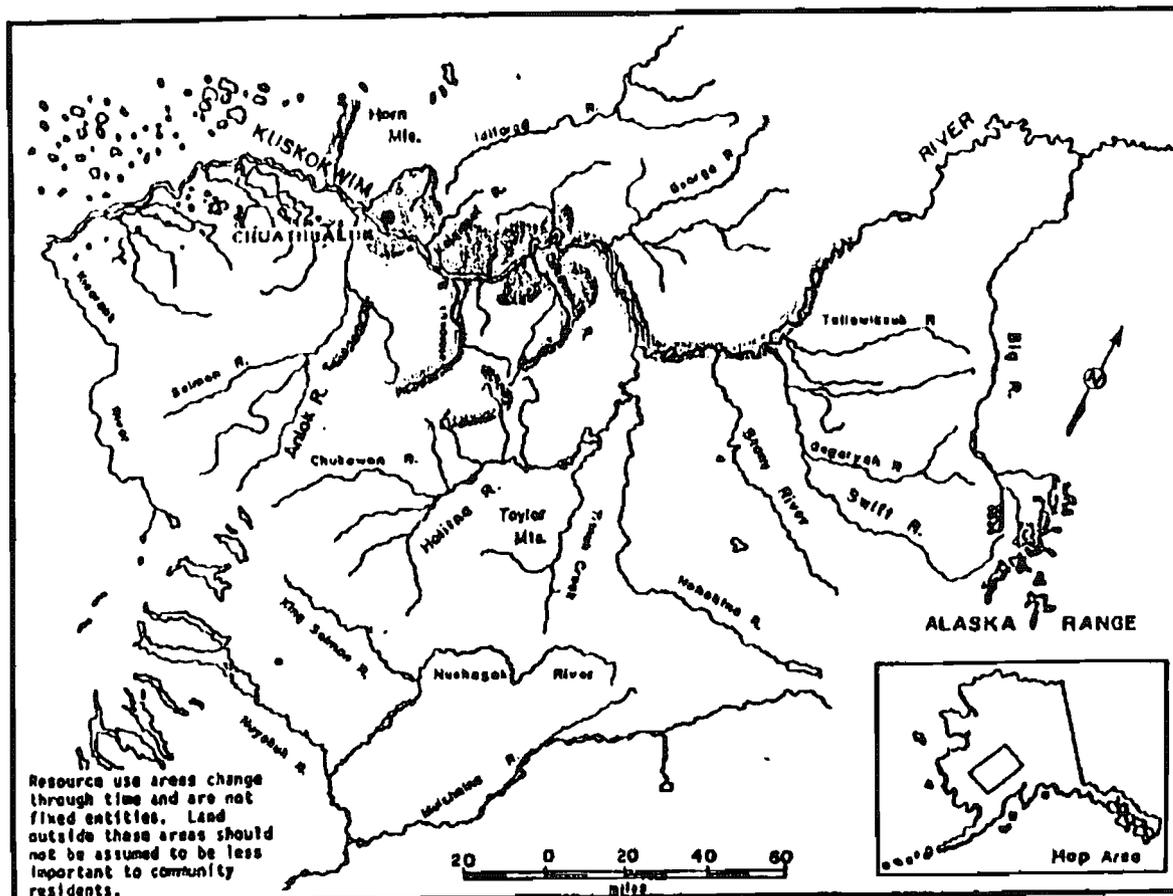


Figure 4.—Areas used by Chuathbaluk residents for hunting bears since moving to Chuathbaluk, through 1983.

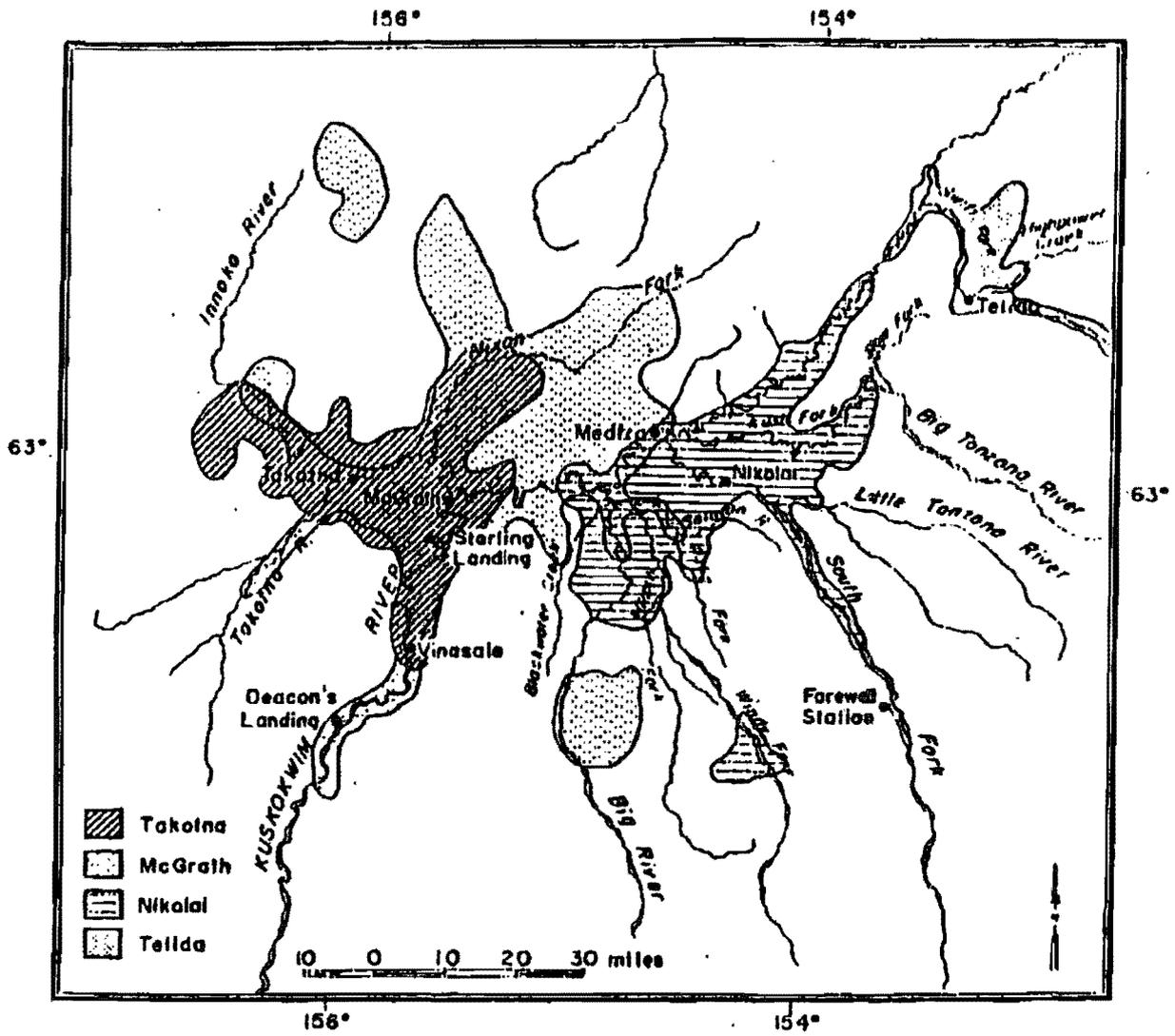


Figure 5.—Areas used by Nikolai, Telida, Takotna, and McGrath black and brown bear hunters, 1967-1983.

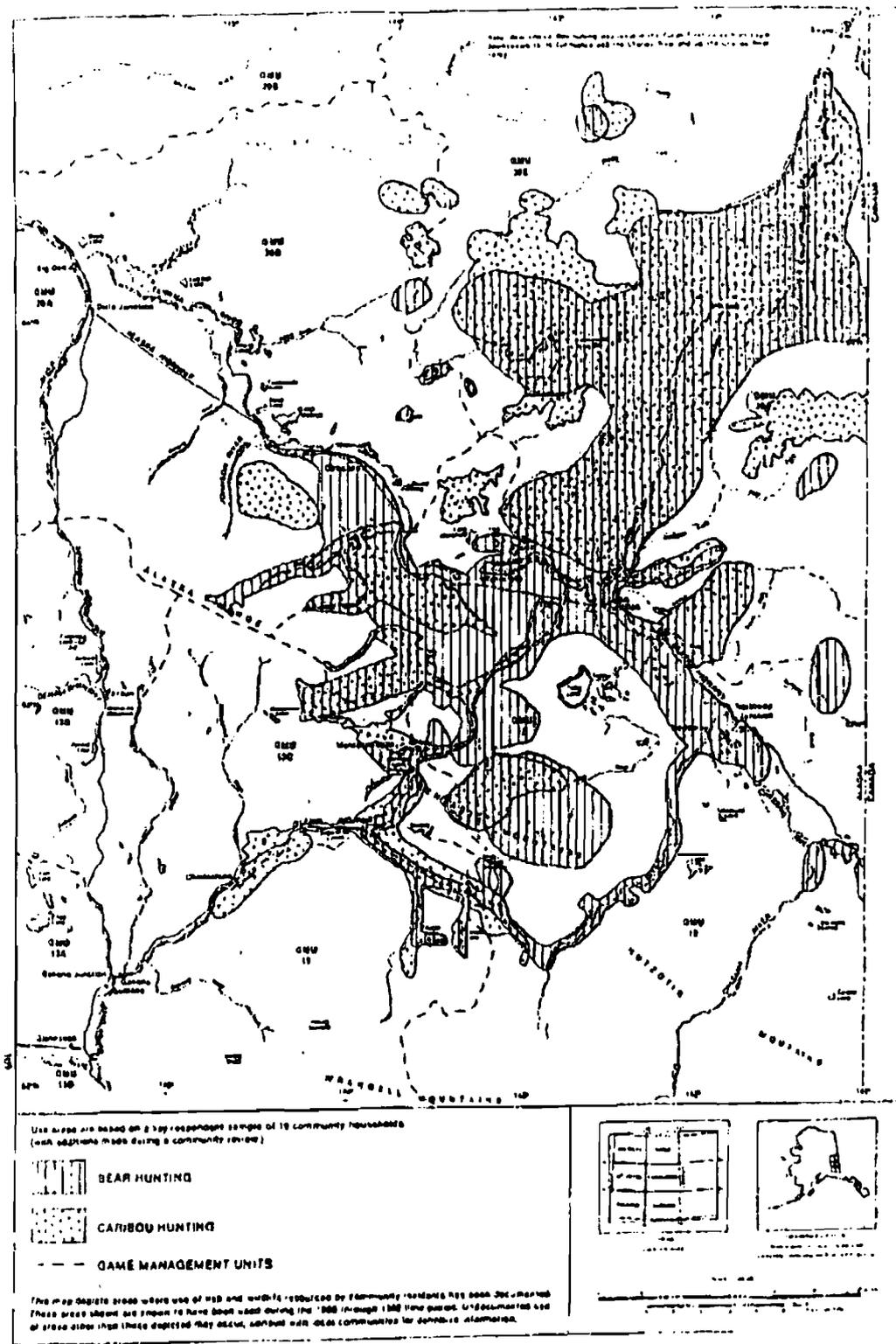


Figure 7.—Tok bear and caribou hunting areas, 1968-1988.

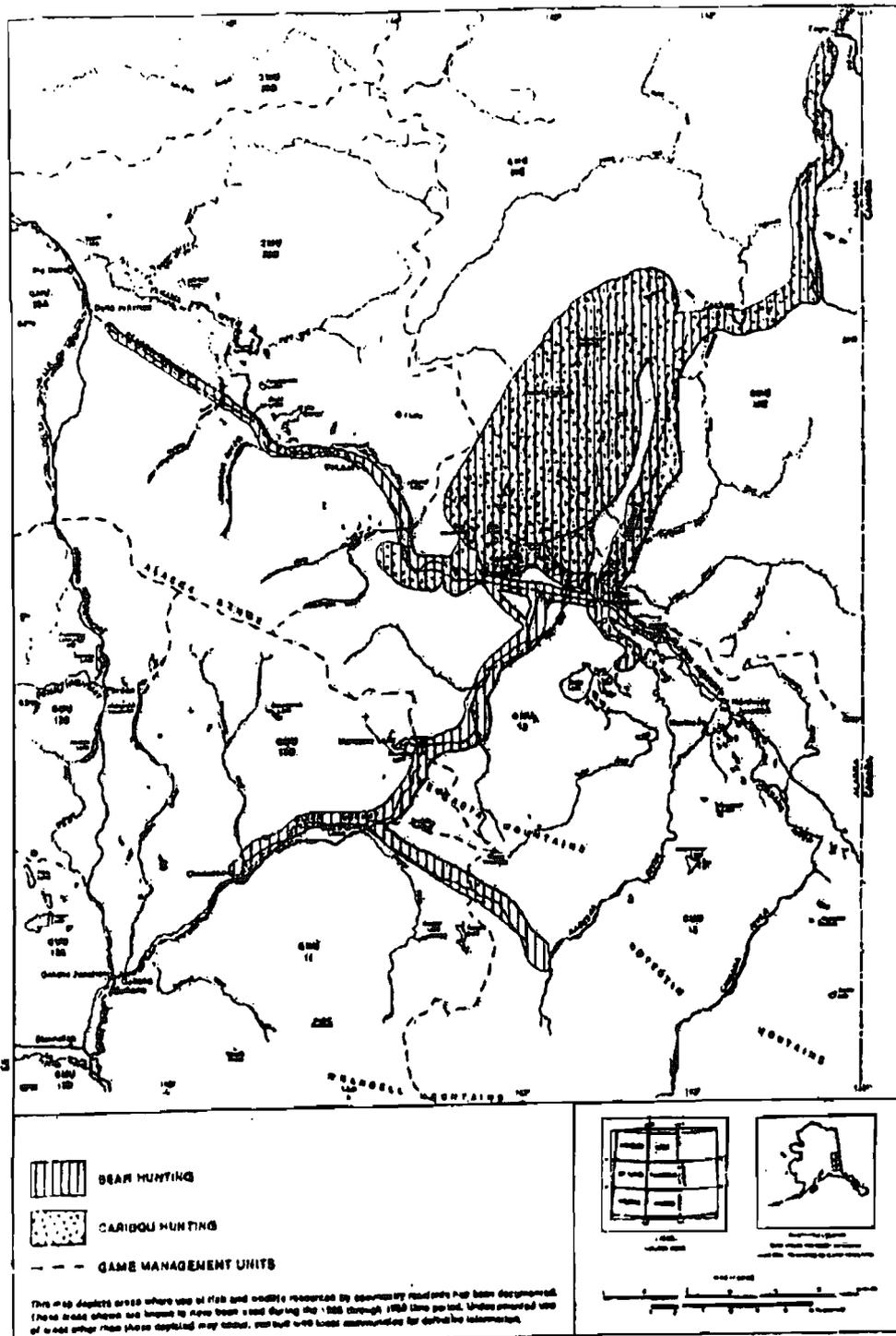


Figure 8.—Tanacross bear and caribou hunting areas, 1968-1988.

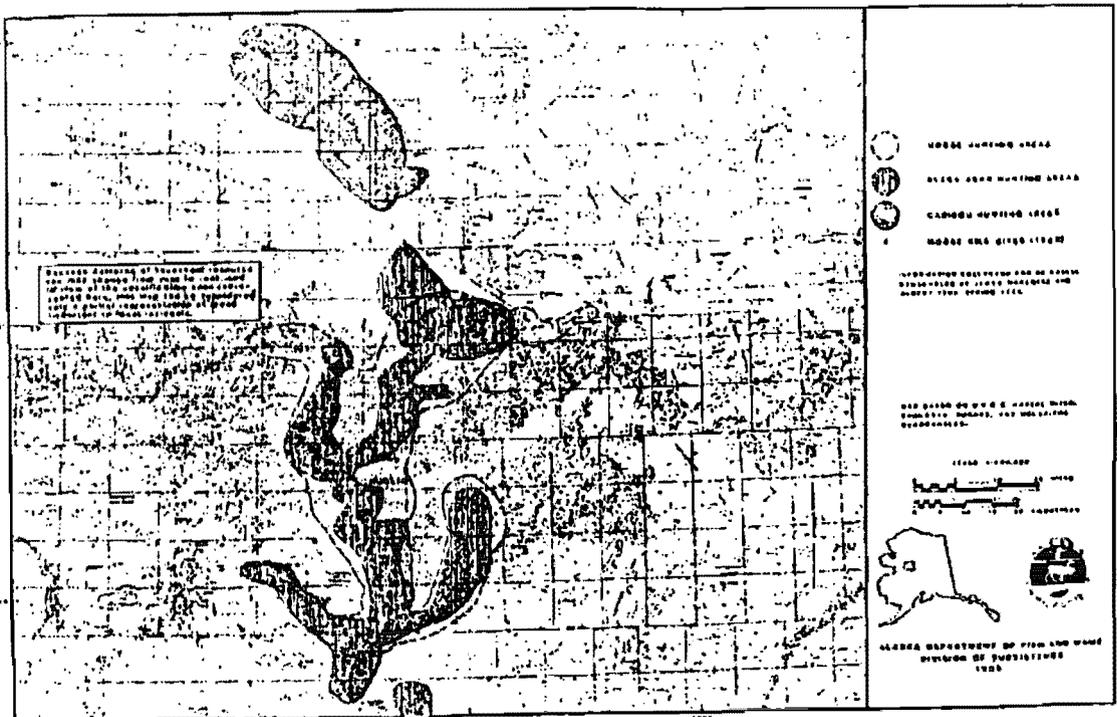


Figure 10.—Huslia moose, black bear, and caribou hunting areas, 1981-1983.

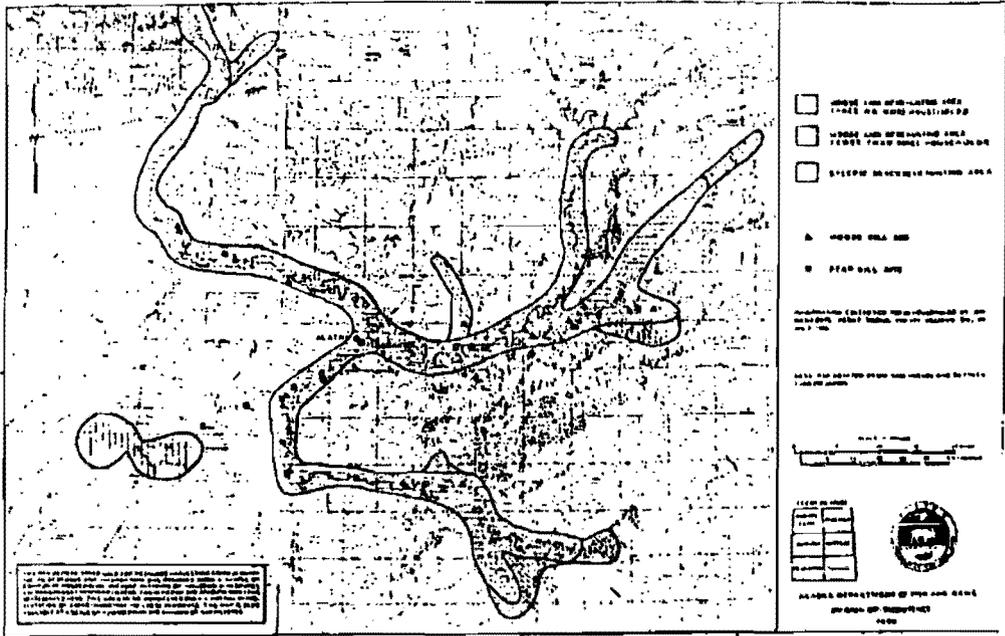


Figure 11.—Areas used by Allakaket and Alatna residents for moose and black bear hunting, January 1981-December 1982.

**APPENDIX A.—LITERATURE EXCERPTS PERTAINING TO
CUSTOMARY AND TRADITIONAL BLACK BEAR HUNTING
AND USE PATTERNS IN INTERIOR ALASKA**

Following are quotations from selected literature pertaining to customary and traditional black bear hunting and use patterns in Interior Alaska.

Andersen, D. B., C. J. Utermohle, and L. Brown. 1998. The 1997-98 harvest of moose, caribou, and bear in middle Yukon and Koyukuk river communities, Alaska. Alaska Department of Fish and Game Division of Subsistence Technical Paper No. 245, Juneau. <http://www.subsistence.adfg.state.ak.us/TechPap/tp245.pdf>

There is significant annual and individual variability in denning dates for bears. However, in interior Alaska, most black bears enter their winter dens by mid-October and emerge from dens by mid April (J. Hechtel, ADF&G, Pers. Comm). This being the case, it is likely that some of the bears harvested in October, and most of the bears taken in November, December, and March, represent bears taken in dens, a practice still common among Koyukon Athabaskan¹ hunters. (Andersen et al. 1998:25)

Andersen, D. B., C. J. Utermohle, and G. Jennings. 2001. The 1999-2000 harvest of moose, caribou, and bear in ten middle Yukon and Koyukuk river communities. Alaska Department of Fish and Game Division of Subsistence Technical Paper No. 262, Juneau. <http://www.subsistence.adfg.state.ak.us/TechPap/tp262.pdf>

An estimated total of 68 black bears were taken by hunters in the 10 survey communities (Table 9). Of these, Huslia hunters took 27 bears or 40% of the overall harvest. Black bear harvests consisted of 45 males (67%), 18 females (26%), and 5 black bears of unreported sex (Table 10). While black bear harvests were reported in all months except December, January, and March, the 4-month period August through November accounts for 88% of the black bear harvest (Fig. 4). Bears taken in November and February, and perhaps some of the October harvest, can be attributed to the regional practice of hunting bears in their dens. (Andersen et al. 2001:5)

Case, M., and L. Halpin. 1990. Contemporary wild resource use patterns in Tanana, Alaska, 1987. Alaska Department of Fish and Game Division of Subsistence Technical Paper No. 178, Juneau.

Black and brown bear were occasionally hunted in their dens in the late fall, when the animals were still fat. (Case and Halpin 1990:21)

At camps or in town, black bear were harvested if they became nuisances, but generally there was little hunting of black bear at this time of year [April and early May]. (Case and Halpin 1990:33)

Black and brown (or grizzly) bear occur in the Tanana area. Residents noted that black bear were more numerous and visible along the river corridors and bottomlands, proving themselves nuisances at fish camps, while brown bear occurred more often in the uplands, and were considered to be more unpredictable and dangerous than black bear. Athabaskan (sic.) tradition attributes to the bear much spiritual power, and local men challenged themselves in former years by coaxing brown bear out of dens in the spring to hunt them with spears. Certain behaviors that would involve bear, such as

¹ Delegates representing the member tribes of the Tanana Chiefs Conference passed a resolution regarding the variety of spellings of the term chose "Athabaskan" as the preferred spelling. Various spellings will be found in this report due to the historical nature of the literature.

women in their child-bearing years looking at or consuming bear meat, are traditionally hootlaanee (taboo). Both black and brown bear were hunted locally by those with a taste for the meat and grease, and use for the fur. The latter was used as ruffs and as bedding in trapping cabins. (Case and Halpin 1990:84,87)

Both black and brown bear were hunted primarily in fall, after light snowfall had covered the ground and tracking was feasible, but prior to denning. Fall black bear were preferred for their high fat content, and hunting usually occurred in late October, although some bear hunting coincided with moose hunting somewhat earlier. Some hunting was done in winter by coaxing bears out of their dens, and in spring, especially if meat for dogs was needed. The fur was considered prime in spring by some. Bears were occasionally harvested during summer if they were bothering fishing operations. (Case and Halpin 1990:88)

Hosley, E. H. 1981. Environment and culture in the Alaska Plateau. Pages 533-545 in Sturtevant, W. C., editor, Handbook of the North American Indians, volume 6: Subarctic. Smithsonian Institution, Washington, D.C.

[With respect to the Athabascan Indians of the Alaska Plateau region] Snares were used to take a variety of other game [other than caribou], from hares to grizzly bears and Dall sheep. In its several variations – spring pole, tossing pole, and tether snares – the snare was one of the most sophisticated and widely applied hunting devices of the Alaskan Athapaskans. Deadfalls and the bow...were also used to take a variety of animals, and the lance or spear...was widely used to kill denned bears and to stab moose and caribou from a canoe...as they crossed lakes or streams" (Hosley 1981:535).

McKenna, R. A. 1959. The Upper Tanana Indians. Yale University Department of Anthropology, New Haven.

Bears were formerly hunted much more than they are today. The combat was largely a hand-to-hand one, and the killing of a bear brought great honor to the hunter. In the summer the animals were brought to bay, often with the aid of dogs, and dispatched by spears; and the Indians maintain that the bravest hunters sometimes killed them with heavy clubs of caribou horn (cf. Weapons). Such hand-to-hand encounters were accepted methods of acquiring prestige among a number of the western tribes, including the Han (Schmitter, 1910:8), Peel River Kutchin (Osgood 1936b:27), Ten'a [Koyukon-speaking people] (Jette 1909:482); Ingalik [Deg Hi'tan, or Deg Xinag-speaking people of Unit 21E] (Osgood 1940:200,207), Tanaina (Osgood 1937:32-33), Eyak (Birket-Smith and de Laguna 1938:100), and Tahtan (Emmons 1911:72). (McKenna 1959:49)

A bear is sometimes lured to his death by the hunter's imitating the call of the raven. The bear responds thinking that some carrion is near and is promptly shot. In the winter, bears are poked from their dens and shot as they emerge. In the old days another interesting method was used when a bear was roused from his winter den. As he broke out through the snow two strong men would pinch him between two poles, and while they held him the other hunters would dispatch him with clubs or spears. This unusual device was also used by the Chipewyan (Birket-Smith 1930:24). (McKenna 1959:49)

Mishler, C., and W. E. Simeone, *editors*. 2006. *Tanana and Chandalar: The Alaska field journals of Robert A. McKennan*. University of Alaska Press, Fairbanks.

Old Joseph...reports killing a monstrous silver tip 'as big-as a moose.' He poked it out of its winter den and then shot it. The bear pretty nearly got Joseph and was only about ten feet from him when it finally went down. I [Robert A. McKennan] saw the skin and it was a monster. (Mishler and Simeone 2006:100)

Nelson, R. K. 1973. *Hunters of the northern forest: Designs for survival among the Alaskan Kutchin*. University of Chicago Press, Chicago.

Bears are of course seasonal animals, hibernating for several months during the winter. Even during the seasons when they are active and therefore readily hunted there are only certain periods when the Kutchin consider them fit for eating. Black bears are hunted especially during the fall, when they build up their thickest fat. They retire to their dens by late September, but remain fat and tasty through the winter. After they emerge from their dens between mid-April and early May, food is scarce and they become lean. By June they are thin, and the Indians do not hunt them. (Nelson 1973:115-116)

[With respect to bear snaring] It takes little more than the thought of facing a bear at close range with a bow and arrow or spear to make one understand why snares were an important method for killing these animals in aboriginal times. Snares were highly effective and required almost no risk to the hunter. Today's adult Kutchin are all familiar with bear snaring techniques, but if they still catch bears this way they do not consider it a matter of public information. The best time for snaring bears is during the fall, when they are fat and seem to wander along well-defined trails. They could be snared during the spring as well, but no one every mentioned doing this. (Nelson 1973:116-117)

The aboriginal Kutchin made their snares from braided strands of babiche, but in recent times 1/8-inch or 1/4-inch aviation cable was found to be more effective. A homemade cable snare works well unless the bear does not pull it tight and is able to slip it off with its claws. Commercial snares are provided with one-way choking locks and cannot be removed. The human scent is eliminated from a cable snare by boiling it with willow bark or by rubbing it with the tips of spruce boughs. (Nelson 1973:116-117)

The bear snare is usually set in a trail, either a man-made trail intended for winter travel or a natural game trail. It is generally placed where a constriction is created by bushes or trees, so that the snare fills the whole trail, so that the bear is forced to go underneath. A snare set under a log is very effective, and is easily tethered to the log itself. Instead of using a fixed toggle or anchorage, a bear snare is attached to a flexible young tree, to a sizable log, or to a log placed between the crotches of two trees on opposite sides of the trail. In the last case the anchor is a crosspiece which cannot be dragged off, but the bear may simply chew the log in half and escape. The loose log toggle is dragged away into the brush until the bear finally chokes itself. Many a snare has been broken, however, leaving the bear with a snare collar as a memento of this escape. (Nelson 1973:116-117)

A typical snare set for black or grizzly bear would be made along the lines described earlier for moose snares. After finding a suitable place on a trail and selecting a fixed or loose toggle, the Indian tethers his snare so that it hangs in the middle of the pathway. It is opened to a loop varying from 20 to 24 inches in diameter, with its bottom edge 24 to 30 inches above the ground. The cable snare is held open by tying it in several places to slender sticks pushed in the ground beside it. Short pieces of grass or thread are used to make the ties. (Nelson 1973:117)

The trail is usually wider than the snare's loop, and so a few sticks 4 or 5 feet long are set up on either side of it to block the way around. One or more sticks are also pushed into the ground right under the snare, reaching almost to its lower edge, to keep the animal from going under it. (Nelson 1973:117)

[With respect to den hunting] Black bears spend approximately seven months of the year hibernating, and grizzlies occupy their dens for four to five months. It is not surprising that over the centuries northern Athapaskans have amassed great knowledge of the bears' denning habits and have developed effective methods of hunting them in their winter quarters. Northern Athapaskans are masters of den hunting, just as they are expert hunters of moose. The Koyukon Indians point out that these are the two skills in which they surpass their neighbors, the Kobuk Eskimos.

Den hunting must have been very important in the aboriginal past, when it afforded an easy means of killing bears with only a spear or bow and arrow. Rifles have replaced traditional methods, but den hunting is still important. This is especially true among the Koyukon, who live in a country rich in bears. They are highly skilled in den-hunting techniques and enjoy bear meat so much that they put considerable effort into the early winter hunts. Den-killed bears are the fattest and best tasting of all; so it is little wonder that the people want them.

As was noted earlier, black bears go into their dens by late September. The date is variable, depending on the weather. They start working on the dens sometime in September, and occupy them intermittently until really cold weather signals the time for uninterrupted hibernation. Grizzly bears enter their dens much later, in November or December, and may become active during midwinter warm spells. They seem to take hibernation much less seriously than do black bears.

The Koyukon and Kutchin Athapaskans often find bear dens by accident, stumbling onto them when they are traveling through the brush at any time of the year. Once they have discovered a den they check it each fall. The Koyukon usually consider each den a sort of property, 'owned' by the man who discovered it or learned of it from his father. Thus people speak of 'Sam's den,' 'Henry's den,' and so on (G. R. Bane, personal communication). The Chalkyitsik Kutchin do not formalize ownership in this way. Each hunter knows the location of many dens, and they are hunted on a first-come, first-served basis. The only kind of 'ownership' here is established by men who find dens and keep their locations secret, thus ensuring themselves a private potential resource. (Nelson 1973:118)

Each fall or early winter a hunter is likely to go out and check the dens he 'owns' or knows about to see if any are occupied. There are several ways to find previously undiscovered dens or to pinpoint known dens once their general location has been

ascertained. In the early fall, when bears have selected a hibernating site but are still active, they will remain in the immediate area digging up the moss and dirt searching for roots. When an Indian comes across this kind of sign in September, he knows that a bear is probably going to hibernate in that area. This is the best indicator that a denning site is nearby, but of course much searching may be required to find the site itself.

Black bears like to make their dens in places where they get some help from nature. Most dens are under partly overturned trees, whose roots have lifted the earth and moss to create a bear-sized cavern underneath. They also like to dig dens in banks, such as along a steep-sided creek bed. Another good place for denning is a sandy knoll or ridge, where caverns are easily dug out. In general, holes beneath upturned spruce trees seem the most likely den sites, and these are perhaps the easiest kind to locate. One such den that I saw was about 5 feet long, 4 feet wide, and 2 ½ feet high.

A black bear prepares its den by gathering moss and grass from the surrounding areas and lining the interior with it. The entrance will be plugged with the same material later on. Thus, if a hunter comes across a place where the moss and grass are freshly dug up and scraped away it is a sure sign that a bear den is nearby. If such a place is discovered before snow falls the bear is likely to be away foraging, and so the hunter remembers its location and returns later. When snow covers the ground, dens are much harder to find. A small hole usually remains open in the snow above a den, however, and heavy frost covers the surface and any vegetation around its opening. The frost is formed by condensation from the bear's moist breath. (Nelson 1973:119)

Sometimes very special knowledge and alertness leads to the discovery of a bear den. For example, Simon Edwards of Huslia once came upon a set of tracks from a running fox. He followed them a short distance and found a place where the fox had sat down for a while, looking back over its trail. Simon wondered what had frightened it, and why it sat watching back the way it had come, so he followed the trail the opposite way. He found shortly that the fox had encountered a bear den and was frightened away by its occupant. Simon got the bear. (Nelson 1973:119-120)

Another time this same man was walking along on snowshoes and came to a place where a marten track crossed the trail. Thinking he might find the marten in a burrow, he sidetracked and followed it. At one point he noticed that the animal had dug into the snow before moving on, and next to the hole he found a single blade of grass the marten had pulled up onto the snow. The grass was a kind that bears use for bedding in their dens, and so he poked around further and discovered that the marten had dug right into an occupied bear den. The reward for his effort was fat black bear. (Nelson 1973:120)

The Koyukon and Kutchin use different techniques for bear den hunting. The following account of the Koyukon method is based largely on information supplied by G. R. Bane, who has lived among these people for several years.

Having located a denning site, the Koyukon hunter first needs to learn if it is occupied or empty. He finds a long stick which he can shove into the den's opening. It should be curved because bear holes have a tendency to go down, then turn off to one side. He pokes around inside until the stick touches the bear, disturbing it enough so its movement can be felt. If the hunter is not sure, he holds the stick against what he thinks is the bear and its breathing will move the stick back and forth. Listening closely, the

hunter may also hear the animal's breathing. Once he has ascertained that a bear is inside, the Indian puts his stick to another use. He takes note of the exact direction the passageway runs, and just how far in the stick goes before it touches the bear. Then he pulls it out and lays it on the ground or snow. Its end should mark a point right above the animal.

After he knows the bear's location, the hunter finds several large poles or logs and plugs the entrance with them. These may be tied securely in place to be sure that the animal cannot escape. This done, he uses his ax to chop into the roof of the den so he will have an opening through which to shoot. This can be quite a job, since he wants an opening about 6 inches in diameter and may have to chop through 2 feet of frozen ground. If it is too dark in the den, he can toss a handful of snow on the bear so that a white dusting makes it clearly visible. Once he sees it well, the Indian shoots it in the head. In former times he would kill it with a spear. After a bear is killed in its den, a rope is used to pull it up through the entrance. (Nelson 1973:120-121)

The Black River Kutchin use a simpler but more dangerous method of killing bears in their winter dens. Once they are certain a bear is inside, they start poking and jabbing at it with a long stick. Eventually the animal becomes unsettled enough to come out after whatever is tormenting it. When it starts moving up the entryway the hunters stand ready with their rifles. Black bears come out slowly and are either shot in the head when they first emerge or shot in the heart after they get about halfway out.

This method is much simpler than the Koyukon technique. It requires less physical labor, since there are no holes to chop and the dead bear does not have to be dragged out of the hole. And the method can be used when a den is dug into a bank, where there is no way to chop down into it. It does involve a somewhat greater risk, but so long as the animal is a black bear the Kutchin feel that there is no danger. Herbert John said he once knelt on top of a den and killed the emerging bear with his knife. (Nelson 1973:121)

Grizzly bears can be killed by driving them from their winter quarters, but the Indians treat them in a different way. Whereas a black bear comes out slowly, not looking for a fight, the grizzly angrily charges out, trying to get anyone it can. The Kutchin say that grizzlies do not really hibernate; 'Maybe he don't even go to sleep in there.' Thus if a grizzly den is found, the hunter must expect trouble unless he decides to be prudent and leave it alone. One of the first things a Kutchin will do upon locating a den, therefore, is decide whether it belongs to a black bear or a grizzly bear.

Black bear dens have fairly small openings, about 2 feet high and 3 feet wide, whereas grizzly dens are higher and wider by about a foot. There is also a tendency for the black bear to plug the opening of its quarters, or at least narrow its size considerably, whereas grizzly bears leave the opening wide enough to move in and out. A grizzly is also likely to growl when anyone walks near its hole, which black bears apparently never do. (Nelson 1973:121)

The Chalkyitsik Kutchin say that it is often unnecessary to coax a grizzly from its den, because the animal may charge out before a hunter has a chance to do anything. Otherwise, a grizzly would be hunted in much the same way as a black bear. Actually,

the Kutchin fear the grizzly and rarely eat its flesh, and so they seldom take the risk of hunting this animal from its den. (Nelson 1973:121-122)

[With respect to spring and summer hunting] Most bears are killed when encountered by hunters traveling overland during the early spring or going along the river in boats during the summer and fall, or when the animals appear close to an occupied camp or village. Spring is the best season for bears because they still retain some fat from the winter and they are almost completely unafraid of people. In the fall they run if they sense a man nearby.

The black bear usually leaves his hibernating place after the snow disappears in late April. If he is not well fattened when he enters his den, hunger drives him out earlier. During May and June an Indian never goes anywhere without a rifle or shotgun because he knows a bear could turn up unexpectedly. A number of black bears were sighted within 200 yards of Chalkyitsik in the spring of 1970. When the people lived in muskrat-hunting camps during the spring, they could count on frequent visits from bears attracted by the smell of meat. The Indians also know of many areas that are especially good for bears during the spring, and they sometimes go to these places to hunt for them.

Some bears run when they see a snowmachine or dog team, but others will merely stand and watch. The snowmobile hunter can stop and take a shot if he gets within range, but with a dog team things are not so simple. If there is no snow on the lakes, a hunter cruising the ice looking for bears cannot hope to stop his team once the dogs spot an animal. All he can do is let them chase the bear, then jump off the sled and try to shoot before his dogs reach it. When an Indian finds very fresh bear sign but there is not enough snow to track the animal, he may try to attract the animal by using an old technique. He conceals himself and imitates the call of a raven. If the bear is nearby it may think a raven has discovered carrion and come straight to the sound, expecting to find a free meal. (Nelson 1973:122)

Dogs are sometimes used to run down a bear that escapes into the brush and cannot be caught in any other way. They might be released from the team after a bear is spotted, or a hunter might go out from the village on foot, taking his dogs along to help him. In the old days a man would take several dogs when he hunted, and they would course through the woods searching for a scent. When dogs catch up to a black bear it will climb a tree to escape them. Grizzlies stay on the ground and always stop to defend themselves against the biting dogs. If a hunter hears all of his dogs barking at one place, he knows they have found a bear, moose, or porcupine, and he goes quickly to get whatever game they have brought to bay. (Nelson 1973:122-123)

Bears are also hunted from boats during the open-water season. A number are usually taken during the fall moose hunt, when the Indians see them along the river. Some bears are wary enough to run when they see a boat coming, but others are unafraid. Bears are also shot by hunters traveling on the river in spring, often by duck hunters in their little canoes. (Nelson 1973:123)

The Chalkyitsik Kutchin prefer to shoot bears in the heart, perhaps because this was always the best shot with a bow and arrow. Heart shots can be very dangerous, however, because when an animal is hit in the heart it often runs a fair distance before

dying. This could mean a charge at the hunter. The Eskimos and the Koyukon Athapaskans warn against shooting bears in the heart, preferring shoulder or neck shots, which instantly incapacitate the animal. They advise heart shots only if a light rifle such as a .22 is being used, when there is no chance of shattering the animal's shoulder or neck bones.

The Kutchin are aware that neck and head shots are deadly, but correctly point out that these are very small targets. If they are close to a bear, they may shoot for the neck vertebrae or the occipital condyle (where the head and neck join). But only an expert takes these shots, because if they miss the bone the animal is wounded and enraged. If a bear charges or comes straight toward a hunter, he shoots it in the chest between the forelegs, or in the head. The Kutchin prefer heavy rifles, such as .30-06 caliber, for shooting bears. Black bears can be killed with a .22 rifle, but this requires a perfect hit in the occipital condyle or heart. Shotguns afford good protection from bears if they are used a close range and are aimed for the animal's eyes, but they are not good for ordinary hunting. (Nelson 1973:123)

The Koyukon suggest that the best shot for a big bear angles from the shoulder to the hip. This gives maximum crippling potential and is likely to do considerable internal damage. Like the Eskimos, they prefer shoulder, backbone, or neck shots. They advise shooting a black bear in the ear if a .22 rifle is used. Eskimos prefer ear or heart shots with a .22, and have killed both grizzly bears and polar bears in this way.

It is difficult to understand why the Kutchin prefer heart shots over hits which are more deadly and crippling, particularly in view of the dangers involved. They never mention shoulder shots as the correct way to shoot any animal, and apparently consider them poor because they damage some of the meat. Needless to say, Kutchin hunters must always be alert for a charge, especially if they shoot a grizzly. The Indians say that if a bear charges it is best to stand still and aim at the bear, waiting until it is close enough for a certain shot. Both the Kutchin and Koyukon warn that a wounded black bear or grizzly bear may wait in concealment for a hunter to follow, then attack when he comes along. (Nelson 1973:124)

Nelson, R. K., K. H. Mautner, and G. R. Bane. 1982. Tracks in the wildland: A portrayal of Koyukon and Nunamiut subsistence. University of Alaska Cooperative Park Studies Unit Anthropology and Historic Preservation, Fairbanks.

Before the introduction of firearms, bears were hunted and killed with spears (pana in Eskimo). It required a particularly brave man, armed only with a spear, to rush an adult bear and then to taunt the bear into attacking. As the bear rose up to lunge on his tormentor, the hunter planted the butt of the spear in the ground and aimed its point so that it would enter near the collar bone of the bear. As the bear fell onto the spear the hunter rolled away, hoping the bear would be unable to continue the attack. Occasionally a party of men would attack a bear, thereby increasing the chance of success. The last known killing of bear with a primitive spear in the Koyukuk Valley area occurred during the late 1800s, according to an elderly Native informant.

The Koyukuk Athabaskans of the past employed a special snaring technique for the harvesting of black bears. This technique was used primarily by men too old to participate in the more active means of taking bears. The bear snare (gaabeelh)

consisted of a rawhide line made from bearded seal skin obtained from Kobuk Eskimos, a willow loop, and a special birch bark basket with seams overlapping in a clockwise pattern.

The snare was placed in a tall straight spruce tree near a well-traveled bear trail. All branches of the spruce tree were cut off of one side flush with the trunk to a height of approximately 12 feet. The birch bark basket full of fish was hung on a branch just above the trimmed area. The rawhide line was secured at one end around the tree trunk under the basket with the other end extending down to an elongated willow loop which held it out horizontally from the trunk. The rawhide line formed a noose of approximately 18 inches in diameter, which was supported by the willow loop. This snare was set approximately 9 feet above the ground.

A bear smelling the fish and seeing the basket hung in the tree would climb up the trimmed area, pushing his head through the willow loop and its supported rawhide noose. As it descended, the noose, tied with a special non-slip knot, would tighten and kill it. Bear snares were set in the latter part of August and were checked each day by the owner. (Nelson et al. 1982:44)

Bear hunting among the Koyukuk Athabaskans is an activity that far transcends the meeting of simple biological needs. To these people the bear is invested with particularly powerful spiritual powers and, when carried out by culturally prescribed methods, the killing, treatment, and consumption of a bear is literally a religious act. Thus it is impossible to accurately describe Koyukuk bear hunting without including supernatural beliefs and prescribed behavior.

According to Native custom, a man planning to hunt a bear must not verbalize his plans. He must also never speak in a boasting manner about his successes in such hunts or in any way demean the bears he has killed. To do so would insult the bears and the hunter would soon lose all of his luck, possibly going for years without finding another bear. According to Koyukon belief, a bear must favor a hunter before it allows him the opportunity to kill it.

In all elements of subsistence, but particularly in bear hunting, luck plays a very large part in the eyes of the Koyukuk Athabaskans (see chapter 12). Without luck, or the proper relationship with the environment, skill is worthless in bear hunting. The bear will reveal himself only to those it favors. One man may walk right by a bear and never see it while another will easily spot it as though drawn to the spot. According to the Koyukuk Athabaskans the difference is summed up in the work 'luck'. (Nelson et al. 1982:45)

The fall bear hunt immediately after freeze-up is the high point of the male seasonal activities. Parties of several men leave the village on foot carrying packs containing their necessary camp gear. Very little food will be taken, as the hunters expect to live off the land. Light tarps are carried in place of bulky tents. The bear hunting party roams the flats and foothills, camping in particularly promising areas and spending two or three days carefully searching the local terrain for bear dens or signs of recent bear activity. (Nelson et al. 1982:45-46)

Bear dens may occur in a variety of places, but Native hunters have learned that bears tend to den on dry well-drained land. The exposed roots of large spruce, thick patches of diamond willow, and sandy banks are particularly favored by bears. As the hunters search, they watch for patches of moss that have been pulled from the earth or tall grass that has been torn away. They also look for crude nests which bears often make near a den they are excavating. All of these signs indicate that there is an occupied den in the nearby vicinity.

Over the years a great many bear dens have been discovered by Koyukuk hunters. When a man discovers a new bear hole and takes a bear from it, it becomes known as his den: that is, 'Joe's bear hole.' Other hunters usually allow the 'owner' of a known bear den the opportunity to be first to check it each fall. The locations of particularly productive bear holes are passed from father to son. As men search for bears in the fall they characteristically check all known bear dens in the vicinity. Usually, a great many old dens must be checked before one is found that is occupied.

As two or more hunters progress separately through an area, they maintain contact by occasionally striking a tree with a stick. It is forbidden to yell back and forth as this will frighten off any bears in the vicinity. The only time one should cry out is when discovering an occupied den.

Once a den is discovered, and its entrance appears to be purposely plugged up, the hunter will sometimes cut a long curving rod to poke back into its tunnel. Most den tunnels curve before the nest area is reached. When the stick strikes something soft the hunter will hold it against the obstruction and try to detect any breathing movement. If the bear is not completely asleep it may rush out of the den, in which case the hunter must be ready to quickly respond and shoot it. If the bear does not leave the den, the hunter will carefully withdraw the rod and lay it on the roof of the end at the same angle it was injected into the hole. The end of the rod should be resting directly over the sleeping bear. (Nelson et al. 1982:46)

With the hibernating bear located, the hunter and his companions will sometimes cut heavy poles and brush and securely plug up the entrance of the den to prevent their prey from escaping. At the spot above the den nest, they will chop and dig a hole perhaps 6 inches in diameter. If enough light can filter through the hole, it may be possible to see the bear and to allow the hunter to shoot it in the head. Otherwise, a rod will be lowered to 'feel' for the bear. Once the bear is located, one hunter may hold the rod steady while another aims and fires his rifle along its length. (Nelson et al. 1982:47)

Often bears can be hunted in their dens by a much simpler method. The hunter simply disturbs the animal until it comes up into the den tunnel or pokes its head out the entrance, and then he shoots it. Or in many cases a hunter looks into the den tunnel, using a flashlight or torch to locate the animal inside. If he can see it clearly, he is able to aim and shoot effectively from the den entrance.

From time to time, one may discover a den occupied by a sow bear and one or two yearling cubs. These cubs are often two-thirds the size of a full adult. It is the obligation of the hunter to take all occupants of a den. If the bears did not wish to be taken they would not have revealed themselves, and to not take them would be an act of disrespect.

The slain bear or bears will be removed from the den and skinned on the spot. The small bone just under the tongue will be discarded. The intestines, heart, lungs, and any bone or other parts not to be taken should be burned to prevent other animals from defiling them. The hide may be kept, although it usually is not. A bear hide continues to have 'life' for three years, and so it cannot be used for clothing or anything else until this time has passed. Only women who have experienced menopause may scrape and tan a bear hide.

If a man or hunting party is some distance from the village and takes several bears, they will cache the meat and pack back only a small percentage of their kill. Later they will use dog teams-and, lately, snowmachines - to retrieve the meat. (Nelson et al. 1982:47)

According to custom, the man who actually kills a bear retains very little of the meat for himself, perhaps only a forearm or hindquarter. The ribs, fat, and other choice cuts are usually frozen and preserved for village potlatches. It is particularly important to have large quantities of bear meat for memorial potlatches. Other parts of the bear such as the neck, forearms, head, and paws are used to host a bear party in honor of the bear that has been killed. Bear parties, by tradition, are attended by males only and are usually held outside the village limits soon after the bear meat has been returned to the community. (Nelson et al. 1982:47-48)

Although bear hunting significantly declines after mid-winter, it does not cease entirely. When traveling overland via snowshoes, dog team, or snowmachine, a Native hunter is always alert to signs of possible bear dens. An air hole often forms in the snow covering a bear den. The snow around the hole is usually stained yellow. If a man sees such a sign, he will dig out the den and harvest its occupant. As a man travels along a trail with his dog team he notes the dogs' behavior. The writer [Ray Bane] drove his team of dogs along a well-packed trail daily for over a week and noticed the team sniffing the air and glancing off into a patch of birch trees each time a certain point was passed. This observation was discussed with a local Native hunter who then spent several days searching around the area until he found and killed a bear in a snow-concealed den. Small predators, such as marten, weasels, and foxes, are often drawn to a bear hole by its odor and may walk up to it and circle it out of curiosity. A hunter, seeing where such creatures have deviated from their general path of travel and circled such a spot, will suspect a bear den. As mentioned earlier, to find a bear den obligates the hunter to harvest its occupants. (Nelson et al. 1982:48)²

Summer bear harvest usually consists of simple chance encounters with bears while carrying out other activities such as checking fish nets, cutting wood, or traveling by boat. There seems to be less emphasis on the taking of bears at this time. (Nelson et al. 1982:48)

[T]he brown bear is the one animal that is killed both for use as food and for self protection, being considered too dangerous to have in areas where people regularly

² "It has been noted that the Koyukuk people are particularly conservation-conscious in the harvest of most furbearers, particularly those species which are non-migratory. Beaver are considered to be especially vulnerable to over-harvest, and most trappers will pull their sets from a beaver house after two adults have been taken. Wolf, wolverine, and fox are considered to be less affected by trapping, and little effort is made to limit the take of these predators. The custom of recognized traplines encourages men to practice conservation so as to maintain a sustained yield from their territories" (Nelson et al. 1982:60).

camp or travel. It is also disliked for its habit of killing black bears in their dens. (Nelson et al. 1982:227)

If a bear is taken from its den, the men eat certain parts together and save others for a later 'bear party' outside the village. Some highly preferred portions are set aside for village potlatch feasts. The successful hunter keeps only a small amount for use in his own household. Sometimes the successful hunter in a group keeps nothing at all for himself. (cf. Loyens 1966:41; cited in Nelson et al. 1982:235)

The Koyukon have greatly elaborated their knowledge of bears, which in some past times were the only big game animal available to them. Their fund of information on bear denning is especially remarkable. This knowledge is used to locate dens by recognizing subtle clues, to learn if dens are occupied and by what sort of animal, and to succeed in taking these animals when they are found.

Expert hunters are able to find dens by detecting bear tracks in the frozen moss beneath as much as 2 feet of undisturbed snow, and by spotting miniscule disturbances, such as incongruous bits of grass or cracked twigs. If a den is located (and this may require days of searching), there are equally sophisticated means of investigating its occupant and eventually making a kill. Careful studies are made of the den and its surroundings, but sometime the hunter must enter an inhabited den to accomplish his task. By putting his head just inside a den's entrance and listening carefully, he may hear the bear licking its chops or breathing, or he may detect its heartbeat growing steadily louder and faster. In the latter case, he knows that he has found a young animal, its pounding heart registering fear. Older bears do not react this way because they are unafraid. Knowing that young animals are more likely to flee a den after disturbance, hunters keep a close watch on the entrance until the hunt is over. (Nelson et al. 1982:246)

Some other rules for proper behavior toward animals can be exemplified by listing a few of the regulations for the treatment of bears. There are rules for proper butchering: a bear's eyes are always removed and the eyeballs slit so that it will not see if the hunter errs in following any taboos; rules for the proper care of the meat: dogs must never eat bear meat because it is disrespectful and because it would make the dogs mean; and the rules governing who eats the animal or parts of it: bear brains are never eaten, because it would cause a person to anger easily. Women cannot eat from the front quarters of black bear, and are completely forbidden to eat brown bear meat.

There are also rules for the disposing of unusable portions: edible parts of the animals must be used, to begin with, because waste is profoundly disrespectful. Bear bones should be burned or hung in a tree out in the woods. There are rules for using hides: bear skins should never be stepped on or over by women and are often disposed of in the woods to prevent all female contact. Another set of rules pertain to a 'bear party' which is similar to a funeral and must be held by men, outside the village, whenever these animals are taken. Bear meat should be safely cached for several days or weeks so that it is fully and completely dead before being brought to a settlement (living things die slowly, not at the moment when normal life processes stop). Killed bears should never be dragged over the ground, or pulled from dens with snowmachines. (Nelson et al. 1982:260)

Spirit vengeance can be severe. For relatively minor offenses, bears become aloof or somehow invisible to the hunter. One man did not kill a single bear for 12 years following an infraction, another hunted unsuccessfully for 20 years. Still another man who kicked a bear neck across the floor and spoke badly of the animal was mauled to death soon afterward. (Nelson et al. 1982:260-261)

Taboos are often tested individually to see if they must be followed, although this is usually limited to the less spiritually powerful animals. Six men who were bear hunting together decided to test the taboo on eating a certain part of the bear's stomach. Elders warned that if young men ate this organ their moccasins would be slippery as they trekked through the woods in search of dens. Three young men ate the tabooed part, and three abstained. Next day the three violators had a terrible time, slipping and falling repeatedly, while the others had no trouble at all. Seeing that the taboo was right, they carefully followed it thereafter. (Nelson et al. 1982:263)

Implements such as sleds, fishnets, rifles, or snowshoes are also infused with luck. A man lamented to me the troubles he had with one of his rifles, saying that it would shoot a bear coming out of a den, at point blank range, but it only made a wound despite his high caliber rating. Another gun had to be used to make the kill. None of these problems were caused by malfunctioning, he explained, the gun was simply 'out of luck.' He said he suspected a young woman had stepped over it, rendering it useless. (Nelson et al. 1982:265)

Koyukuk people also know the landscape through a profusion of names. Some of these names are used primarily for location, as we use street signs. Others have special meanings derived from personal or traditional history. Hundreds of bear dens, for example, are known throughout Koyukon country, and many of these have special names. All of the dens that have been known for some time have personal associations, and when hunters stop to check them each fall, they often recall past experiences there. Some of these stories go back even to previous generations, and so the dens have become much more than just hunting places. (Nelson et al. 1982:299)

The first 3 or 4 feet of the intestines [of black bears or brown bears] are discarded, and the rest is turned inside-out so the fat is inside, then it is placed on a fire to roast. The result is a sausage-like delicacy. Only hibernating bears are used this way, because their intestines are empty. (Nelson et al. 1982:350)

Osgood, C. 1959. Ingalik mental culture. Yale University Department of Anthropology, New Haven.

The Man Who Slept in a Bear Hole: Once a man went out in the fall just before the first snow to hunt for a bear. The weather was cold. He found a bear hole at last, killing the bear and skinning it. Then because it was too cold he crawled into the bear hole which seemed like a nice place to stay overnight. He piled grass over the opening to keep out the air and went to sleep. When he woke up from time to time, he turned over. At last he woke up, but he felt strange. The flesh of his face was drawn tightly over his cheekbones. He listened a moment and could hear flies at the door. It was spring. 'Did I sleep all winter?' he asked himself. Then he went out. He found the remnants of his bear meat with flies all over it. He felt very weak and it took him a long time to walk home. The people were surprised to see him. They had hunted for him all winter.

Someone asked, 'Didn't your father tell you not to sleep in a bear hole?' That is why people do not go into bear holes. (Osgood 1959:146)

Osgood, C. 1971. *The Han Indians: A compilation of ethnographic and historical data on the Alaska-Yukon boundary area.* Yale University Department of Anthropology, New Haven.

Schmitter (1910:10) writes of the Han: 'One of their most useful weapons, the spear, was made by binding a hunting knife of caribou-horn to the end of a pole about 6 feet long.' This is an almost identical description of the lance described by Jones (1872:323). Jonathan Wood at Moosehide spoke of a very similar weapon which he called a *t'at*, and said that it consisted of a birch pole five to six feet long, and of a convenient diameter to hold. At one end was a point made of caribou horn which he guessed to be about eight inches long, but he was not sure. This implement served to attack a bear that had been aroused from its den. Walter also knew of such a lance.

Then he [Wilson in Schwatka 1900] says of the Han of Eagle: 'In Winter these Indians leave the river and scatter out in different directions in quest of game, principally moose and caribou, which, in reality, provide them with their only food. Besides these, however, great numbers of bears are found, particularly the black variety; also deer, mountain sheep, and rabbits. (Osgood 1971:103)

Black bears, their brown variation, and grizzlies are reported to have been killed and eaten in the Han area. Schmitter (1910:8) provides a clear account of the classic Athapaskan technique of killing bears with a lance. 'A pike or spear is nearly always used in hunting bears. The hunter attracts the bear by making a raven-like noise, causing the bear, as the Indians say, to think the raven has discovered a dead moose. They also further explain that the big bears only would come, as the little bears would not know what the croaking meant. As the bear approaches the Indian holds the spear in position, facing the bear as it draws near to him, and as the bear springs the Indian sticks the spear into its throat at the top of the breast-bone, at the same time shoving the handle of the pole into the ground, thus causing the bear to spear himself with his own weight. Sometimes three men hunt in this manner, two of them attacking the bear on either side as it rushed forward. The meat of the young bear killed in the fall, when they feed on huckleberries, is considered a great luxury'. (Osgood 1971:110 citing Schmitter 1910:8)

VanStone, J. W. 1979. *Ingalik contact ecology: an ethnohistory of the lower-middle Yukon, 1790-1935.* Field Museum of Natural History, Fieldiana, Anthropology, Chicago.

[With respect to the Anvik-Shageluk area of Unit 21] Black bears were taken in snares or with deadfalls during the summer. (VanStone 1979:28)

Special Publication No. BOG 2008-08

**Customary and Traditional Use Worksheet,
Black Bears, Game Management Unit 25**

Prepared by

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for the November 2008 Juneau Board of Game meeting

November 2008

Alaska Department of Fish and Game

Division of Subsistence



Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the *Système International d'Unités* (SI), are used without definition in the following reports by the Division of Subsistence. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)		General		Measures (fisheries)	
centimeter	cm	Alaska Department of Fish and Game	ADF&G	fork length	FL
deciliter	dL	Alaska Administrative Code	AAC	mid-eye-to-fork	MEF
gram	g	all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	mid-eye-to-tail-fork	METF
hectare	ha	all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.	standard length	SL
kilogram	kg			total length	TL
kilometer	km			Mathematics, statistics	
liter	L			all standard mathematical signs, symbols and abbreviations	
meter	m			alternate hypothesis	H _A
milliliter	mL			base of natural logarithm	e
millimeter	mm			catch per unit effort	CPUE
				coefficient of variation	CV
Weights and measures (English)		at	@	common test statistics	(F, t, χ^2 , etc.)
cubic feet per second	ft ³ /s	compass directions:		confidence interval	CI
foot	ft	east	E	correlation coefficient (multiple)	R
gallon	gal	north	N	correlation coefficient (simple)	r
inch	in	south	S	covariance	cov
nautical mile	nmi	west	W	degree (angular)	°
ounce	oz	copyright	©	degrees of freedom	df
pound	lb	corporate suffixes:		expected value	E
quart	qt	Company	Co.	greater than	>
yard	yd	Corporation	Corp.	greater than or equal to	≥
		Incorporated	Inc.	harvest per unit effort	HPUE
		Limited	Ltd.	less than	<
Time and temperature		District of Columbia	D.C.	less than or equal to	≤
day	d	et alii (and others)	et al.	logarithm (natural)	ln
degrees Celsius	°C	et cetera (and so forth)	etc.	logarithm (base 10)	log
degrees Fahrenheit	°F	exempli gratia	e.g.	logarithm (specify base)	log ₂ , etc.
degrees kelvin	K	(for example)		minute (angular)	'
hour	h	Federal Information Code	FIC	not significant	NS
minute	min	id est (that is)	i.e.	null hypothesis	H ₀
second	s	latitude or longitude	lat. or long.	percent	%
		monetary symbols (U.S.)	\$, ¢	probability	P
Physics and chemistry		months (tables and figures): first three letters	Jan., ..., Dec.	probability of a type I error (rejection of the null hypothesis when true)	α
all atomic symbols		registered trademark	®	probability of a type II error (acceptance of the null hypothesis when false)	β
alternating current	AC	trademark	™	second (angular)	"
ampere	A	United States (adjective)	U.S.	standard deviation	SD
calorie	cal	United States of America (noun)	USA	standard error	SE
direct current	DC	U.S.C.	United States Code	variance	Var
hertz	Hz	U.S. state	use two-letter abbreviations (e.g., AK, WA)	population sample	var
horsepower	hp				
hydrogen ion activity (negative log of)	pH				
parts per million	ppm				
parts per thousand	ppt, ‰				
volts	V				
watts	W				

SPECIAL PUBLICATION NO. BOG 2008-08

**CUSTOMARY AND TRADITIONAL USE WORKSHEET, BLACK BEARS,
GAME MANAGEMENT UNIT 25**

by

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November 2008

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This document should be cited as:

Simon, J. J. 2008. Customary and traditional use worksheet, black bears, Game Management Unit 25. Alaska Department of Fish and Game Division of Subsistence Special Publication No. BOG 2008-08, Fairbanks.

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INTRODUCTION

BACKGROUND

The Alaska Board of Game made a positive customary and traditional use finding for black bears *Ursus americanus* in Game Management Unit (GMU) 25 on March 17, 2002, and established an amount reasonably necessary for subsistence of 150 to 250 black bears pursuant to Alaska Statute 16.05.258 (Subsistence use and allocation of fish and game) and Alaska regulation 5 AAC 99.010 (Boards of fisheries and game subsistence procedures)(Alaska Board of Game 2002).¹

At its March 2008 Interior Region regulatory meeting, the Alaska Board of Game requested that the ADF&G Division of Subsistence provide more detail on the customary and traditional uses of black bears in Unit 25, specifically with reference to methods and means of black bear harvests in Unit 25 (Criterion 3, 5 AAC 99.010(b)(3)). The additional information was requested so as to better evaluate a deferred proposal submitted by the Yukon Flats Fish and Game Advisory Committee and the Council of Athabaskan Tribal Governments to recognize in regulation customary and traditional harvest practices of black bear.

This revised customary and traditional use summary for black bears in Unit 25 provides an expanded description of customary and traditional harvest and use practices for black bears from the ethnographic and ethnohistorical literature of this region of Interior Alaska. Appendix A is included at the end of this report to provide pertinent quotations related to customary and traditional uses of black bears from the literature.

THE EIGHT CRITERIA

CRITERION 1: LENGTH AND CONSISTENCY OF USE

A long-term consistent pattern of noncommercial taking, use, and reliance on the fish stock or game population that has been established over a reasonable period of time of not less than one generation, excluding interruption by circumstances beyond the user's control, such as unavailability of the fish or game caused by migratory patterns.

Black bears have been a valued source of food and fur in Interior Alaska from the prehistoric period to the present (Hosley 1981; Osgood 1970). Among Gwich'in² Athabascans residing in the Upper Yukon-Porcupine river area of Alaska (GMU 25), various longstanding cultural traditions and beliefs surrounding the proper use and treatment of harvested bears speak to the length and consistency of black bear use (Caulfield 1983; Cruikshank 1986; Nelson 1973; Peter 1981; Slobodin 1981). Historical sources from the early contact period in the 19th century mention the use of bears by residents of the region (Schwatka 1900). Today, black bears continue to be an important commonly harvested subsistence resource in all Yukon Flats communities, except in Arctic Village, where they are rarely found (e.g., Hadleigh-West

¹ In 2002, the Alaska Board of Game established an amount reasonably necessary for subsistence uses by taking the average number of black bears harvested per capita from Division of Subsistence studies in Beaver, Fort Yukon, and Stevens Village (0.155 black bears per person) and multiplying this by the total human population of the Yukon Flats, minus Arctic Village, and then bracketing the point estimate of 203 black bears by 25%, which resulted in 152 to 254 black bears (Alaska Board of Game 2002).

² "Gwich'in" is now the commonly-accepted spelling, replacing "Kutchin."

1963:140-141). Division of Subsistence studies show that it is not uncommon for 30% to 40% of the households in Yukon Flats communities to be involved in the harvesting of black bears (Table 1; see also the ADF&G Community Subsistence Information System (CSIS)³; Sumida 1988; Sumida 1989; Sumida and Andersen 1990).

CRITERION 2: SEASONALITY

A pattern of taking or use recurring in specific seasons of each year.

In GMU 25, black bears are hunted primarily in the spring, fall, and early winter (e.g., Caulfield 1983; Nelson 1973; Nelson et al. 1982; Sumida 1988; Sumida 1989; Sumida and Andersen 1990). "Although bear hunting significantly declines after mid-winter, it does not cease entirely. When traveling overland via snowshoes, dog team, or snowmachine, a Native hunter is always alert to signs of possible bear dens" (Nelson et al. 1982:48). In areas within or near black bear habitat, black bear hunting continues after bears begin to emerge from their dens in April and extends through May. They are a notable resource in this area, often being the only large animal available at a time when winter food stores have been depleted and fresh meat is welcome.

In the fall, from late August through October, black bears are hunted in conjunction with or incidental to moose and caribou. Snaring of black bears was a particularly useful method of harvest during the fall (Nelson et al. 1982:44). The quality of black bear flesh is often mentioned as a factor in the timing of the harvest. Black bears "retire to their dens by late September, but remain fat and tasty through the winter" (Nelson 1973:116). Immediately after emerging from dens in the spring, black bears have some fat for a short period of time. The flesh of black bears is considered best in the fall and early winter, when they have been feeding primarily on berries and when they have built up a thick layer of fat in preparation for the winter hibernation. Den hunting, or "denning," of black bears is still practiced; using this method, the harvest of bears continues through the winter (Caulfield 1983; Nelson 1973:115-116; Nelson et al. 1982:48; Sumida 1988; Sumida 1989; Sumida and Andersen 1990).

CRITERION 3: MEANS AND METHODS OF HARVEST

A pattern of taking or use consisting of methods and means of harvest that are characterized by efficiency and economy of effort and cost.

Traditional and historical methods of taking black bears include the use of spears, lances, bow and arrows, clubs, deadfalls, snares⁴ along trails, snares in trees, rifles, and the use of nooses to take swimming bears from boats (Hadleigh-West 1959; McKennan 1965:32-34; Nelson 1973; Osgood 1970; VanStone 1974). Dogs were sometimes used to track bears or locate dens (McKennan 1959:49). Bears were also called by imitating the call of a raven (e.g., McKennan 1965:33). Today, bears are commonly taken with large-caliber rifles or sometimes with snares (Nelson 1973).

Black bears are either specifically sought or harvested in conjunction with other harvesting activities (e.g., moose or caribou hunting, duck hunting in the spring). After the spring breakup, bears found along the edge of a river near muskrat camps are often taken from boats, or while spring waterfowl hunting, during open-water seasons near fish camps, during fall moose hunts,

³ www.subsistence.adfg.state.ak.us/CSIS

⁴ Black bear snaring in Interior Alaska is well-documented in the ethnohistorical literature (e.g., Nelson 1973:116-117; Nelson et al. 1982:44; see also McKennan 1965:33; Sumida 1988:141; Sumida and Andersen 1990).

and during wood cutting (e.g., Caulfield 1983:69; Nelson 1973:122,123; Nelson et al. 1982:48). Hunters typically access hunting areas by boat, all-terrain vehicle (ATV), snowmachine, or on foot. Formerly, snowshoes and dog teams were common means of access.

Black bears are also harvested by taking bears from the den⁵. Known denning sites are checked for signs of occupancy in the late fall and early winter. Many hunters know from the size of the den and signs around it if the occupant is a single animal or a female with cubs, but "to find a den obligates the hunter to harvest its occupants" (Nelson et al. 1982:48).

From time to time, one may discover a den occupied by a sow bear and one or two yearling cubs. These cubs are often two-thirds the size of a full adult. It is the obligation of the hunter to take all occupants of a den. If the bears did not wish to be taken they would not have revealed themselves, and to not take them would be an act of disrespect. (Nelson et al. 1982:47)

Once an occupied den is located, the bear is either shot through a hole in the top of the den or through the entrance. Sometimes the bear is disturbed and then shot as it exits the den. Occasionally, the entrance is blocked so as to slow the exit of the bear (e.g., McKennan 1959:49). Bears taken in dens are typically butchered away from the den site to maintain the productivity of the den and to ensure its use by bears the following year (Nelson 1973; Sumida 1988:141-142; Sumida 1989).

Black bears are also harvested by using snares⁶, which is typically done during the fall "when they are fat and seem to wander along well-defined trails" (Nelson 1973:116-117). Specific bear snaring techniques are discussed at length in Nelson (1973:116-117) and Nelson et al. (1982:44). For example, one technique involves placing the snare in a tall, straight spruce tree near a well-traveled black bear trail. The tree is stripped of branches on one side up to a height of approximately 12 feet. A basket of fish is hung on a branch just above the trimmed area and the rawhide line of the snare forms a noose approximately 18 inches in diameter and approximately 9 feet above the ground.

A bear smelling the fish and seeing the basket hung in the tree would climb up the trimmed area, pushing his head through the willow loop and its supported rawhide noose. As it descended, the noose, tied with a special non-slip knot, would tighten and kill it. Bear snares were set in the latter part of August and were checked each day by the owner. (Nelson et al. 1982:44)

Black bears are often attracted to fish camps during the summer months when fish are being processed and stored. In major fishing areas, fish scraps are sometimes placed on sand bars away from the fish cutting site in an effort to divert bears away from the processing area. Occasionally, these bears are intentionally taken, although such bears are considered less desirable for human consumption due to the flavor of the meat during that time of year. Nuisance bears found near villages or fish camps are shot or snared as a safety measure (e.g., Nelson 1973; Sumida 1988:141; Sumida 1989).

⁵ Brown bears were also harvested from dens in times past (Case and Halpin 1990:84,87; Hadleigh-West 1963:140-141,143; McKennan 1965:144-145).

⁶ Hadleigh-West (Hadleigh-West 1963:162) observed that black bears were rarely present and therefore seldom used by the Netsi Gwich'in of the Arctic Village area, but did point out that snares were used to harvest bears, presumably referring to brown bears.

CRITERION 4: GEOGRAPHIC AREAS

The area in which the noncommercial, long-term, and consistent pattern of taking, use, and reliance upon the fish stock and game population has been established.

Community use areas for black bears tend to fall into 2 categories: 1) specific near-community areas where black bear hunting is known to be productive at specific times of the year; and 2) river corridor areas where fishing and moose hunting activities take place and black bears are hunted in conjunction with or incidental to these other activities. Residents familiar with the use of black bears report that they have caught black bears in regularly-hunted areas as long as elders in their communities can recall and can recount stories of uses by previous generations. Hunting areas for black bears have been mapped for many individual communities (e.g., Caulfield 1983; Sumida 1988; Sumida 1989; Sumida and Andersen 1990).

CRITERION 5: MEANS OF HANDLING, PREPARING, PRESERVING, AND STORING

A means of handling, preparing, preserving, and storing fish or game that has been traditionally used by past generations, but not excluding recent technological advances where appropriate.

Black bears provide an important source of meat, fat, and fur. Depending on particular customs, bear meat is eaten in the household, in the context of community gatherings, or in special celebrations.

Black bears are commonly butchered in the field and processed like other large game. The meat is shared with relatives, especially if fresh meat has been scarce. The meat is frozen, smoked, or canned for later use. The meat is also made into dry-meat by cutting thin strips of meat and allowing it to air dry. Bear meat is typically prepared by boiling, frying, broiling, barbecuing, or roasting. Black bear fat is highly valued, and is often rendered into bear grease or tallow. The grease is then used for cooking and making "Native ice cream" (a mixture of berries, sugar, fat, and sometimes dried fish). Bear fat is also eaten with dried meat or dried fish. The fat is often shared with other households, especially elders.

Some sources report patterns of butchering and sharing that depend upon the number in the hunting party, the hunter who made the kill, and the age of the hunters. The choicest parts, such as the hindquarters or organs (heart, kidneys, and intestines), are often given to elders.

The first 3 or 4 feet of the intestines [of black or brown bears *Ursus arctos*] are discarded, and the rest is turned inside-out so the fat is inside, then it is placed on a fire to roast. The result is a sausage-like delicacy. Only hibernating bears are used this way, because their intestines are empty. (Nelson et al. 1982:350)

If the meat has to be transported some distance, or if return to the village is not imminent, the meat may be dried in the field in order to decrease its weight and prevent spoilage.

According to custom, the man who actually kills a bear retains very little of the meat for himself, perhaps only a forearm or hindquarter. The ribs, fat, and other choice cuts are usually frozen and preserved for village potlatches. It is particularly important to have large quantities of bear meat for memorial potlatches. (Nelson et al. 1982:47-48)

Bear skins are sometimes used for ruffs, mukluks, mittens, and camp or cabin bedding. The furs are also used as insulation around doors (cf. Nelson 1973). Black bears are considered to have the most waterproof skins (Sumida 1988; Sumida 1989).

CRITERION 6: INTERGENERATIONAL TRANSMISSION OF KNOWLEDGE, SKILLS, VALUES, AND LORE

A pattern of taking or use that includes the handing down of knowledge of fishing or hunting skills, values, and lore from generation to generation.

Gwich'in Athabascan tradition attributed great spiritual power to bears; there is an elaborate set of beliefs and values surrounding their harvest and use (Caulfield 1983; Cruikshank 1986; McKennan 1965:84,144-145; Mishler 1995; Nelson 1973; Peter 1981). For example, residents in some villages follow rules that prescribe who may eat bear meat, what portions may be eaten, how it is prepared, what should be done with the inedible parts such as the claws and skull, and proper ways of referring to or speaking about bears (Nelson 1973).

As with many subsistence activities, teaching young men how to track, hunt, and butcher black bears, and young women how to process and preserve bear meat and handle its products, is accomplished through participation in these activities under the oversight of those more experienced. Children are included in many activities and are expected to show interest and eventually participate in the activities, depending upon their age and acquired skills. Most hunting is done in family-based groups, so that the learning and proficiency of younger participants can be monitored.

CRITERION 7: DISTRIBUTION AND EXCHANGE

A pattern of taking, use, and reliance where the harvest effort or products of that harvest are distributed or shared, including customary trade, barter, and gift-giving.

Typically, black bear meat is widely shared within hunting parties, families, communities, and even between communities. Often, a small number of select hunters are involved in the hunting of bears and provide bear meat to a large portion of the households in the community. Bear fat is highly prized and commonly shared between households.

Certain prized black bear parts, such as the hindquarters, the organ meats, and the fat, are often given to elders. Bear meat is often considered a specialty food and served at special communal gatherings and ceremonial potlatches (e.g., Nelson et al. 1982:47-48). Traditional beliefs in some Interior regions restrict the eating of bear meat to men and elderly women. These beliefs tend to limit or structure the sharing and distribution practices for this resource.

CRITERION 8: DIVERSITY OF RESOURCES IN AN AREA; ECONOMIC, CULTURAL, SOCIAL, AND NUTRITIONAL ELEMENTS

A pattern that includes taking, use, and reliance for subsistence purposes upon a wide variety of fish and game resources and that provides substantial economic, cultural, social, and nutritional elements of the subsistence way of life.

Black bears are just one of the many wild resources that are typically harvested for subsistence uses by GMU 25 residents. As large game animals that are widely distributed throughout the Interior, and that have relatively liberal hunting seasons and bag limits, black bears often

rank among the top resources harvested by hunters in terms of pounds of meat per household. Other major resources harvested for subsistence in the interior include salmon *Oncorhynchus*, moose *Alces alces*, caribou *Rangifer tarandus*, various species of whitefishes, northern pike *Esox lucius*, burbot *Lota lota*, and a variety of small game, waterfowl, plants, and berries (see the ADF&G CSIS).

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TABLES AND FIGURES

Table 1. -- Black bear harvests, Game Management Unit 25, 1984-1987.

Community	Year	Percentage of households harvesting	Estimated total number harvested	Lbs per capita harvest
Beaver	1985	10	10	4
Fort Yukon	1987	31	150	7
Stevens Village	1984	40	17	19

Source ADF&G Division of Subsistence survey data.

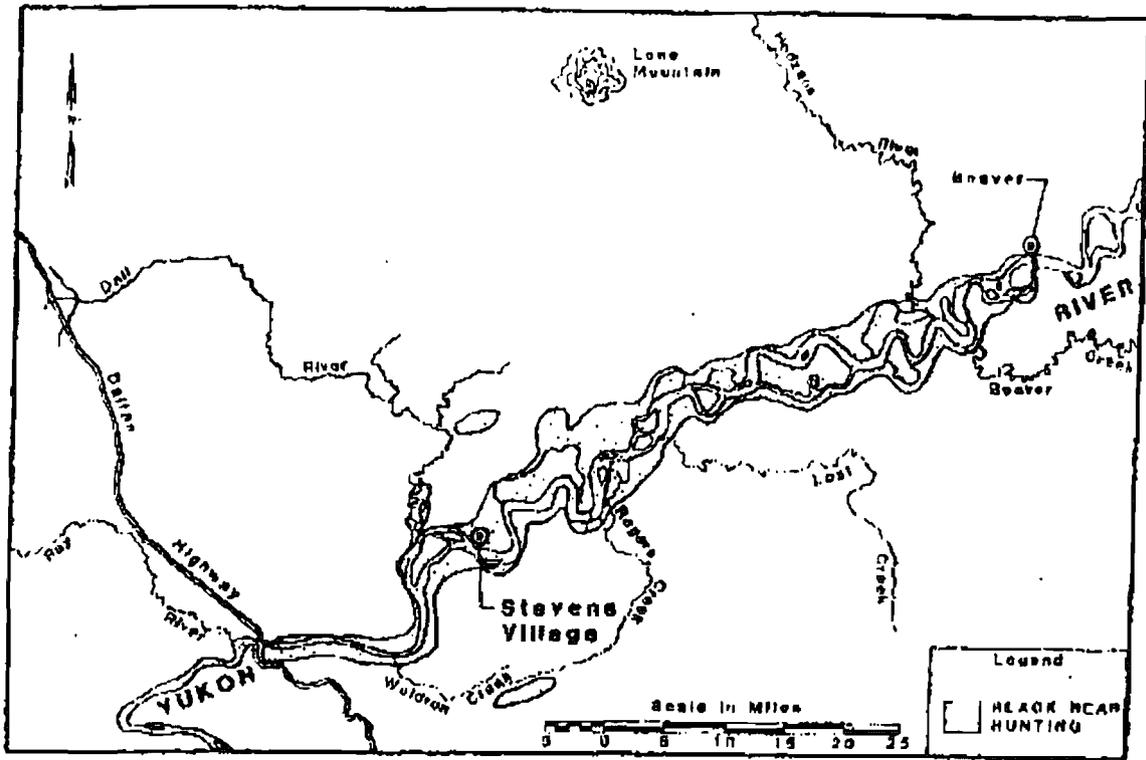


Figure 1.—Areas used by Stevens Village residents for black bear hunting, 1974-1984.

**APPENDIX A.—LITERATURE EXCERPTS PERTAINING TO
CUSTOMARY AND TRADITIONAL BLACK BEAR HUNTING
AND USE PATTERNS IN GAME MANAGEMENT UNIT 25**

Following are quotations from selected literature pertaining to customary and traditional black bear hunting and use patterns in Game Management Unit 25, Alaska.

Caulfield, R. A. 1983. Subsistence land use in Upper Yukon Porcupine communities, Alaska: Dinjii Nats'aa Nan Kak Adagwaandail. Alaska Department of Fish and Game, Division of Subsistence, Technical Paper No. 16, Fairbanks.
<http://www.subsistence.adfg.state.ak.us/TechPap/tp016.pdf>

Black bears (shoh zhraii) are utilized by all Upper Yukon-Porcupine communities except Arctic Village, where they are rarely found. Bears are common in the Yukon Flats and are a frequent sight along riverbanks and near fishcamps. Generally, the Gwich'in^[1] do not consider them dangerous, except perhaps in the spring (Caulfield 1983:69).

Hunting of black bear takes place primarily in the spring and fall. In late April and early May, bears emerge from their dens and are easily hunted because they are less shy of humans than later in the fall. The meat at this time is desirable because bears still retain some of their winter fat. Spring is particularly 'lean' time of year for human food, and bear meat can often be an important food source until waterfowl arrive. Often bears are spotted along rivers after breakup near muskrat and fishing camps. At one such camp on Beaver Creek in spring of 1980, five bears, including two cubs, were encountered by Fort Yukon residents and two adult bears were killed. Both were shot in or near the camp and the meat was used for human and dog food.

In fall, usually September, black bear meat is fat and desirable. Often bears are killed in conjunction with moose hunting along rivers. Furthermore, den hunting, described by Nelson (1973:118-122), is still occasionally undertaken today. Bear meat is generally frozen or used fresh. It is usually boiled or fried, but in either case it must be fat to be considered suitable for human consumption. Hides are sometimes sold or are used for insulation around doors (Caulfield 1983:69)

Hosley, E. H. 1981. Environment and culture in the Alaska Plateau. Pages 533-545 in Sturtevant, W. C., editor. Handbook of the North American Indians, volume 6: Subarctic. Smithsonian Institution, Washington, D.C.

[With respect to the Athabascan Indians of the Alaska Plateau region] Snares were used to take a variety of other game [other than caribou], from hares to grizzly bears and Dall sheep. In its several variations – spring pole, tossing pole, and tether snares – the snare was one of the most sophisticated and widely applied hunting devices of the Alaskan Athapaskans. Deadfalls and the bow...were also used to take a variety of animals, and the lance or spear...was widely used to kill denned bears and to stab moose and caribou from a canoe...as they crossed lakes or streams. (Hosley 1981:535)

^[1] "Gwich'in" is the more recent spelling of the Athabascan people of the Yukon Flats. Given the historical nature of the literature, readers will see that "Kutchin" was more commonly used in the past.

McKenna, R. A. 1959. The Upper Tanana Indians. Yale University Department of Anthropology, New Haven.

Bears were formerly hunted much more than they are today. The combat was largely a hand-to-hand one, and the killing of a bear brought great honor to the hunter. In the summer the animals were brought to bay, often with the aid of dogs, and dispatched by spears; and the Indians maintain that the bravest hunters sometimes killed them with heavy clubs of caribou horn (cf. Weapons). Such hand-to-hand encounters were accepted methods of acquiring prestige among a number of the western tribes, including the Han (Schmitter 1910:8), Peel River Kutchin (Osgood 1936b:27), Ten'a [Koyukon-speaking people] (Jette 1909:482); Ingalik [Deg Hi'tan, or Deg Xinag-speaking people of Unit 21E] (Osgood 1940:200,207), Tanaina (Osgood 1937:32-33), Eyak (Birket-Smith and de Laguna 1938:100), and Tahtan (Emmons 1911:72). (McKenna 1959:49)

A bear is sometimes lured to his death by the hunter's imitating the call of the raven. The bear responds thinking that some carrion is near and is promptly shot. In the winter, bears are poked from their dens and shot as they emerge. In the old days another interesting method was used when a bear was roused from his winter den. As he broke out through the snow two strong men would pinch him between two poles, and while they held him the other hunters would dispatch him with clubs or spears. This unusual device was also used by the Chipewyan (Birket-Smith 1930:24). (McKenna 1959:49)

Mishler, C., and W. E. Simeone, editors. 2006. Tanana and Chandalar: The Alaska field journals of Robert A. McKenna. University of Alaska Press, Fairbanks.

Old Joseph...reports killing a monstrous silver tip 'as big-as a moose.' He poked it out of its winter den and then shot it. The bear pretty nearly got Joseph and was only about ten feet from him when it finally went down. I [Robert A. McKenna] saw the skin and it was a monster. (Mishler and Simeone 2006:100)

Nelson, R. K. 1973. Hunters of the northern forest: Designs for survival among the Alaskan Kutchin. University of Chicago Press, Chicago.

Bears are of course seasonal animals, hibernating for several months during the winter. Even during the seasons when they are active and therefore readily hunted there are only certain periods when the Kutchin consider them fit for eating. Black bears are hunted especially during the fall, when they build up their thickest fat. They retire to their dens by late September, but remain fat and tasty through the winter. After they emerge from their dens between mid-April and early May, food is scarce and they become lean. By June they are thin, and the Indians do not hunt them. (Nelson 1973:115-116)

[With respect to bear snaring] It takes little more than the thought of facing a bear at close range with a bow and arrow or spear to make one understand why snares were an important method for killing these animals in aboriginal times. Snares were highly effective and required almost no risk to the hunter. Today's adult Kutchin are all familiar with bear snaring techniques, but if they still catch bears this way they do not consider it a matter of public information. The best time for snaring bears is during the fall, when they are fat and seem to wander along well-defined trails. They could be

snared during the spring as well, but no one ever mentioned doing this. (Nelson 1973:116-117)

The aboriginal Kutchin made their snares from braided strands of babiche, but in recent times 1/8-inch or 1/4-inch aviation cable was found to be more effective. A homemade cable snare works well unless the bear does not pull it tight and is able to slip it off with its claws. Commercial snares are provided with one-way choking locks and cannot be removed. The human scent is eliminated from a cable snare by boiling it with willow bark or by rubbing it with the tips of spruce boughs.

The bear snare is usually set in a trail, either a man-made trail intended for winter travel or a natural game trail. It is generally placed where a constriction is created by bushes or trees, so that the snare fills the whole trail, so that the bear is forced to go underneath. A snare set under a log is very effective, and is easily tethered to the log itself. Instead of using a fixed toggle or anchorage, a bear snare is attached to a flexible young tree, to a sizable log, or to a log placed between the crotches of two trees on opposite sides of the trail. In the last case the anchor is a crosspiece which cannot be dragged off, but the bear may simply chew the log in half and escape. The loose log toggle is dragged away into the brush until the bear finally chokes itself. Many a snare has been broken, however, leaving the bear with a snare collar as a memento of this escape.

A typical snare set for black or grizzly bear would be made along the lines described earlier for moose snares. After finding a suitable place on a trail and selecting a fixed or loose toggle, the Indian tethers his snare so that it hangs in the middle of the pathway. It is opened to a loop varying from 20 to 24 inches in diameter, with its bottom edge 24 to 30 inches above the ground. The cable snare is held open by tying it in several places to slender sticks pushed in the ground beside it. Short pieces of grass or thread are used to make the ties. (Nelson 1973:117)

The trail is usually wider than the snare's loop, and so a few sticks 4 or 5 feet long are set up on either side of it to block the way around. One or more sticks are also pushed into the ground right under the snare, reaching almost to its lower edge, to keep the animal from going under it. (Nelson 1973:117)

[With respect to den hunting] Black bears spend approximately seven months of the year hibernating, and grizzlies occupy their dens for four to five months. It is not surprising that over the centuries northern Athapaskans have amassed great knowledge of the bears' denning habits and have developed effective methods of hunting them in their winter quarters. Northern Athapaskans are masters of den hunting, just as they are expert hunters of moose. The Koyukon Indians point out that these are the two skills in which they surpass their neighbors, the Kobuk Eskimos.

Den hunting must have been very important in the aboriginal past, when it afforded an easy means of killing bears with only a spear or bow and arrow. Rifles have replaced traditional methods, but den hunting is still important. This is especially true among the Koyukon, who live in a country rich in bears. They are highly skilled in den-hunting techniques and enjoy bear meat so much that they put considerable effort into the early winter hunts. Den-killed bears are the fattest and best tasting of all; so it is little wonder that the people want them.

As was noted earlier, black bears go into their dens by late September. The date is variable, depending on the weather. They start working on the dens sometime in September, and occupy them intermittently until really cold weather signals the time for uninterrupted hibernation. Grizzly bears enter their dens much later, in November or December, and may become active during midwinter warm spells. They seem to take hibernation much less seriously than do black bears.

The Koyukon and Kutchin Athapaskans often find bear dens by accident, stumbling onto them when they are traveling through the brush at any time of the year. Once they have discovered a den they check it each fall. The Koyukon usually consider each den a sort of property, 'owned' by the man who discovered it or learned of it from his father. Thus people speak of 'Sam's den,' 'Henry's den,' and so on (G. R. Bane, personal communication). The Chalkyitsik Kutchin do not formalize ownership in this way. Each hunter knows the location of many dens, and they are hunted on a first-come, first-served basis. The only kind of 'ownership' here is established by men who find dens and keep their locations secret, thus ensuring themselves a private potential resource. (Nelson 1973:118)

Each fall or early winter a hunter is likely to go out and check the dens he 'owns' or knows about to see if any are occupied. There are several ways to find previously undiscovered dens or to pinpoint known dens once their general location has been ascertained. In the early fall, when bears have selected a hibernating site but are still active, they will remain in the immediate area digging up the moss and dirt searching for roots. When an Indian comes across this kind of sign in September, he knows that a bear is probably going to hibernate in that area. This is the best indicator that a denning site is nearby, but of course much searching may be required to find the site itself.

Black bears like to make their dens in places where they get some help from nature. Most dens are under partly overturned trees, whose roots have lifted the earth and moss to create a bear-sized cavern underneath. They also like to dig dens in banks, such as along a steep-sided creek bed. Another good place for denning is a sandy knoll or ridge, where caverns are easily dug out. In general, holes beneath upturned spruce trees seem the most likely den sites, and these are perhaps the easiest kind to locate. One such den that I saw was about 5 feet long, 4 feet wide, and 2 ½ feet high.

A black bear prepares its den by gathering moss and grass from the surrounding areas and lining the interior with it. The entrance will be plugged with the same material later on. Thus, if a hunter comes across a place where the moss and grass are freshly dug up and scraped away it is a sure sign that a bear den is nearby. If such a place is discovered before snow falls the bear is likely to be away foraging, and so the hunter remembers its location and returns later. When snow covers the ground, dens are much harder to find. A small hole usually remains open in the snow above a den, however, and heavy frost covers the surface and any vegetation around its opening. The frost is formed by condensation from the bear's moist breath. (Nelson 1973:119)

Sometimes very special knowledge and alertness leads to the discovery of a bear den. For example, Simon Edwards of Huslia once came upon a set of tracks from a running fox. He followed them a short distance and found a place where the fox had sat down for a while, looking back over its trail. Simon wondered what had frightened it, and why

it sat watching back the way it had come, so he followed the trail the opposite way. He found shortly that the fox had encountered a bear den and was frightened away by its occupant. Simon got the bear. (Nelson 1973:119-120)

Another time this same man was walking along on snowshoes and came to a place where a marten track crossed the trail. Thinking he might find the marten in a burrow, he sidetracked and followed it. At one point he noticed that the animal had dug into the snow before moving on, and next to the hole he found a single blade of grass the marten had pulled up onto the snow. The grass was a kind that bears use for bedding in their dens, and so he poked around further and discovered that the marten had dug right into an occupied bear den. The reward for his effort was fat black bear. (Nelson 1973:120)

The Koyukon and Kutchin use different techniques for bear den hunting. The following account of the Koyukon method is based largely on information supplied by G. R. Bane, who has lived among these people for several years.

Having located a denning site, the Koyukon hunter first needs to learn it if is occupied or empty. He finds a long stick which he can shove into the den's opening. It should be curved because bear holes have a tendency to go down, then turn off to one side. He pokes around inside until the stick touches the bear, disturbing it enough so its movement can be felt. If the hunter is not sure, he holds the stick against what he thinks is the bear and its breathing will move the stick back and forth. Listening closely, the hunter may also hear the animal's breathing. Once he has ascertained that a bear is inside, the Indian puts his stick to another use. He takes note of the exact direction the passageway runs, and just how far in the stick goes before it touches the bear. Then he pulls it out and lays it on the ground or snow. Its end should mark a point right above the animal.

After he knows the bear's location, the hunter finds several large poles or logs and plugs the entrance with them. These may be tied securely in place to be sure that the animal cannot escape. This done, he uses his ax to chop into the roof of the den so he will have an opening through which to shoot. This can be quite a job, since he wants an opening about 6 inches in diameter and may have to chop through 2 feet of frozen ground. If it is too dark in the den, he can toss a handful of snow on the bear so that a white dusting makes it clearly visible. Once he sees it well, the Indian shoots it in the head. In former times he would kill it with a spear. After a bear is killed in its den, a rope is used to pull it up through the entrance. (Nelson 1973:120-121)

The Black River Kutchin use a simpler but more dangerous method of killing bears in their winter dens. Once they are certain a bear is inside, they start poking and jabbing at it with a long stick. Eventually the animal becomes unsettled enough to come out after whatever is tormenting it. When it starts moving up the entryway the hunters stand ready with their rifles. Black bears come out slowly and are either shot in the head when they first emerge or shot in the heart after they get about halfway out.

This method is much simpler than the Koyukon technique. It requires less physical labor, since there are no holes to chop and the dead bear does not have to be dragged out of the hole. And the method can be used when a den is dug into a bank, where there is no way to chop down into it. It does involve a somewhat greater risk, but so long as the animal is a black bear the Kutchin feel that there is no danger. Herbert John said he

once knelt on top of a den and killed the emerging bear with his knife. (Nelson 1973:121)

Grizzly bears can be killed by driving them from their winter quarters, but the Indians treat them in a different way. Whereas a black bear comes out slowly, not looking for a fight, the grizzly angrily charges out, trying to get anyone it can. The Kutchin say that grizzlies do not really hibernate; 'Maybe he don't even go to sleep in there.' Thus if a grizzly den is found, the hunter must expect trouble unless he decides to be prudent and leave it alone. One of the first things a Kutchin will do upon locating a den, therefore, is decide whether it belongs to a black bear or a grizzly bear.

Black bear dens have fairly small openings, about 2 feet high and 3 feet wide, whereas grizzly dens are higher and wider by about a foot. There is also a tendency for the black bear to plug the opening of its quarters, or at least narrow its size considerably, whereas grizzly bears leave the opening wide enough to move in and out. A grizzly is also likely to growl when anyone walks near its hole, which black bears apparently never do. (Nelson 1973:121)

The Chalkyitsik Kutchin say that it is often unnecessary to coax a grizzly from its den, because the animal may charge out before a hunter has a chance to do anything. Otherwise, a grizzly would be hunted in much the same way as a black bear. Actually, the Kutchin fear the grizzly and rarely eat its flesh, and so they seldom take the risk of hunting this animal from its den. (Nelson 1973:121-122)

[With respect to spring and summer hunting] Most bears are killed when encountered by hunters traveling overland during the early spring or going along the river in boats during the summer and fall, or when the animals appear close to an occupied camp or village. Spring is the best season for bears because they still retain some fat from the winter and they are almost completely unafraid of people. In the fall they run if they sense a man nearby.

The black bear usually leaves his hibernating place after the snow disappears in late April. If he is not well fattened when he enters his den, hunger drives him out earlier. During May and June an Indian never goes anywhere without a rifle or shotgun because he knows a bear could turn up unexpectedly. A number of black bears were sighted within 200 yards of Chalkyitsik in the spring of 1970. When the people lived in muskrat-hunting camps during the spring, they could count on frequent visits from bears attracted by the smell of meat. The Indians also know of many areas that are especially good for bears during the spring, and they sometimes go to these places to hunt for them.

Some bears run when they see a snowmachine or dog team, but others will merely stand and watch. The snowmobile hunter can stop and take a shot if he gets within range, but with a dog team things are not so simple. If there is no snow on the lakes, a hunter cruising the ice looking for bears cannot hope to stop his team once the dogs spot an animal. All he can do is let them chase the bear, then jump off the sled and try to shoot before his dogs reach it. When an Indian finds very fresh bear sign but there is not enough snow to track the animal, he may try to attract the animal by using an old technique. He conceals himself and imitates the call of a raven. If the bear is nearby it

may think a raven has discovered carrion and come straight to the sound, expecting to find a free meal. (Nelson 1973:122)

Dogs are sometimes used to run down a bear that escapes into the brush and cannot be caught in any other way. They might be released from the team after a bear is spotted, or a hunter might go out from the village on foot, taking his dogs along to help him. In the old days a man would take several dogs when he hunted, and they would course through the woods searching for a scent. When dogs catch up to a black bear it will climb a tree to escape them. Grizzlies stay on the ground and always stop to defend themselves against the biting dogs. If a hunter hears all of his dogs barking at one place, he knows they have found a bear, moose, or porcupine, and he goes quickly to get whatever game they have brought to bay. (Nelson 1973:122-123)

Bears are also hunted from boats during the open-water season. A number are usually taken during the fall moose hunt, when the Indians see them along the river. Some bears are wary enough to run when they see a boat coming, but others are unafraid. Bears are also shot by hunters traveling on the river in spring, often by duck hunters in their little canoes. (Nelson 1973:123)

The Chalkyitsik Kutchin prefer to shoot bears in the heart, perhaps because this was always the best shot with a bow and arrow. Heart shots can be very dangerous, however, because when an animal is hit in the heart it often runs a fair distance before dying. This could mean a charge at the hunter. The Eskimos and the Koyukon Athapaskans warn against shooting bears in the heart, preferring shoulder or neck shots, which instantly incapacitate the animal. They advise heart shots only if a light rifle such as a .22 is being used, when there is no chance of shattering the animal's shoulder or neck bones.

The Kutchin are aware that neck and head shots are deadly, but correctly point out that these are very small targets. If they are close to a bear, they may shoot for the neck vertebrae or the occipital condyle (where the head and neck join). But only an expert takes these shots, because if they miss the bone the animal is wounded and enraged. If a bear charges or comes straight toward a hunter, he shoots it in the chest between the forelegs, or in the head. The Kutchin prefer heavy rifles, such as .30-06 caliber, for shooting bears. Black bears can be killed with a .22 rifle, but this requires a perfect hit in the occipital condyle or heart. Shotguns afford good protection from bears if they are used a close range and are aimed for the animal's eyes, but they are not good for ordinary hunting. (Nelson 1973:123)

The Koyukon suggest that the best shot for a big bear angles from the shoulder to the hip. This gives maximum crippling potential and is likely to do considerable internal damage. Like the Eskimos, they prefer shoulder, backbone, or neck shots. They advise shooting a black bear in the ear if a .22 rifle is used. Eskimos prefer ear or heart shots with a .22, and have killed both grizzly bears and polar bears in this way.

It is difficult to understand why the Kutchin prefer heart shots over hits which are more deadly and crippling, particularly in view of the dangers involved. They never mention shoulder shots as the correct way to shoot any animal, and apparently consider them poor because they damage some of the meat. Needless to say, Kutchin hunters must always be alert for a charge, especially if they shoot a grizzly. The Indians say that if a

bear charges it is best to stand still and aim at the bear, waiting until it is close enough for a certain shot. Both the Kutchin and Koyukon warn that a wounded black bear or grizzly bear may wait in concealment for a hunter to follow, then attack when he comes along. (Nelson 1973:124)

Nelson, R. K., K. H. Mautner, and G. R. Bane. 1982. Tracks in the wildland: A portrayal of Koyukon and Nunamiut subsistence. University of Alaska Cooperative Park Studies Unit Anthropology and Historic Preservation, Fairbanks.

Before the introduction of firearms, bears were hunted and killed with spears (*pana* in Eskimo). It required a particularly brave man, armed only with a spear, to rush an adult bear and then to taunt the bear into attacking. As the bear rose up to lunge on his tormentor, the hunter planted the butt of the spear in the ground and aimed its point so that it would enter near the collar bone of the bear. As the bear fell onto the spear the hunter rolled away, hoping the bear would be unable to continue the attack. Occasionally a party of men would attack a bear, thereby increasing the chance of success. The last known killing of bear with a primitive spear in the Koyukuk Valley area occurred during the late 1800s, according to an elderly Native informant.

The Koyukuk Athabaskans of the past employed a special snaring technique for the harvesting of black bears. This technique was used primarily by men too old to participate in the more active means of taking bears. The bear snare (*gaabeelh*) consisted of a rawhide line made from bearded seal skin obtained from Kobuk Eskimos, a willow loop, and a special birch bark basket with seams overlapping in a clockwise pattern.

The snare was placed in a tall straight spruce tree near a well-traveled bear trail. All branches of the spruce tree were cut off of one side flush with the trunk to a height of approximately 12 feet. The birch bark basket full of fish was hung on a branch just above the trimmed area. The rawhide line was secured at one end around the tree trunk under the basket with the other end extending down to an elongated willow loop which held it out horizontally from the trunk. The rawhide line formed a noose of approximately 18 inches in diameter, which was supported by the willow loop. This snare was set approximately 9 feet above the ground.

A bear smelling the fish and seeing the basket hung in the tree would climb up the trimmed area, pushing his head through the willow loop and its supported rawhide noose. As it descended, the noose, tied with a special non-slip knot, would tighten and kill it. Bear snares were set in the latter part of August and were checked each day by the owner. (Nelson et al. 1982:44)

Bear hunting among the Koyukuk Athabaskans is an activity that far transcends the meeting of simple biological needs. To these people the bear is invested with particularly powerful spiritual powers and, when carried out by culturally prescribed methods, the killing, treatment, and consumption of a bear is literally a religious act. Thus it is impossible to accurately describe Koyukuk bear hunting without including supernatural beliefs and prescribed behavior.

According to Native custom, a man planning to hunt a bear must not verbalize his plans. He must also never speak in a boasting manner about his successes in such hunts or in

any way demean the bears he has killed. To do so would insult the bears and the hunter would soon lose all of his luck, possibly going for years without finding another bear. According to Koyukon belief, a bear must favor a hunter before it allows him the opportunity to kill it.

In all elements of subsistence, but particularly in bear hunting, luck plays a very large part in the eyes of the Koyukuk Athabaskans (see chapter 12). Without luck, or the proper relationship with the environment, skill is worthless in bear hunting. The bear will reveal himself only to those it favors. One man may walk right by a bear and never see it while another will easily spot it as though drawn to the spot. According to the Koyukuk Athabaskans the difference is summed up in the work 'luck'. (Nelson et al. 1982:45)

The fall bear hunt immediately after freeze-up is the high point of the male seasonal activities. Parties of several men leave the village on foot carrying packs containing their necessary camp gear. Very little food will be taken, as the hunters expect to live off the land. Light tarps are carried in place of bulky tents. The bear hunting party roams the flats and foothills, camping in particularly promising areas and spending two or three days carefully searching the local terrain for bear dens or signs of recent bear activity. (Nelson et al. 1982:45-46)

Bear dens may occur in a variety of places, but Native hunters have learned that bears tend to den on dry well-drained land. The exposed roots of large spruce, thick patches of diamond willow, and sandy banks are particularly favored by bears. As the hunters search, they watch for patches of moss that have been pulled from the earth or tall grass that has been torn away. They also look for crude nests which bears often make near a den they are excavating. All of these signs indicate that there is an occupied den in the nearby vicinity.

Over the years a great many bear dens have been discovered by Koyukuk hunters. When a man discovers a new bear hole and takes a bear from it, it becomes known as his den: that is, 'Joe's bear hole.' Other hunters usually allow the 'owner' of a known bear den the opportunity to be first to check it each fall. The locations of particularly productive bear holes are passed from father to son. As men search for bears in the fall they characteristically check all known bear dens in the vicinity. Usually, a great many old dens must be checked before one is found that is occupied.

As two or more hunters progress separately through an area, they maintain contact by occasionally striking a tree with a stick. It is forbidden to yell back and forth as this will frighten off any bears in the vicinity. The only time one should cry out is when discovering an occupied den.

Once a den is discovered, and its entrance appears to be purposely plugged up, the hunter will sometimes cut a long curving rod to poke back into its tunnel. Most den tunnels curve before the nest area is reached. When the stick strikes something soft the hunter will hold it against the obstruction and try to detect any breathing movement. If the bear is not completely asleep it may rush out of the den, in which case the hunter must be ready to quickly respond and shoot it. If the bear does not leave the end, the hunter will carefully withdraw the rod and lay it on the roof of the end at the same angle

it was injected into the hole. The end of the rod should be resting directly over the sleeping bear. (Nelson et al. 1982:46)

With the hibernating bear located, the hunter and his companions will sometimes cut heavy poles and brush and securely plug up the entrance of the den to prevent their prey from escaping. At the spot above the den nest, they will chop and dig a hole perhaps 6 inches in diameter. If enough light can filter through the hole, it may be possible to see the bear and to allow the hunter to shoot it in the head. Otherwise, a rod will be lowered to 'feel' for the bear. Once the bear is located, one hunter may hold the rod steady while another aims and fires his rifle along its length. (Nelson et al. 1982:47)

Often bears can be hunted in their dens by a much simpler method. The hunter simply disturbs the animal until it comes up into the den tunnel or pokes its head out the entrance, and then he shoots it. Or in many cases a hunter looks into the den tunnel, using a flashlight or torch to locate the animal inside. If he can see it clearly, he is able to aim and shoot effectively from the den entrance.

From time to time, one may discover a den occupied by a sow bear and one or two yearling cubs. These cubs are often two-thirds the size of a full adult. It is the obligation of the hunter to take all occupants of a den. If the bears did not wish to be taken they would not have revealed themselves, and to not take them would be an act of disrespect.

The slain bear or bears will be removed from the den and skinned on the spot. The small bone just under the tongue will be discarded. The intestines, heart, lungs, and any bone or other parts not to be taken should be burned to prevent other animals from defiling them. The hide may be kept, although it usually is not. A bear hide continues to have 'life' for three years, and so it cannot be used for clothing or anything else until this time has passed. Only women who have experienced menopause may scrape and tan a bear hide.

If a man or hunting party is some distance from the village and takes several bears, they will cache the meat and pack back only a small percentage of their kill. Later they will use dog teams-and, lately, snowmachines - to retrieve the meat. (Nelson et al. 1982:47)

According to custom, the man who actually kills a bear retains very little of the meat for himself, perhaps only a forearm or hindquarter. The ribs, fat, and other choice cuts are usually frozen and preserved for village potlatches. It is particularly important to have large quantities of bear meat for memorial potlatches. Other parts of the bear such as the neck, forearms, head, and paws are used to host a bear party in honor of the bear that has been killed. Bear parties, by tradition, are attended by males only and are usually held outside the village limits soon after the bear meat has been returned to the community. (Nelson et al. 1982:47-48)

Although bear hunting significantly declines after mid-winter, it does not cease entirely. When traveling overland via snowshoes, dog team, or snowmachine, a Native hunter is always alert to signs of possible bear dens. An air hole often forms in the snow covering a bear den. The snow around the hole is usually stained yellow. If a man sees such a sign, he will dig out the den and harvest its occupant. As a man travels along a trail with his dog team he notes the dogs' behavior. The writer [Ray Bane] drove his team of dogs along a well-packed trail daily for over a week and noticed the team sniffing the air and

glancing off into a patch of birch trees each time a certain point was passed. This observation was discussed with a local Native hunter who then spent several days searching around the area until he found and killed a bear in a snow-concealed den. Small predators, such as marten, weasels, and foxes, are often drawn to a bear hole by its odor and may walk up to it and circle it out of curiosity. A hunter, seeing where such creatures have deviated from their general path of travel and circled such a spot, will suspect a bear den. As mentioned earlier, to find a bear den obligates the hunter to harvest its occupants. (Nelson et al. 1982:48)²

Summer bear harvest usually consists of simple chance encounters with bears while carrying out other activities such as checking fish nets, cutting wood, or traveling by boat. There seems to be less emphasis on the taking of bears at this time. (Nelson et al. 1982:48)

[T]he brown bear is the one animal that is killed both for use as food and for self protection, being considered too dangerous to have in areas where people regularly camp or travel. It is also disliked for its habit of killing black bears in their dens. (Nelson et al. 1982:227)

If a bear is taken from its den, the men eat certain parts together and save others for a later 'bear party' outside the village. Some highly preferred portions are set aside for village potlatch feasts. The successful hunter keeps only a small amount for use in his own household. Sometimes the successful hunter in a group keeps nothing at all for himself. (cf. Loyens 1966:41; cited in Nelson et al. 1982:235)

The Koyukon have greatly elaborated their knowledge of bears, which in some past times were the only big game animal available to them. Their fund of information on bear denning is especially remarkable. This knowledge is used to locate dens by recognizing subtle clues, to learn if dens are occupied and by what sort of animal, and to succeed in taking these animals when they are found.

Expert hunters are able to find dens by detecting bear tracks in the frozen moss beneath as much as 2 feet of undisturbed snow, and by spotting miniscule disturbances, such as incongruous bits of grass or cracked twigs. If a den is located (and this may require days of searching), there are equally sophisticated means of investigating its occupant and eventually making a kill. Careful studies are made of the den and its surroundings, but sometimes the hunter must enter an inhabited den to accomplish his task. By putting his head just inside a den's entrance and listening carefully, he may hear the bear licking its chops or breathing, or he may detect its heartbeat growing steadily louder and faster. In the latter case, he knows that he has found a young animal, its pounding heart registering fear. Older bears do not react this way because they are unafraid. Knowing that young animals are more likely to flee a den after disturbance, hunters keep a close watch on the entrance until the hunt is over. (Nelson et al. 1982:246)

² "It has been noted that the Koyukuk people are particularly conservation-conscious in the harvest of most furbearers, particularly those species which are non-migratory. Beaver are considered to be especially vulnerable to over-harvest, and most trappers will pull their sets from a beaver house after two adults have been taken. Wolf, wolverine, and fox are considered to be less affected by trapping, and little effort is made to limit the take of these predators. The custom of recognized traplines encourages men to practice conservation so as to maintain a sustained yield from their territories" (Nelson et al. 1982:60).

Some other rules for proper behavior toward animals can be exemplified by listing a few of the regulations for the treatment of bears. There are rules for proper butchering: a bear's eyes are always removed and the eyeballs slit so that it will not see if the hunter errs in following any taboos; rules for the proper care of the meat: dogs must never eat bear meat because it is disrespectful and because it would make the dogs mean; and the rules governing who eats the animal or parts of it: bear brains are never eaten, because it would cause a person to anger easily. Women cannot eat from the front quarters of black bear, and are completely forbidden to eat brown bear meat.

There are also rules for the disposing of unusable portions: edible parts of the animals must be used, to begin with, because waste is profoundly disrespectful. Bear bones should be burned or hung in a tree out in the woods. There are rules for using hides: bear skins should never be stepped on or over by women and are often disposed of in the woods to prevent all female contact. Another set of rules pertain to a 'bear party' which is similar to a funeral and must be held by men, outside the village, whenever these animals are taken. Bear meat should be safely cached for several days or weeks so that it is fully and completely dead before being brought to a settlement (living things die slowly, not at the moment when normal life processes stop). Killed bears should never be dragged over the ground, or pulled from dens with snowmachines. (Nelson et al. 1982:260)

Spirit vengeance can be severe. For relatively minor offenses, bears become aloof or somehow invisible to the hunter. One man did not kill a single bear for 12 years following an infraction, another hunted unsuccessfully for 20 years. Still another man who kicked a bear neck across the floor and spoke badly of the animal was mauled to death soon afterward. (Nelson et al. 1982:260-261)

Taboos are often tested individually to see if they must be followed, although this is usually limited to the less spiritually powerful animals. Six men who were bear hunting together decided to test the taboo on eating a certain part of the bear's stomach. Elders warned that if young men ate this organ their moccasins would be slippery as they trekked through the woods in search of dens. Three young men ate the tabooed part, and three abstained. Next day the three violators had a terrible time, slipping and falling repeatedly, while the others had no trouble at all. Seeing that the taboo was right, they carefully followed it thereafter. (Nelson et al. 1982:263)

Implements such as sleds, fishnets, rifles, or snowshoes are also infused with luck. A man lamented to me the troubles he had with one of his rifles, saying that it would shoot a bear coming out of a den, at point blank range, but it only made a wound despite his high caliber rating. Another gun had to be used to make the kill. None of these problems were caused by malfunctioning, he explained, the gun was simply 'out of luck.' He said he suspected a young woman had stepped over it, rendering it useless. (Nelson et al. 1982:265)

Koyukuk people also know the landscape through a profusion of names. Some of these names are used primarily for location, as we use street signs. Others have special meanings derived from personal or traditional history. Hundreds of bear dens, for example, are known throughout Koyukon country, and many of these have special names. All of the dens that have been known for some time have personal associations,

and when hunters stop to check them each fall, they often recall past experiences there. Some of these stories go back even to previous generations, and so the dens have become much more than just hunting places. (Nelson et al. 1982:299)

The first 3 or 4 feet of the intestines [of black bears or brown bears] are discarded, and the rest is turned inside-out so the fat is inside, then it is placed on a fire to roast. The result is a sausage-like delicacy. Only hibernating bears are used this way, because their intestines are empty. (Nelson et al. 1982:350)

Osgood, C. 1970. Contributions to the ethnography of the Kutchin. Reprint of the 1936 edition, Volume No. 14, Yale University Publications in Anthropology. Human Relations Area Files Press, New Haven.

Bears are common in the Peel River¹¹ country. The Indians either shoot them with bows and arrows as the occasion offers, pull them out of their holes in winter and club them to death, snare them, or in times of rare courage, spear them. It is said that when a man discovers a bear hole, he kills the bear but tells no one. Later he may be seen to put a little hair in the fire whereupon some smart old man says, 'Oh, I know you found a bear hole.' Naturally the killing of black bears most frequently occurs as they are less ferocious and more numerous than either the brown bear or the grizzly. Grizzly bears meet with respect because of their strength and hunters exercise more than usual care in attacking them, but the method is the same. Dogs are not used for hunting bears. (Osgood 1970:27)

Osgood, C. 1971. The Han Indians: A compilation of ethnographic and historical data on the Alaska-Yukon boundary area. Yale University Department of Anthropology, New Haven.

Schmitter (1910:10) writes of the Han: 'One of their most useful weapons, the spear, was made by binding a hunting knife of caribou-horn to the end of a pole about 6 feet long.' This is an almost identical description of the lance described by Jones (1872:323). Jonathan Wood at Moosehide spoke of a very similar weapon which he called a *t'ut*, and said that it consisted of a birch pole five to six feet long, and of a convenient diameter to hold. At one end was a point made of caribou horn which he guessed to be about eight inches long, but he was not sure. This implement served to attack a bear that had been aroused from its den. Walter also knew of such a lance.

Then he [Wilson in Schwatka 1900] says of the Han of Eagle: 'In Winter these Indians leave the river and scatter out in different directions in quest of game, principally moose and caribou, which, in reality, provide them with their only food. Besides these, however, great numbers of bears are found, particularly the black variety; also deer, mountain sheep, and rabbits. (Osgood 1971:103)

Black bears, their brown variation, and grizzlies are reported to have been killed and eaten in the Han area. Schmitter (1910:8) provides a clear account of the classic Athapaskan technique of killing bears with a lance. 'A pike or spear is nearly always

¹¹ Osgood conducted fieldwork in summer 1932 among the Kutchin of Alaska and of the Yukon Territory, Canada. Information specific to hunting of bears in this excerpt is from the Peel River, which is in Canada, but is otherwise corroborated by other literature sources from Alaska. In short, customary and traditional uses of black bears by Peel River Kutchin are likely very similar to those of the Kutchin peoples located a little downriver, in Alaska.

used in hunting bears. The hunter attracts the bear by making a raven-like noise, causing the bear, as the Indians say, to think the raven has discovered a dead moose. They also further explain that the big bears only would come, as the little bears would not know what the croaking meant. As the bear approaches the Indian holds the spear in position, facing the bear as it draws near to him, and as the bear springs the Indian sticks the spear into its throat at the top of the breast-bone, at the same time shoving the handle of the pole into the ground, thus causing the bear to spear himself with his own weight. Sometimes three men hunt in this manner, two of them attacking the bear on either side as it rushed forward. The meat of the young bear killed in the fall, when they feed on huckleberries, is considered a great luxury'. (Osgood 1971:110 citing Schmitter 1910:8)

Sumida, V. A. 1988. Land and resource use patterns in Stevens Village, Alaska. Alaska Department of Fish and Game Technical Paper No. 129, Juneau.
<http://www.subsistence.state.ak.us/TechPap/tp129.pdf>

Certain areas of band territories were used by all members while other areas such as beaver houses and ponds, muskrat swamps, fishing sites, bear dens, big game fences, berrying areas adjacent to fish camps, and some bird hunting areas were considered family-held property. (Clark 1981:585 cited in Sumida 1988:22)

Although bears were not actively hunted in the summer [by residents of Stevens Village], they were readily spotted along the rivers and creeks and in the hill country of the Yukon River canyon. During this season bears were harvested in the course of travel or during pursuit of other activities. 'Nuisance' bears found near the village or fish camps were shot or snared as a safety measure. (Sumida 1988:141)

Bears were considered especially good in the fall, after accumulating a thick layer of fat for their winter dormancy, the result of a diet consisting primarily of berries. At times, up to four inches of fat develops along their backs. Den hunting was sometimes undertaken during fall and early winter though not as frequently as in the past when hunters used to do more overland travel on foot both before and after freeze-up and were more likely to come across bear dens. (Sumida 1988:141)

When bears prepare their dens during September and October, hunters can locate denning sites before the first snowfall by noting disturbed areas where the ground has been dug up and where leaves, grass, and moss have been scraped and removed. Dens are excavated from the ground or in riverbanks but can also be natural shelters created by fallen trees or the tree roots of partially downed trees. Dens are lined with grass, moss, leaves, and other materials, and once the bear enters the den for the duration of the winter, the entrance is closed off with similar materials. (Sumida 1988:141-142)

Although snow camouflages evidence of dens, often after an early snowfall, bears can be tracked to their denning sites. 'Old-timers' reportedly searched for bear dens along riverbanks during fall and early winter, looking for the steam from the bear's breath which emanated from the air hole in the roof of the den. (Sumida 1988:142)

When an occupied den was found the hunter noted the location and returned later with others. Hunters blocked the entrance to the den with poles and brush, leaving a small opening. If the bear could be seen from the entrance it was shot through the opening in the blocked entrance. Otherwise, the bear was disturbed by prodding it with a stick and

was shot as its head appeared at the entrance. Another method was to securely block the entrance and chop a hole above the bear in its den, shooting it from that position. A detailed description of Koyukon bear hunting methods is presented in Nelson et al. (1982:46-47). (Sumida 1988:142)

After a bear has been killed, the den must be thoroughly cleaned out and the grass and other materials used to line the interior of the den were removed. This was done so that the den appeared unused and assured that another bear would occupy it the following year. Marking or disturbing the area in any way resulted in future avoidance of the site by other animals. (Sumida 1988:142)

Sumida, V. A. 1989. Patterns of fish and wildlife harvest and use in Beaver, Alaska. Alaska Department of Fish and Game Division of Subsistence Technical Paper No. 140, Fairbanks. <http://www.subsistence.adfg.state.ak.us/TechPap/tp140.pdf>

The harvest and use of bear was more common in the past when families resided in seasonal camps. At that time, den hunting was regularly undertaken during fall. A good description of this activity is provided in Nelson et al. (1982:46-47). Currently, bear hunting is more opportunistic and usually incidental to other activities undertaken during open water seasons, although den hunting is still conducted on occasion. Late summer and early fall are considered the best time to harvest bear since they have developed a thick layer of fat for their winter hibernation.

Black bear is the species most commonly taken. A few households hunt for brown bear although some residents considered these bears to be inedible. During the survey year three households each reported harvesting one black bear and no brown bear were taken. Bear meat is eaten and their fat is sometimes rendered for use in cooking or when eating dried fish or meat. Bear hides were kept by some households. (Sumida 1989:60)

Sumida, V. A., and D. B. Andersen. 1990. Patterns of fish and wildlife use for subsistence in Fort Yukon, Alaska. Alaska Department of Fish and Game Division of Subsistence Technical Paper No. 179, Fairbanks. <http://www.subsistence.adfg.state.ak.us/TechPap/tp179.pdf>

In the past, snares were used to harvest both large and small mammals including moose, caribou, bear, and snowshoe hare. (Osgood 1970:36; McKennan 1959:48)

**Customary and Traditional Use Worksheet:
Dall Sheep in GMU 19, McGrath Area**

Prepared by the
Alaska Department of Fish and Game
Division of Subsistence
for the February–March 2010 Fairbanks Board of Game meeting

February 2010

Alaska Department of Fish and Game

Division of Subsistence



Symbols and Abbreviations

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Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft ³ /s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols

alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of) pH	
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

all commonly-accepted abbreviations
e.g., Mr., Mrs., AM, PM, etc.

all commonly-accepted professional titles e.g., Dr., Ph.D., R.N., etc.

Alaska Administrative Code AAC
at @

compass directions:

east	E
north	N
south	S
west	W

copyright ©

corporate suffixes:

Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.

District of Columbia D.C.

et alii (and others) et al.

et cetera (and so forth) etc.

exempli gratia (for example) e.g.

Federal Information Code FIC

id est (that is) i.e.

latitude or longitude lat. or long.

monetary symbols (U.S.) \$, ¢

months (tables and figures): first three letters (Jan., ..., Dec)

registered trademark ®

trademark ™

United States (adjective) U.S.

United States of America (noun) USA

U.S.C. United States Code

U.S. state use two-letter abbreviations (e.g., AK, WA)

Measures (fisheries)

fork length	FL
mid-eye-to-fork	MEF
mid-eye-to-tail-fork	METF
standard length	SL
total length	TL

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations

alternate hypothesis H_A

base of natural logarithm e

catch per unit effort CPUE

coefficient of variation CV

common test statistics (F, t, χ^2 , etc.)

confidence interval CI

correlation coefficient (multiple) R

correlation coefficient (simple) r

covariance cov

degree (angular) °

degrees of freedom df

expected value E

greater than >

greater than or equal to ≥

harvest per unit effort HPUE

less than <

less than or equal to ≤

logarithm (natural) ln

logarithm (base 10) log

logarithm (specify base) log₂, etc.

minute (angular) '

not significant NS

null hypothesis H₀

percent %

probability P

probability of a type I error (rejection of the null hypothesis when true) α

probability of a type II error (acceptance of the null hypothesis when false) β

second (angular) "

standard deviation SD

standard error SE

variance

population Var

sample var

SPECIAL PUBLICATION NO. BOG 2010-02

CUSTOMARY AND TRADITIONAL USE WORKSHEET:

DALL SHEEP IN GMU 19, MCGRATH AREA

by

Alaska Department of Fish and Game, Division of Subsistence
Fairbanks

Alaska Department of Fish and Game
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1300 College Road, Fairbanks, Alaska, 99701-1599

February 2010

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*Alaska Department of Fish and Game, Division of Subsistence,
1300 College Rd., Fairbanks, AK, 99701-1599, USA*

This document should be cited as:

ADF&G Division of Subsistence. 2010. Customary and traditional use worksheet: Dall sheep in GMU 19, McGrath area. Alaska Department of Fish and Game Division of Subsistence Special Publication No. BOG 2010-02, Fairbanks.

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INTRODUCTION

Proposal 82 for the February–March 2010 Alaska Board of Game (BOG) meeting in Fairbanks requests the establishment of a subsistence registration hunt for Dall sheep *Ovis dalli* with $\frac{1}{4}$ -curl or smaller horns, excluding ewes with lambs, in Game Management Unit (GMU) 19C. The proposal also recommends a small number of permits in addition to other stipulations.¹ However, there is currently no customary and traditional use finding in regulation for sheep in GMU 19. This worksheet pertaining to the 8 criteria in 5 AAC 99.010 has been developed by the Alaska Department of Fish and Game (ADF&G) to assist the BOG in making a customary and traditional use determination prior to considering the proposed limited registration permit hunt.

THE EIGHT CRITERIA

CRITERION 1: LENGTH AND CONSISTENCY OF USE

A long-term consistent pattern of noncommercial taking, use, and reliance on the fish stock or game population that has been established over a reasonable period of time of not less than one generation, excluding interruption by circumstances beyond the user's control, such as unavailability of the fish or game caused by migratory patterns.

While sheep meat is still highly prized by Nikolai residents, changes in the seasonal round and resources use patterns have resulted in a decrease of sheep hunting among local residents (Holen et al. 2006; Stokes 1985:157). For example, technological advances such as fish wheels, firearms, and steel traps have focused harvest patterns on fish, particularly salmon resources, as well as caribou *Rangifer tarandus* and furbearers. Also, moose *Alces americanus* began to repopulate the area in the late 1880s; according to sources, this coincided with a decline in the caribou populations in the 1920s and 1930s, allowed moose to become a major source of winter meat and shifted hunting pressure from the Alaska Range foothills to the river corridors (Stokes 1985:73).

Additionally, state hunting regulations have also inhibited traditional sheep hunting practices [Collins 2004 (revised)]. Holen et al. (2006:107,109) note that in the 1960s, Nikolai hunters traveled by dog team up the Little Tonzona River to hunt sheep in November, when snow conditions were ideal for travel. Accumulated snowfall also pushed sheep off the high mountains, making them more accessible to hunters, who harvested both ewes and rams. However, currently in GMUs 19 and 20, sheep can be hunted only between August 10 and September 20, and only mature rams with a full curl can be harvested, animals that are traditionally of less interest to local hunters. Finally, social changes, including missionization, sedentarization in villages, decreases in the human population due to disease, and shifts in seasonal economic patterns cemented the declining use of the Alaska Range foothills (Hosley 1966; Stokes 1985; Stickney [1981]).

Historical use of sheep in GMU 19 has been documented for residents of Lime Village, McGrath, Nikolai, and Telida (Bishop 1978; Kari 1983; Stokes 1985; Holen et al. 2006). Small but consistent harvests have been reported to ADF&G by local residents since the 1980s (Table 1). No household reported a harvest of Dall sheep during a comprehensive baseline survey in Nikolai residents in 2002 (Holen et al. 2006:107). However, Stokes (1985) notes that

¹ The proponent would like this hunt to disallow the use of aircraft and to make permits available only in Nikolai, Telida, McGrath, and Takotna.

Nikolai hunters historically traveled great distances to obtain sheep, or *drodeya* in Upper Kuskokwim Athabascan, in the Alaska Range. While harvest estimates are not available for the earlier period, Stokes (1985) reported that residents believe that sheep were far more numerous than reflected by contemporary harvest levels: likely averaging approximately 5 per year during the 1960s, ranging from 1–8 in the 1980s, and 0–3 in the 2000s (Table 1).²

CRITERION 2: SEASONALITY

A pattern of taking or use recurring in specific seasons of each year.

Sheep were traditionally harvested by Upper Kuskokwim residents between August and October, with additional harvests occurring in June and July and again in November (Stokes 1985:70). Nikolai hunters traditionally hunted sheep in November by dog team when snow conditions were ideal for travel (e.g., there was enough snow for sleds but not so much that trails had to be broken) and when accumulated snow forced sheep off high, mountainous areas, making them more accessible to hunters (Ray Collins, area resident, personal communication February 11, 2010; Holen et al. 2006).

During a 1983 harvest survey, Stokes documented that Nikolai residents reported harvesting sheep primarily in September, October, and February, and they reported fewer harvests in January and March. McGrath residents reported harvests in September (Stokes 1985:77,79). As noted above, changes in transportation technologies, resource availability, and regulatory changes affect the seasonal round.

Today, sheep hunting is restricted to the legal fall season of August 10 to September 20, with a bag limit of 1 full-curl ram. Most of the harvest takes place in August, due to the lack of a winter season.

CRITERION 3: MEANS AND METHODS OF HARVEST

A pattern of taking or use consisting of methods and means of harvest that are characterized by efficiency and economy of effort and cost.

Oral reports of historical sheep hunting by Nikolai residents documented by Stokes (1985) suggest that, in the pre-firearm period, hunters employed multiple strategies to harvest sheep. Hunters used camouflage clothing made from white animal skins, and canvas in later periods, when hunting in the snowy areas characteristic of sheep habitats. Knowledge of sheep movements allowed hunters to approach and then disperse sheep into brushy canyon bottoms or lure them towards hunters hidden in the brush during the fall rut. Larger hunting parties sometimes engaged in “drives,” during which sheep were chased past concealed hunters who harvested them with spears, hatchet-like weapons, and arrows.

Today, sheep are taken with firearms, usually incidental to other activities (Stokes 1985:156–157). More than half of the sheep hunters report the use of registered guides in this area,³ and most hunters report the use of airplanes to access sheep hunting areas in the current fall hunt.

² Current regulations carry a harvest reporting requirement (5 AAC 92.010 (h)).

³ Current statute stipulates nonresident sheep hunters must be accompanied by a registered guide (AS 16.05.407).

CRITERION 4: GEOGRAPHIC AREAS

The area in which the noncommercial, long-term, and consistent pattern of taking, use, and reliance upon the fish stock and game population has been established.

According to Stokes (1985), Nikolai hunters historically often traveled great distances to obtain sheep. Hunters followed sheep in the mountainous portions of the headwaters of the Big River in GMU 19C; other hunt areas included the upper Middle, Windy, South, and East forks of the upper Kuskokwim River and the headwaters of the Stony, Swift, and Big rivers (Figure 1). In the 1960s, Nikolai hunters also reportedly traveled up the Little Tonzana River into the Alaska Range.

CRITERION 5: MEANS OF HANDLING, PREPARING, PRESERVING, AND STORING

A means of handling, preparing, preserving, and storing fish or game that has been traditionally used by past generations, but not excluding recent technological advances where appropriate.

Information pertaining to the methods and means of handling, preparing, and preserving sheep resources in GMU 19C is available in the ethnographic literature [Collins 2004 (revised)]. Traditionally, big game meat was eaten fresh or preserved for future use by freezing or drying, depending on the season. Today, sheep meat is probably eaten fresh or preserved by freezing.

In addition to being an important historical component of local diets, sheep skins also provided materials for mattresses, bedding, and moccasin liners (Stokes 1985:156–157).

CRITERION 6: INTERGENERATIONAL TRANSMISSION OF KNOWLEDGE, SKILLS, VALUES, AND LORE

A pattern of taking or use that includes the handing down of knowledge of fishing or hunting skills, values, and lore from generation to generation.

As with many subsistence practices, the knowledge and skills needed to successfully harvest sheep were handed down from generation to generation, typically through participation in hunting and processing practices. For example, young hunters would have the opportunity to learn about sheep movements by participating in large hunting parties described above and in smaller hunting groups that lured and/or chased sheep for harvest (Stokes 1985). Knowledge of traditional sheep hunting methods remains part of the local oral tradition (Ray Collins, area resident, personal communication February 11, 2010) and a limited numbers of local hunters have continued to pursue sheep hunting during the contemporary regulatory fall hunt.

CRITERION 7: DISTRIBUTION AND EXCHANGE

A pattern of taking, use, and reliance where the harvest effort or products of that harvest are distributed or shared, including customary trade, barter, and gift-giving.

According to Collins [2004 (revised)], local residents have always shared sheep meat with community members. Oral historical sources document the hunting, processing, and sharing of sheep meat, and that all households had equal portions. Additionally, local residents note that sheep have been served at potlatches, important community ceremonial events where the entire community participates [Collins 2004 (revised)].

Today, much of the sheep meat distributed to residents of the communities of Nikolai and Telida is provided by locally based guides of trophy hunting clients (Stokes 1985).

CRITERION 8: DIVERSITY OF RESOURCES IN AN AREA; ECONOMIC, CULTURAL, SOCIAL, AND NUTRITIONAL ELEMENTS

A pattern that includes taking, use, and reliance for subsistence purposes upon a wide variety of fish and game resources and that provides substantial economic, cultural, social, and nutritional elements of the subsistence way of life.

Sheep are just one of the many wild resources that are typically harvested for subsistence uses by residents of GMU 19. Other major resources harvested for subsistence by residents of GMU 19 include salmon; nonsalmon fish species; large land mammals, such as moose, caribou, and black bears *Ursus americanus*; small land mammals such as beavers, snowshoe hares, and porcupines; ducks, geese, and other birds; marine invertebrates; and berries and other plants (see the ADF&G CSIS⁴).

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⁴ Community Subsistence Information System (<http://www.subsistence.adfg.state.ak.us/CSIS>).

Table 1.-GMU 19C sheep harvests by residents of Nikolai and McGrath, 1983-2009.

Year	Number of sheep harvested	Number of hunters
1983	2	8
1984	8	10
1985	3	6
1986	1	7
1987	1	8
1988	0	6
1991	1	2
1996	1	1
1997	0	1
1998	0	1
1999	0	1
2005	n/d	n/d
2006	0	3
2007	3	6
2008	0	1
2009	2	3

Note: No data are available for 2005.

Source: ADF&G Division of Wildlife Conservation.

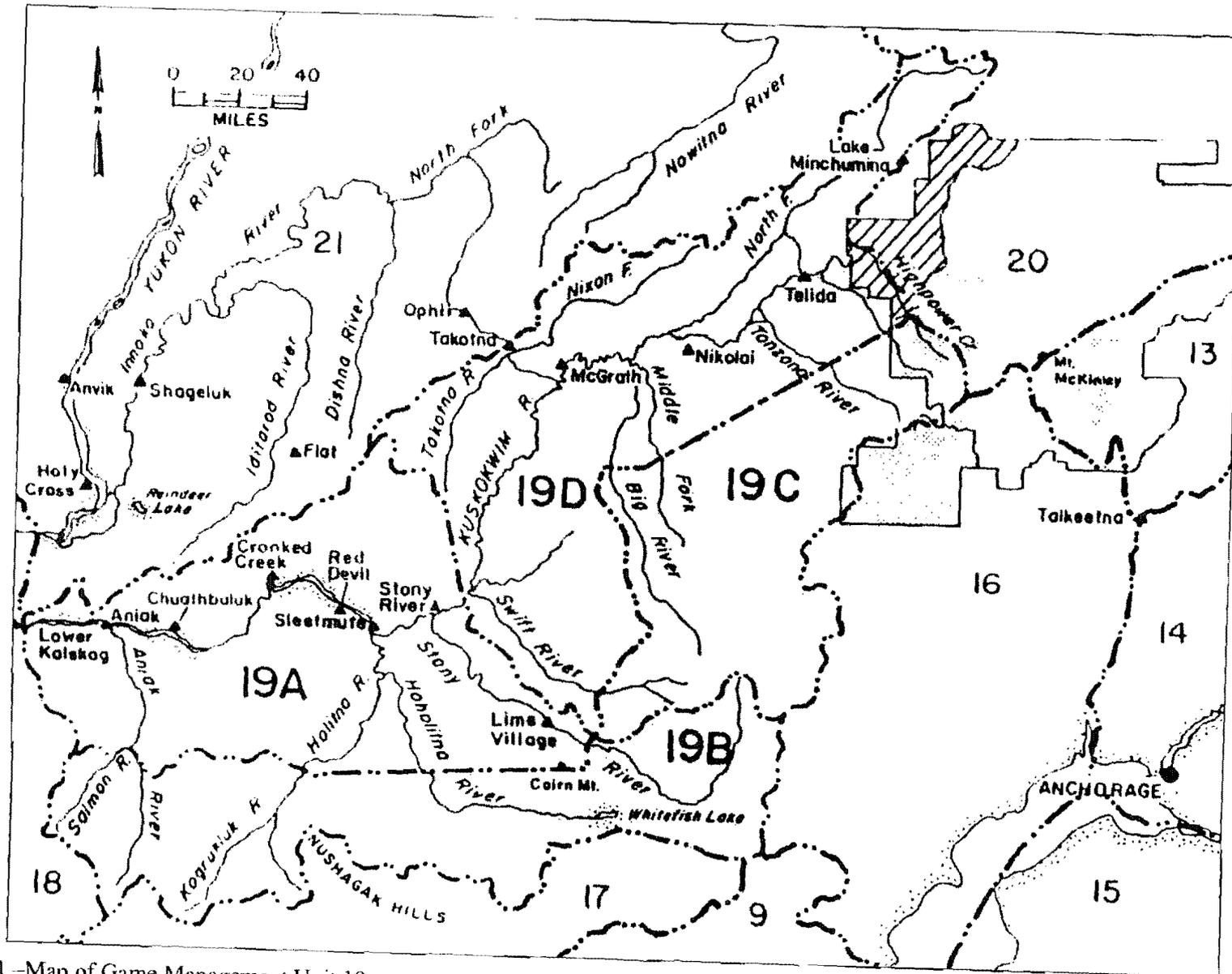


Figure 1.—Map of Game Management Unit 19.