
CHAPTER 12: BROWN BEAR MANAGEMENT REPORT

From: 1 July 2012

To: 30 June 2014

GAME MANAGEMENT UNIT: 13 (23,367 mi²)

GEOGRAPHIC DESCRIPTION: Nelchina Basin

BACKGROUND

The brown bear harvest in Unit 13 has increased substantially since the early 1960s when the average annual take was only 39 bears. The average annual harvest steadily increased through the mid-1990s as bear hunting gained popularity and seasons and bag limits were slowly liberalized. While the long-term trend has been increasing, the annual harvest has stabilized since the mid-1990s, ranging from 117 to 166 bears. Liberalization of brown bear hunting regulations started in 1980 with the initiation of a spring season. The bag limit was increased to 1 bear a year between 1983 and 1988, and again starting in 1995. In 2003, with the exception of Denali State Park, the Unit 13 brown bear hunting season was extended to year-round. Brown bear harvests have been the highest in those years when the bag limit has been 1 bear/year and the resident tag fee waived.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVE

- Maintain a minimum unitwide population of 350 brown bears.

METHODS

Department representatives sealed skulls and hides of harvested bears. Skulls were measured, sex was determined, a premolar tooth was extracted for aging, and hair-hide samples were collected by staff for genetic studies. Sealing agents collected information on date, location of harvest, and time spent afield by successful hunters. A study to evaluate brown bear population trends and indices in the expanded Nelchina study area in western Subunit 13A was initiated in 2006; 137 bears were captured and data are currently being analyzed. In 2011, a capture-mark-recapture (CMR) survey was completed to estimate the size of the bear population in the western half of Subunit 13A and the data are currently being reviewed.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Estimated brown bear densities in Subunits 13A and 13E are among the highest estimates for brown bears in Interior and northern Alaska (Testa et al. 1998).

POPULATION SIZE

The brown bear management strategy adopted by the Board of Game since the mid-1990s has included liberalized seasons and bag limits for the purpose of reducing the brown bear population, and in turn, increasing moose calf survival. This management approach has been attempted in other areas of the state, with the eventual goal of increasing the harvestable surplus of moose. In an attempt to measure regulation effectiveness, biologists have actively evaluated brown bear population demographic data, as well as initiated new research to evaluate any changes in the brown bear population and in the predator-prey dynamic.

While several population estimates have been calculated for brown bears in Unit 13 in the past 30 years, each has relied heavily on anecdotal information and/or extrapolation. During the late 1970s an estimate of 1,500 brown bears was calculated based solely on field observations, hunter reports, and harvests. Past CMR brown bear density estimates are available for 2 study areas in Subunit 13E and a study area in western Subunit 13A. Line transect surveys were also used in the past to derive density estimates for all of Subunit 13E, and both Subunits 13A and 13B together. Estimates are described in terms of all bears, or independent bears (bears ≥ 2 years of age).

On the upper Susitna River (Subunit 13E), the 1987 CMR estimate of 6.46 independent bears/1,000 km² was down from the 1979 removal-based estimate of 10.5 independent bears/1,000 km² (Ballard et al. 1982, Miller 1988). For the original Susitna Hydroelectric (Su-Hydro) Study Area which is on the border between Subunits 13A and 13E, CMR density estimates in 1985 and 1995 were 18.8 and 23.3 independent bears/1,000 km² (27.1 and 40.8 for all bears), respectively (Miller 1995). Unfortunately, while similar census techniques were used, the latter survey was stopped prematurely after only 5 days to conserve funds. While the results at the time were not significantly different from the 1985 survey, it was reported that confidence intervals were becoming smaller each day, and given an additional 2 days, the difference could have been significant (Miller 1995). Extrapolations from density estimates in the Upper Susitna River and Su-Hydro areas from 1979, 1985, and 1987 yielded a recalculated Unit 13 population estimate of 1,228 bears (Miller 1990). Following the 1995 Su-Hydro CMR survey, the unitwide estimate was again revised to 1,456 bears (Miller 1997).

In 1998, Testa et al. reported a CMR density estimate for the Nelchina study area in western Subunit 13A of 21.3 independent bears/1,000 km² (27.5 all bears/1,000 km²). This area continues to be highly accessible to hunters and of high interest to managers.

In springs 2001, 2002, and 2003, line-transect surveys were conducted in Subunit 13E, resulting in a preliminary estimate of 32.3 independent bears/1,000km². The same line transect methodology was used in Subunits 13A and 13B in 2003 and 2004, with 16.3 independent bears/1,000 km² being estimated initially. In May 2011, a CMR survey was conducted in western Subunit 13A. Initial survey results indicated a density of 16.3 independent bears/1,000 km². An estimate for all bears has not yet been calculated. Data are still being analyzed for significance.

POPULATION COMPOSITION

Miller (1993) reported that between 1980 and 1988, on average, reproductive brown bear sows from the Su-Hydro study area were accompanied by 2.1 cubs of the year, 1.9 yearlings, or 1.8 2-year-olds. The estimated reproductive interval was 4.1 years, and the observed age at first

reproduction was 5.6 years (range = 4–9). In 1998, Testa et al. reported average litter sizes in the Nelchina study area in western Subunit 13A of 2.3 cubs of the year and 1.8 yearlings. Preliminary composition data from the same area between 2006 and 2011 indicate average litter sizes of 2.2 cubs of the year ($n = 55$), 2.1 yearlings ($n = 41$), and 2.0 2-year-olds ($n = 39$). Data are still being analyzed for significance.

Miller (1997) reported the sex ratios of brown bears in the Su-Hydro study area during 2 different periods 10 years apart for bears ≥ 2 years of age. He found 82.4 males:100 females in 1985 ($n = 31$), compared to only 27.8 males:100 females in 1995 ($n = 23$). Miller concluded that heavy hunting pressure was responsible for the decline in the male ratio, even though this area is difficult for hunters to access.

Testa et al. (1998) reported 48.4 males:100 females in the Nelchina study area in western Subunit 13A ($n = 46$) during the 1998 CMR. This study area is just south of the Su-Hydro area and it is highly accessible to hunters.

Capture data from the same Nelchina study area between 2006 and 2008 indicated only 31.6 males:100 females ($n = 75$), initially suggesting a decline from 1998. However, capture data collected between 2009 and 2011 indicated 114 males:100 females ($n = 62$). Of the bears captured between 2009 and 2011, 32 were 2 years of age, and of those, 66% were male. When all capture data from 2006 to 2011 were combined, the ratio was 59 males:100 females ($n = 137$).

Low male ratios are often thought to be caused by high harvest pressure, and the protection reproductive sows have under general brown bear hunting regulations. While this is a logical assumption, recent observations suggest there may be tremendous variability in this parameter between years. Considering harvest pressure remains very high in this area, we may want to consider the possibility that brown bear populations have an inherent ability to respond if the male ratio drops too low. In this case, the population could be compensating by producing more males than females.

MORTALITY

Harvest

Since 2002, there has been no closed season in Unit 13, except for that portion of Subunit 13E within Denali State Park where the season remains 10 August–15 June. The resident \$25 tag fee requirement has been waived annually since 1995 by the Alaska Board of Game in Unit 13, except for that portion of Subunit 13E within Denali State Park. The current bag limit is 1 bear every regulatory year for the entire unit.

Alaska Board of Game Actions and Emergency Orders. The Board of Game designated Unit 13 an intensive management area as directed under Senate Bill 77 during the 1995 meeting. Board findings (during intensive management discussions) were that brown bears were important predators of moose calves, that brown bears were abundant in Unit 13, and that numbers should be reduced to increase moose calf survival. No emergency orders were issued during this reporting period. However, the Board of Game did adopt 2 brown bear hunting proposals, one allowing for the spring harvest of brown bears over black bear baits in Subunit 13D and the other to waive resident tag fees for hunting in Denali State Park. Both of these changes will take effect

in regulatory year (RY) 2013 (regulatory year begins 1 July and ends 30 June, e.g., RY13 = 1 July 2013–30 June 2014).

Harvest by Hunters. During RY12 and RY13, 129 and 158 brown bears were harvested by hunters (Table 1). Since regulations were liberalized in 1995, a total of 2,601 bears have been taken in Unit 13. Harvest since 2008 has averaged 139 bears a year with no trend evident. During this reporting period, the documented average annual brown bear harvest by subunit was 26 in Subunit 13A, 21 in Subunit 13B, 10 in Subunit 13C, 39 in Subunit 13D, and 47 in Subunit 13E. More bears have been reported harvested from Subunit 13E over the years than any other subunit. Across this reporting period, Subunit 13E accounted for 37% and 30% of the total brown bear harvest during RY12 and RY13, respectively.

During RY12, 78 male and 50 female brown bears were harvested in Unit 13 comprising 60% and 40% of the total harvest (Table 1). The RY13 brown bear harvest was composed of 98 males (62% of the harvest) and 60 females (38% of the harvest). The mean skull size for males and females during this reporting period was 21 and 17.8 inches, respectively. The mean ages for male bears taken in RY12 and RY13 were 6.5 and 5.8 years. The mean ages for female bears harvested in RY12 and RY13 were 6.4 and 6.9 years, respectively.

Interpretation of skull size, age, and sex ratios in harvest data is difficult (Miller 1993). Kontio et al. (1998) suggested that even assuming a 50:50 sex ratio at birth, immigration from lighter or unhunted areas could effectively keep subadult harvest biased towards males through age 5.

In most years, the mean age of males taken in the fall was lower than males taken in the spring. Considering older males are the first to emerge from dens, they are more often taken during spring, and hunters can select for older bears by hunting early in April. Males killed in the fall incidentally by hunters pursuing other big game species tend to be younger. Alternately, females taken during the fall tend to be older, larger bears compared to females taken in the spring. While most 2-year-old brown bear cubs in this area are still accompanied by the sow during the spring season, most are on their own by the fall season. While brown bears are legal to harvest as 2-year-olds, hunters tend to avoid sow-cub groups.

The high reported harvest since 1995 exceed predicted sustainable harvest guidelines for brown bears in Unit 13. Miller (1988, 1993) calculated sustainable harvest rates of 5.7% for all bears or 8% for bears ≥ 2.0 years of age. These rates would give a maximum unitwide sustainable harvest of only 83 given a population of 1,450 bears. The current average yearly take (for all bears) during this reporting period represents an estimated harvest rate of 11%. This harvest rate exceeds all modeled sustainable rates for Alaska grizzlies or brown bears, yet Unit 13 harvests have been relatively stable for the past 17 years.

Hunter Residency and Success. Successful hunter residency data are presented in Table 2. Nonresident hunters took 31 bears in RY12 (24% of the total harvest) and 32 bears in RY13 (20% of the total harvest). An average of 35 (range = 21–48) brown bears have been harvested by nonresidents over the last 30 years. Local residents harvested 20 bears in RY12 (15% of the total harvest) and 28 bears in RY13 (18% of the total harvest). In contrast, nonlocal Alaskan residents harvested 78 bears in RY12 (61% of the total harvest) and 98 bears in RY13 (62% of

the total harvest). The nonlocal Alaska resident harvest did increase appreciably in those years when hunting regulations were liberalized.

Successful Unit 13 brown bear hunters averaged 43.8 days per bear harvested in RY12 and 4.7 days per bear harvested in RY13. Since 2007, hunters in Unit 13 have averaged 4.3 days per bear. Successful nonresidents during this reporting period averaged 4.2 days per bear harvested.

Harvest Chronology. During this reporting period 55% of the total harvest occurred during the fall (Table 3). The fall season continues to be the most important timeframe for bear hunters in Unit 13. Spring harvests have fluctuated between years but no trend is evident. Deep persistent snow cover can result in increased April harvests, while a particularly late breakup could interfere with off-road vehicle access and limit harvests until later in May.

Transport Methods. The most important method of transportation for brown bear hunters in Unit 13 continues to be all-terrain vehicles (Table 4). Unit 13 has numerous extensive trail systems that are ideally suited to 4-wheeler transportation during the fall hunting season. The importance of all-terrain vehicles as a transportation method for all hunting in Unit 13 has steadily increased. Aircraft and highway vehicles are still consistently used, while snowmachine use is highly variable and dependent on snow conditions during the spring season.

Other Mortality

During the period of this report 4 bears were killed in defense of life or property (DLP) in Unit 13. Since the year-round season was adopted in 2003, most problem bears have been harvested under general hunting regulations and the hunter has been able to keep the bear. The reported DLP harvest has always been considered a minimum estimate because some bears are shot and not reported, especially at remote cabins, home sites, and mining claims. The state requirement to salvage and surrender the hides of DLP bears often deters individuals from reporting kills.

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

Intolerance of brown bears in proximity to people and dwellings has become more of a problem in Unit 13 as development has increased. Because of the increase in the human population in the unit, bear-human encounters have become more numerous. A year-round season provides the public opportunity to harvest problem bears during previously closed summer months. Even with increased hunting opportunity in recent years, the Glennallen office continues to receive complaints of problem bears and requests to tranquilize and relocate bears. In dealing with bear-human conflicts at remote sites, we continue to recommend the department maintain its policy of not relocating problem bears and rely on public outreach and education to prevent habituation of bears to human food as a preventive measure.

CONCLUSIONS AND RECOMMENDATIONS

Because of their relatively low density and secretive behavior, observing and counting brown bears is both difficult and expensive. Brown bears in Unit 13 do not generally congregate on salmon streams and are wary of motorized vehicles. Because of this, population data are available for only limited portions of Unit 13. All the unitwide bear estimates are based on

extrapolations of estimated densities. The problems with this are obvious, particularly given the differences in study areas and survey techniques.

The most recent brown bear research in Unit 13 has been focused on monitoring the population composition and trend in the Nelchina study area in western Subunit 13A, the project began in May 2006. The CMR survey conducted in May 2011 and capture data through 2011 suggest brown bears are still abundant, and that the population may be more resilient than previously thought.

Thus far, no long-term discernable decline in bear numbers has been detected in Unit 13, yet the brown bear harvest regulations in this area have been quite liberal for many years. Hunters can take any brown bear 2 years of age and up year-round, and the bag limit is 1 bear/year.

Research since 2005 has documented continued high neonatal moose calf mortality from bears in the Nelchina study area in western Subunit 13A. During 2003, 2005, and 2008, annual moose calf mortality in Subunit 13A ranged 65–70%, and exceeded 80% in 2004 and 2006 (Lou Bender, ADF&G, Alaska, personal communication). However, despite high documented moose calf mortality, the options are limited for further increasing the take of brown bears in this area. One potential option to further increase hunting effort in Unit 13 would be to change the guide requirement to allow nonresidents to hunt brown bears in Unit 13 without a guide. Although the majority of Unit 13 brown bears are similar to Interior grizzlies in size, they are classified as brown bears by Boone & Crocket. An attempt to reclassify these bears in Boone & Crocket as grizzlies was unsuccessful. Opening Unit 13 to nonresidents, with no guide requirement, would be the only way to create a new pool of hunters looking for an inexpensive opportunity to take a legal brown bear, and subsequently increase the harvest.

While moose numbers were low in Unit 13 during the late 1990s, and focus was on increasing calf survival, the population has since improved. From 2001 to 2009 the moose observed during annual trend counts in Unit 13 increased by 46% (Tobey and Schwanke 2010). The number of moose counted increased an average of 6% each year. While bear harvests were high during this period, fall calf ratios remained stable, averaging 20 calves per 100 cows across the unit. If the changes in bear harvest regulations were having an effect, we would expect the calf ratios to be significantly higher. The rise in the number of moose observed was attributed to good productivity, mild winters, and lower wolf predation due to predator management.

Whether continued harvests at the current level can reduce bear numbers is unknown, let alone result in a reduction substantial enough to appreciably reduce predation on moose calves. Estimates of changes in productivity, cub survival, and immigration following high harvests are being researched in the Subunit 13A study. Current regulations that protect the reproductive portion of the population (females with cubs of the year or yearlings) may protect enough females to maintain recruitment, and eliminate the possibility of, or at least delay a population reduction.

We recommend maintaining the current season, bag limit, and resident tag fee waiver. The most we can conclude to date is that while providing substantial hunting opportunity and an increased harvest, the population within the Subunit 13A West study area has yet to decline dramatically as

originally predicted. A slow decline in the population may be occurring, though due to the difficulty in enumerating bears, any change detected may be insignificant.

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Table 1. Unit 13 brown bear harvest, Southcentral Alaska, regulatory years^a 2008–2013.

Regulatory year	Hunter kill						Nonhunting kill ^b			Total kill			
	M	(%)	F	(%)	Unk	Total	M	F	Unk	M	F	Unk	Total
<i>2008</i>													
Fall 2008	47	(42)	65	(58)	0	112	0	3	0	47	68	0	115
Spring 2009	32	(74)	11	(26)	0	43	0	0	0	32	11	0	43
Total	79	(51)	76	(49)	0	155	0	3	0	79	79	0	158
<i>2009</i>													
Fall 2009	62	(60)	42	(40)	0	104	3	3	0	65	45	0	110
Spring 2010	17	(59)	12	(41)	1	30	1	1	0	18	13	1	32
Total	79	(59)	54	(41)	1	134	4	4	0	83	58	1	142
<i>2010</i>													
Fall 2010	66	(63)	38	(37)	0	104	0	0	0	66	38	0	104
Spring 2011	21	(62)	13	(38)	0	34	0	0	0	21	13	0	34
Total	87	(63)	51	(37)	0	138	0	0	0	87	51	0	138
<i>2011</i>													
Fall 2011	43	(55)	35	(45)	1	79	0	0	0	43	35	1	79
Spring 2012	29	(71)	12	(29)	0	41	0	0	0	29	12	0	41
Total	72	(61)	47	(39)	1	120	0	0	0	72	47	1	120
<i>2012</i>													
Fall 2012	51	(58)	37	(42)	1	89	0	0	2	51	37	3	91
Spring 2013	27	(68)	13	(32)	0	40	0	0	0	27	13	0	40
Total	78	(60)	50	(40)	1	129	0	0	2	78	50	3	131
<i>2013</i>													
Fall 2013	58	(57)	44	(43)	0	102	1	0	0	58	44	1	103
Spring 2014	40	(68)	16	(32)	0	56	1	0	0	40	16	1	57
Total	98	(62)	60	(38)	0	158	2	0	0	98	60	2	160

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

^b Includes defense of life or property kills, research mortalities, and other known human-caused accidental mortality.

Table 2. Unit 13 brown bear successful hunter residency, Southcentral Alaska, regulatory years^a 2008–2013.

Regulatory year	Local ^b resident	(%)	Nonlocal resident	(%)	Nonresident	(%)	Successful hunters ^c
2008	12	(8)	95	(61)	48	(31)	155
2009	19	(14)	81	(61)	34	(25)	134
2010	8	(6)	84	(61)	46	(33)	138
2011	16	(13)	73	(61)	31	(26)	120
2012	20	(15)	78	(60)	31	(25)	129
2013	28	(18)	98	(62)	32	(20)	158

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

^b Local resident means resident of Unit 13.

^c Includes unknown residency.

Table 3. Unit 13 brown bear harvest chronology percent by month, Southcentral Alaska, regulatory years^a 2008–2013.

Regulatory year	Harvest chronology percent by month																		
	Jul		Aug		Sep		Oct		Nov		Mar		Apr		May		Jun		<i>n</i>
	%	(<i>n</i>)	%	(<i>n</i>)	%	(<i>n</i>)	%	(<i>n</i>)	%	(<i>n</i>)	%	(<i>n</i>)	%	(<i>n</i>)	%	(<i>n</i>)	%	(<i>n</i>)	
2008	10	(15)	19	(30)	36	(56)	7	(11)	0	(0)	0	(0)	7	(11)	10	(16)	10	(16)	
2009	10	(13)	16	(21)	46	(61)	7	(9)	0	(0)	0	(0)	4	(5)	13	(18)	5	(7)	134
2010	7	(10)	27	(37)	35	(48)	7	(9)	0	(0)	0	(0)	6	(8)	12	(16)	7	(10)	138
2011	8	(10)	21	(25)	31	(37)	6	(7)	0	(0)	0	(0)	10	(12)	12	(14)	13	(15)	120
2012	2	(3)	26	(34)	36	(47)	4	(5)	0	(0)	0	(0)	4	(4)	17	(22)	11	(14)	129
2013	2	(3)	23	(34)	33	(47)	3	(5)	0	(0)	0	(0)	8	(12)	15	(21)	16	(23)	145

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

Table 4. Unit 13 brown bear harvest percent by transport method, Southcentral Alaska, regulatory years^a 2008–2013.

Regulatory year	Harvest percent by transport method								<i>n</i> ^d
	Airplane	Horse	Boat	ATV ^b	Snowmachine	ORV ^c	Highway vehicle	Walking	
2008	22	0	14	29	5	5	14	10	154
2009	21	0	12	34	7	2	17	8	134
2010	19	1	17	32	7	5	10	8	138
2011	20	1	14	29	13	4	11	8	120
2012	16	0	7	33	13	6	15	10	129
2013	14	1	12	38	7	3	15	10	158

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

^b ATV = all-terrain vehicle.

^c ORV = off-road vehicle.

^d Includes only reported method of transportation.