

Mountain Goat Management Report and Plan, Game Management Unit 6:

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

Charlotte L. Westing



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Purpose of this Report

This report provides a record of survey and inventory management activities for mountain goats (*Oreamnos americanus*) in Game Management Unit 6 for the 5 regulatory years 2013–2017 and plans for survey and inventory management activities in the next 5 regulatory years, 2018–2022. A regulatory year (RY) begins 1 July and ends 30 June (e.g., RY14 = 1 July 2014–30 June 2015). This report is produced primarily to provide agency staff with data and analysis to help guide and record agency efforts but is also provided to the public to inform it of wildlife management activities. In 2016 the Alaska Department of Fish and Game’s (ADF&G, the department) Division of Wildlife Conservation (DWC) launched this 5-year report to report more efficiently on trends and to describe potential changes in data collection activities over the next 5 years. It replaces the mountain goat management report of survey and inventory activities that was previously produced every 2 years.

I. RY13–RY17 Management Report

Management Area

Unit 6 covers approximately 10,140 mi² of land, including Prince William Sound, the Copper River Delta, and the North Gulf Coast of Alaska (Fig. 1). Unit 6 is divided into 4 administrative units (6A, 6B, 6C, and 6D), which are also referred to as subunits. Terrain includes rugged mountains, old-growth forest, coastal wetlands, and muskeg meadows.

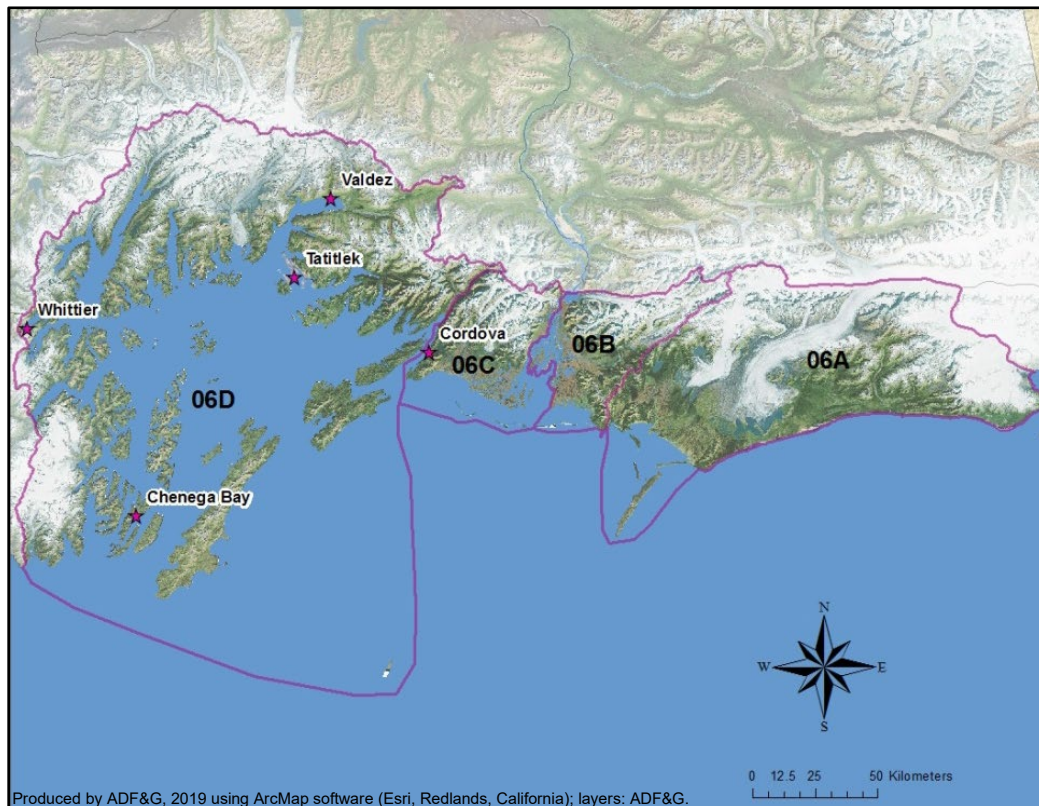


Figure 1. Game Management Unit 6 and its administrative units (subunits), Alaska.

Summary of Status, Trend, Management Activities, and History of Mountain Goats in Unit 6

Mountain goats are endemic to the mainland in Unit 6; and Bainbridge, Culross, and Knight islands. Their presence has been documented in one or more of these areas by Captain Cook in 1785 (Beaglehole 1966), Edmond Heller in 1908 (Heller 1910), and Cordova district staff in contributions to Alaska Game Commission reports (Clarence Rhode, Alaska Game Commission 1938; Fred Robards, Alaska Game Commission 1952). Robards estimated a population size of 4,350 goats between Cape Fairfield and Bering Glacier, which includes most of Unit 6. Coastal mountain goat populations were reduced by hunting pressure during much of the twentieth century, probably starting in the 1940s when Art Sheets (former Alaska Territorial wildlife biologist in Cordova) reported that military personnel stationed in Whittier reduced goat numbers in Port Wells. Goat numbers remained low during the late 1970s and 1980s because of hunter harvest (Griese 1988a) and predation (Reynolds 1981, Griese 1988b).

Habitat for mountain goats includes steep escape terrain for refugia from predators in proximity to areas with adequate forage. In the spring, goats utilize avalanche chutes and low elevation south-facing slopes. During the summer when most of the snowpack has melted, they use the high elevation alpine and subalpine habitats. Deep winter snow pushes goats into heavily forested areas or to windswept slopes with little snow cover. During some heavy snow events, goats may even descend to forested coastlines (Fox et al. 1989). While winter snow depth can influence goat survival, hot summer temperatures may also affect survival the following winter (White et al. 2011).

Goats are considered generalist feeders, taking advantage of a wide range of foods including alder, rhizomes, new shoots of ferns, early emergent sedges, and forbs. Winter diet is severely limited but may include conifers, mosses, lichens, shrubs, forbs, ferns, and grasses (Fox and Smith 1988).

Mountain goats exhibit lower fecundity compared with other ungulates. Females generally do not reach sexual maturity until 4 years of age and rarely produce twins. The mean number of kids produced in a nanny's lifetime averages 5–6 goats (Festa-Bianchet and Cote 2008). Monitoring kids:100 adults gives managers an indication of population robustness. Observations of between 15 and 17 kids per 100 adults may indicate stability. Observations above or below this range may indicate growth or decline respectively.

Harvest management evolved and important lessons were learned as biologists recognized the need to manage mountain goats based on small geographic units to reduce harvest and to distribute hunting pressure (Foster 1977). Long seasons with bag limits of 1–2 goats were in effect from statehood through 1975. The bag limit was reduced to 1 goat in 1976, and the first permit hunt was established in 1980. By 1986, the present system of registration permit hunts was in place. By 1987, the goat population had declined to 3,400 and continued decreasing to 3,000 by 1994. This trend continued despite the implementation of more conservative management, such as reduced harvest and no hunting of small groups of goats (<60, Nowlin 1996). Conservative harvest strategies finally allowed the population to rebound to approximately 4,000 goats by 1999.

Following the success of a tracking harvest strategy (Caughley 1977, Smith 1984) on the Kenai Peninsula (Del Frate and Spraker 1994), Nowlin (1998) established one for Unit 6 to guide goat management decisions. The 3 important elements for implementation of the strategy were 1) improved aerial survey methods for obtaining trend information, 2) registration permit hunts allowing careful monitoring of harvest distribution and magnitude, and 3) a formalized minimum population objective of 2,400 goats for Unit 6.

The Alaska Department of Fish and Game (ADF&G) began flying aerial surveys in 1969 to determine mountain goat population size and sex and age composition. Griese (1988a) improved and standardized methods in 1986 by establishing count areas that were systematically searched. From the late 1980s to the late 1990s extensive aerial surveys were flown with most survey areas flown every year. However, since that time fuel costs have increased and budgets have not kept pace. The current budget allows for flying only a sample of areas. Therefore, interpolation is required between survey years and is questionable at best. During RY03–RY12 the population has probably remained between 3,500 and 4,000 goats, declining during winters of heavy snow, and recovering after mild winters.

Harvest has been monitored since 1972 using hunter reports. Both successful and unsuccessful hunters have been required to report, except during 1980 through 1985, when only successful hunters reported. Annual harvest reached an historic high of 182 animals in regulatory year 1983 and declined to an historic low of 27 goats (weighted by sex) in RY96. Average harvest for the 10 years prior to this reporting period (RY03–RY12) was 49 goats; average harvest for RY93–RY02 was 39 goats.

Management Direction

EXISTING WILDLIFE MANAGEMENT PLANS

A formal plan for goat management in Unit 6 has not been developed. Goat hunts are administered using a 3–5% harvest rate and using a “goat points” system with billies counting as 1 point and nannies counting as 2 points.

GOALS

Manage goat populations to provide for sustained annual use by hunters and wildlife viewers.

CODIFIED OBJECTIVES

Amounts Reasonably Necessary for Subsistence Uses

Goats in Unit 6 have a positive customary and traditional use finding. The amount necessary for subsistence is 15–26 goats.

Intensive Management

There is a negative intensive management finding for goats in Unit 6.

MANAGEMENT OBJECTIVES

- Conduct aerial surveys of high priority areas at least every 3 years.
- Maintain a minimum population in Unit 6 of at least 2,400 goats.
- Use educational materials to achieve >70% males in the harvest.

MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1. Conduct aerial minimum count surveys during peak snow melt. Survey areas are selected with consideration of the length of time since the last survey, past survey quality, hunt pressure, and population trend. Classify young of the year (kids) during aerial minimum count surveys.

Data Needs

Minimum count surveys are used to determine appropriate level of harvest. Quantifying kids may help to anticipate population trajectory and guide setting of appropriate harvest rates.

Methods

We conducted aerial surveys to estimate mountain goat population size, trend, and composition in permit hunt areas (Fig. 2). Individual hunt areas were surveyed during August and September. Surveys were prioritized based on management needs which included factors such as high harvest, high participation, or high nanny take. Each area was divided into 1 or more sample units. Further details on methods of data collection are in the last Unit 6 Mountain goat management report Westing 2014.

Results and Discussion

We flew complete surveys in 15 out of 17 open permit hunt areas during RY13–RY17¹ (Table 1). Additionally, 6 areas were completed twice, and 2 areas were surveyed where hunts had been closed for many years (RG208, Suckling Hills and RG215, Don Miller Hills). Data from these surveys are presented with historical minimum counts for comparison in Figs. 3–20. Seven of these areas had not been surveyed within the last 10 years. In 9 of the surveyed areas, the minimum count was the highest ever observed. Three of the areas surveyed had low counts, RG215, RG208, and RG212. Two of these areas (RG208 and RG215) have been closed to hunting for decades due to low goat numbers. All other areas had survey results within the normal range.

Goat survey data are patchy and have only very recently been updated for many areas. Therefore, estimating the unitwide goat population reliably is impossible. Compiling the most recent

¹ Charlotte Westing, Area Wildlife Biologist, ADF&G, Cordova, Completion of goat surveys in GMU 6 memoranda: 17 October 2013, 13 October 2014, 3 November 2015, 4 November 2016, 6 November 2017.

minimum counts for each area gives an estimate of about 3,700 goats. Recognizing that this is conservative, the actual population is probably between 3,500 and 4,500 goats.

Goat densities range from 1–6 goats observed per square mile of habitat. Densities are highly variable with hunt areas within each subunit represent nearly the full range of goat densities. Considering the most recent minimum count, Unit 6C has the highest average goat density (3 goats per square mile of habitat) and Unit 6B has the lowest average goat density (2 goats per square mile of habitat). Goat densities in Unit 6A and Unit 6D fall between these two (almost 3 goats per square mile of habitat in both areas).

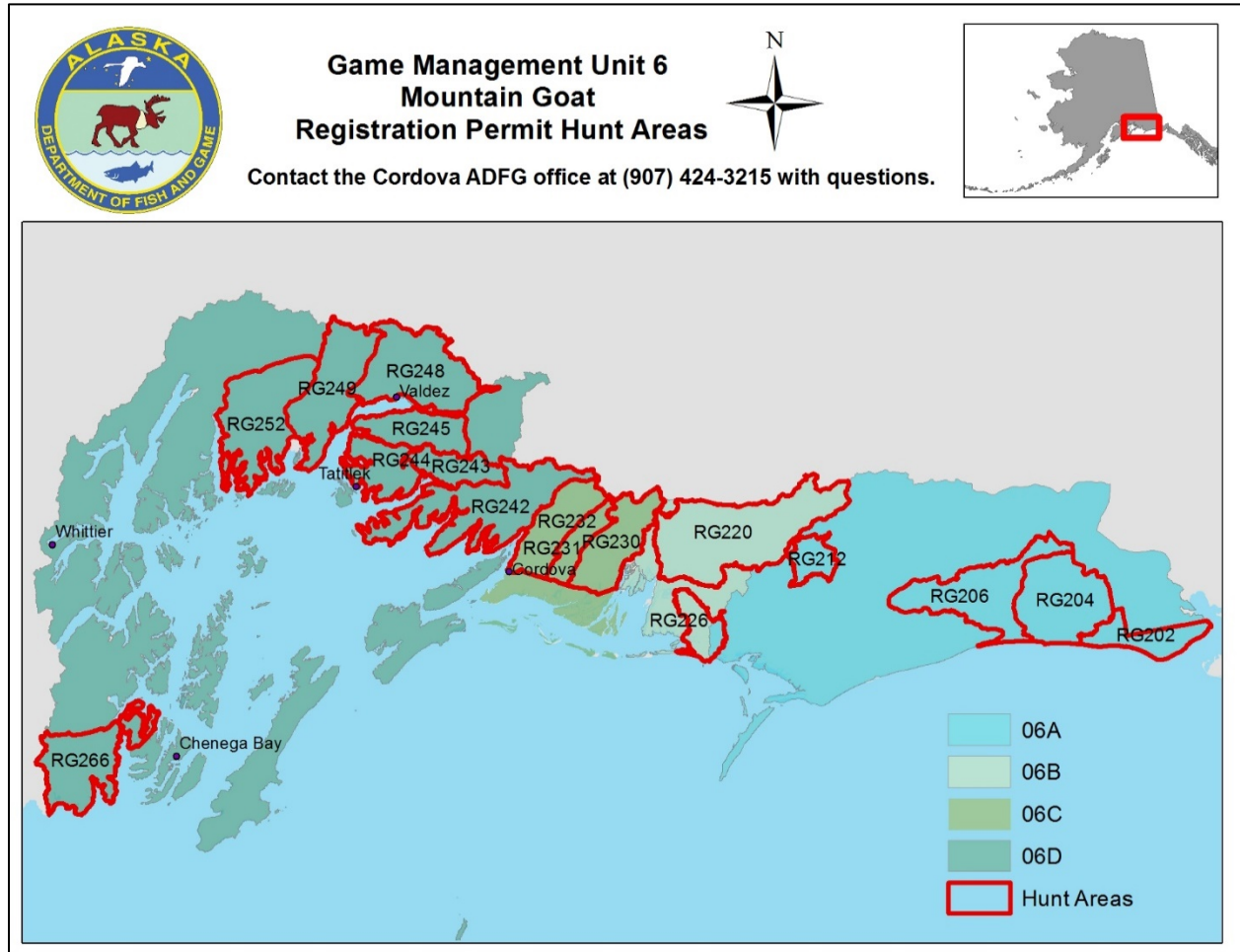


Figure 2. Mountain goat registration hunt areas in Unit 6, Alaska.

Population Composition

In any given year, surveyed areas may show a high amount of variability with some areas showing poor kid production or retention (<15 kids per adult), and some showing exceptional kid production or retention (>20 kids per adult). This may be a result of variable snow loads, icing or avalanche conditions, or simply classification error. However, some years show consistent

patterns that may be a result of winter conditions. Low kid numbers were consistently observed in RY13². Conversely, RY14 and RY15 had consistently high kid numbers³.

Recommendations for Activity 1.1.

Continue.

Table 1. Unit 6, Alaska most recent summer mountain goat composition and minimum counts, regulatory years 2013–2017.

Unit	Area	Year	Survey coverage	Older goats ^a	(%)	Kids (%)	Kids:100 older goats ^a	Total goats observed
6A	RG202	RY17	Full	266	(86)	44 (14)	17	310
	RG204	RY13–RY17	None	–	–	–	–	–
	RG206	RY13–RY17	None	–	–	–	–	–
	RG208	RY17	Full	12	(86)	2 (14)	17	14
	RG212	RY15	Full	33	(79)	9 (21)	27	42
	RG215	RY17	Full	16	(89)	2 (11)	13	18
	Brower Ridge	RY17	Full	139	(81)	33 (19)	24	172
6B	RG220	RY16	Full	154	(85)	28 (15)	18	182
	RG226	RY17	Full	105	(78)	30 (22)	29	135
6C	RG230	RY16	Full	101	(81)	23 (19)	23	124
	RG231	RY16	Full	146	(84)	27 (16)	18	173
	RG232	RY17	Full	282	(89)	35 (11)	12	317
6D	RG242	RY13	Full	350	(85)	64 (15)	18	414
	RG243	RY15	Full	161	(79)	43 (21)	27	204
	RG244	RY15	Full	312	(82)	68 (18)	22	384 ^c
	RG245	RY17	Full	158	(90)	18 (10)	11	176
	RG248	RY17	Full	136	(84)	26 (16)	19	162
	RG249	RY14	Full	280	(73)	101 (27)	36	381
	RG252	RY16	Full	332	(83)	67 (17)	20	399
	RG266	RY14	Full	234	(80)	57 (20)	24	291

Note: En dashes represent where no surveys were flown in the reporting period.

^a Older goats include yearlings.

^b Partial count.

^c Includes 4 unknown aged goats.

² Charlotte Westing, Area Wildlife Biologist, ADF&G, Cordova, Completion of goat surveys in GMU 6 memorandum, 17 October 2013.

³ Charlotte Westing, Area Wildlife Biologist, ADF&G, Cordova, Completion of goat surveys in GMU 6 memoranda, 13 October 2014, and 3 November 2015.

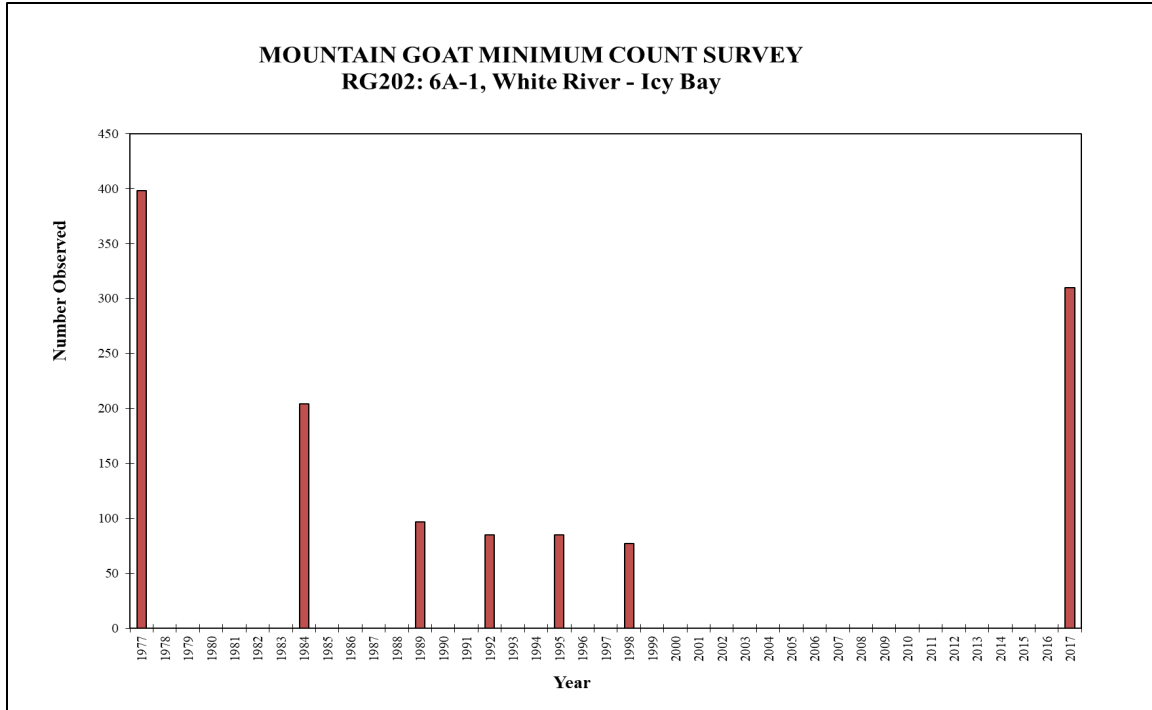


Figure 3. Mountain goat minimum count surveys conducted in hunt area RG202 (6A-1), White River to Icy Bay, Alaska, from 1977 to 2017.

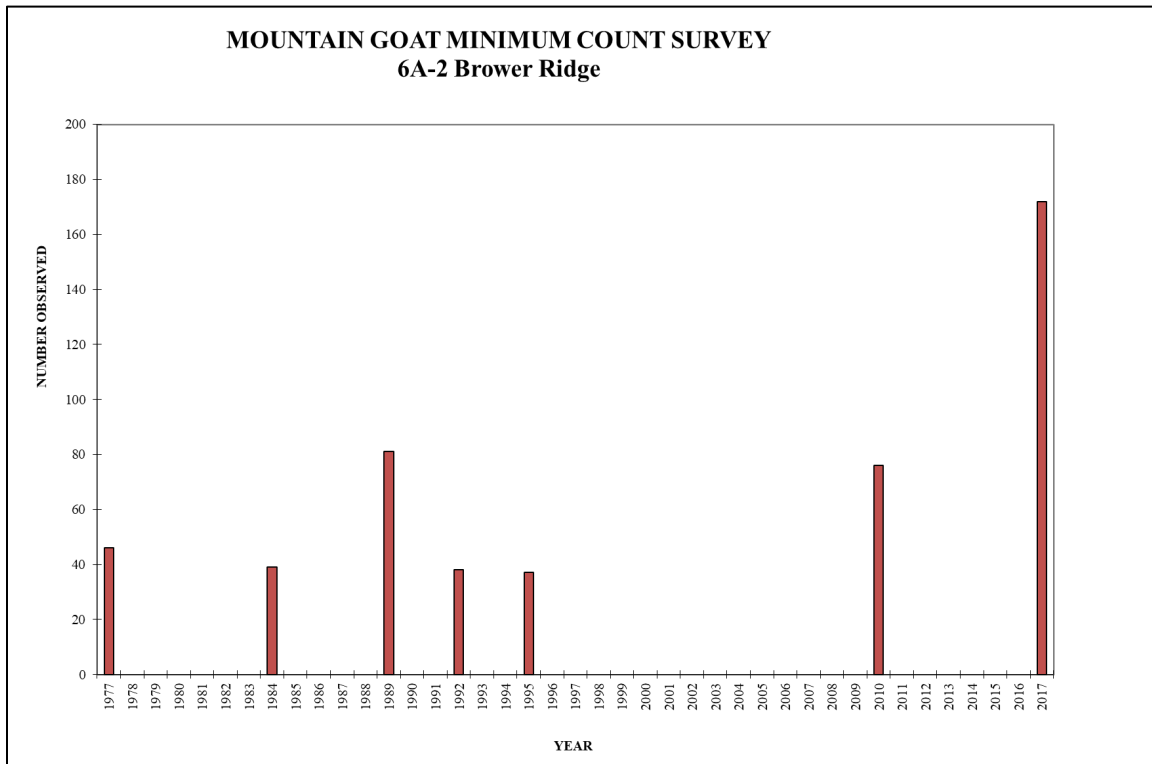


Figure 4. Mountain goat minimum count surveys conducted in hunt area RG204 (6A-2), Brower Ridge, Alaska, from 1977 to 2017.

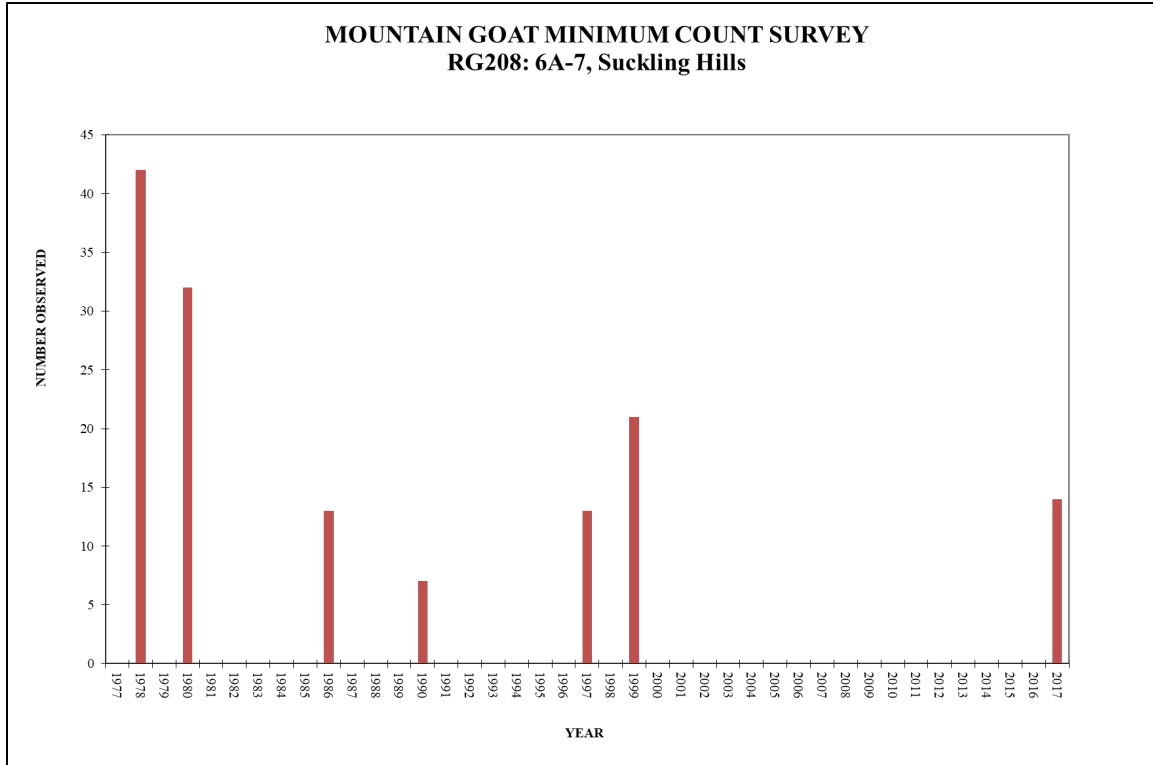


Figure 5. Mountain goat minimum count surveys conducted in hunt area RG208 (6A-7), Suckling Hills, Alaska, from 1977 to 2017.

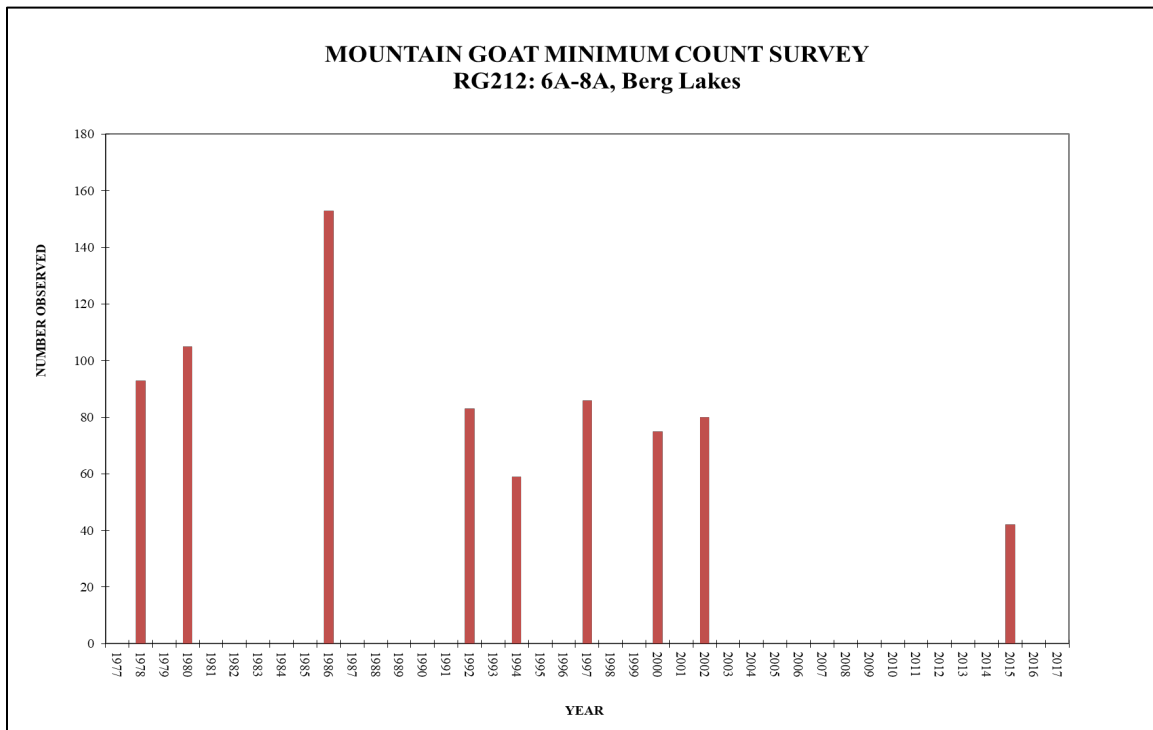


Figure 6. Mountain goat minimum count surveys conducted in hunt area, RG212 (6A-8A), Berg Lakes, Alaska, from 1977 to 2017.

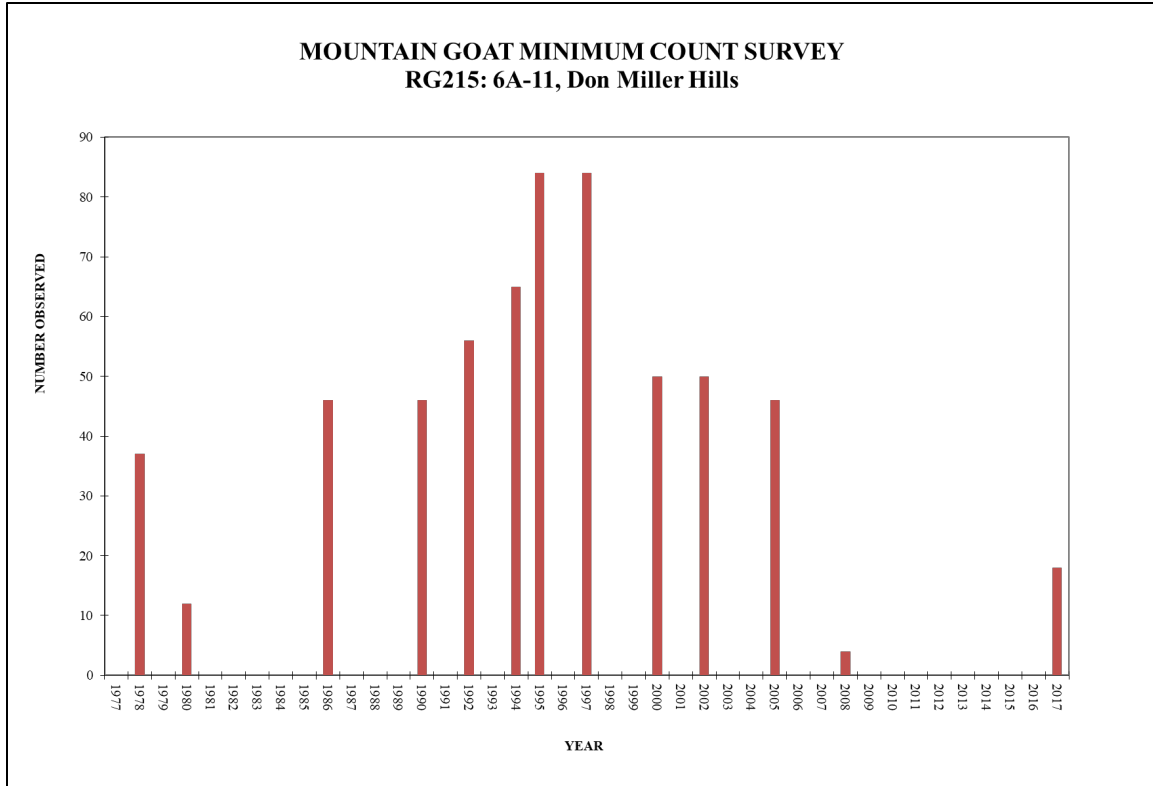


Figure 7. Mountain goat minimum count surveys conducted in hunt area, RG215 (6A-11), Don Miller Hills, Alaska, from 1977 to 2017.

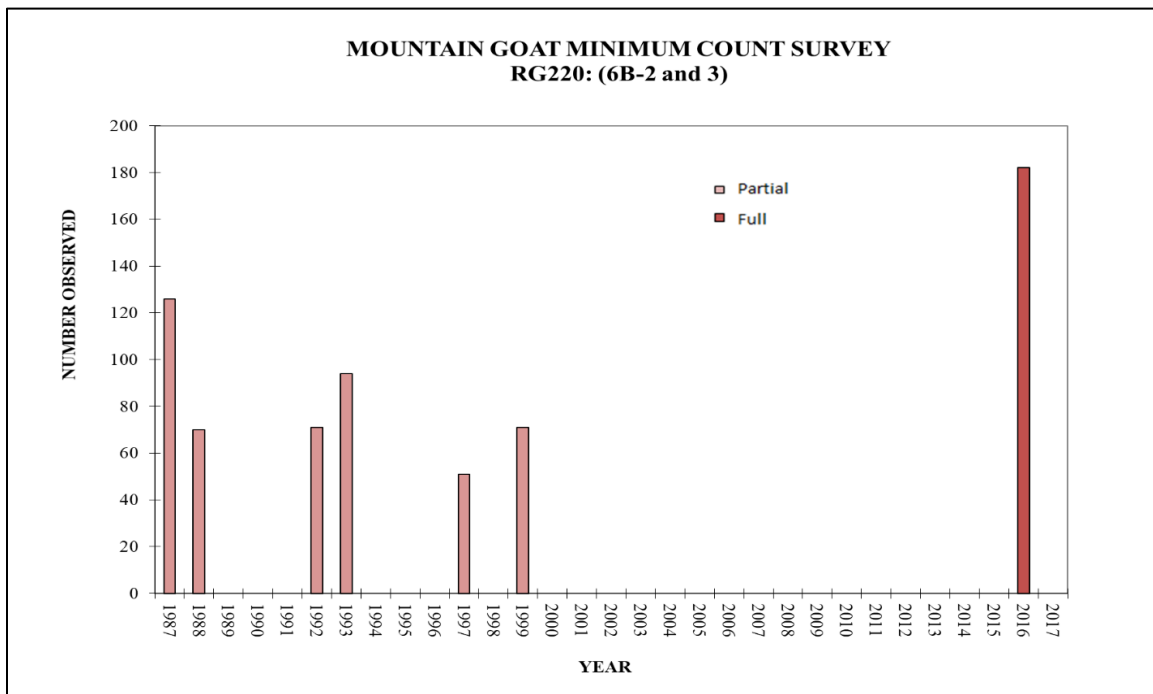


Figure 8. Mountain goat minimum count surveys conducted in hunt area, RG220 (6B-2 and 3), Alaska, from 1987 to 2017.

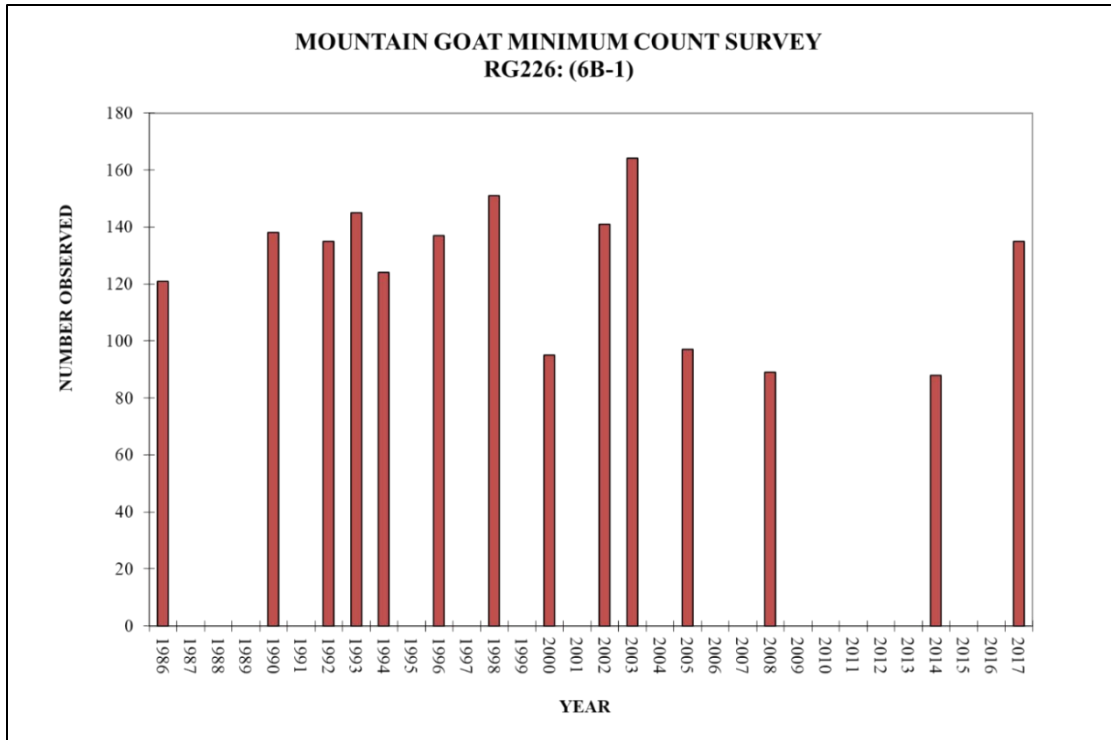


Figure 9. Mountain goat minimum count surveys conducted in hunt area, RG226 (6B-1), Alaska, from 1986 to 2017.

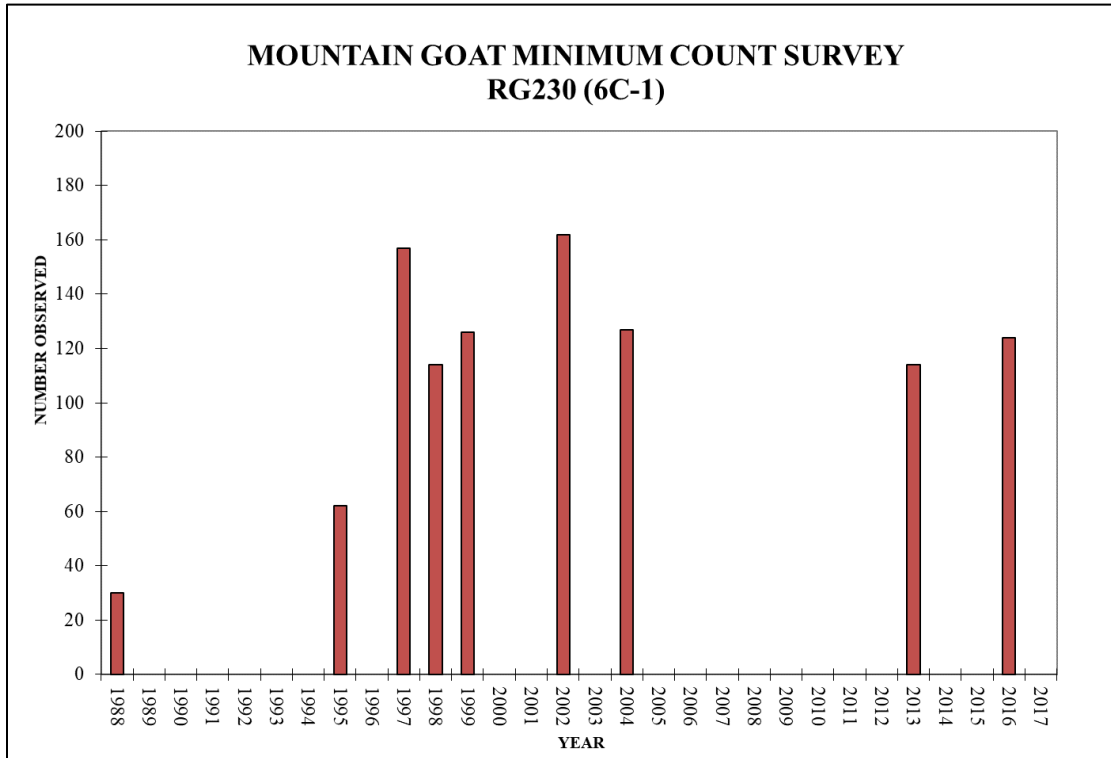


Figure 10. Mountain goat minimum count surveys conducted in hunt area, RG230 (6C-1), Unit 6C-1, Alaska, from 1988 to 2017.

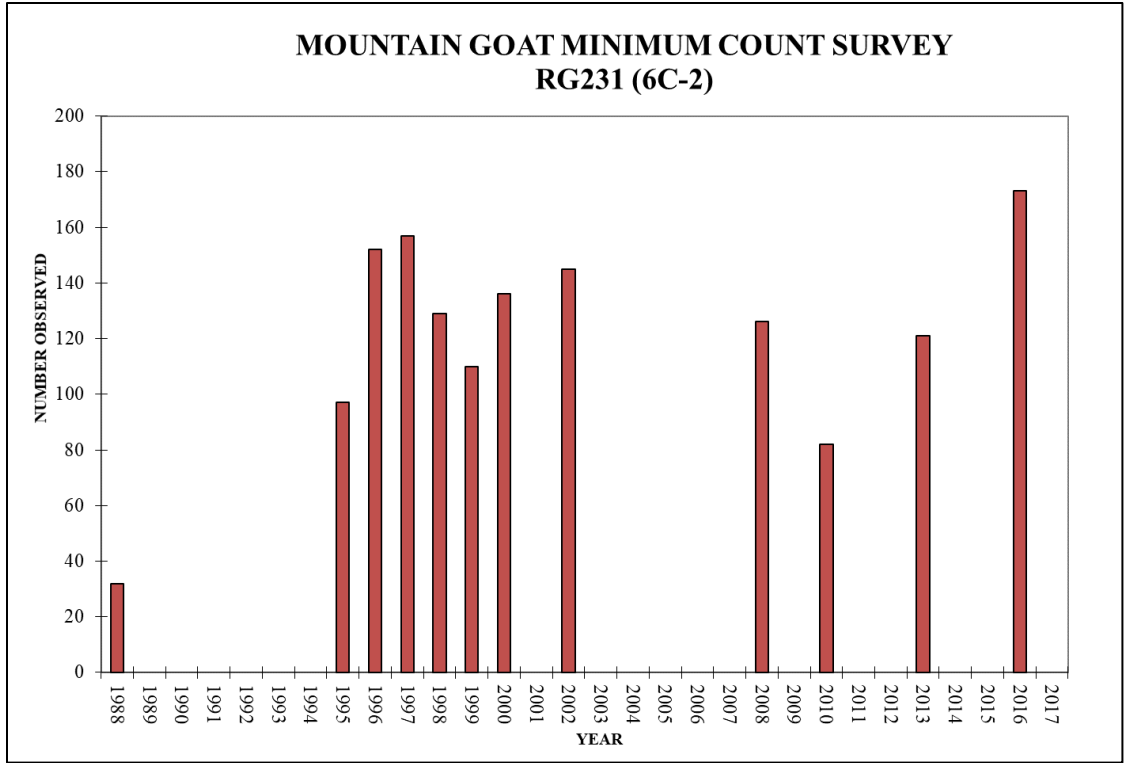


Figure 11. Mountain goat minimum count surveys conducted in hunt area, RG231 (6C-2), Unit 6C-2, Alaska, from 1988 to 2017.

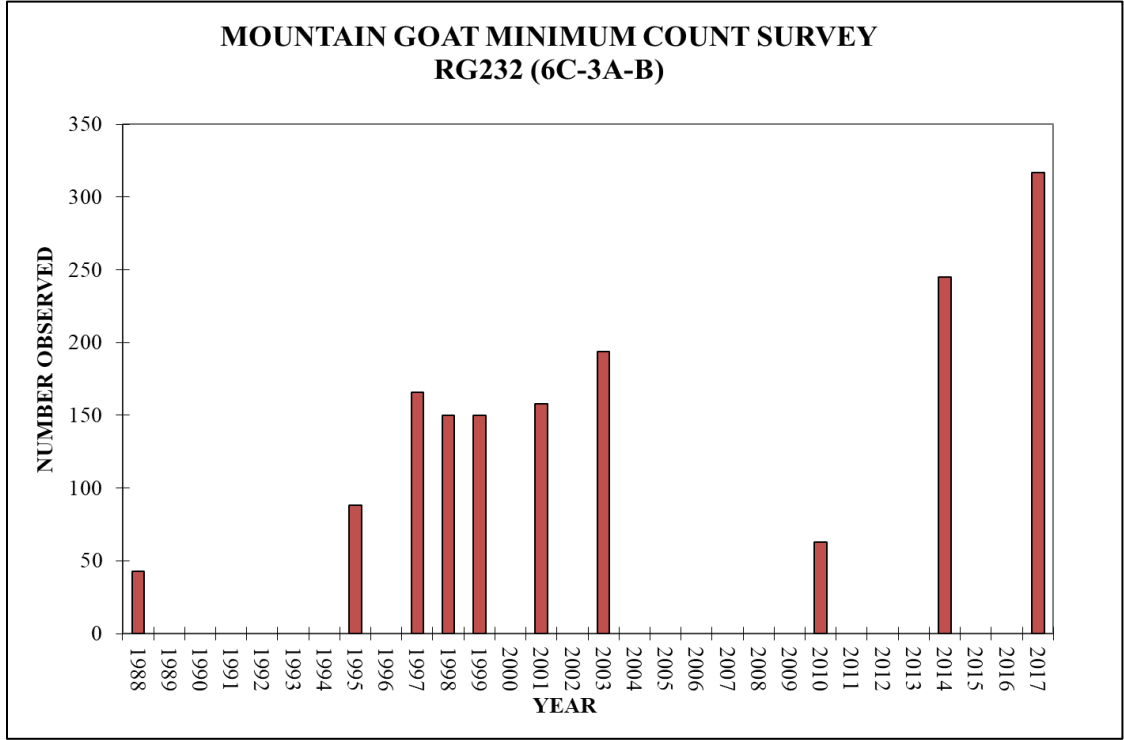


Figure 12. Mountain goat minimum count surveys conducted in hunt area, RG232 (6C-3A-B), Alaska, from 1988 to 2017.

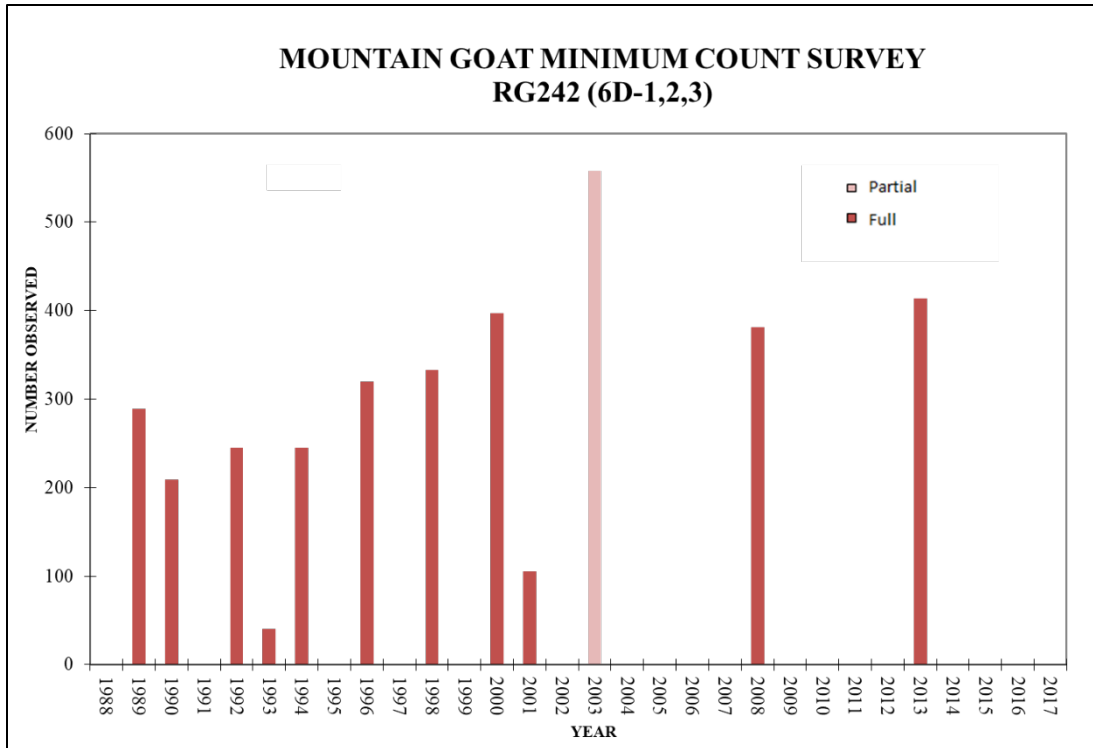


Figure 13. Mountain goat minimum count surveys conducted in hunt area, RG242 (6D-1, 2, and 3) Alaska, from 1988 to 2017.

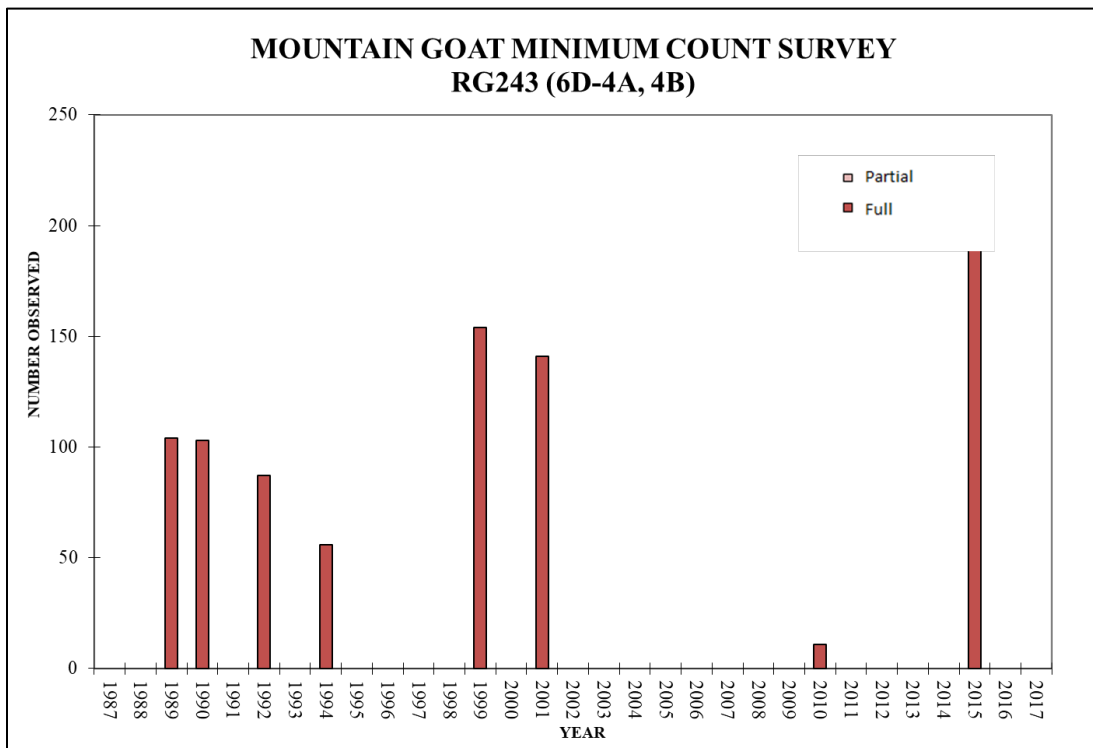


Figure 14. Mountain goat minimum count surveys conducted in hunt area, RG243 (6D-4A, 4B), Alaska, from 1987 to 2017.

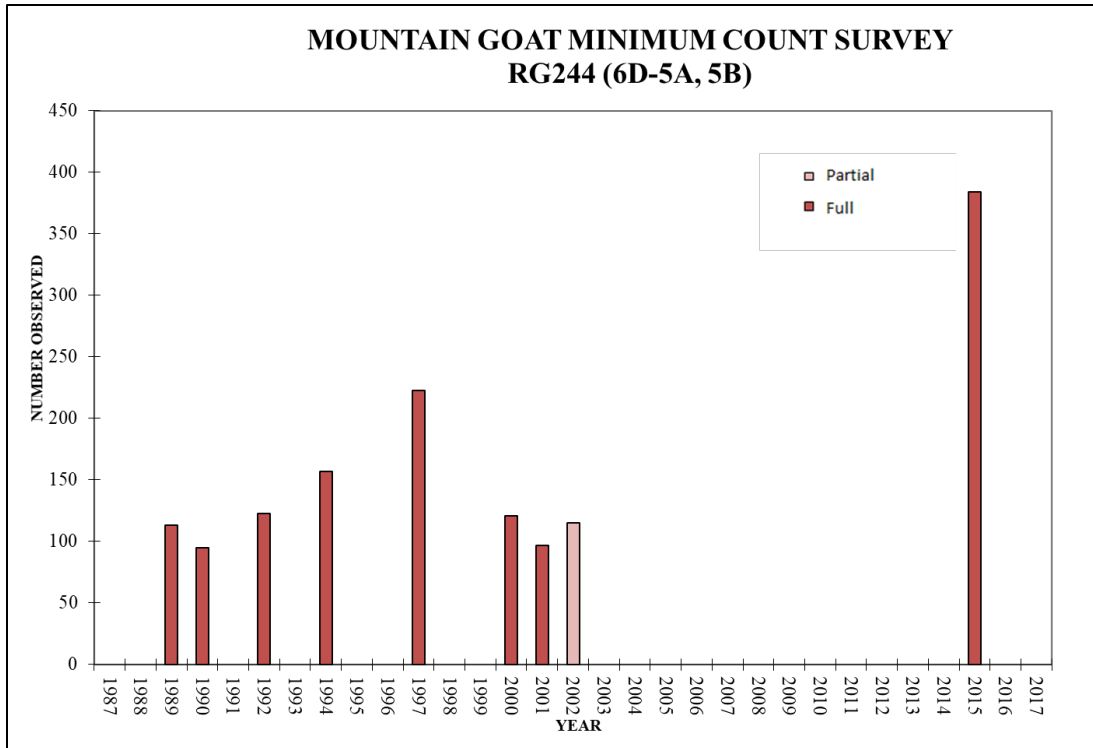


Figure 15. Mountain goat minimum count surveys conducted in hunt area, RG244 (6D-5A, 5B), Alaska, from 1987 to 2017.

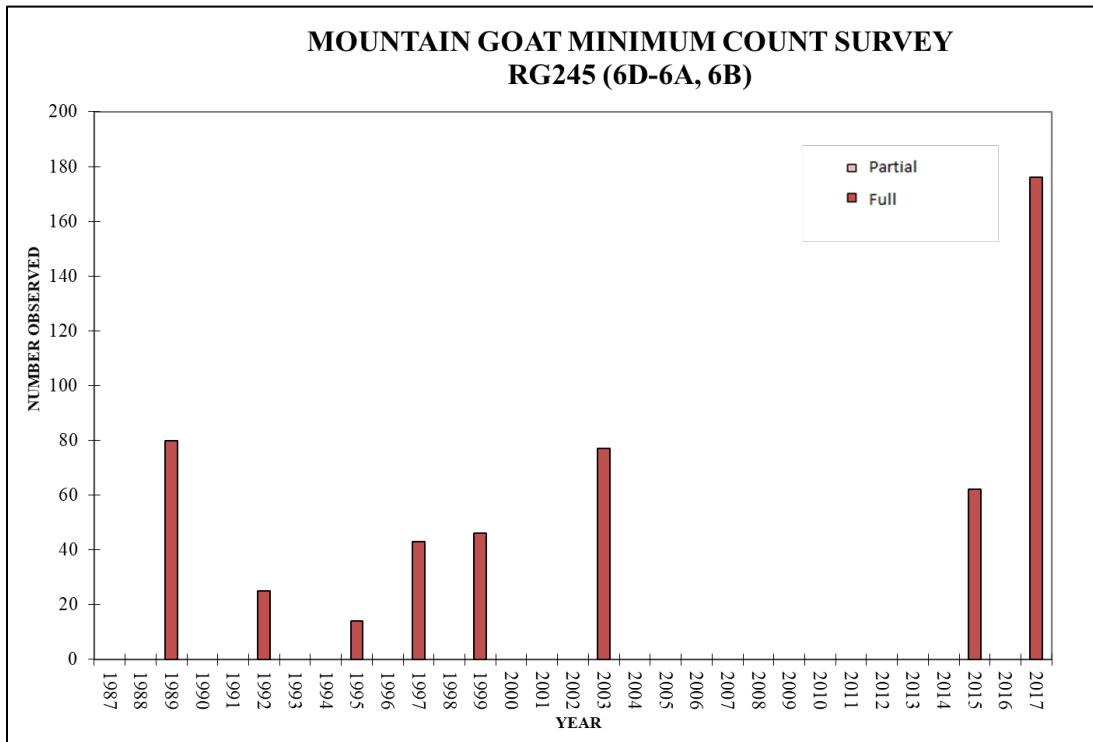


Figure 16. Mountain goat minimum count surveys conducted in hunt area, RG245 (6-D-6A, 6B), Alaska, from 1987 to 2017.

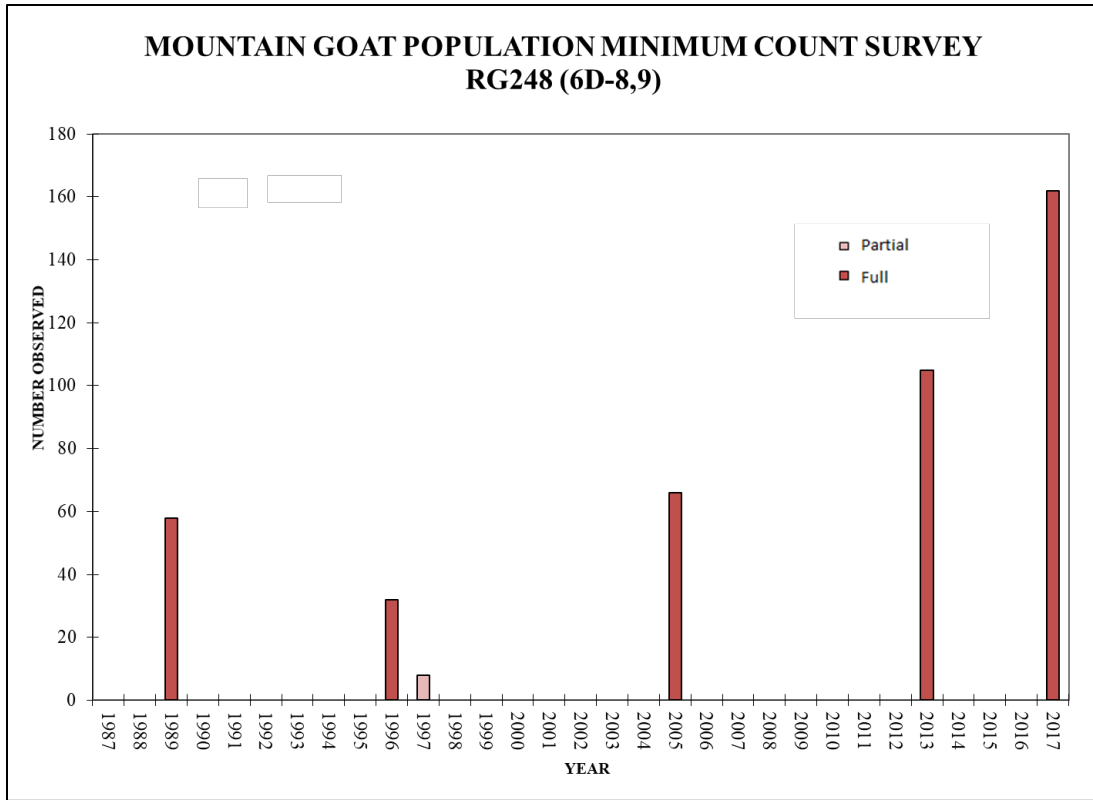


Figure 17. Mountain goat minimum count surveys conducted in hunt area, RG248 (6D-8 and 9), Alaska, from 1987 to 2017.

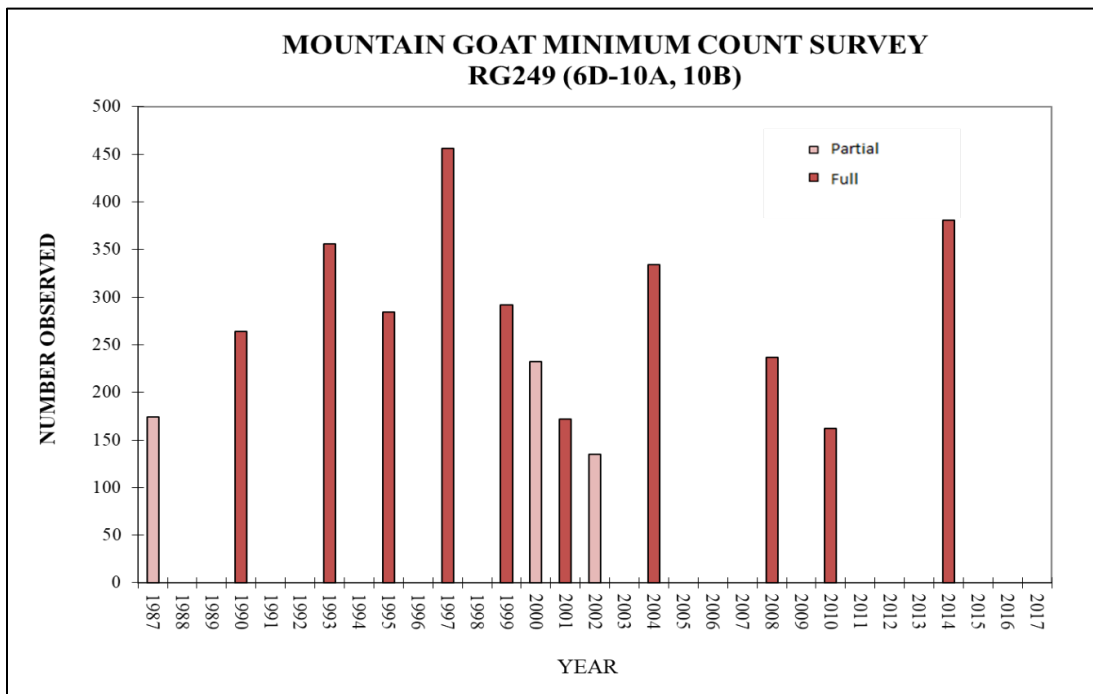


Figure 18. Mountain goat minimum count surveys conducted in hunt area, RG249 (6D-10 and 10B), Alaska, from 1987 to 2017.

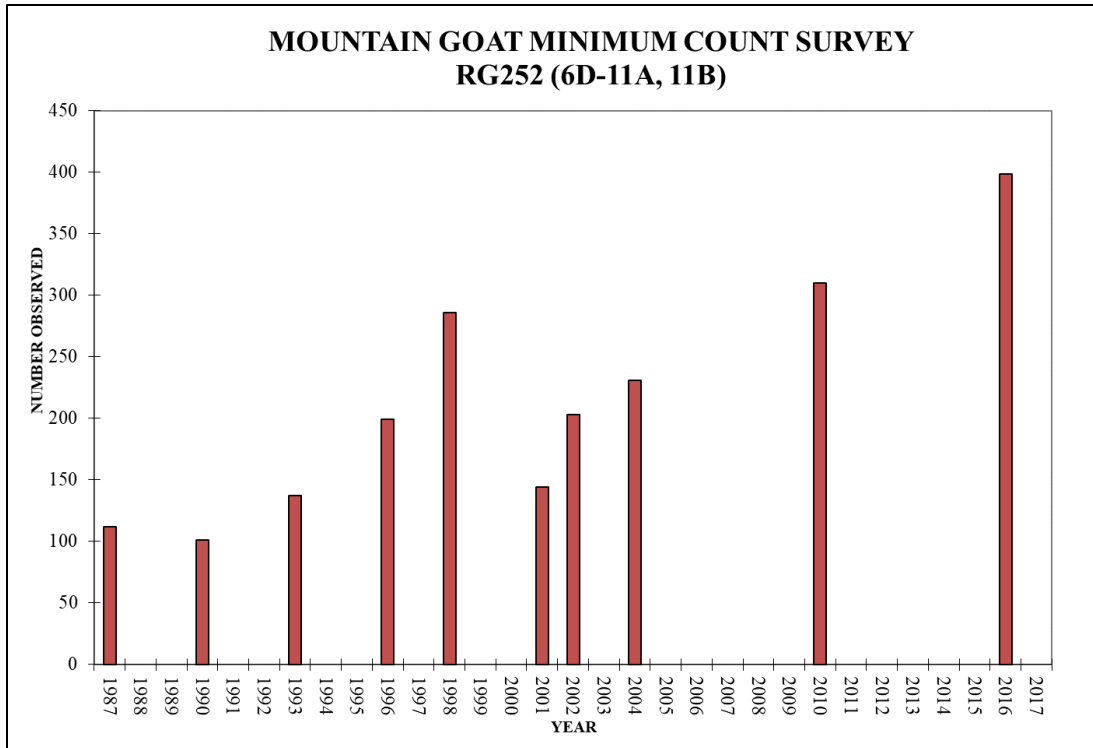


Figure 19. Mountain goat minimum count surveys conducted in hunt area, RG252 (6D-11A, 11B), Alaska, from 1987 to 2017.

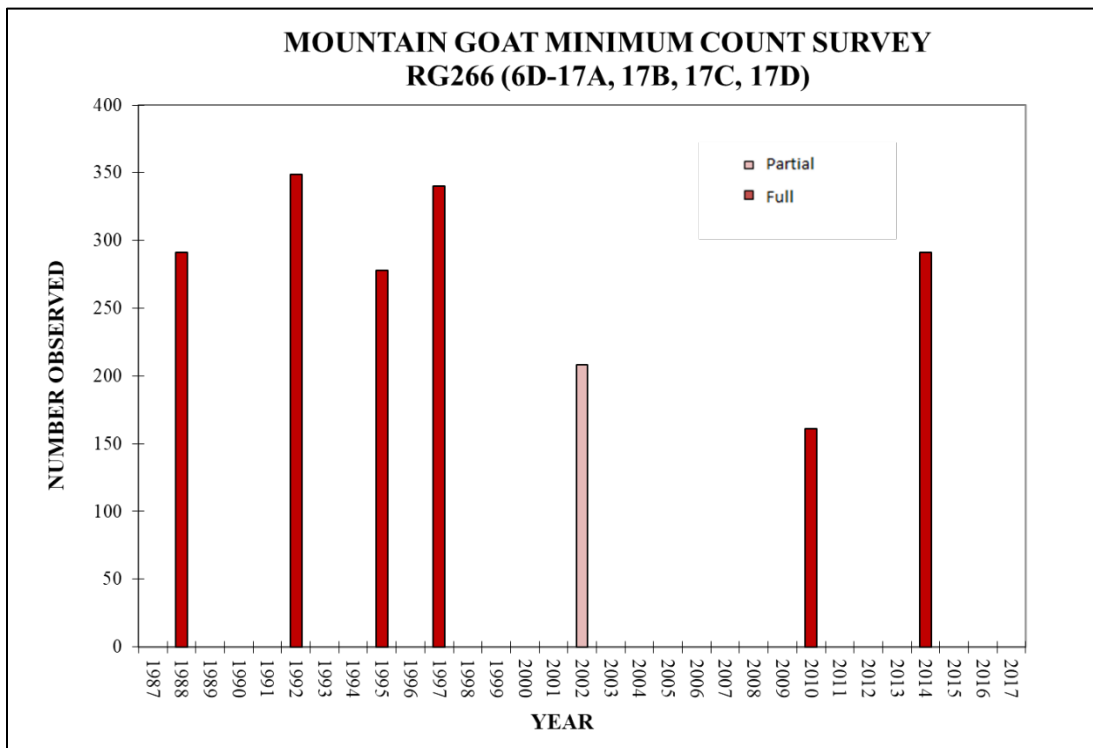


Figure 20. Mountain goat minimum count surveys conducted in hunt area, RG266 (6D-17A, 17B, 17C, and 17D), Alaska, from 1987 to 2017.

2. Mortality-Harvest Monitoring and Regulations

ACTIVITY 2.1. Monitor mortality and harvest in Unit 6 annually.

Data Needs

Annual summaries of harvest are needed to establish maximum allowable harvest (MAH) for sustained yield management.

Methods

We established MAH for each year and each permit hunt. It was calculated as a percentage of goats observed during the most recent survey. The percentage applied ranged from 3–5%, depending on population trend, nanny harvest, and elapsed time since the last survey. Permit hunts were closed by emergency order if the weighted harvest (goat points) was reached or anticipated to reach MAH.

We monitored harvest through permit hunt reports that were required from all hunters. Hunters who failed to report were sent up to 2 reminder letters per department policy. In addition to standard ADF&G harvest parameters, we calculated a weighted total harvest by multiplying the number of females taken by 2, and lost goats or unknowns by 1.5 (unless the lost goat was identified by sex by a guide). Weighted harvest is also referred to as “goat points” taken per hunt area (Del Frate 1992).

Season and Bag Limit

The mountain goat season in Units 6A and 6B (RG202-RG220) was 20 August–31 January with no seasons closing by emergency order during RY13–RY17. Unit 6D (RG242-RG266) hunts opened 15 September (except RG248 which opened 1 October). Hunts in Unit 6C (RG230-RG232) opened 7 October and some closed early by emergency order (Table 2). All hunts that did not close early closed 31 January by regulation. The bag limit was 1 goat by registration permit only for all of Unit 6. The taking of nannies accompanied by kids was prohibited.

Table 2. Season length in number of days for hunt areas that were closed early in Unit 6 during regulatory years 2013–2017, Alaska.

Year	Hunt area									
	RG204	RG230	RG231	RG232	RG243	RG245	RG248	RG249	RG252	RG266
2013	164	57	0	45	41	138	1	6	23	6
2014	164	12	18	17	138	78	1	32	29	35
2015	164	3	1	91	138	32	1	21	21	138
2016	67	116	12	116	138	27	2	24	15	48
2017	164	116	116	13	138	138	6	35	25	138

Results and Discussion

Harvest by Hunters

Weighted mountain goat harvests (goat points) during RY13–RY17 for Units 6A and 6B were well below MAH except for RG204, which reached the MAH and closed early in RY16 (Tables 3 and 4). In Unit 6C, harvest met the MAH or fell just below it in all years of this reporting period (Table 5). In Unit 6D, weighted harvest was at or under the MAH in all areas except RG245, RG248, RG249, RG252, and RG266 during RY13–RY17 (Table 6). The likelihood of exceeding the MAH is greatly increased by nanny harvest and/or delayed reporting.

There were no females harvested in Unit 6B during RY13–RY17. One female was taken in 4 of the 5 years of this reporting period in Unit 6A (Table 3). In Unit 6C, the harvest of nannies exceeded 30% in all hunt areas for 2 years of this reporting period (Table 5). Under its discretionary permit authority, ADF&G requires that hunters participating in the RG230, RG231, RG232, and RG248 road-system based hunts complete an online hunter education program focusing on reducing the harvest of nannies. In Unit 6D, nanny harvest exceeded 30% in at least 1 of the years of the reporting period in hunts RG244, RG248, RG249, and RG266 (Table 6). The Unit 6 total harvest included 17–18% females overall, which was within the objective of 30% maximum females in the harvest.

In most years, virtually no goats (0–1) were deemed “unrecoverable goats” by their respective hunters. However, in RY16 seven goats were reported as unrecoverable. This dramatic increase is curious and concerning.

Table 3. Mountain goat harvest data by permit hunt, Unit 6A, Alaska, regulatory years 2013–2017.

Hunt area	Regulatory year	Permits issued	Did not hunt (%)	No. Hunters	Success (%)	No. male	Male (%) ^a	No. Female	Female (%) ^a	Unknown	Total goats	Total points ^b	MAH ^c
RG202	2013	3	(100)	0	–	0	–	0	–	0	0	0	4
	2014	5	(60)	2	(50)	1	(100)	0	(0)	0	1	1	4
	2015	6	(83)	1	(0)	0	–	0	–	0	0	0	4
	2016	8	(75)	2	(0)	0	–	0	–	0	0	0	4
	2017	14	(100)	0	–	0	–	0	–	0	0	0	9
RG204	2013	6	(67)	2	(100)	1	(50)	1	(50)	0	2	3	9
	2014	14	(71)	4	(75)	2	(67)	1	(33)	0	3	4	9
	2015	12	(67)	4	(100)	3	(75)	1	(25)	0	4	5	9
	2016	31	(61)	12	(75)	8	(100)	0	(0)	1	9	9.5	9
	2017	27	(56)	12	(58)	5	(83)	1	(17)	1	7	8.5	14
RG206	2013	6	(50)	3	(67)	2	(100)	0	(0)	0	2	2	10
	2014	7	(14)	6	(83)	5	(100)	0	(0)	0	5	5	10
	2015	12	(75)	3	(100)	3	(100)	0	(0)	0	3	3	10
	2016	22	(55)	10	(80)	7	(100)	0	(0)	1	8	8.5	10
	2017	24	(67)	8	(50)	4	(100)	0	(0)	0	4	4	10
RG212	2013	2	(100)	0	–	0	–	0	–	0	0	0	5
	2014	1	(100)	0	–	0	–	0	–	0	0	0	5
	2015	0	–	0	–	0	–	0	–	0	0	0	5
	2016	2	(100)	0	–	0	–	0	–	0	0	0	5
	2017	4	(100)	0	–	0	–	0	–	0	0	0	5

Note: En dash represents years with no harvest.

^a Percentages based on animals of known sex only.

^b Goat points are calculated with males counted as 1, females counted as 2 and unknowns counted as 1.5.

^c Maximum allowable harvest.

Table 4. Unit 6B mountain goat harvest data by permit hunt, RY13–RY17.

Hunt area	Year	Permits issued	Did not hunt (%)	Hunters	Success (%)	No. Male	Male (%)	No. female	Female (%)	Unknown	Total goats	Total points ^a	MAH ^b
RG220	2013	5	(100)	0	–	0	–	0	–	0	0	0	11
	2014	2	(100)	0	–	0	–	0	–	0	0	0	11
	2015	6	(100)	0	–	0	–	0	–	0	0	0	11
	2016	7	(57)	3	(100)	3	(100)	0	(0)	0	3	3	9
	2017	4	(100)	0	–	0	–	0	–	0	0	0	9
RG226	2013	11	(45)	6	(67)	4	(100)	0	(0)	0	4	4	6
	2014	13	(46)	7	(57)	4	(100)	0	(0)	0	4	4	5
	2015	9	(67)	3	(100)	3	(100)	0	(0)	0	3	3	5
	2016	19	(68)	6	(50)	3	(100)	0	(0)	0	3	3	5
	2017	16	(63)	6	(67)	4	(100)	0	(0)	0	4	4	7

Note: En dash represents years with no harvest

^a Goat points are calculated with males counted as 1, females counted as 2 and unknowns counted as 1.5.

^b Maximum allowable harvest.

Table 5. Unit 6C mountain goat harvest data by permit hunt, regulatory years 2013–2017.

Hunt area	Year	Permits issued	Did not hunt (%)	Hunters	Success (%)	No. Male	Male (%)	No. Female	Female (%)	Unknown	Total goats	Total points ^a	MAH
RG230	2013	30	(50)	15	(33)	5	(100)	0	(0)	0	5	5	5
	2014	25	(60)	10	(40)	3	(75)	1	(25)	0	4	5	5
	2015	25	(76)	6	(83)	5	(100)	0	(0)	0	5	5	5
	2016	23	(78)	5	(40)	1	(50)	1	(50)	0	2	3	6
	2017	41	(73)	11	(18)	1	(50)	1	(50)	0	2	3	6
RG231 ^b	2013	0	–	–	–	–	–	–	–	–	–	–	–
	2014	27	(67)	9	(56)	4	(80)	1	(20)	0	5	6	6
	2015	17	(59)	7	(57)	2	(50)	2	(50)	0	4	6	6
	2016	30	(80)	6	(67)	1	(25)	3	(75)	0	4	7	8
	2017	43	(53)	20	(30)	6	(100)	0	(0)	0	6	6	8
RG232	2013	18	(44)	10	(30)	2	(67)	1	(33)	0	3	4	2
	2014	30	(63)	11	(45)	4	(80)	1	(20)	0	5	6	7
	2015	28	(57)	12	(42)	3	(60)	2	(40)	0	5	7	7
	2016	41	(54)	19	(47)	9	(100)	0	(0)	0	9	9	10
	2017	33	(52)	16	(69)	10	(91)	1	(9)	0	11	12	12

^a Goat points are calculated with males counted as 1, females counted as 2, and unknowns counted as 1.5.

^b Season closed RY10–RY13 due to high nanny take and subsequent population decline.

Table 6. Unit 6D mountain goat harvest data by permit hunt, regulatory years 2013–2017.

Hunt area	Regulatory year	Permits issued	Did not hunt (%)	Hunters	Success (%)	No. Male	Male (%)	No. Female	Female (%)	Unknown	Total goats	Total points ^a	MAH ^b
RG242	2013	52	(65)	18	(50)	8	(89)	1	(11)	0	9	10	21
	2014	48	(69)	15	(47)	7	(100)	0	(0)	0	7	7	21
	2015	41	(56)	18	(56)	9	(90)	1	(10)	0	10	11	21
	2016	51	(69)	16	(63)	7	(100)	0	(0)	3	10	11.5	21
	2017	52	(77)	12	(50)	5	(83)	1	(17)	0	5	7	21
RG243	2013	10	(60)	4	(75)	3	(100)	0	(0)	0	3	3	3
	2014	7	(57)	3	(100)	3	(100)	0	(0)	0	3	3	3
	2015	17	(82)	3	(100)	3	(100)	0	(0)	0	3	3	10
	2016	24	(58)	10	(90)	8	(89)	1	(11)	0	9	10	10
	2017	22	(64)	8	(63)	5	(100)	0	(0)	0	5	5	10
RG244	2013	26	(65)	9	(33)	3	(100)	0	(0)	0	3	3	9
	2014	12	(75)	3	(67)	1	(50)	1	(50)	0	2	3	9
	2015	24	(79)	5	(60)	2	(67)	1	(33)	0	3	4	12
	2016	21	(71)	6	(67)	3	(75)	1	(25)	0	4	5	12
	2017	19	(79)	4	(100)	3	(75)	1	(25)	0	4	5	12
RG245	2013	39	(64)	14	(21)	1	(33)	2	(67)	0	3	5	7
	2014	24	(42)	14	(57)	7	(88)	1	(12)	0	8	9	7
	2015	35	(29)	13	(20)	5	(100)	0	(0)	0	5	5	7
	2016	27	(37)	11	(41)	6	(86)	1	(14)	0	7	8	5
	2017	41	(24)	8	(13)	3	(75)	1	(25)	0	4	5	8
RG248	2013	13	(8)	12	(25)	1	(33)	2	(67)	0	3	5	5
	2014	20	(10)	18	(44)	7	(88)	1	(12)	0	8	9	5
	2015 ^c	0	–	–	–	–	–	–	–	–	–	–	0
	2016	12	(17)	10	(40)	2	(67)	1	(33)	1	4	5.5	5
	2017	12	(17)	10	(30)	2	(67)	1	(33)	0	3	4	5

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Table 6. Page 2 of 2.

Hunt area	Regulatory year	Permits issued	Did not hunt (%)	Hunters	Success (%)	No. Male	Male (%)	No. Female	Female (%)	Unknown	Total goats	Total points ^a	MAH ^b
RG249	2013	26	(65)	9	(67)	4	(67)	2	(33)	0	6	8	9
	2014	34	(35)	22	(59)	11	(85)	2	(15)	0	13	15	15
	2015	44	(52)	21	(62)	11	(85)	2	(15)	0	13	15	15
	2016	44	(59)	18	(72)	11	(92)	1	(8)	1	13	14.5	15
	2017	49	(49)	25	(60)	13	(87)	2	(13)	0	15	17	15
RG252	2013	37	(32)	25	(68)	17	(100)	0	(0)	0	17	17	16
	2014	38	(34)	25	(60)	13	(87)	2	(13)	0	15	17	16
	2015	45	(31)	31	(65)	17	(85)	3	(15)	0	20	23	16
	2016	39	(46)	21	(67)	11	(79)	3	(21)	0	14	17	16
	2017	57	(46)	31	(65)	19	(95)	1	(5)	0	20	21	19
RG266	2013	24	(67)	8	(63)	3	(60)	2	(40)	0	5	7	6
	2014	46	(67)	15	(53)	6	(75)	2	(25)	0	8	10	10
	2015	53	(77)	12	(42)	5	(100)	0	(0)	0	5	5	10
	2016	54	(57)	23	(43)	9	(90)	1	(10)	0	10	11	10
	2017	45	(71)	13	(46)	6	(100)	0	(0)	0	6	6	10

^a Goat points are calculated with males counted as 1, females counted as 2 and unknowns counted as 1.5. ^b MAH are jointly managed between state and federal biologists. Federal MAH are as follows: RG242-2, RG243-4, RG244/RG245-2, RG249-4, RG252- 1, and RG266-4. ^c Hunt was not held in RY15 due to overharvest in RY14.

Permit Hunts

The number of registration permits issued during RY13–RY17 was similar to previous years (Tables 3–6). The largest number of permits issued were for hunts RG242, RG252, and RG266. Hunts RG242 and RG252 have relatively easy access and the largest MAH, which probably drives interest. RG266 does not have a large MAH and probably experiences a disproportionate amount of interest. RG248 was opened in RY13 after being closed for 3 years. RG231 was closed in RY13 because of high nanny harvest in the preceding years was open during RY14–RY17.

All hunt areas in Unit 6 except RG248 have an unlimited number of permits that can be issued. During RY14, MAH in RG248 was nearly doubled in the 1-day opening. The following year, no permits were issued. When the hunt resumed in RY16, we issued 12 permits in person for the 5-goat-point MAH hunt opportunity. This seems to have reduced the desperation to “just kill a goat” before the season closes. Surprisingly, nanny harvest is still a regular occurrence in this hunt.

Hunter Residency and Success

Participation is highest in Unit 6D with an annual average of 109 hunters during RY13–RY17. Participation in all of Unit 6 was comparable to years prior to this reporting period (Table 7). Differences in effort seem to be most influenced by fall weather.

Nonresidents primarily focused their efforts in Units 6A and 6D. Nonlocal resident hunters also predominantly focused their time in Unit 6D. The majority of local residents hunted in Unit 6C; however, in some years local residents hunted Unit 6D (Table 7).

Unitwide hunter success rates over the past 5 years have averaged about 55% (Table 7). Success rates are highest in Unit 6A and Unit 6B, probably due to the preponderance of guided hunters. Other units may be influenced by goat densities, a high proportion of first-time hunters, and the ease and affordability of “day trips.”

Table 7. Unit 6 mountain goat hunter residency and success, regulatory years RY13–RY17.

Unit	Year	Successful					Unsuccessful					Total hunters
		Local resident	Nonlocal resident	Nonresident	Total	(%)	Local resident	Nonlocal resident	Nonresident	Total	(%)	
6A	2013	0	0	4	4	(80)	0	0	1	1	(20)	5
	2014	0	4	5	9	(75)	0	1	2	3	(25)	12
	2015	0	0	7	7	(88)	0	1	0	1	(13)	8
	2016	0	1	16	17	(71)	0	0	7	7	(29)	24
	2017	0	0	11	11	(55)	0	2	7	9	(45)	20
6B	2013	1	1	1	3	(38)	3	0	2	5	(63)	8
	2014	0	0	4	4	(50)	1	1	2	4	(50)	8
	2015	0	0	2	2	(100)	0	0	0	0	(0)	2
	2016	0	1	5	6	(60)	0	2	2	4	(40)	10
	2017	1	0	3	4	(67)	0	0	2	2	(33)	6
6C	2013	5	3	0	8	(36)	6	8	0	14	(64)	22
	2014	8	5	1	14	(48)	12	3	0	15	(52)	29
	2015	7	6	1	14	(56)	7	3	1	11	(44)	25
	2016	11	4	0	15	(52)	12	2	0	14	(48)	29
	2017	14	3	2	19	(40)	22	6	0	28	(60)	47
6D	2013	5	15	30	50	(50)	15	27	8	50	(50)	100
	2014	12	20	32	64	(56)	16	19	16	51	(44)	115
	2015	3	21	36	60	(58)	7	17	20	44	(42)	104
	2016	10	19	42	71	(62)	14	22	8	44	(38)	115
	2017	5	21	37	63	(57)	9	26	13	48	(43)	111
Unit 6 total	2013	11	19	35	65	(48)	24	35	11	70	(52)	135
	2014	20	29	42	91	(55)	29	24	20	73	(45)	164
	2015	10	27	46	83	(60)	14	21	21	56	(40)	139
	2016	21	25	63	109	(61)	26	26	17	69	(39)	178
	2017	20	24	53	97	(53)	31	34	22	87	(47)	184

Harvest Chronology

Most goats are harvested in September and October (Table 8). However, Unit 6A has a significant number of hunters that take advantage of the season in August which is only available in Units 6A and 6B. Unit 6B has more participation in September. Harvest in Unit 6C takes place almost entirely in October. This is due to the season starting October 7, and the onset of fall weather. If hunting conditions are poor in the fall, MAH will likely not be reached, even though the season extends into winter.

Table 8. Unit 6 mountain goat harvest chronology percent by month, regulatory years 2013–2017.

Unit	Regulatory year	August	September	October	November	December	January	<i>n</i>
6A	2013	50	25	25	0	0	0	4
	2014	22	33	33	0	11	0	9
	2015	86	14	0	0	0	0	7
	2016	41	18	41	0	0	0	17
	2017	18	45	36	0	0	0	11
6B	2013	33	33	33	0	0	0	3
	2014	50	50	0	0	0	0	4
	2015	0	100	0	0	0	0	2
	2016	17	83	0	0	0	0	6
	2017	25	25	50	0	0	0	4
6C	2013	0	0	38	62	0	0	8
	2014	0	0	100	0	0	0	14
	2015	0	0	93	0	0	7	14
	2016	0	0	100	0	0	0	14
	2017	0	0	84	16	0	0	19
6D	2013	0	60	36	0	4	0	50
	2014	0	45	50	3	2	0	64
	2015	0	56	42	2	0	0	59
	2016	0	48	48	4	0	0	71
	2017	0	40	54	6	0	0	63
Unit 6 total	2013	5	49	35	8	3	0	65
	2014	4	37	54	2	2	0	91
	2015	7	44	46	1	0	1	82
	2016	7	39	51	3	0	0	10
	2017	3	32	58	7	0	0	97

Transport Methods

Airplanes were the most important means of hunter transport in Units 6A and Unit 6B (Table 9). In Unit 6C highway vehicles were the primary means of transportation; however, 3- or 4-wheelers and boats were also popular. In Unit 6D boats are the most commonly used means of transportation but airplanes are also used by many hunters. Unitwide, airplanes and boats are the most commonly used means of transportation.

Table 9. Unit 6 mountain goat harvest percent by transport method, regulatory years 2013–2017.

Unit	Regulatory year	Airplane		Boat		3- or 4-wheeler		Snowmachine		ORV		Highway vehicle		Unknown		Total
		<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>
6A	2013	3	(75)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	1	(25)	4
	2014	7	(78)	1	(11)	0	(0)	0	(0)	0	(0)	0	(0)	1	(11)	9
	2015	7	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	7
	2016	13	(76)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	4	(24)	17
	2017	9	(82)	1	(9)	1	(9)	0	(0)	0	(0)	0	(0)	0	(0)	11
6B	2013	2	(67)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	1	(33)	3
	2014	4	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	4
	2015	2	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	2
	2016	6	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	6
	2017	4	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	4
6C	2013	0	(0)	0	(0)	3	(38)	0	(0)	0	(0)	5	(63)	0	(0)	8
	2014	0	(0)	1	(7)	4	(29)	0	(0)	0	(0)	9	(64)	0	(0)	14
	2015	0	(0)	3	(21)	4	(29)	0	(0)	1	(7)	2	(14)	4	(29)	14
	2016	0	(0)	1	(7)	2	(13)	0	(0)	0	(0)	9	(60)	3	(20)	15
	2017	2	(11)	3	(16)	0	(0)	0	(0)	0	(0)	13	(68)	1	(5)	19
6D	2013	17	(34)	27	(54)	2	(4)	0	(0)	0	(0)	2	(4)	2	(4)	50
	2014	16	(25)	35	(55)	0	(0)	0	(0)	0	(0)	6	(9)	7	(11)	64
	2015	20	(33)	34	(57)	0	(0)	0	(0)	0	(0)	3	(5)	3	(5)	60
	2016	23	(32)	38	(54)	3	(4)	0	(0)	0	(0)	1	(1)	6	(8)	71
	2017	21	(33)	35	(56)	1	(2)	0	(0)	0	(0)	4	(6)	2	(3)	63
Unit 6 total	2013	22	(34)	27	(42)	5	(8)	0	(0)	0	(0)	7	(11)	4	(6)	65
	2014	27	(30)	37	(41)	4	(4)	0	(0)	0	(0)	15	(16)	8	(9)	91
	2015	29	(35)	37	(45)	4	(5)	0	(0)	1	(1)	5	(6)	7	(8)	83
	2016	42	(39)	39	(36)	5	(5)	0	(0)	0	(0)	10	(9)	13	(12)	109
	2017	36	(37)	39	(40)	2	(2)	0	(0)	0	(0)	17	(18)	3	(3)	97

Other Mortality

Predation studies on goats in Unit 6 have not been conducted. However, many local residents and long-time guides are concerned about the potential for wolf predation, particularly in lower lying areas such as the Don Miller Hills and Suckling Hills that have seen population declines. Predation by carnivores undoubtedly occurs, but the magnitude of it is currently unknown.

Alaska Board of Game Actions and Emergency Orders

In March 2015, the Board of Game adopted a regulation (5 AAC 85.040 (a)(2)) that made it illegal to hunt mountain goats in Unit 6 for 5 years after shooting a nanny.

For RY13–RY17 between 4 and 8 emergency orders were issued annually to close registration permit hunts when MAH was reached (Table 2). The shortest seasons were in RG248 and RG231, each of which had a season lasting 1 day. The longest seasons were in Units 6A and 6B, where no areas closed early (except RG204 in RY16 which closed for the first time since our current registration system was established).

Recommendations for Activity 2.1.

Continue to monitor harvest data and mortality data as possible.

3. Habitat Assessment-Enhancement

There were no habitat assessment or enhancement projects for mountain goats in Unit 6 during RY13–RY17.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

An increasing number of operators using helicopters to support backcountry skiing and other activities are utilizing areas of Unit 6. Studies in other areas suggest that goats are impacted by helicopters (Goldstein et al. 2005). Helicopter exposure effects may be exacerbated in winter when goats are in reduced body condition. While any given operation may be relatively low impact, the cumulative effects of these activities should be considered. As these businesses become more prevalent, the Alaska Department of Fish and Game should develop guidelines for minimizing impacts. This may include limiting commercial use of helicopters or access in critical wintering areas or developing travel corridors that focus use on areas not utilized by goats.

Federal records have not been updated in ADF&G's Wildlife Information Network (WinfoNet) system since 2010. Records in WinfoNet from 2001–2010 contain errors and omissions. Federal harvest data is currently inadequately handled and could lead to overharvest in areas with shared quotas.

Data Recording and Archiving

- Harvest data are stored in WinfoNet, an internal database housed on a state server (<http://winfonet.alaska.gov/index.cfm>).
- Survey data from data sheets are entered, scanned, and stored on the Cordova ADF&G server (O:\DWC\Goat).
- Original datasheets are stored in file folders located in the Cordova area biologist's office.
- Historical survey notes and data sheets are being digitized and scanned for permanent storage on the file server.

Agreements

Alaska Department of Fish and Game and USFS Chugach National Forest have a cooperative agreement that allows for financial support and the sharing of harvest data.

Permitting

None.

Conclusions and Management Recommendations

Previously management reports stated that areas were to be surveyed on a 2- to 3-year rotation (Crowley 2004). However, the average length of time between surveys is 10 years. While survey schedules can be severely limited by difficult weather, distance to survey areas, and pilot availability, more frequent collection of population data is necessary for setting appropriate harvest levels. Since 2013, all survey areas have been flown at least once except one. Some areas have been flown for the first time in over 20 years.

We achieved our objective to maintain a minimum population size of 2,400 goats. The estimated number of goats at the end of RY17 was between 3,500 and 4,000 goats. The population has probably been high and stable during RY13–RY17, suggesting that weighted harvest rates have been appropriate. While overall the objective to achieve 70% or more males in the harvest was met, some areas routinely experience high nanny take that results in large reductions in MAH (e.g., RG230, RG231, RG248, and RG266). The mandatory education requirement may have helped inform hunters about the importance of selecting billies. The 5-year average nanny take (20%, RY13–RY17) in Unit 6C where education is required was lower than the previous 10-year average (31%, RY03–RY12). More data is needed to evaluate the impact of this program as well as the regulation preventing hunting in Unit 6 for 5 years following nanny harvest.

II. Project Review and RY18–RY22 Plan

Review of Management Direction

MANAGEMENT DIRECTION

A formal plan for goat management in Unit 6 has not been developed. Goat hunts are administered using a 3–5% harvest rate and using a “goat points” system with billies counting as 1 point and nannies counting as 2 points.

GOALS

Manage goat populations to provide for sustained annual use by hunters and wildlife viewers.

CODIFIED OBJECTIVES

Amounts Reasonably Necessary for Subsistence Uses

Goats in Unit 6 have a positive customary and traditional use finding by the Board of Game. The amount necessary for subsistence is set at 15–26 goats.

Intensive Management

Goats in Unit 6 have a negative intensive management finding.

MANAGEMENT OBJECTIVES

- Conduct aerial surveys of high priority areas at least every 3 years.
- Maintain a minimum population in Unit 6 of at least 2,400 goats.
- Use educational materials to achieve >70% males in the harvest.

REVIEW OF MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1. Conduct aerial minimum count surveys during peak snow melt. Survey areas are selected with consideration of the length of time since the last survey, past survey quality, hunt pressure, and population trend. Classify young of the year (kids) during aerial minimum count surveys.

Data Needs

No change from RY13–RY17.

Methods

No change from RY13–RY17.

2. Mortality-Harvest Monitoring

ACTIVITY 2.1. Monitor mortality and harvest in Unit 6 annually.

Data Needs

No change from RY13–RY17.

Methods

No change from RY13–RY17.

3. Habitat Assessment-Enhancement

No activities are planned.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

Data sharing issues between federal and state agencies must be resolved at higher levels. Federal records have not been updated in the WinfoNet system since 2010. Records that exist in the system contain errors and omissions. Currently, we have access to these records using the informal sharing of an excel spreadsheet between the USFS subsistence biologist and ADF&G. These data should be stored in a way that protects records from erroneous modification, while documenting changes, and is password protected. Additionally, the current form of data sharing is dependent on positive relationships among parties and is not a viable long-term solution. Entering these data into a secure database would ensure that all parties can access secure information and that hunt records are collected consistently and accurately.

Data Recording and Archiving

- Harvest data are stored on WinfoNet, an internal database housed on a server (<http://winfonet.alaska.gov/index.cfm>).
- Survey data and data sheets are entered, scanned, and stored on the Cordova ADF&G server (O:\DWC\Goat).
- Original datasheets are stored in file folders located in the Cordova area biologist's office.
- Historical survey notes and data sheets are digitized and scanned for permanent storage on the file server.

Agreements

Alaska Department of Fish and Game and USFS Chugach National Forest have a cooperative agreement that allows for financial support and the sharing of harvest data.

Permitting

None.

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