Yukon–Innoko Moose Management Plan

For Game Management Subunits 21A and 21E

Prepared by:
Alaska Department of Fish and Game,
Division of Wildlife Conservation,
in Cooperation With
The Yukon-Innoko Moose Management Working Group

December 2006

Acknowledgements

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All drawings in this plan were done by Michael Williams, Beaver, Alaska.

Participants in the April 2005 Yukon-Innoko Moose Management Working Group meeting in Shageluk.

Mission: Maintain healthy and abundant moose populations by proactively managing moose, predation and habitat and keeping moose harvest within sustained yield so that subsistence needs for moose are met on an annual basis and there is sufficient moose to provide for personal and family use of Alaska residents and some nonresident hunting opportunity for generations to come.

EXECUTIVE SUMMARY

The Yukon-Innoko Moose Management Plan (YIMMP) is intended to establish a proactive management program that will help to maintain an abundant moose population to provide for high levels of human consumptive uses. This approach is designed to help prevent a decline in the moose population to a low level that would be very difficult to reverse. The YIMMP is a comprehensive management plan. The plan includes recommendations to manage moose harvest conservatively, maintain moose habitat, to provide public information and education materials and to increase harvest of black bears, grizzly bears and wolves through hunting and trapping.

The plan was developed through a cooperative effort involving a citizens' advisory group called the Yukon-Innoko Moose Management Working Group (YIWG or Working Group) State and federal agency staff participated in the project as technical advisors. The Working Group includes representatives of the Grayling-Anvik-Shageluk-Holy Cross (GASH) and Lower Yukon Fish and Game Advisory Committees, the Western Interior and Yukon-Kuskokwim Delta Regional Advisory Councils, non-local hunters and representatives of commercial interests in hunting in the region.

Initially the planning effort was focused only on Unit 21E. Members of the Working Group noted that moose hunting that takes place in the Innoko River drainage in Unit 21A has a significant influence on moose management in Unit 21E. Based on the group's recommendation, the Innoko River drainage in Unit 21A is included in this plan.

For several years prior to the planning process local residents and hunters reported observing a decline in the moose population in Game Management Unit 21E. In January 2003 the GASH Advisory Committee (AC) voted against reauthorizing the state winter antlerless moose hunt in Unit 21E to limit harvest of cow moose. This initial proactive action helped to maintain productivity of the moose population and may have prevented a significant decline.

At the first planning meeting held in January 2005 the Working Group reviewed data from a February 2000 moose population estimation survey and identified the need for a new survey to provide a better basis for developing recommendations. The Alaska Department of Fish and Game (ADF&G or department) worked in cooperation with the U.S. Fish and Wildlife Service, Bureau of Land Management, Tanana Chiefs Conference, and the Association of Village Council Presidents and completed a new moose population estimation survey in Unit 21E in March 2005. The survey indicated the moose population is relatively stable but may have declined somewhat since the previous survey that was conducted in March 2000.

The March 2005 moose population estimate and population modeling later conducted by ADF&G biologists indicated that, in order to prevent a decline in the population, harvest should be kept within 4% or less of the total moose population, and that only minimal cow harvest can be sustained. The current estimated annual harvest is near the upper end of the harvestable surplus.

At the final meeting held in November 2005, the Working Group discussed how close the current level of harvest is to the maximum sustainable harvest. The group noted that a decline in the moose population would likely result in the need for more significant reductions in harvest, including the possibility of further action to reduce Alaska resident harvest. At this point, members of the Working Group who were present agreed to recommend reducing the nonresident season by 5 days and implementing a drawing permit system to prevent an increase in nonresident hunting at the current moose population level.

Based on this situation, the Working Group felt compelled to recommend intensive management of moose in Unit 21E, including pursuing adoption of a wolf predation control implementation plan. Department staff advised the Working Group that the resources available to implement predation control programs are limited and that supporting the predation control programs that are already in place would be given priority.

In March 2006 the Board of Game (board) endorsed the YIMMP and adopted the regulatory proposals recommended by the Working Group, with a few minor modifications. In May 2006 the YIMMP was endorsed by the Federal Subsistence Board. (The endorsements by the Board of Game and Federal Subsistence Board are provided in Appendix A)

In their endorsement of the plan the board requested the department develop a plan for Intensive Management (IM) of moose in Unit 21E. The department will work with the GASH AC and others to prepare a plan that considers all options for Intensive Management in Unit 21E. The plan will be submitted for consideration by the board at the next interior Alaska meeting scheduled for March 2008. At that time the department will have to re-evaluate resources available and priorities for IM programs and advise the GASH AC and board whether the department will be able to develop and effectively implement a wolf predation control program or other options for IM in Unit 21E.

The ADF&G greatly appreciates the dedication of time and effort by members of the Yukon-Innoko Moose Management Working Group and participating agency staff in helping to develop the YIMMP. In addition, we appreciate the great hospitality of the communities of Grayling, Shageluk, Anvik and Holy Cross in hosting the meetings. This plan could not have been developed without the support and participation of all who were involved.

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INTRODUCTION

This plan is written to guide the management of moose and related wildlife in Game Management Units (GMU or Unit) 21E and Unit 21A in western Alaska (Figure 1). The plan is intended to be comprehensive by addressing moose hunting regulations, moose habitat, management of predation on moose, and information and education needs. The plan has been prepared through a cooperative effort involving state fish and game advisory committees, federal subsistence councils, local and non-local hunters, big game hunting transporters, Native organizations and others. The planning process was initiated by the Alaska Department of Fish and Game, Division of Wildlife Conservation (DWC) but included involvement and coordination with the ADF&G Division of Subsistence, the Innoko National Wildlife Refuge (INWR), the Bureau of Land Management (BLM) and the U.S. Fish and Wildlife Service, Office of Subsistence Management (FWS/OSM).

Communities in the planning area include Grayling, Anvik, Shageluk and Holy Cross. Below Unit 21E on the Yukon River there are several additional communities including Russian Mission, Marshall, Mountain Village and Emmonak. At the lower end of Unit 21E the Kuskokwim River is located less than 50 miles to the south and the communities of Lower and Upper Kalskag and Aniak are close by. Bethel, with a population of just under 6,000 is the largest community in the region and is located approximately 75 air miles from the southern tip of Unit 21E.

The Grayling-Anvik-Shageluk-Holy Cross State Fish and Game Advisory Committee (GASH AC) represents residents of Unit 21E for state fish and wildlife matters. Other state fish and game advisory committees (ACs) in the region which share an interest in moose management in Units 21E and A include the Lower Yukon, McGrath, Central Kuskokwim, and Middle Yukon ACs. Unit 21E and Unit 21A are within the area represented by the Western Interior Regional Council (WIRAC) for federal subsistence management issues. The Yukon-Kuskokwim Delta Regional Advisory Council (Y-K Delta RAC) also has an interest in moose management issues in Unit 21E.

The majority of moose hunters in Unit 21E are Alaska residents. Moose are a very important subsistence resource for residents of the communities in Unit 21E. During fall, hunters from communities in the lower Yukon River and other locations in Unit 18 travel by boat to hunt in Unit 21E. In the past, before the winter hunt was closed under state regulations, residents of Units 18 and 19A traveled by snowmachine to hunt in Unit 21E. In recent years the moose population has grown in the lower Yukon River area in Unit 18 and has resulted in fewer hunters coming up river into Unit 21E.

Some resident and nonresident hunters from outside the region also participate in the fall hunt in Unit 21E and several guides and transporters operate in the area. The Paradise Controlled Use Area (PCUA) encompasses lands along the Yukon and Innoko Rivers and prohibits use of aircraft for hunting moose or transporting moose hunters (Figure 1). The PCUA access restrictions have the effect of reducing the number of hunters from outside the region that hunt in this portion of Unit 21E.

Within the Innoko River drainage in Unit 21A a large portion of the hunters are Alaska residents who live outside the area or nonresidents who fly into the area. Many non-local hunters fly in and float down the Innoko River. Holikachuk Slough allows access from the Yukon River to the Innoko River above Grayling, well upriver from the mouth of the Innoko River on the Yukon. Residents of Grayling and Shageluk and occasionally other communities in the area travel up the Innoko River by boat to hunt moose in Unit 21A.

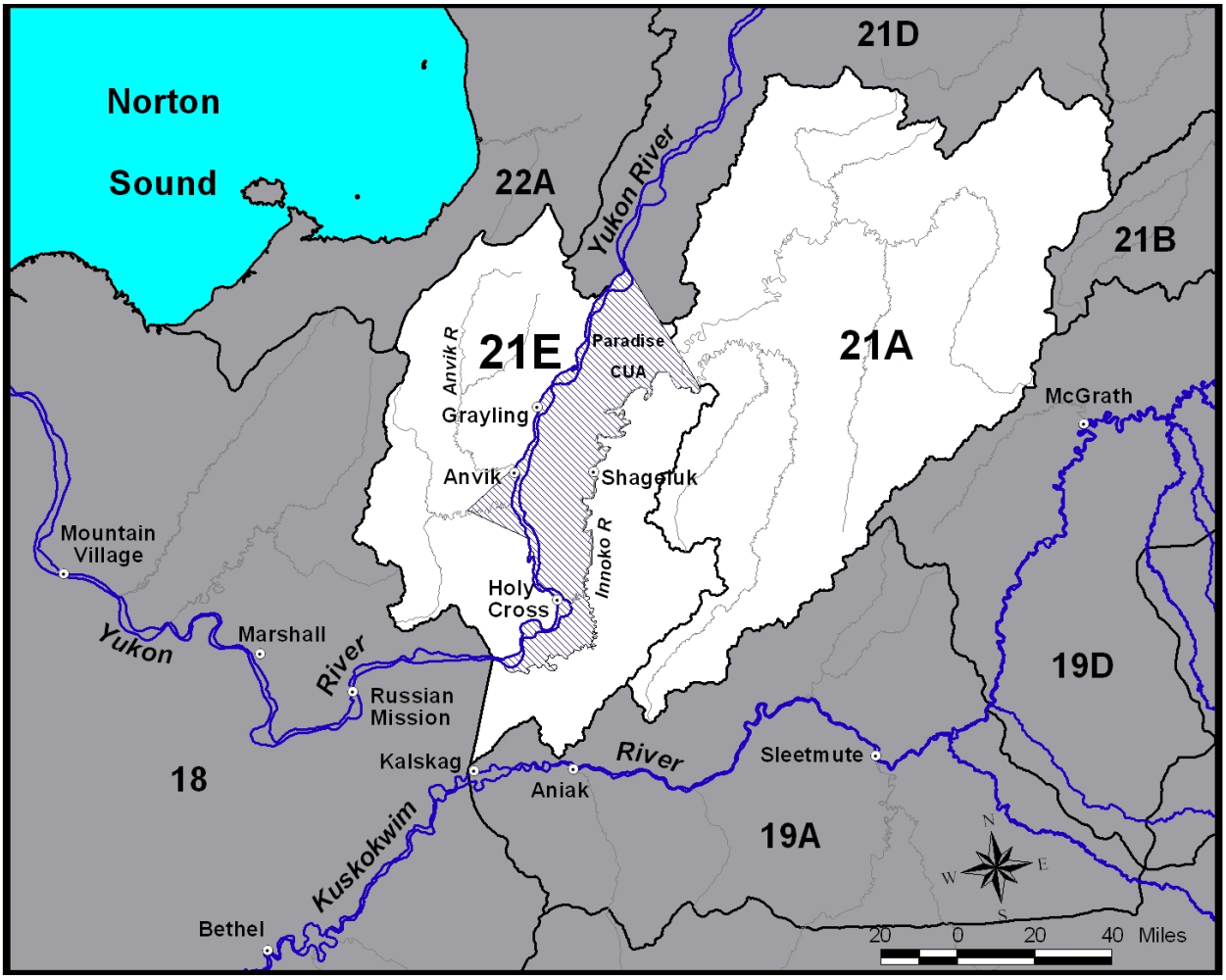


Figure 1. Yukon-Innoko Moose Management Planning Area

About 45% of land in Unit 21E is under state and private ownership with Native corporations being the primary private landowners (Figure 2). The remaining 55% of Unit 21E is federal public lands managed by the BLM (44%) and the Innoko and Yukon Delta National Wildlife Refuges (11%). Land ownership in the Innoko River drainage in Unit 21A is 39% INWR, 8.7% BLM, 49.6% state and 2.7% private.

When the planning process was initiated information on the status of moose populations was not as complete as desired. The data available suggested that compared with many areas of interior Alaska, the moose population in Unit 21E, was relatively healthy. In the northern and eastern portions of Unit 21E and within the Innoko River drainage in Unit 21A moose population

densities are lower. Collaboration with the INWR on data they had obtained in the past and a cooperative moose survey conducted in Unit 21E during the planning process provided additional information on the moose population. As more data became available and was carefully evaluated it became apparent that the moose population cannot sustain a significant increase in mortality from harvest or predation without the risk of a population decline.

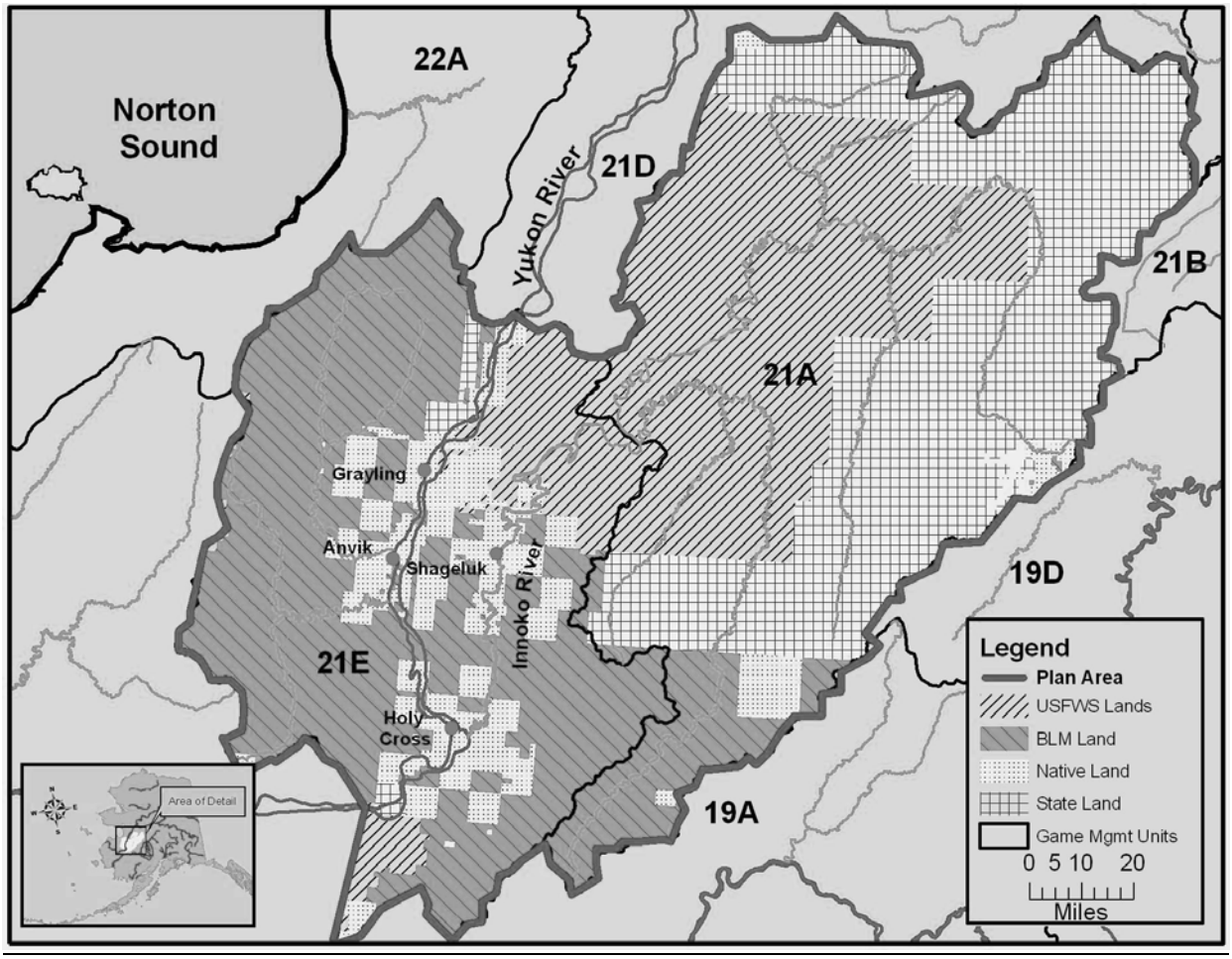


Figure 2. Major land ownership patterns in the planning area.

Factors That Led to the Planning Effort

For several years prior to the planning process residents of the GASH communities expressed concerns about increased competition for moose and the potential for declines in the moose population. Many local residents reported that predation on moose had increased and felt the moose population was declining. The WIRAC, GASH AC and others advocated for a planning effort in Unit 21E to address the moose management situation proactively rather than waiting for a severe decline in the moose population to occur, a situation that would be much more difficult to reverse. In January 2003 the GASH AC took the initiative to not reauthorize the state winter antlerless moose hunt in Unit 21E due to concerns about the possibility of a decline in the moose population.

Efforts to increase or maintain moose populations in adjacent GMUs have resulted in reduced hunting opportunity in those areas. Temporary restrictions in hunting opportunity to help increase moose populations in adjacent GMUs could lead to increased hunting pressure in Units 21E and 21A. In fall 2004 a five-year moratorium on moose hunting intended to increase moose numbers went into effect in the Kuskokwim River drainage in Unit 18. In March 2004 Unit 19A was closed to nonresident hunting and a registration permit was established for resident hunters. In March 2006 the eastern portion of GMU 19A was closed to all moose hunting and the western portion of Unit 19A was changed to a Tier II subsistence hunt with only limited numbers of permits available. In recent years drawing and registration permit hunts have been established in GMUs 21D and 21B upriver along the Yukon. These regulatory changes in adjacent Units have caused increased concern about displaced hunters causing increased hunting pressure in Unit 21E.

Another issue involving Unit 21E moose in the last several years has been proposals to the Federal Subsistence Board (FSB) from residents of Unit 18 to be recognized as customary and traditional (C&T) users of moose in Unit 21E under federal subsistence hunting regulations. Currently Russian Mission is the only community in Unit 18 with a positive C&T finding under federal regulations for Unit 21E moose. Because there is still a federal winter moose hunting season in Unit 21E a change in the C&T determination could make many more people eligible to participate in this hunt and result in excessive cow harvest.

In addition, the proposed development of the Donlin Creek Mine and the possible construction of a road between the Kuskokwim River and Yukon River could increase the population in the area and provide improved access that may increase pressure on the Unit 21E moose population.

Finally, the DWC recognized the need to work more closely with the GASH AC and others concerned with moose management in this area. The division supported the concept of establishing a cooperative planning effort to take a proactive approach in managing moose in the Yukon–Innoko River area.

Process Used to Develop the Plan

In October 2004 DWC staff developed a Unit 21E moose management planning proposal and announced the intent to begin a planning process in the "Unit 21E Moose Planning News." The newsletter was sent to all residents of Unit 21E, persons who had reported hunting in the Unit in 2002 or 2003, guides registered for the Unit, transporters and others potentially interested in the planning process. The newsletter invited nominations for representatives to participate in a moose management working group from fish and game advisory committees, federal subsistence councils, guides and transporters and others who hunt in Unit 21E. The proposed planning process was discussed at the GASH AC meeting held November 2, 2004 in Anvik. The GASH AC chose to appoint one representative to the Working Group and recommended that each local village council also appoint a representative. The planning process was further discussed at a joint meeting of the four GASH village councils in Shageluk on November 4th and later each council appointed a representative. The Working group members appointed by the village councils have all been members of the GASH AC or served as alternates. The Lower Yukon AC, WIRAC and Y-K Delta RAC each appointed a representative. All of the non-local hunters and the transporter that were nominated and available to participate were included in the Working

Group. No persons who guide in the area expressed an interest in being involved. A second transporter, Gwen White expressed interest in participating and was added to the group after the first meeting. The resulting membership of the Yukon-Innoko Moose Management Working Group (YIWG or Working Group) follows.

1. Bob Aloysius, Kalskag, Y-K Delta Regional Advisory Council
2. Ken Chase, Anvik, Chairman, GASH Advisory Committee
3. Arnold Hamilton, Shageluk Village Council, GASH Advisory Committee
4. Mike Hoffman, Bethel, non-local hunters
5. Carl Jerue, Jr., Anvik Village Council
6. Bill Lyle, Wasilla, non-local hunters
7. Gabe Nicholai, Grayling Village Council
8. Leroy Peters, Holy Cross Village Council
9. Steve Powers, Bethel, guides and transporters
10. Andrew Stephanoff, Russian Mission, Lower Yukon Advisory Committee
11. Robert Walker, Anvik, Western Interior Regional Advisory Council
12. Gwen White, Willow, guides and transporters

In addition, James Charles and Greg Roczicka served as alternate representatives for the Y-K Delta RAC, Stan Peters was an alternate for the Lower Yukon AC and Derral Godbee was an alternate for Gwen White.

Mike Smith, Director of Wildlife for Tanana Chiefs Conference (TCC) and Tim Andrew, Natural Resource Director for the Association of Village Council Presidents (AVCP) were invited to participate as technical advisors and were able to attend some meetings. Phillip Demientieff, TCC Holy Cross Subregional Director attended all Working Group meetings. State and federal agency staff involved in the planning effort included:

ADF&G: Beth Lenart, Assistant McGrath Area Biologist; Roy Nowlin, Management Coordinator; Jennifer Eason, Statistics Technician; Toby Boudreau, McGrath Area Biologist; Randy Rogers, Wildlife Planner, and; Caroline Brown; Subsistence Specialist.

U.S. Fish and Wildlife Service: Bill Schaff, INWR Manager; Steve Kovach, INWR Wildlife Biologist; Clara Demientieff, INWR Refuge Information Technician; Polly Wheeler, Office of Subsistence Management, Anthropologist.

Bureau of Land Management: Jeff Denton, Wildlife Biologist

The Working Group met in Grayling in January 2005, in Shageluk in April, in Anvik in July and in Holy Cross in November. All of these communities made an extra effort to host the meetings and there was great involvement from elders, students and others. The hospitality shown by these communities was greatly appreciated.

At the January meeting the group determined that moose hunting within the Innoko River drainage in Unit 21A has an important influence on moose and moose hunters in Unit 21E. The group recommended adding the portion of Unit 21A Innoko drainage to the plan. Based on this

recommendation the name of the group was changed to the Yukon-Innoko Moose Management Working Group, as was the name of the plan, and new boundaries for the planning area were established. In January 2006 the board revised the boundary between Units 21A and 21B so that the Nowitna River drainage is now in Unit 21B and Unit 21A all lies within the Innoko River drainage. The planning area now includes all of Units 21A and 21E.

A second newsletter, now called the Yukon-Innoko Moose Planning News, was distributed in fall 2005. All hunters who reported hunting Unit 21A in recent years and members of the McGrath Advisory Committee were added to the distribution list. This newsletter included a summary of the recommendations being considered for inclusion in the draft plan and a public comment form. Forty-four comments were received in response to the newsletter. The comments showed strong support for the mission and goals of the plan and the regulation changes proposed by the Working Group.

At the November 2005 meeting in Holy Cross the Working Group considered public comments received from the Yukon-Innoko Moose Planning News, new moose population modeling information provided by the ADF&G and reviewed the preliminary draft Yukon-Innoko Moose Management Plan. Members of the YIWG present at the meeting reached consensus on their final recommendations to be included in the plan and regulation proposals to submit to the board.

The regulatory proposals submitted as part of the plan were made available for review and comment by the GASH AC, other ACs and the federal RACs and the public. On February 1, 2006 the GASH AC unanimously voted to endorse the plan. The draft management plan and the associated regulation proposals were considered by Board of Game at their March 2006 meeting. The board endorsed the plan and adopted all the regulation proposals with a few minor modifications. The Federal Subsistence Board endorsed the Yukon-Innoko Moose Management Plan in May 2006.

Primary Issues Identified by the Working Group

Moose Hunting Regulations: 1) With the current moose population and numbers of moose hunters, what changes, if any, are needed in state and/or federal moose hunting regulations to ensure that harvest is within sustained yield and subsistence harvest of moose is given priority?

2) If the moose population declines or if there is a major increase in numbers of hunters, what changes, if any, may be needed in state and/or federal moose hunting regulations to ensure that harvest is within sustained yield and subsistence harvest of moose is given priority?

Managing Predation on Moose: What can be done to manage the effects of predation on moose to prevent a decline in the moose population and maintain an abundant moose population that can provide for human consumptive uses?

Maintaining or Improving Moose Habitat: What needs to be done to maintain or improve moose habitat to ensure that habitat does not become a factor limiting the moose population size?

Cooperative Moose Management: How can we develop cooperative efforts between state, federal, Native and other wildlife and land management programs to improve moose management and increase involvement of local residents and others in the those programs?

Obtaining the Information Needed to Make Wise Management Decisions: What can be done to ensure that quality scientific information, Indigenous Ecological Knowledge and the general knowledge of all users are available to support future moose management decisions?

BACKGROUND INFORMATION

MOOSE POPULATION STATUS

Methods used to count moose

ADF&G used 3 techniques to collect information on moose population dynamics. The moose survey areas used by ADF&G in Unit 21E are shown in Figure 3.

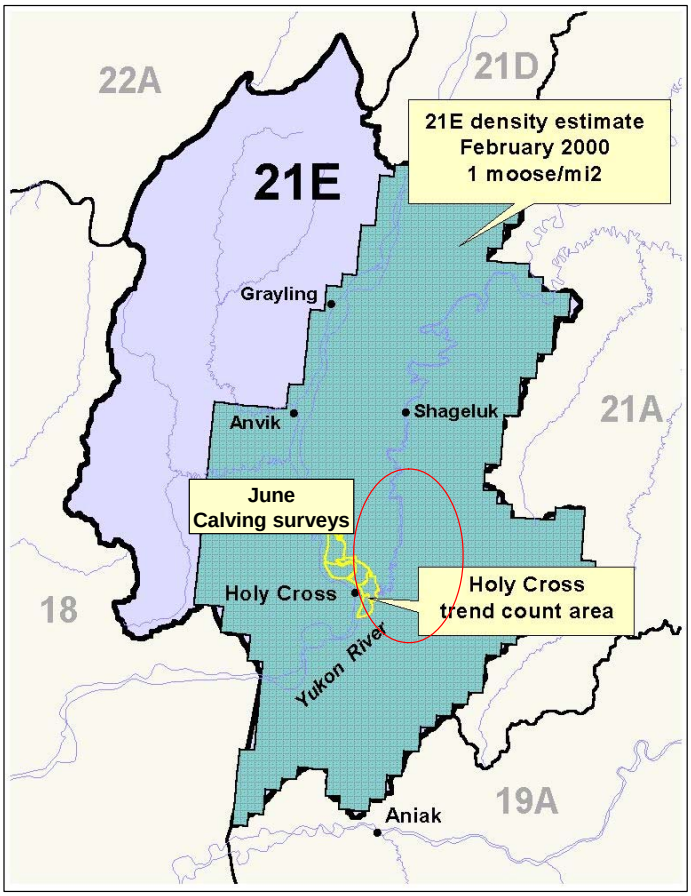


Figure 3. Moose survey areas in Unit 21E.

Fall composition counts provide information on the sex and age composition of the moose population (proportions of bulls, cows, and calves). Those counts are conducted in traditional trend count areas (TCA) during November when snow cover allows moose to be seen from the air. TCAs are frequently established where moose numbers and hunting pressure are greatest.

The Holy Cross TCA encompasses 60 mi^2 along the Yukon River near Holy Cross (shown in yellow in Figure 3). It was established in 1987 and surveyed until 1998. Managers frequently attempt to maintain a ratio of 25–30 bulls:100 cows to ensure adequate numbers of bulls are available for breeding. Calf:cow ratios in most interior GMUs with naturally regulated predator numbers are below 35 calves per 100 cows. Low calf:100 cow ratios are characteristic of populations that receive substantial predation by bears and wolves on summer calves. Where summer predation has been reduced autumn calf:100 cow ratios are often above 40 calves:100 cows. Low calf:100 cow ratios may also result from low birth rates of calves. Calf:100 cow ratios by themselves, do not necessarily indicate declining or increasing trends in population size.

Twinning surveys were conducted during June along the Yukon and Innoko Rivers (shown by the red circle in Figure 3) between Holy Cross, Anvik, and Shageluk from 2000 through 2004 (except in 2001). A twinning survey was also attempted in 2005, but leaf-out occurred early that year resulting in limited sightability and inadequate sample size, negating the survey results. Twinning rates are a general index to the nutritional condition of the moose population. If 25% or more of cows with calves have twins it is unlikely that poor nutrition is limiting production. If twinning rates are consistently less than 20%, forage conditions are probably less than optimal. However, year to year variation can occur as a result of severe weather events. Therefore, low twinning rates in a given year alone may not reflect habitat conditions; but when considered in the context of successive, annual surveys have proven quite reliable.

Estimates of moose numbers in Unit 21E were derived from aerial surveys conducted in late February 2000 and early March 2005 in a 5,070 mi^2 area on the eastern side of Unit 21E (shown by the light green cross-hatched area in Figure 3). From those surveys biologists calculated a density (moose/mi^2) and an index to calf recruitment (% calves in the population). The density estimate calculated from the survey area was extrapolated to derive a population estimate for all of Unit 21E.

INWR moose surveys

The Innoko NWR conducted moose surveys with helicopters since 1994, primarily surveying river corridors where most moose are found. The INWR method of data collection is different than that used by ADF&G. However, ADF&G and INWR Wildlife Biologists collaborated to provide additional insight into the status of moose populations in the planning area. This data has been particularly helpful in the upper Innoko River drainage in Unit 21A where ADF&G has little survey data.

Results of Moose Surveys

Seven surveys were conducted in the Holy Cross TCA between 1987 and 1998. During most years bull:cow ratios and calf:cow ratios were at or above the minimum management objective of 25-30 bulls:100 cows and 30–40 calves: 100 cows (Figure 4). However, the Holy Cross TCA (60 mi^2) contains less than 1% of the land area within subunit 21E (7,995 mi^2), therefore composition data from that small trend area may not accurately reflect population characteristics of the entire unit.

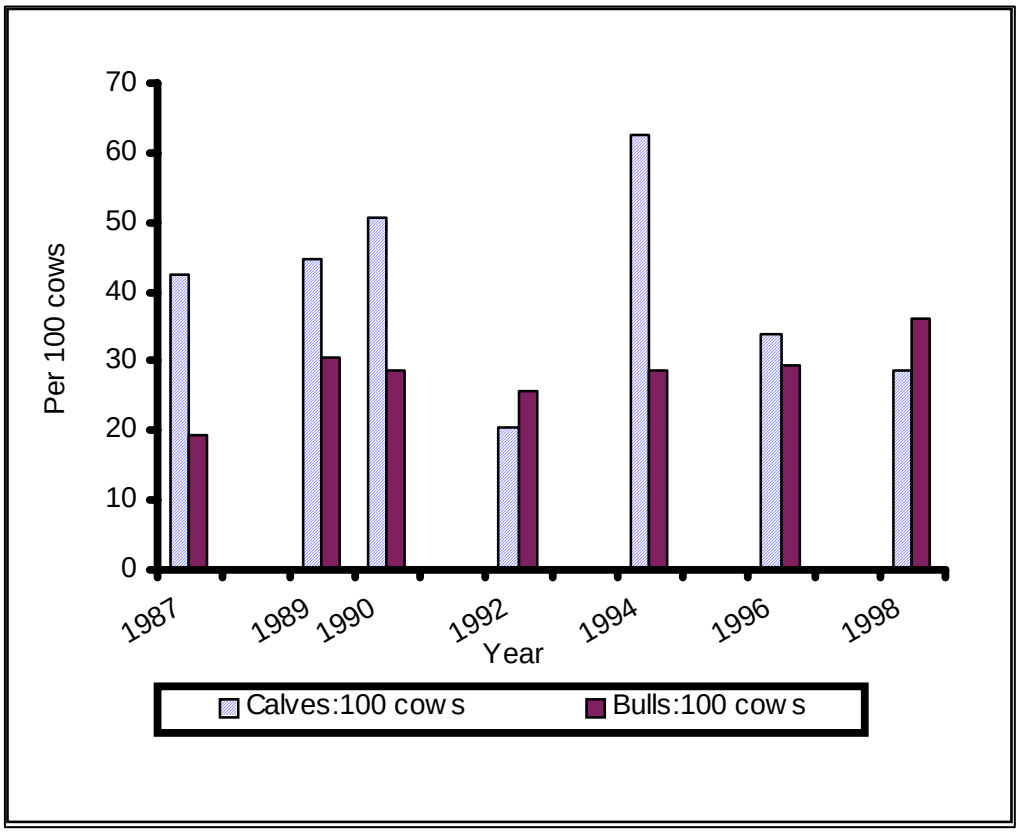


Figure 4. Holy Cross TCA data, 1987- 1998

In most years, twinning rates exceeded 25% in Unit 21E (Table 1). Those data suggest habitat conditions in Unit 21E are not limiting productivity of the moose population.

Table 1. Twinning rates in Unit 21E along Yukon and Innoko Rivers

Year	Number of calf/cow pairs located	Percent twins (%)
2000	36	38
2001	-	-
2002	40	20
2003	47	30
2004	28	32

Moose population estimation surveys were conducted in late February to early March in 2000 and 2005 in a 5,070 mi^2 portion of eastern Unit 21E (Figure 3). In 2000, the moose density was estimated at 1 moose/mi^2 or 5151 moose ± 13% (90% Confidence Interval) with an estimated 16% calves. In February 2005, the moose density was estimated at 0.9 moose/mi^2 or 4673 moose ± 17% (90% CI) with an estimated 18% calves (Figure 5). Because the confidence intervals overlap those estimates do not indicate a detectable change in the moose population size between 2000 and 2005. Extrapolating the spring 2005 survey data to all of Unit 21E results in an estimated moose population size was 7,000–9,000 moose.

The GASH AC, local residents and others reported that moose numbers have been declining, but those observations have not been confirmed by survey results. It is possible moose were at higher densities in the early 1990s, declined throughout the 1990's, but have stabilized since 2000. This could help explain the moose population decline reported by many people familiar with the area.

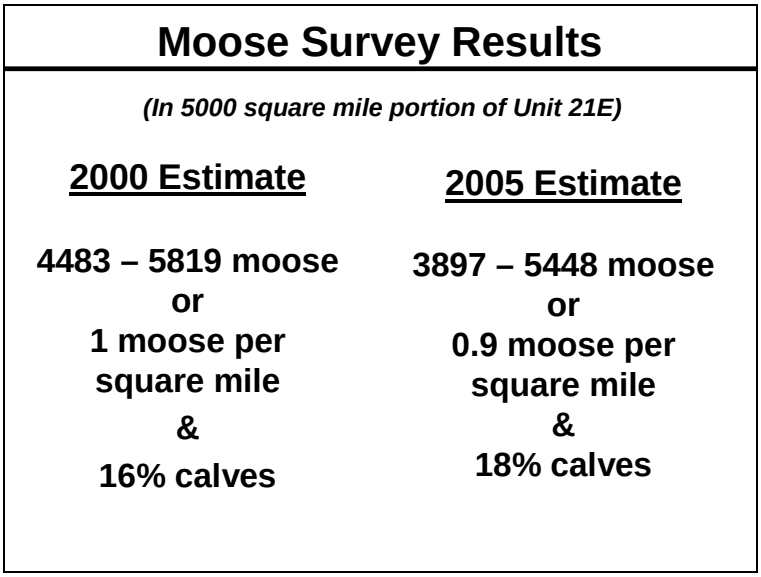


Figure 5. Comparison of the moose population estimation survey results for a 5,000 square mile portion of Unit 21E, 2000 and 2005.

ADF&G has not conducted trend counts, June calving surveys, or spring population estimates on moose in Unit 21A. The INWR has conducted density estimates in the refuge portion of Unit 21A. Based on those surveys, there is an indication that the density of moose along the Innoko River in Unit 21A declined from 1998–2002. Based on the surveys conducted by INWR and extrapolating data from the Unit 21E surveys, we estimate that there are 4,300–6,480 moose in Unit 21A (0.4–0.6 moose/mi^2).

Moose Population Distribution and Movements

Observations from local residents and BLM and INWR staff suggests that large scale movements of moose occur during early winter as moose move to the riparian area along the Yukon River, particularly south of Anvik. Many moose probably come from the Innoko, Anvik, and Bonasila drainages. Some moose may come from Unit 18, Unit 19A, and Unit 21A. During the 1980s, a cooperative moose radio-telemetry study was conducted by INWR, BLM, and ADF&G. Fifteen cows and 20 bull moose were radiocollared. Approximately half of the cows and 25% of the bulls spent their entire year in the lowlands. The remaining moose spent their winters in the lowland and summers in the mountains. Two bulls spent their entire year in the mountains. One bull and 1 cow showed extreme movements. The bull was caught near Holikachuk and spent his summers in the upper Iditarod River area. The cow was caught north of Holy Cross and spent her summers down river of Mountain Village.

MOOSE HARVEST

The department uses two methods to determine the number of moose harvested in an area. These are: 1) harvest tickets whereon a hunter reports activities of the hunt on a report card that is mailed to the department, and 2) household surveys conducted by the Division of Subsistence that involve house to house interviews with hunters and their families to determine the number of moose harvested.

In a paper published in 1992 Bill Gasaway, et. al. estimated that harvest is under-reported by urban residents of Alaska by approximately 17%. In many areas of rural Alaska harvest ticket returns probably report only 28% to 50% of the actual total harvest. Data from household surveys are likely to give more accurate estimates of resident harvest in surveyed communities. Nonresident harvest is assumed to be reported fairly accurately on harvest tickets.

The harvest of moose in Unit 21E, as reported on returned harvest tickets, increased during the early-mid 1990s, remained at about the same level for a few years, and declined since 2000 (Figure 6). During 1994–2001, a large proportion of the harvest (and hunters) came from Unit 18, however, since that time the numbers of hunters from those areas declined (Figure 7). Harvest in Unit 21E by other Alaskan residents has also declined somewhat in recent years. There has been a slight increase in the numbers of nonresident hunters, although the number of moose harvested is small at about 30 moose. Harvest data shown in Figures 6 and 7 only reflect harvest ticket reports and are likely underestimates. Harvest ticket report data that has recently become available for the 2005 season show a slight decline in total numbers of hunters (206) and number of moose harvested about the same as 2004 at 118 moose.

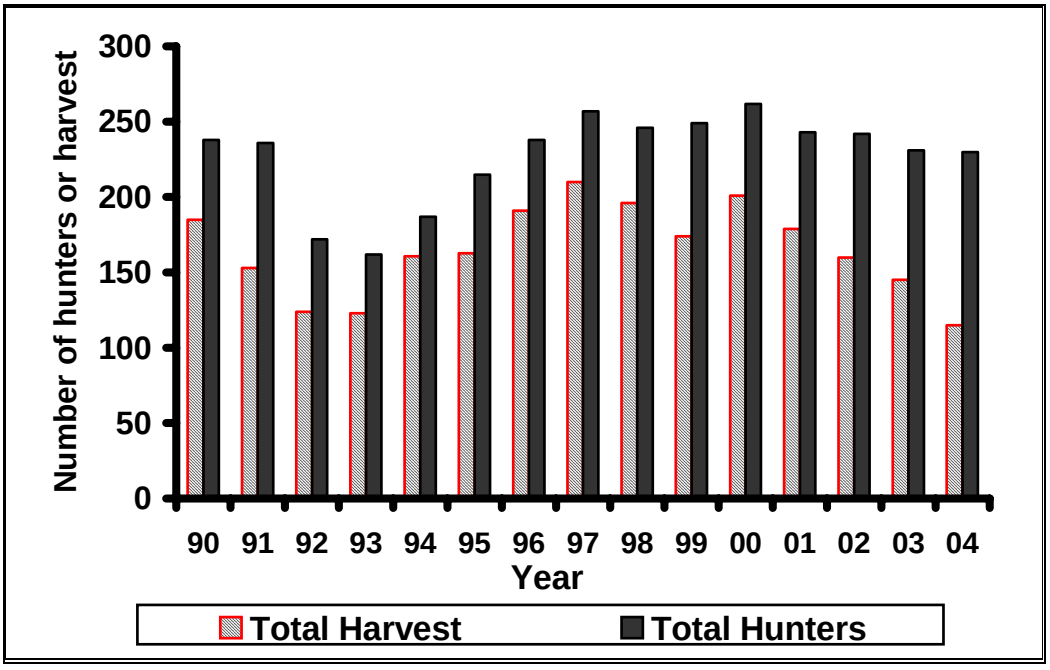


Figure 6. Unit 21E Moose harvest and hunters, 1990-2004.

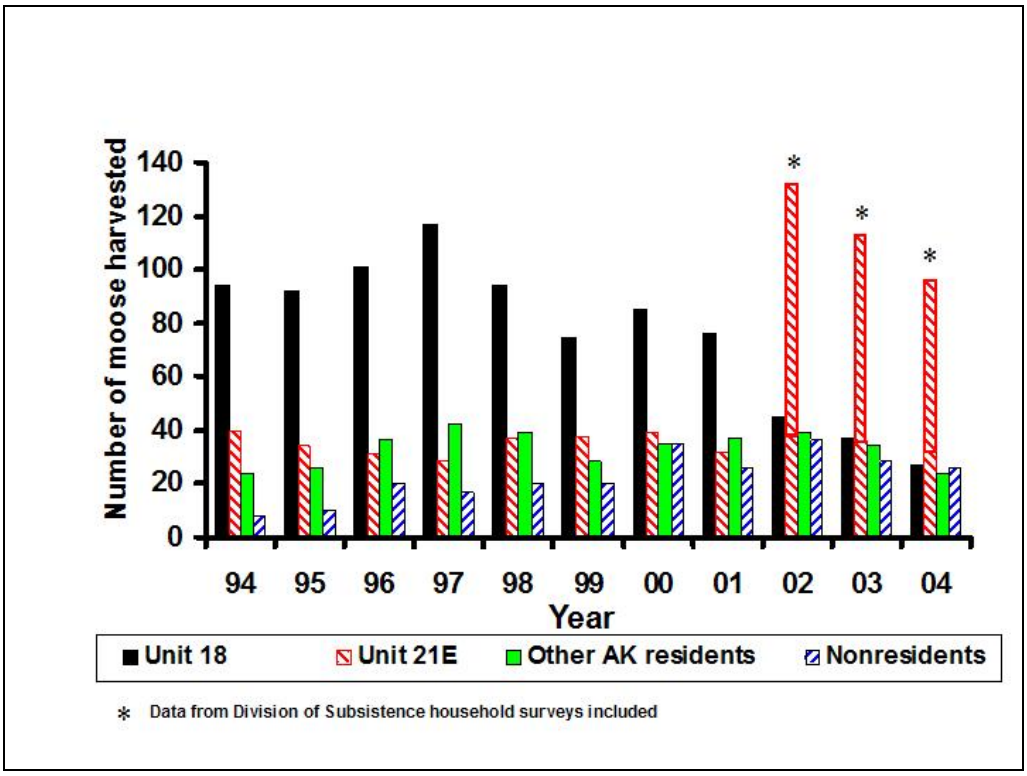


Figure 7. Number of moose harvested by residency in Unit 21E, 1994-2004.

The Division of Subsistence conducted household surveys in Grayling, Anvik, Shageluk and Holy Cross to estimate subsistence harvest of big game species for the regulatory years of 2002-03, 2003-04 and 2004-05. For the regulatory years 2002, 03 and 04 the bars in Figure 7 depicting harvest by residents of Unit 21E have been extended to show the total estimated harvest based on Division of Subsistence household survey data. Table 2 provides a comparison of the harvest of each big game species for all three years.

Table 2. Comparison of big game harvests between all survey years.

Species	Total		
	2002-2003	2003-2004	2004-2005
Moose	133	118	94
Caribou	2	2	2
Black Bear	0	5	3
Brown Bear	0	1	0
Wolf	39	52	54

During the three years surveyed, moose harvest by residents of the Unit 21E has declined from 133 moose to 94 moose. Harvest was unusually low in 2004-05 due to low water and forest fires than burned all the way into the moose hunting season. For comparison, a March 2002 report to the Board of Game the Division of Subsistence estimated the average annual harvest of moose by residents of Unit 21E from 1996-1999 to be 226 moose. In recent years annual harvest has included approximately 20-25 cows.

Because harvest ticket reports alone are not reliable and household survey data in only available for local communities, the following approach was used to estimate total harvest by Alaska residents in Unit 21E.

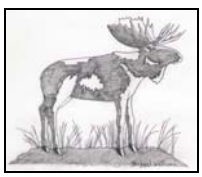
1. Harvest of moose by residents of Unit 21E was estimated by taking an average of the harvest reported in subsistence use survey data. The average includes an estimate provided to the board in 2002 for average harvest during the years 1996-99 (226 moose), 2002-03 (133 moose), 2003-04 (118) and 2004-05 (94). This results in as estimated average harvest of 143 moose by residents of Unit 21E.

2. The estimate of the average moose harvest by residents of Units 18 and 19 was developed by taking an average of reported harvest during the five years from 2000-2004, and then multiplying that number by 2 to account for an estimated 50% non-reporting factor. Initially, in Working Group discussions reporting was estimated at 33% based on information used in a board determination of the amount of moose necessary for subsistence in Unit 19. In further discussion members of the YIWG felt reporting was better that 33% and recommended using a 50% non-reporting factor. The result is an estimate of an average of 127 moose harvested in Unit 21E by residents of Units 18 and 19.

3. The average reported harvest from Alaska residents who live outside of Units 18, 19 was calculated by taking an average of the reported harvest during the five years from 2000-2004 and then increased to account for an estimated non-reporting factor of 17%. The result is an estimated average annual harvest of 41 moose by Alaska residents from outside Units 18, 19 and 21E.

The result is an estimated average annual harvest of 311 moose in Unit 21E by all Alaska residents, for both subsistence and non-subsistence users. The average nonresident harvest between 2000 and 2004 was 30 moose. Rounded-off, this makes the total estimated annual moose harvest in Unit 21E 340 moose.

All of the harvest data collected in Unit 21A comes from harvest ticket reports. Most hunters use airplanes to access the area to conduct float hunts. Some hunting by residents of Shageluk and Grayling occurs on the main Innoko River and above the confluence of the Innoko and Iditarod Rivers. Hunting by residents of Takotna occurs near Ophir in the headwaters of the Innoko River. The number of hunters in Unit 21A has remained relatively constant since 1994, but reported harvest and success rates have declined since 1999 (Figure 8). Beginning in 1999, nonresidents harvested more moose than resident hunters except for 2004 (Figure 9). The average reported harvest from 2000-2004 was 61 moose. During that period the average resident harvest was 28 moose and the average nonresident harvest was 32 moose.



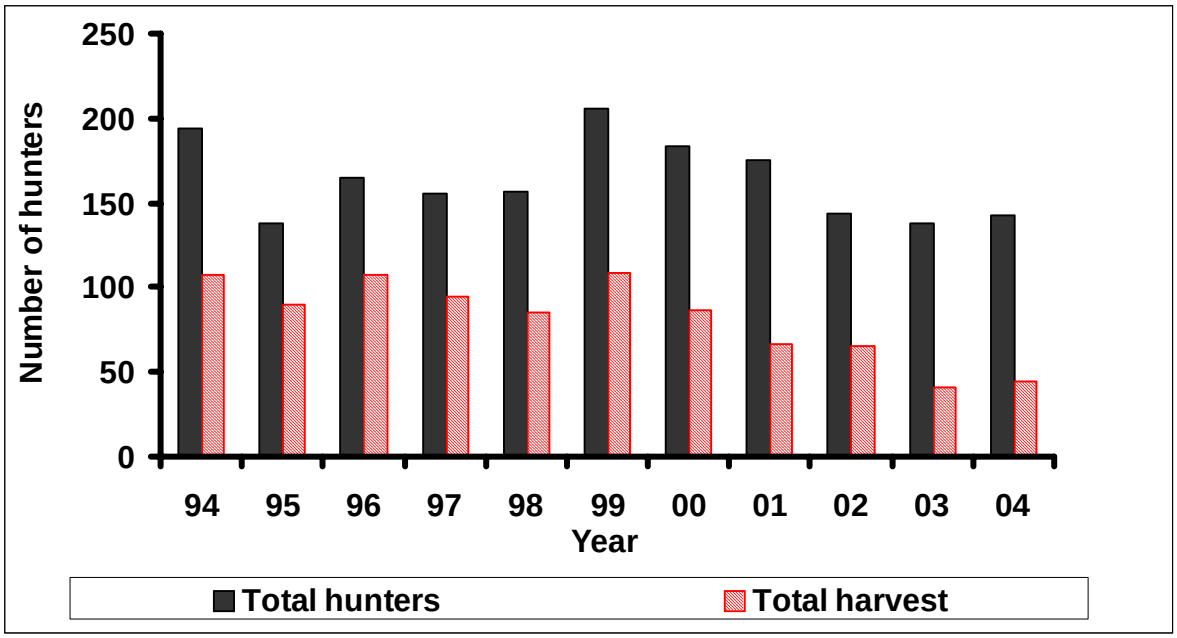


Figure 8. Reported numbers of hunters and moose harvest in the Innoko drainage in Unit 21A.

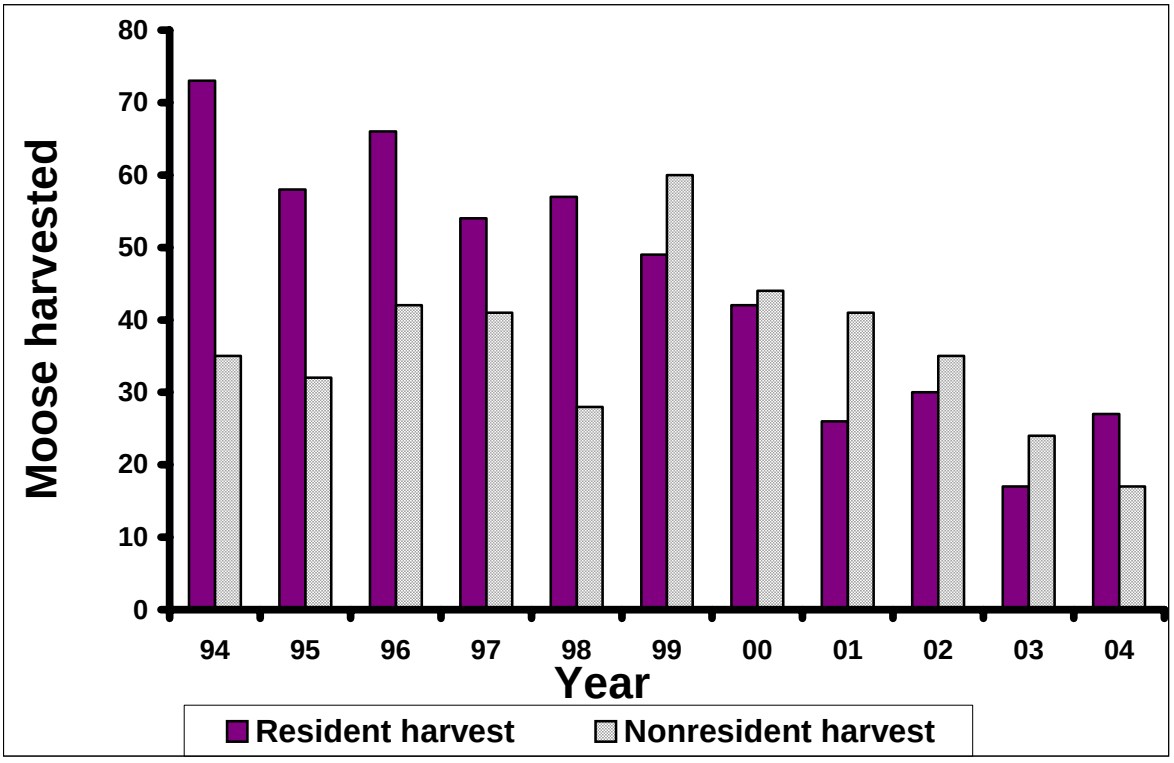


Figure 9. Reported resident and nonresident moose harvest in the Innoko drainage in Unit 21A.

BEARS AND WOLVES

ADF&G has not conducted wolf, black bear, or brown bear surveys in Unit 21E. The estimates in Table 3 are extrapolated from predator densities determined in other areas where habitat and prey densities were similar to those of Unit 21E.

Reported harvests of wolves and grizzly bears are relatively low (Table 3). Some wolf and grizzly hides used locally for handicraft items are not reported. There is no requirement to seal black bear hides and skulls so the harvest is unknown although an average of one black bear is voluntarily sealed each year. Table 2, above, which shows data from Division of Subsistence surveys provides a more accurate estimate of the harvest of black bears, brown bears and wolves by residents of Unit 21E.

Table 3. Extrapolated estimates of wolf, grizzly, and black bear populations and reported harvests of wolves and grizzly bears in Unit 21E, 2000-2004.

PREDATOR	Extrapolated Population Estimates	AVERAGE REPORTED HARVEST (years: 2000—2004)
Wolves	180—240	29 wolves/year
Grizzly Bear	120—200	5 grizzly bear/year
Black Bear	800—1200	1 black bear/year

The number of bears and wolves in Unit 21A has not been estimated. During 2000-2004, an average of 9 wolves and 2 brown bears were reported harvested annually. Black bears from Unit 21A are not required to be sealed; approximately 1 black bear per year was voluntarily reported harvested.

CONDITION OF THE MOOSE HABITAT

Moose forage changes with season. In late summer/autumn the best range is often in meadows (commonly diamondleaf willow). In winter the best range is found along large rivers (commonly feltleaf willow). Moose need to build adequate fat reserves by autumn to make it through the winter. Eating winter forage slows the consumption of body reserves; but does not allow a moose to gain weight. Good winter range (abundant forage within reach of moose) allows moose to survive severe winters. Forage between 18 inches and 10 feet tall is considered "available" to moose during the average winter.

Based on browse information from Units 19D and 18, moose density in Unit 21 E and twinning rates in Unit 21E, habitat is probably not limiting moose population growth in the GASH region. Habitat enhancement alone is not likely to cause a moose population increase in 21E and 21A. However, allowing natural forces to create or rehabilitate successional forage communities used by moose is a good long-term strategy that will allow for increased moose abundance if other limiting factors are managed.

In spring 2006, ADF&G conducted a moose browse survey in Unit 21E. Survey crews also measured snow depth and noted age of dominant plant species at each site. A total of 77 sites were visited and the helicopter landed at 29 sites, plus three subjective plots of high production in tall shrub.

Observers noted abundant feltleaf willow on the islands and floodplain of the middle Yukon River and diamondleaf willow in extensive meadows adjacent to the Yukon and lower Innoko Rivers provide high potential for moose population growth. Portions of most islands had lower terraces with cohorts of feltleaf willow 1-5 yrs old. However, similar to GMU 19A, browse availability is much less than historic highs because of decades since the last major flood disturbance, allowing large stands of feltleaf willow on higher terraces to grow beyond reach by moose. Lateral stems on the bole of feltleaf trees still provide available forage, although at far lower production than primary succession in the active floodplain. Snow was deep enough this year (average 0.7 m, range 0.3-1.0 m) to begin restricting moose movements to sites with higher biomass production or quality.

MANAGEMENT RECOMMENDATIONS

MOOSE POPULATION AND HARVEST MANAGEMENT

Goal 1A: Achieve the Intensive Management[1] moose population and harvest objectives for Unit 21E (a population of 9,000–11,000 moose with a harvest of 550–1,100 moose).

The March 2005 estimate of the moose population in Unit 21E was 7,000–9,000. The upper end of this population estimate corresponds to the lower end of the Intensive Management (IM) population objective (Table 4). It is most likely that the population is lower than the IM population objective. The estimated allowable harvest of moose in Unit 21E based on the 2005 population estimate and using a 4% harvest rate is 280–360 moose. The estimate of the current average harvest in Unit 21E is 340 moose, near the upper end of the range of the allowable harvest. A significant increase in the moose population would be necessary before harvest levels could be increased to achieve the IM harvest objective.

Table 4. Comparison of IM objectives with current moose population and harvest levels in Unit 21E.

Intensive Management Objectives for Moose in Unit 21E (5 AAC 92.108)	Current Estimated Moose Population and Total Harvest for Unit 21E
Population: 9,000 – 11,000 moose	Population: 7,000 – 9,000
Harvest: 550 – 1,100 moose	Estimated Harvest: 340

[1] Intensive Management (IM) means active management to maintain high levels of game for human harvest using a variety of techniques that could include predation control, habitat improvement and manipulation of seasons, bag limits, and methods and means.

Goal 1B: Maintain or increase moose numbers and harvest levels in Unit 21A.

Based on the low average number of moose harvested in the past, the board made a negative finding for application of IM in Unit 21A. Due to this finding the board did not establish IM population and harvest objectives for Unit 21A. Nonetheless, the Innoko River drainage is used for moose hunting by residents of Unit 21E, Takotna and McGrath, other Alaskans and nonresidents. The moose population in the Innoko drainage in Unit 21A is at a fairly low density but there is also relatively little hunting pressure. While there is not a large number of moose taken in this portion of the planning area it still provides an important contribution to the overall moose hunting opportunity in the region and management efforts should be directed toward maintaining or increasing this opportunity.

Current harvest in Unit 21A is believed to be within the allowable harvest using the recommended 4% harvest rate. At the same time, success rates have declined in recent years. A moose population estimation survey is tentatively scheduled for Unit 21A in 2008. Following that survey harvest management should be re-evaluated.

> Action Taken: The YIWG made no recommendations for changes to the moose hunting regulations in Unit 21A. The board did, however, amend a public proposal and shortened the nonresident season in Unit 21A by five days. This aligns the nonresident seasons in Unit 21A and 21E so they are both September 5-20 and is consistent with the Working Group's recommendations to manage moose harvest conservatively (Recommendation 1.8 below describes moose hunting regulation changes in Unit 21E).

Strategy 1A: Establish a framework for state and federal moose hunting regulations designed to maximize hunting opportunity when possible but which will also ensure that harvest remains within sustained yield and that priority for subsistence uses of moose is provided when restrictions in harvest are needed.

Strategy 1B: Manage harvest to help ensure the moose population remains stable or growing by periodically calculating the harvestable surplus of moose based on the most current moose population data and other information such as weather and predation and then adjusting harvest management as needed.

Objective 1A – Harvest Rate: Manage harvest conservatively throughout the planning area with a harvest rate less than or equal to 4% of the estimated moose population.

Harvest should be directed predominantly at bulls. The total allowable harvest includes any cow harvest that may be allowed (see the recommendations on managing cow harvest identified below). If the moose population in Unit 21E is documented to be within the mid to upper range of the IM population objective an increased harvest rate can be considered. Harvest levels should be adjusted, if needed, based on a 3-year mean estimated total harvest and the most recent moose population data.

Objective 1B – Moose Harvest by Alaska Residents: Provide the opportunity for harvest of approximately 310 moose in Unit 21E by residents of communities in Unit 21E and other Alaskans.

Alaska residents harvest an estimated average of 310 moose each year in Unit 21E. The average Alaska resident harvest for the Innoko River drainage in Unit 21A from 2000-2004 based on harvest ticket reports alone is 28 moose.

The board has determined that there is customary and traditional subsistence use of moose in Unit 21, and 600-800 moose is the Amount Reasonably Necessary for Subsistence (ANS) within all of Unit 21. Because all Alaska residents are potentially qualified as subsistence hunters it is difficult to distinguish between subsistence and non-subsistence harvest by Alaska residents. Nonetheless, the estimate of Alaska resident harvest of moose in Units 21E and 21A can be used in combination with moose population information to help judge when restrictions in non-subsistence harvest may be needed in order to provide the required priority for subsistence uses by Alaska residents. The estimate of total resident harvest in Unit 21E is not intended to be used as an ANS number. If the board were to consider a revised ANS for Unit 21 or an ANS for Subunit 21E, all available data should be re-examined and taken into consideration.

Recommendation 1.1: The ADF&G should periodically review the level of subsistence use of moose in Unit 21E and the other subunits of Unit 21. If subsistence needs change, the board should re-examination the ANS for Unit 21 and, if necessary, increase or decrease the number of moose needed for subsistence.

Moose Population Management Objectives

The following objectives define the desired status of the moose population. Some of the objectives will be easier to achieve than others. For example, in 1998 the bull:cow ratio was estimated at 36 bulls:100 cows and meets the objective described below. In contrast, the moose population will have to grow significantly, or moose mortality from predation would have to be significantly reduced, in order to meet the IM harvest objective of 550–1,100 moose.

Objective 1C – Intensive Management in Unit 21E

- Manage to achieve the IM population objective of 9,000–11,000 moose
- Manage to achieve the IM harvest objective of 550–1,100 moose

Objective 1D – Bull:Cow Ratios for the Planning Area

- Manage for a minimum fall post-hunt ratio of 25–30 bulls: 100 cows.

Objective 1E – Calf:Cow Ratios for the Planning Area

- Manage for a minimum fall post hunt ratio of 30–40 calves: 100cows.

Objective 1F –Calf Over-winter Survival for the Planning Area

- Manage for a minimum calf over-winter survival of 20% of the total population in late winter moose population surveys.

Recommendations for Moose Harvest Management in Unit 21E under Present Conditions

This section provides recommendations for moose harvest management at the current moose population level (7,000 – 9,000 moose) and numbers of hunters (about 225). The next section provides recommendations on how harvest management might change if the moose population increases or decreases or if there were to be a significant change in the numbers of hunters in the area.

The Working Group carefully considered available moose population and harvest information and evaluated many options for possible changes to the hunting regulations in Unit 21E. An important factor taken into account by the Working Group was the closure of the state winter antlerless moose seasons that occurred in 2003 based on the recommendation from the GASH AC. This winter season closure resulted in reduced subsistence hunting opportunity while nonresident hunting opportunities were not reduced at that time.

Early in the planning process it was thought that the allowable harvest of moose in Unit 21E was large enough to accommodate all the existing uses and few, if any, additional restrictions would be needed. When moose population modeling information provided by the department indicated that a more conservative harvest level would be required to prevent a decline in the moose population, it became apparent that additional measures were needed to ensure that harvest does not increase at the current moose population level. The recommended changes to the moose hunting regulations, some of the rational behind them and the action taken by the Board of Game are described below. There is also a list of some of the alternative ideas for changing moose hunting regulations that were considered and rejected by the Working Group.

Recommendation 1.2: Provide for a small harvest of antlerless moose in the winter in Unit 21E (no more than 40 cows annually) by keeping the state winter season closed and the federal season (Feb. 1-10) open.

Recommendation 1.3: If the total cow harvest in Unit 21E (including cows taken in the federal season and those taken for potlatches and other estimated cow harvest) exceeds 40, use public information and education programs to encourage reducing cow harvest. If cow harvest remains greater than 40, consider the need to recommend closing the federal winter season.

The YIWG reaffirmed the action taken by the GASH AC in January 2003 by agreeing that a large cow harvest would be detrimental to the moose population and a state winter season for antlerless moose should not be proposed. The group recommended keeping the federal winter season for any moose from February 1-10. The federal season applies only on federal lands and is only open to federally qualified subsistence users who are residents of Unit 21E and Russian Mission. With limited eligibility for this hunt there is only a small harvest of cow moose in the winter (approximately 20-25 cows in recent years). This allows some opportunity for winter harvest of moose by local residents but does not have a significant affect on the moose population. A winter season under state regulations open to all Alaska residents would likely have a significantly higher harvest of cow moose that could be detrimental to the moose population. In the past it was estimated that possibly up to 150-200 cows were being taken in

winter when the state season was open, although there is no reliable harvest reporting data to document the exact harvest.

Recommendation 1.4: Develop information and education programs to encourage better harvest reporting, and understanding of state and federal hunting regulations. Components of the program should include: 1) an explanation of how the hunting regulatory year of July 1 – June 30 works; 2) the requirements for harvest reporting under both state and federal regulations, and; 3) clarify that there is a one moose bag limit per regulatory year that includes the fall and winter hunts (Some of this information will be included in a winter 2007 issue of the Yukon-Innoko Moose Planning News).

In recent years knowledge of subsistence harvest of moose by communities in Unit 21E has been greatly improved through the community household surveys conducted by the Division of Subsistence, made possible by funding from the FWS/OSM. Members of the YIWG expressed concern that if household surveys are not continued there may not be good data to determine the number of cows being taken.

Recommendation 1.5: When household subsistence use surveys are discontinued in Unit 21E, federal subsistence managers and/or the ADF&G should work with tribal councils to track winter harvest in each village eligible to participate in the federal winter hunt in Unit 21E. This effort should also apply to a state winter hunt if one is opened in the future.

At the time this final plan was prepared there was no longer funding available to conduct household subsistence use surveys in communities in Unit 21E. At the January 2007 GASH AC meeting, ADF&G staff will discuss working in cooperation with tribal councils and the FWS to track winter moose harvest.

Recommendation 1.6: Maintain the current August 20–September 25 federal subsistence moose hunting season in Unit 21E.

The early federal season opening provides some opportunity for federally qualified local rural residents to take a moose before hunters from outside the area are present. The early opening does not change in the total number of moose harvested by local residents. The YIWG determined it would be better to keep this early season opportunity than to endorse a proposal to extend the fall season to October 1 when bulls may be going into rut and quality of the meat may be reduced.

Recommendation 1.7: Maintain the Paradise Controlled Use Area as currently established.

The Paradise Controlled Use Area (PCUA) prohibits use of aircraft for hunting moose in the core area between the Yukon and Innoko Rivers used by local residents and others who hunt by boat. Eliminating or changing the PCUA could result in an increase in the number of hunters and harvest level in this portion of Unit 21E and possibly result in a need for more restrictive hunting regulations. There were no comments or suggestions for changing the PCUA received from the public during the planning process.

Recommendation 1.8: Revise the nonresident moose hunting regulations in Unit 21E by:

1. Reduce the nonresident season length by 5 days to make a 15 day season from September 5-20.
2. Establish a drawing permit system for nonresident moose hunting in Unit 21E and conduct the drawing in the early winter.
3. Change the nonresident bag limit to any bull.

Currently there is not a large number of nonresident hunters or a large number of moose harvested by nonresidents in Unit 21E. Of the estimated 340 moose harvested annually in Unit 21E, the average nonresident harvest between 2000 and 2004 was 30 moose. Through action taken by the GASH Advisory Committee to close the state winter season to conserve cow moose, subsistence hunting opportunity has already been reduced. If further restrictions in moose harvest are needed to ensure the moose population does not decline, the board must consider reducing nonresident hunting opportunity first.

The concept of the recommended changes to the nonresident moose hunting regulations in Unit 21E is to begin more closely managing nonresident hunting while not greatly changing nonresident hunting opportunity or number of nonresident hunters at the current moose population level. Taking 5 days off the end of the nonresident season may reduce nonresident harvest to some degree and will also provide opportunity for harvest by Alaska residents with less competition from nonresident hunters.

The recommendation for the drawing permit system is to issue a sufficient number of permits to maintain the current level of nonresident hunting unless the status of the moose population changes. Having a nonresident drawing system in place provides the ability to more closely monitor and control harvest and to reduce or increase the numbers of permits and the level of nonresident hunting in the future if needed. The drawing permit application period should be in winter to allow successful applicants more time to make logistical arrangements and contract with a guide, if they choose to do so. With a permit system in place the level of nonresident harvest can be controlled without use of antler restrictions. This may result in fewer of the large breeding bulls being taken by nonresident hunters.

The ADF&G should be authorized to issue up to 100 nonresident drawing permits. The first year of the hunt 60 permits should be issued. With a 50% success rate, approximately 30 moose would be taken which equals the current level of nonresident harvest. After the initial year, permit numbers should be adjusted according to the success rate of nonresident hunters and the status of the moose population. The number of permits should be reduced if the success rate is greater that 50% or the moose population declines and can be increased if success rates are low or the moose population increases.

> Action Taken: The Board of Game adopted the YIWG proposal with an amendment to keep the bag limit for nonresident hunters as one bull with antlers 50-inch or greater or 4 brow tines on one side. The nonresident season was reduced by 5 days to September 5-20 beginning in the fall 2006 season. The nonresident drawing permit system goes into

effect for the fall 2007 season. This hunt is included in the Winter Drawing Permit Hunt Supplement with the deadline for applications being in early December. Successful permit applicants will be notified in January. The Board also added language to allocate up to 20% of the nonresident drawing permits to guided hunters and at least 80% of the permits to non-guided hunters.

Harvest Management Recommendations for Unit 21E Considered by the Working Group but Rejected

- Re-establish an antlerless moose winter season under state regulations.
- Close the federal winter season and align the fall federal season length with the state season.
- Establish a state resident season for antlered bulls during Dec. 1-10.
- Extend the fall moose hunting season under state and federal regulations to October 1.
- Reduce the nonresident season by taking 5 days from the beginning of the season.

Recommendations for Moose Harvest Management in Unit 21E if Conditions Change

If the moose population declines or if there are significant increases in numbers of hunters in the area it may be necessary to implement more restrictive harvest regulations. On the other hand, if the moose population is shown to be increasing and is well within the IM objectives it may be possible to increase hunting opportunity. If the IM population objective is achieved and data indicate good productivity and recruitment in the moose population, then higher harvest rates and either sex hunts can be considered.

Strategy 1C: Implement a more restrictive harvest management program if needed to maintain the moose population, stay within the harvest rate of 4% and/or to provide a reasonable opportunity for subsistence uses by residents of Unit 21E and other Alaskans.

Implementation guideline: Adjust harvest levels if fall composition counts indicate ratios < 25 bulls:100 cows or < 30 calves:100 cows. Recommendations for revised harvest regulations should be developed in consultation with the GASH AC and others and available for public comment through the board regulatory process.

If there were to be large increases in the number of nonresident hunters and a larger portion of the harvestable surplus were being taken by nonresident hunters, it may become necessary to reduce nonresident hunting opportunity to provide reasonable opportunity for subsistence. Further, if a large proportion of the harvestable surplus were being taken by non-local Alaska residents such that residents of Unit 21E (for which a large portion of the ANS is based upon) do not have a reasonable opportunity for subsistence, it may become necessary to provide mechanisms to emphasize customary and traditional subsistence use patterns, while still providing opportunity for all Alaska residents (for example, a resident registration permit system). In the extreme worst case situation state Tier II permits could be required and hunting on federal lands could be restricted to rural residents who are qualified under federal regulations.

Recommendation 1.9: If the federal customary and traditional subsistence use determination (C&T) for Unit 21E is revised to make a large number of additional communities eligible, the federal winter season should be eliminated.

The YIWG considered the topic of the federal customary and traditional (C&T) use determination for Unit 21E. C&T use determinations establish who is eligible to participate in the federal subsistence moose hunting seasons. Currently Shageluk, Grayling, Anvik, Holy Cross and Russian Mission are the only communities identified as having C&T use of moose in Unit 21E. The Working group did not identify this topic as a major issue to be considered in this plan, instead electing to focus on measures to ensure that total harvest is sustainable and defer recommendations on the C&T determination to the involved federal regional advisory councils (RACs).

A change in the federal customary and traditional use determination for Unit 21E moose to include communities in Unit 18 and possibly Unit 19A may still be pursued by others and could greatly increase the number of hunters eligible for the federal winter hunt. Should this occur, the antlerless harvest in the federal winter hunt would likely result in excessive harvest. If proposals are submitted into the federal regulatory process to change the federal C&T determination for moose in Unit 21E, the issue will have to be addressed by the WIRAC, the Y-K Delta RAC, and ultimately the FSB. A proposal to close the federal winter moose season in Unit 21E should be submitted and considered concurrently by the FSB.

Strategy 1D: Increase opportunities for moose harvest if the moose population is documented to have increased and productivity is high.

If the moose population reached 10,000, the mid point of the IM population objective, the harvestable surplus with a 4% harvest rate would be 400 moose or, if the harvest rate were increased to 5% it would be 500 moose. In the latter situation it would likely be feasible to consider increasing the harvest quota under the federal winter hunt, establishing a winter season opening under state regulations and possibly increasing the number of nonresident permits.

Recommendation 1.10: If the moose population increases, is within the IM population objectives and composition counts and other data indicate high productivity, consider expanding winter hunting opportunities, including providing for increased cow harvest and increasing nonresident hunting opportunity.

Criteria for evaluating the allowable harvest of antlerless moose:

- If the population is determined stable (e.g. current midpoint of 8,000 moose from 2005 estimate), maintain a cow harvest not to exceed 0.5% of the population (40 cows).
- If there is an indication that the population has increased to approximately 9,000 moose (based on either spring density estimates and/or short yearling survival), then consider allowing an increased cow harvest to 0.8% of the population (72 cows).
- If the population achieves the Intensive Management objective of 10,000 moose, a harvest at least 1% (100 cows) could be sustained and if there are indications that the population is growing, consider opening an antlerless season under state regulations.

If changes in harvest management are needed in the future they should follow the sequence below. Going down the list, more restrictive harvest would be implemented while going up the list (with some terminology changes) would define the sequence for increasing hunting opportunity. This sequence can be used as a general guideline for the plan and actual decisions on changes in harvest management would be made through the regulatory processes of the board and FSB.

1. Close the state winter season to reduce cow harvest (This was done in 2003 when the GASH AC voted against reauthorization of the winter antlerless season in Unit 21E).

2. Shorten the nonresident season and/or establish a nonresident drawing permit system to more closely monitor nonresident harvest and prevent a large increase in nonresident hunters (this action is recommended as part of the YIMMP).

The YIWG recommends that an Intensive Management Implementation Plan be prepared and submitted to the board at this level of harvest reduction (Refer to the recommendations below on moose predation management).

3. Reduce or eliminate nonresident drawing permits.

4. Establish a resident registration permit system that emphasizes customary and traditional subsistence use patterns or use other options for reducing resident harvest.

5. Eliminate the federal winter season.

6. Establish a Tier II hunt to allocate among subsistence users in state regulations.

7. Recommend closing moose hunting on federal lands in Unit 21E to all but federally qualified subsistence users.

8. Allocate among federally qualified subsistence users according to federal law.

9. Implement a closure on all moose harvest.

MOOSE PREDATION MANAGEMENT

Causes of moose mortality include harvest by humans, predation and other natural causes such as disease and environmental factors. Flooding frequently occurs along the Yukon and Innoko Rivers during spring breakup and, at times, may increase spring calf mortality. This section addresses the predominant cause of moose mortality which is thought to be predation by wolves, black bears and brown bears.

Recommendations for managing predation on moose are broken down into two categories. First there is a strategy and recommendations designed to reduce the level of predation on moose through hunting and trapping efforts and public education. The second strategy is to apply more active management of predation according to the state Intensive Management laws. This strategy includes consideration of measures such as establishing an aerial wolf predation control program.

Through the first several meetings of the YIWG the main emphasis of the group was to identify options for reducing predation on moose through the efforts of local residents and other hunters. At the November 2005 YIWG meeting moose population modeling information provided by the department showed a need to use a conservative harvest rate to prevent a decline in the moose population. This, in turn, resulted in a recalculation of the allowable harvest and suggested that current harvest is already at the maximum sustainable harvest. As mentioned in the above section on moose population and harvest management, the YIWG agreed on a recommendation for a nonresident drawing permit program to help prevent an increase in the current level of harvest. It also became apparent that any significant decline in the moose population would result in the need for further harvest reductions to prevent a major decline in the moose population. At this point, following an extensive discussion of options for managing predation on moose, members of the Working Group agreed that it would be necessary to recommend a wolf predation control program to the board in order for the plan to achieve the mission to be proactive and prevent a decline in the moose population.

Goal 2: Manage the effects of predation on moose to maintain an abundant moose population that can provide for high levels of human consumptive uses consistent with the IM population and harvest objectives.

Objective 2A: Reduce the effects of predation on moose so there are no less than 20% short-yearlings (calves from the previous year) in the moose population in late winter surveys.

This objective is consistent with moose population management objective 1F. Generally speaking, late winter short-yearling survival can serve as an indication of the level of predation on moose calves throughout the year.

Strategy 2A: Manage the level of predation on moose by harvesting enough wolves, black bears and grizzly bears under state and federal hunting and trapping regulations to reduce the level of predation on moose so that the moose population remains stable or increases.

The actions below are recommended to help reduce the effects of predation on moose. None of these actions alone are anticipated to have a major effect on predator populations. Together they may help to reduce overall predation and benefit the moose population.

Recommendation 2.1: Waive the $25 resident tag fee for grizzly bears in Unit 21E and recommend annual reauthorization of the waiver.

Residents who are reluctant or unable to purchase the $25 tag before hunting will be able to opportunistically and legally harvest brown bears. Collectively, the harvest may contribute to a reduction in grizzly bear predation on moose calves.

Action Taken: The board adopted the proposal to waive the $25.00 resident grizzly bear tag fee in Unit 21E.

Recommendation 2.2: Authorize use of snowmachines for taking wolves in Unit 21E.

Allowing use of snowmachines to take wolves will increase the ability of local residents to harvest wolves and help reduce wolf predation. Providing an additional method for taking wolves may contribute to an increase in the moose population.

Action Taken: The board adopted a proposal which authorized the use of a snowmachine to position hunters to take wolves in Units 21 (including both subunits A and E) and Unit 24.

In January 2006 the board adopted standard language for use of snowmachines to take wolves in all areas of the state where the practice is allowed. The new regulations state "a snowmachine may be used to position hunters to select individual wolves for harvest, and wolves may be shot from a stationary snowmachine." Also, there is a new provision in the regulations that using a snowmachine to take wolves will not be allowed on National Park Service or National Wildlife Refuge lands unless approved by the federal agencies. Therefore, snowmachines will not be allowed to take wolves in the portions of Unit 21A and 21E within the Innoko or Yukon Delta National Wildlife Refuges.

Recommendation 2.3: Increase the bag limit for wolves under hunting regulations to 10 wolves per day in Unit 21E.

This recommendation will provide for additional take of wolves under hunting regulations and may help contribute to an increase in the moose population.

Action Taken: The board adopted the proposal to increase the hunting bag limit for wolves in Unit 21E to 10 wolves per day.

The board also amended another proposal submitted by the public and increased the hunting bag limit for wolves in Unit 21A to 10 wolves (per season) and extended the wolf trapping season to October 1 – April 30. The early trapping season opening is to provide opportunity for persons from Takotna that may travel to Unit 21A by road to trap earlier than it would normally be possible traveling by snowmachine.

Recommendation 2.4: Use public information and education to inform local residents and other hunters about the effects of bear and wolf predation on moose and to encourage increased harvest of species that prey on moose. The ADF&G should also produce public informational materials to help educate urban Alaska residents, non-hunters and residents of other states about the effects of predation on moose populations and the importance of moose for the livelihood of subsistence hunters.

Recommendation 2.5: State and federal agencies should work with village councils to conduct wolf snaring and trapping clinics in communities in Unit 21E on a periodic basis, according to local interest and the resources available.

Strategy 2B: Utilize intensive management techniques to achieve the IM population and harvest objectives through active management of predators and/or habitat.

Recommendation 2.6: Prepare an Intensive Management plan for consideration by the board at their March 2006 meeting. The plan should include a wolf predation control implementation plan.

Other methods that should be considered for inclusion in an IM plan include:

1. Allowing the sale of black and grizzly bear hides.
2. Legalize use of grizzly bear fur and claws for handicrafts in Unit 21E through federal regulations.
3. Same day airborne hunting for black bears.
4. Classify black bears as furbearers to be able to sell hides.
5. Lessen guide requirement to give opportunity to residents of local communities just for grizzly or black bear, similar to the provision of local residents to guide musk ox hunts on Nunivak Island.

Action Taken: The department was not prepared to present an IM plan at the March 2006 board meeting, primarily due to lack of sufficient resources to implement additional predation control programs. Predation control programs require increased biological monitoring of both predator and prey populations that require extensive staff and airplane flight time that exceed what is presently available. Staff requirements to administer an aerial wolf predation control program are also significant.

The Board of Game letter endorsing the YIMMP (Appendix A) requests that the department prepare an Intensive Management plan for Unit 21E that can be considered by the board at the next available opportunity. The department will work with the GASH AC and others to prepare an Intensive Management Plan for Unit 21E for consideration at the next interior Alaska board meeting scheduled for March 2008. At that time the department will have to re-evaluate resources available and priorities for IM programs and advise the GASH AC and board whether the department is able to develop and effectively implement a wolf predation control program in Unit 21E.

HABITAT MANAGEMENT

Goal 3: Ensure that optimal moose habitat is maintained so that it does not become a factor limiting the moose population size and also ensure that the moose population does not become so large that habitat is overused and adversely impacted.

A moose browse survey in Unit 21E will help to establish the utilization rates of species browsed by moose and provide a baseline to ensure that the moose population remains within the carrying capacity of the habitat.

Action Taken: In spring 2006 ADF&G conducted a moose browse survey in Unit 21E. Results of this survey have been incorporated into the Background Information provided in this plan.

Strategy 3: Indirectly monitor habitat condition by monitoring moose twinning rates. If concerns about the quality of moose habitat develop, conduct browse surveys and other research to more fully evaluate habitat conditions and identify actions to improve habitat.

Recommendation 3.1: Work with village corporations and other landowners to review, adopt and implement fire management guidelines that provide for a natural fire regime to the greatest degree possible in consideration of the need to protect homes and property.

Recommendation 3.2: Support planning and implementation of prescribed burns where needed to maintain or improve moose habitat.

In recent years planning and implementation of prescribed burns to improve moose habitat has become very problematical due to land manager concerns, budget constraints, and air quality concerns. Nonetheless, if these concerns can be worked out prescribed burning can be one of the most effective tools to maintain or improve moose habitat. In the current situation managing wild fires to enhance moose habitat is likely to be the most effective technique.

COOPERATIVE MOOSE MANAGEMENT

Goal 4: Develop cooperative programs between state, federal, Native and other wildlife and land management programs to improve moose management and increase involvement of local residents and others in management programs.

Strategy 4: Using the forums of the GASH AC and WIRAC, continue to look for opportunities to develop cooperative management programs with local residents, tribal councils, other wildlife users and state and federal agencies.

Action to be taken: At the January 2007 GASH AC meeting, ADF&G staff will discuss establishing a cooperative program with tribal councils and the FWS to track winter moose harvest.

INFORMATION NEEDED FOR SOUND MANAGEMENT

Goal 5: Identify the information needed to support sound management of moose in Unit 21E and cooperate with other agencies, organizations and local residents to obtain and utilize the necessary information, including scientific data, indigenous ecological knowledge and the general knowledge of all users.

Strategy 5: At least once every two years get managing agencies and involved users to discuss information needs and identify cooperative resources needed to obtain the top priority information. Discuss data needs and proposed monitoring work with the GASH AC and WIRAC.

Staff from the DWC, INWR and BLM met in October 2005 to discuss cooperative survey efforts for the next several years. The following surveys are projected based on that meeting, depending on available funding and suitable survey conditions:

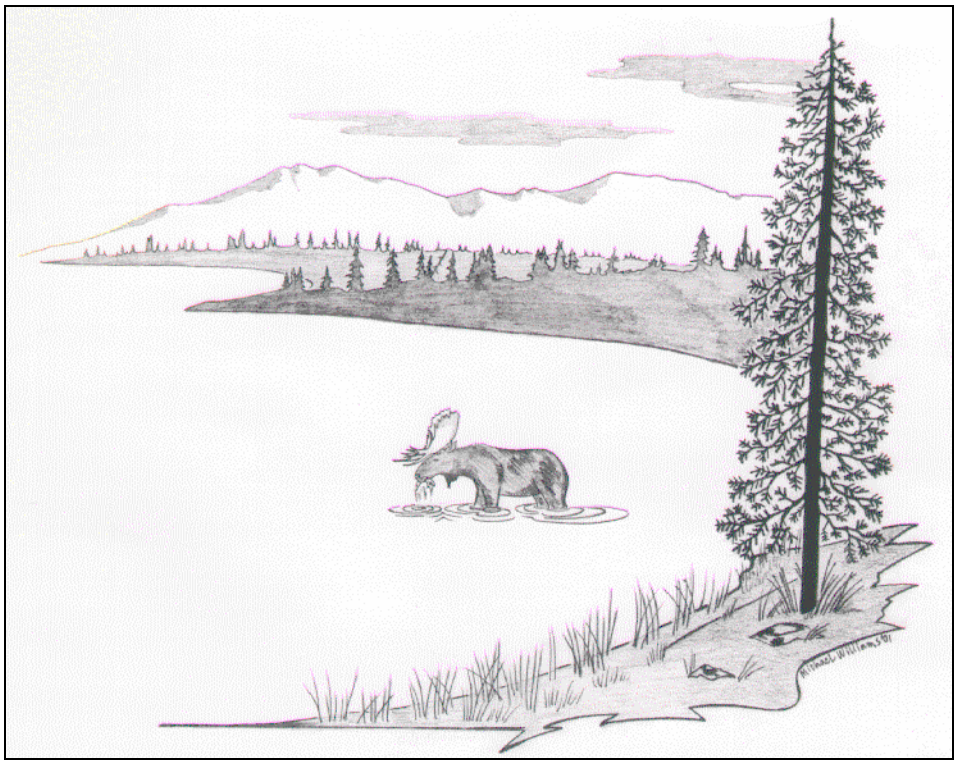
Every spring: Unit 21E moose twinning rate survey (ADF&G)

Every other fall: Unit 21E moose composition survey (ADF&G)

Every 2-3 falls: Unit 21A fall moose composition survey (ADF&G)

Spring 2008: Unit 21A moose population estimation survey (cooperative effort by ADF&G, INWR and BLM)

Spring 2010: Unit 21E moose population estimation survey (cooperative effort by ADF&G, INWR and BLM)



APPENDIX A: BOARD OF GAME AND FEDERAL SUBSISTENCE BOARD ENDORSEMENTS

STATE OF ALASKA

DEPARTMENT OF FISH AND GAME

BOARD of GAME

FRANK H. MURKOWSKI, GOVERNOR

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March 20, 2006

Subject: Board of Game endorsement of the Yukon-Innoko Moose Management Plan

The Alaska Board of Game endorses the Yukon-Innoko Moose Management Plan (YIMMP) as a proactive approach to managing moose in Game Management Units 21A and 21E in western Alaska. The board supports the goals of the YIMMP which include maintaining or increasing moose populations and managing the effects of predation on moose to provide for high levels of human consumptive use of moose.

The Board commends the Grayling, Anvik, Shageluk and Holy Cross Fish and Game Advisory Committee for their action taken in January 2003 close the antlerless moose season in Unit 21E. This action was taken to conserve cow moose and maintain the productivity of the moose population and very likely helped to prevent a more severe decline in the moose population.

The board also recognizes and appreciates the time and commitment of the participants in the Yukon-Innoko Moose Management Working Group (YIWG). Members of the YIWG represent diverse interests in moose management in the area and deserve credit for working together to develop a plan to protect the moose resource. The YIMMP provides a framework to ensure that harvest is kept within sustained yield, that subsistence use by residents of Unit 21E and other Alaskans will be given priority, and that opportunities for non-subsistence use will also be provided.

The YIMMP includes a recommendation for the Alaska Department of Fish and Game to develop an Intensive Management Plan for Unit 21E which should include a wolf predation control plan. In that regard, the Board of Game requests the Department proceed with preparing a draft Intensive Management Plan that can be considered by the Board at the next available opportunity. The plan should consider wolf predation control program and any other management actions that may be taken to help achieve the intensive management objectives for Unit 21E. Rebuilding the moose population through active management should be a top priority.

The Board of Game will look forward to further consideration of intensive management in Unit 21E and continuing to work with the GASH Advisory Committee and others as the YIMMP is implemented.

Sincerely,

Mike Fleagle /KT

Mike Fleagle
Chairman, Board of Game

Resolution: 06-02
Federal Subsistence Board
Dated May 18, 2006

RESOLUTION OF SUPPORT FOR THE YUKON-INNOKO MOOSE MANAGEMENT PLAN

Whereas; we, the Federal Subsistence Board, have reviewed the *Yukon-Innoko Moose Management Plan* dated March 2006, as presented in May 2006; and

Whereas; the Yukon-Innoko Moose Management Plan has been developed by a diverse group of users and managers including: representatives of the GASH and Lower Yukon Fish and Game Advisory Committees, Western Interior and Yukon-Kuskokwim Delta Regional Advisory Councils, transporters, Native organizations and State and Federal wildlife and land management agencies; and

Whereas; the purpose of the plan is to maintain healthy and abundant moose populations in Units 21A and 21E by proactively managing moose, predation and habitat, and keeping moose harvest within sustained yield so that subsistence needs for moose are met on an annual basis and there is sufficient moose to provide for personal and family use of Alaska residents and some nonresident hunting opportunity for generations to come; and

Whereas; the plan has been developed carefully, over time, to ensure that a wide range of views and opinions have been expressed and considered; and

Whereas; the Board recognizes the recommendations in the plan as a comprehensive compromise package and acknowledges that Working Group members honored the values of other members in reaching conclusions; and

Whereas; the Board understands that the plan includes recommendations for implementation of actions that are within and outside the Board's jurisdiction and that the Board and its agencies have latitude to implement, reject or modify any or all recommendations within its purview; and

Whereas; the development of the plan embodies the collaborative and inclusive approach for resolving resource management issues envisioned in the Interim Memorandum of Agreement between the Federal Subsistence Board and the Alaska Department of Fish and Game and Alaska Boards of Fisheries and Game;

Therefore, be it resolved that the Federal Subsistence Board:

1. Supports the Yukon-Innoko Moose Management Plan as presented in May 2006.

2. Recommends that the members of the Yukon-Innoko Moose Management Working Group meet periodically and maintain and update the plan as needed.

3. Encourages members of the Yukon-Innoko Moose Management Working Group, the affected Regional Advisory Councils, and the public at large to carefully monitor implementation of the plan and the status of the Unit 21A and Unit 21E moose populations to ensure the mission and goals expressed in the plan are adhered to and, should the need arise, work cooperatively to develop recommendations or proposals for changes to the plan and/or State and Federal regulations.

4. Recommends that when possible, the public and/or agencies consult with the Working Group when submitting regulatory proposals that impact the plan in order to protect the integrity of the plan and the cooperative efforts of the Working Group.

5. Expresses our appreciation for the work of all members who have voluntarily contributed their time, their effort and their creativity to this worthy endeavor.

Mitch Demientieff, Chair
Federal Subsistence Board